



**ARCHITECTURE AND THE BUILT ENVIRONMENT**  
**RESEARCH PORTFOLIO 2010 - 2015**

*TU Delft Faculty of Architecture and the Built Environment*



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# Foreword

This publication provides an overview of TU Delft's most significant research achievements in the field of architecture and the built environment during the years 2010–2012. It was produced in preparation for the midterm research assessment exercise that took place in November 2013.

The system of research assessments in the Netherlands requires that an institute conducts what is known as a self-analysis, using a detailed format that is stipulated by a standard evaluation protocol or SEP. As always we in Delft try to break away as much as possible from the traditional quantitative presentation of research performance, to show more of our qualitative achievements that are relevant to society and to combine these with traditional output indicators.

This publication is the first presentation of the joint research portfolio of the Faculty of Architecture and OTB Research Institute since their integration into the Faculty of Architecture and the Built Environment.

As such the portfolio holds a strong promise for the future. In a time when the economy seems to be finally picking up and in which such societal issues as energy, climate and ageing are more prominent than ever before, there are plenty of fields for us to explore in the next three years.

**Frank van der Hoeven PhD**

*Director of Research, Faculty of Architecture and the Built Environment  
Delft University of Technology*

**Prof. Karin Laglas**

*Dean, Faculty of Architecture and the Built Environment  
Delft University of Technology*





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# Architecture and the Built Environment

DEAN: Prof. Karin Laglas

DIRECTOR OF RESEARCH: Frank van der Hoeven PhD

# 1

## Scope

### 1.1 Scientific aims

The vision of the Architecture and the Built Environment Research Portfolio is to consolidate the excellent international academic reputation of the Faculty of Architecture and the Built Environment as a leading design academy; to be an international platform for innovation in architectural design, architectural engineering, urban planning, landscape architecture, management in the built environment, housing, urban studies and geoinformation; and to be a platform for debate on current societal themes in the fields of architecture and the built environment.

The Faculty's mission is to educate leading international Master's and PhD students in architecture, urbanism and building sciences and in geomatics; to perform excellent and innovative research, engineering and design; to integrate this knowledge into its Bachelor's and Master's degree programmes and beyond through journal articles and book publications, exhibitions and events, and through consulting.

#### ***Societal concerns and issues***

The principle societal concerns addressed in the Faculty's research are 'design excellence', 'quality of life in buildings, cities and regions', and 'innovation in the creative industry'. These concerns are related to various issues such as aesthetics, energy efficiency, land-use efficiency and value creation, which affect the lifestyles of individuals and the social, economic and territorial cohesion of communities.

#### ***Research area***

The specific characteristics of the Faculty's research encompasses a broad typology of research activities situated on an imaginary axis ranging from intuitive design on the 'art' side to optimising scientific research on the 'science' side.

The Faculty of Architecture and the Built Environment comprises nine research groups:

- Architectural Project and its Foundations
- Design & History
- Computation & Performance
- Green Building Innovation
- Urbanism
- Innovations in the Management of the Built Environment
- Housing
- Urban & Regional Studies
- Geoinformation Governance & Technology

## 1.2 Where do we stand?

TU Delft's Faculty of Architecture and the Built Environment (Faculteit Bouwkunde) focuses on design, engineering, planning and management related to architecture and the built environment. With approximately 3,000 BSc/MSc students, 200 PhD students and around 325 FTE in academic staff, the Faculty is one of the largest in its field in Europe. Just under 300 first-year students enrol in its BSc programme annually, over 50% of whom are female.

The Faculty as we know it today first emerged in 1904 when the Architecture Department, originally part of the Civil Engineering Department of the Technische Hogeschool Delft (TH-Delft), first began to offer an Architecture degree programme. The Architecture degree programme was enhanced by the new Urban Development degree programme in 1948 and by the Public Housing programme in 1972.

In 1986, Technische Hogescholen (Technical Colleges) in the Netherlands became Technische Universiteiten (Universities of Technology), of which there are now three: Delft, Eindhoven and Twente. At that point in time, the Architecture Department became the Faculty of Architecture, and in 1987 the Real Estate and Project Management programme was added to the three existing degree programmes, followed in 1989 by the Building Technology degree programme.

On 13 May 2008, the Faculty of Architecture building at TU Delft was reduced to ashes in a devastating fire, and the Faculty was forced to move to what had been TU Delft's main building, located at Julianalaan 134 in Delft, which became known as BK City.

In 2012 the Faculty was enlarged by the integration of the OTB Research Institute for the Built Environment and the Berlage Institute. OTB's research covers the areas of housing studies, urban studies, transport studies and

geoinformation studies. Its research activities relate to the built environment and draw from aspects of the technological sciences, policy and management sciences, behavioural sciences, spatial disciplines and information and communications technology. The English name of the Faculty was changed to the Faculty of Architecture and the Built Environment, incorporating OTB.

The Berlage Institute was transformed into the Berlage Center for Advanced Studies in Architecture and Urban Design, and since 2012 has been housed in BK City. The Berlage offers an advanced Master's programme but no longer conducts PhD research.

## 1.3 Where do we want to be next?

The Faculty's objective is to play a key role in the creative industry and building sectors in the Netherlands, as well as develop a strong international presence by exploiting the reputation of Dutch architecture and spatial planning and the significance of the Randstad as a leading European region.

### ***Tenured and non-tenured staff***

Tenured staff (assistant professors, associate professors and professors) spend an average of 35% of their time on research, while non-tenured staff (researchers) spend 70% and PhD students 80% of their time on research. These percentages are incorporated into the FTE tables.

Much of the difference between the FTE numbers and staff numbers can be explained by these percentages. However, the difference is also due to a substantial number of part-time staff, many of whom are non-tenured.

# 2 Composition

**Table a. Research staff Faculty of Architecture and the Built Environment**

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	175	125,6	173	122,2	164	117,8
Non-tenured staff	126	72,76	106	63,2	105	59,8
PhD students	154	97,1	183	117,3	198	124,4
Guests	131	0	128	0	124	0
<b>TOTAL RESEARCH STAFF</b>	<b>586</b>	<b>295.3</b>	<b>590</b>	<b>302.7</b>	<b>591</b>	<b>302.0</b>

**Table b. Research staff Architectural Project and its Foundations**

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	34	24,9	33	24,8	34	24,7
Non-tenured staff	15	7,15	13	6,9	15	7,15
PhD students	25	13,00	30	14	34	16
Guests	18	5,0	23	10,0	26	12
<b>TOTAL RESEARCH STAFF</b>	<b>92</b>	<b>50.1</b>	<b>99</b>	<b>55.7</b>	<b>109</b>	<b>59.9</b>

**Table c. Research staff Design & History**

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	14	9,80	16	11,0	15	10,40
Non-tenured staff	8	5,20	8	5,40	6	3,80
PhD students	14	3	14	3	15	4
Guests	31	0	26	0	20	0
<b>TOTAL RESEARCH STAFF</b>	<b>67</b>	<b>18</b>	<b>64</b>	<b>19.4</b>	<b>56</b>	<b>18.2</b>

**Table d. Research staff Green Building Innovation**

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	17	10,70	16	10,3	17	11,8
Non-tenured staff	12	7,43	10	6,9	6	3,8
PhD students	28	24	31	28	32	29
Guests	13	0	12	0	11	0
<b>TOTAL RESEARCH STAFF</b>	<b>70</b>	<b>45.7</b>	<b>69</b>	<b>47</b>	<b>66</b>	<b>45.2</b>

**Table e. Research staff Computation & Performance**

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	18	14,45	15	10,1	14	9,3
Non-tenured staff	6	3,6	3	2,8	3	2,8
PhD students	17	11	22	17	21	17
Guests	4	0	7	0	8	0
<b>TOTAL RESEARCH STAFF</b>	<b>45</b>	<b>30.8</b>	<b>47</b>	<b>31.6</b>	<b>46</b>	<b>31</b>

## Tenured and non-tenured staff

Tenured staff (assistant professors, associate professors and professors) spend an average of 35% of their time on research, non-tenured staff (researchers) spend 70% of their time on research, PhD students spend 80%.

These percentages are incorporated into the Full Time Equivalent (FTE) figures left and right.

Much of the difference between the FTE numbers and staff numbers can be explained by these percentages.

However, the difference is also caused by a substantial number of part-time staff members, as is the case with many of the non-tenured staff.

Guests' is something of an eclectic grouping. It includes people who make use of the faculty's facilities (such as the library or the model shop). It also includes visiting professors, emeritus professors and guest researchers, as well as staff that have moved to a new job but in the near future are expected to publish on the research they have conducted at TU Delft. Guests are not employed by the faculty and therefore not included in the FTE figures.

Table f. Research staff Geoinformation Governance & Technology (GiGT)

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	13	6.94	13	6.50	13	6.07
Non-tenured staff	5	0.89	3	0.73	3	0.74
PhD students	4	3.31	4	3.32	7	4.91
Guests	3	0	4	0	6	0
<b>TOTAL RESEARCH STAFF</b>	<b>25</b>	<b>11.1</b>	<b>24</b>	<b>10.6</b>	<b>29</b>	<b>11.7</b>

Table g. Research staff Urbanism

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	34	26.01	34	27.31	31	25.8
Non-tenured staff	21	13.2	19	11.3	21	12
PhD students	47	30.0	53	34.0	52	36.0
Guests	21	0	22	0	18	0
<b>TOTAL RESEARCH STAFF</b>	<b>123</b>	<b>69.21</b>	<b>128</b>	<b>72.61</b>	<b>122</b>	<b>73.8</b>

Table h. Research staff Innovation in the Management of the Built Environment

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	30	24.10	29	23.2	26	21.00
Non-tenured staff	7	5.31	6	4.11	6	4.00
PhD students	5	2	10	3	12	3
Guests	21	14.10	14	6.93	15	7.83
<b>TOTAL RESEARCH STAFF</b>	<b>63</b>	<b>45.51</b>	<b>59</b>	<b>37.24</b>	<b>59</b>	<b>35.83</b>

Table i. Research staff Housing

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	29	17.98	28	16.54	26	15.25
Non-tenured staff	10	6.31	7	3.72	6	3.18
PhD students	12	8.7	16	11.7	23	11.7
Guests	17	0	19	0	7	0.00
<b>TOTAL RESEARCH STAFF</b>	<b>68</b>	<b>33.0</b>	<b>70</b>	<b>32.0</b>	<b>62</b>	<b>30.1</b>

Table j. Research staff Urban & Regional Studies

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	19	11	22	11.67	21	12.96
Non-tenured staff	9	3.32	4	2.14	6	2.83
PhD students	2	1.95	2	1.6	2	1.42
Guests	7	0	12	0	15	0
<b>TOTAL RESEARCH STAFF</b>	<b>37</b>	<b>16.27</b>	<b>40</b>	<b>15.41</b>	<b>44</b>	<b>17.21</b>

**Table b. Research staff with position in practice**

WHO	ROLE	FIRM/ORGANISATION	WHERE
Prof. Thijs Asselbergs	Director	aTA Architectuurcentrale	Haarlem NL
Prof. Monica Chao-Duivis PhD	Managing director	Dutch Institute for Construction Law	The Hague NL
Prof. Jo Coenen	Founder and owner	Jo Coenen & Co Architects	Maastricht NL
Prof. Andy van den Dobbelsteen PhD	Associated member	Council for the Environment and Infrastructure (Rli)	The Hague NL
Prof. Mick Eekhout PhD	Director	Octatube International bv	Delft NL
Prof. Tony Fretton	Founder and director	Tony Fretton Architects	London UK
Prof. Dick van Gameren	Founder and director	Dick van Gameren Architecten	Amsterdam NL
Prof. Anke van Hal PhD	Prof. Sustainable Building and Development	Nijenrode Business University	Breukelen NL
Prof. Rob van Hees	Senior researcher	TNO - Netherlands Organisation for Applied Scientific Research	Delft NL
Prof. Maurits de Hoog	Senior urban advisor	Urban Planning Department	Amsterdam NL
Prof. Hans de Jonge	Managing director	Brink Groep bv	Leidschendam NL
Prof. Kees Kaan	Founder, partner and director	Claus en Kaan Architecten	Rotterdam NL
Prof. Ulrich Knæack PhD	Co-founder and consultant	Imagine envelope b.v.	The Hague NL
Prof. Ulrich Knæack PhD	Prof. Design and Construction	Hochschule OWL	Detmold DE
Prof. Marieke Kuipers PhD	Specialist	Cultural Heritage Agency	Amersfoort NL
Prof. Eric Luiten PhD	Advisor on Landscape and Water	Dutch Government	The Hague NL
Prof. Peter Luscuere	Director and founder	Inspired Ambitions	Pijnacker NL
Prof. Peter Luscuere	Commissioner in supervisory board	Van Dorp Installaties BV	Zoetermeer NL
Prof. Winy Maas	Co-founder and director	MVRDV Architects	Rotterdam NL
Prof. Paul Meurs PhD	Co-founder and owner	Steenhuis-Meurs bv	Schiedam NL
Prof. Han Meyer PhD	Board Member	International New Town Institute	Almere NL
Prof. Rob Nijse	Senior advisor	ABT bv	Velp NL
Prof. Kas Oosterhuis	Principal	ONL	Rotterdam NL
Prof. Joop Paul PhD	Managing director	Arup Netherlands	Amsterdam NL
Prof. Hendrik Ploeger PhD	Extraordinary professor Land Law and Land Registration	VU University Amsterdam Faculty of Law	Amsterdam NL
Prof. Michiel Riedijk	Founder, partner and director	Neutelings Riedijk Architecten	Rotterdam NL
Prof. Joost Schrijnen	Programme director Zuidwestelijke Delta	Deltaprogramma	Middelburg NL
Prof. Dirk Sijmons	Owner and director	H+N+S Landscape Architects	Utrecht NL
Prof. Patrick Teuffel PhD	Director	Teuffel Engineering Consultants	Stuttgart DE
Visiting Prof. Dirk Jan de Vries PhD	Specialist	Cultural Heritage Agency	Amersfoort NL
Prof. Wouter Vanstiphout PhD	Founder and partner	Crimson Architecture Historians	Rotterdam NL
Prof. Hans Wamelink PhD	Partner	DHV bv	Amersfoort NL
Prof. Friso de Zeeuw	Director of new markets	Bouwfonds Ontwikkeling	Hoewelaken NL



# 3

## Research environment and embedding

### 3.1 International and national positioning

The Faculty is well embedded in an international setting which is focused on design-oriented practices in architecture and the built environment. The integration of the OTB Research Institute into the Faculty has reinforced this position.

The Faculty continues to see an influx of international PhD students and staff members, while the geographical scope of its activities, such as involvement in conferences, networks and consortia, clearly point to increased levels of interaction with national and international stakeholders and partners. The extent of the Faculty's involvement is evident in the positions held by our professors and associate professors in industry, government and the community. The networks in which they participate, the research commissions they receive from industrial partners and local, regional and national authorities are all evidence of their research endeavours, as are the exhibitions, conferences and congresses in which they participate. Details of the most significant of these endeavours are presented in Chapter 4 'Academic Reputation'.

### 3.2 Collaboration with stakeholders

The Faculty works with government ministries and national agencies, regional and local authorities, European and national research funding agencies, industrial partners, research institutes and societal institutes and foundations.

#### **Ministries and national agencies**

- Ministry of Economic Affairs (EZ)
- Ministry of Education, Culture and Science (OCW)
- State Service for Cultural Heritage (RACM/RDMZ)
- Ministry of Foreign Affairs (BUZA)
- Ministry of Housing, Spatial Planning and the Environment (VROM)
- Dutch Government Buildings Agency (RGD)

#### **Regional authorities**

- Cityregion Eindhoven (SRE)
- Province of Groningen
- Province of Noord-Holland
- Province of Zuid-Holland

#### **Local authorities**

- Almere
- Amsterdam
- Graft-De Rijk
- Rotterdam
- Ootmarsum
- The Hague
- Tilburg
- Delft

#### **European funding**

- European Science Foundation (ESF)
- ALFA-IBIS
- Seventh Framework Programme (FP7)
- Interreg IIIB/IIIC
- Urbact

#### **National research funding agencies**

- Knowledge for Climate (KvK)
- Netherlands Organisation for Scientific Research (NWO)
- SenterNovem
- Technology Foundation (STW)

#### **Industrial partners**

- Amsterdam Airport Schiphol
- Bouwfonds
- INBO architecten
- Octatube International
- Raab Karcher Eshuis Bouwstoffen
- Saint-Gobain Isover Benelux
- Trespø International

#### **Research institutes**

- TNO
- WUR-Alterra
- WUR-PPO

#### **Societal institutes and foundations**

- Belvedere
- EFL Foundation
- European Association Architectural Education (EAAE)
- International New Town Institute (INTI)
- Netherlands Architecture Institute (NAi)
- The Netherlands Architecture Fund

#### **Centre for Urban Systems and Environment**

The joint Centre for Urban Systems and Environment with South China University of Technology, Guangzhou is funded by both universities.

#### **Concept House**

Funded by a consortium of market parties (Eneco, Faay, Rotterdam GW, Living Lab, Raab Karcher, Renson, R&R systems, Schöck, Unica, Uniline, VDM), with the first real-time case studies built as the Concept House Village in the Rotterdam City Harbours for Clean Tech Delta in 2012;

#### **BEEM-UP**

Building Energy Efficiency for Massive market Uptake (FP7 - EeB-Energy)

#### **CBSA**

A consortium led by Prof. Arjan van Timmeren and co-led by Prof. Hans Wamelink. Goal: to support the decision-making process for climate-proof area development by systematically analysing the monetary and non-monetary costs and benefits, and using the results of this analysis to formulate recommendations for improvement (Climate-KIC)

### **3.3 Participation in consortia**

Participation in consortia takes place in externally funded projects, international doctoral programmes, research centres, committees and networks, some highlights:

#### **EAAE, EAHN, DOCOMOMO**

Various members of the faculty have played central roles in national and international research bodies, such as the European Association for Architectural Education (EAAE), the European Architectural History Network (EAHN) and DOCOMOMO.

# 4

## Academic reputation

### Invitations to address major conferences

YEAR	CONFERENCE	WHO	WHERE
2012	Int Symp on Architectural Theory 'New Brutalism - Turning Point of Postwar Architecture'	Avermaete, Heuvel	Berlin DE
2012	Key Note SASBE2012: "Cities Ready for Energy Crises"	Dobbelsteen	Sao Paolo BR
2011	Landscape Infrastructure Symposium, Harvard Graduate School of Design	Sijmons	Cambridge US
2010	Keynote Lecture, Symposium on Construction Management	De Jonge	Aulanko FI
2012	Keynote at ISG 2012: 11th International Symposium & Exhibition on Geoinformation	Van Oosterom	Kuala Lumpur MY

### Conference organisation activities

YEAR	CONFERENCE	ROLE	WHO	WHERE
2012	'EAAE/ISUF conference 'New Urban Configurations', Delft University of Technology	Organisation	Komossa, Marzot, Cavallo	Delft NL
2012	Architectural exchanges between Italy and the Low Countries, 21th Annual NIKI Conference	Organisor & Chair	Van Thoor	Delft NL
2012	Regional Studies Association Conference, Networked regions and cities in times of fragmentation	Joint organisation with OTB	Zonneveld, Fernandez Maldonado & Stead	Delft NL
2011	MISBE 2011	Organisation	IMBE	Amsterdam NL
2010/11	Plandag [Annual Dutch-Flemish Meeting of Academics and Professionals in the Field of Spatial Planning]	Organisation	Waterhout	Brussels BE

### Involvement in scientific or professional event

YEAR	EVENT	ROLE	WHO	WHERE
2012	'The Craft of Architecture Reviewed' Plein 12, manifestation ArtEZ	Speaker	Schrijver	Arnhem NL
2011	'Giuria dei Premi' for the Premio Nazionale IN/ARCH-ANCE IV Edizione, Istituto Nazionale di Architettura	Jury member	Van Bergeijk	Rome IT
2010	6th Int Conf on Innovation in Arch, Engineering & Construction	Scientific Comm.	Sariyildiz	Penn US
2011	Vertical Village Exhibition	Curator	Why Factory	Taipei TW Seoul KR
2008-12	Chair ISPRS WG IV/8 '3D Spatial Data Integration for Disaster Management and Environmental Monitoring'	Chair	Zlatanova	Antalya TR

### Prizes, awards, competitions

YEAR	PRIZES, AWARDS, COMPETITIONS	ISSUER	WHO	WHERE
2010	BNA Kubus (BNA Cube) Award for international oeuvre	BNA	Riedijk	Amsterdam NL
2011	BK City TU Delft, winner of the European Union Prize for Cultural Heritage / Europa Nostra Award 2011	Europa Nostra	Roos (coordinating architect)	The Hague NL
2012	Sustainability and Humanity in the Built Environment	Zumtobel Group	Hackauf, Haikola & Rivas	Berlin DE
2012	2nd prize, open design competition for the redevelopment of the Eptapyrgio area	Municipality of Thessaloniki	Koutamanis	Thessaloniki GR
2011	'Bene Merenti' awarded by the Univ Senate of Bucharest	'Ion Mincu' Univ	Faludi	Bucharest RO

### Honorary positions

YEAR	INSTITUTE	POSITION	WHO	WHERE
2012	Archiprix Netherlands 2012 (best national MSc graduation projects)	Jury Member	Schrijver	Rotterdam NL
2012	Istanbul University of Technology	Guest Prof	Knaack	Istanbul TR
2012	International Cold Climate Housing Association (ICCHA)	Honorary Member	Oosterhuis	Harbin CN
2012/>	Wuhan University - TU Delft Joint Research Centre on Spatial Inform	Delft Scient. Dir.	Van Oosterom	Delft NL
2010-12	Faculty of Law, VU University	Honorary Professor	Ploeger	Amsterdam NL

### Election to academies or academic professional associations

YEAR	INSTITUTE	ROLE	WHO	WHERE
2010-13	European Architectural History Network (EAHN)	Officer/treasurer	Avermaete	Delft NL
2012	JPI (Joint Programming Initiative) Cultural Heritage	Scientific board	Van Hees	Rome IT
2012/>	Association for Education and Research in Computer Aided Architectural Design in Europe (eCAADe)	Administrative Council	Stouffs	Liverpool UK
2010/>	NEPROM, Association of Dutch Developers	Board	De Zeeuw	Den Haag NL
2008/>	European Network for Housing Research	Chair	Boelhouwer	Utrecht NL

### Editorship academic journal/book series

YEAR	JOURNAL	ROLE	WHO	WHERE
2008/>	OASE Architecture Journal	Editorial Board	Avermaete, Grafe, Havik, Teerds	Rotterdam NL
2010/>	Bulletin KNOB (in Dutch)	Editor-in-chief	Van Thoor	Delft NL
1984/>	Planning Practice and Research (Routledge)	Editor-in-Chief	Nadin	Oxford UK
2011/>	International Journal of 3-D Information Modeling (IJ3DIM)	Editor-in-Chief	Zlatanova	Hershey US
1997/>	Journal for Housing and the Built Environment	Editor-in-Chief	Boelhouwer	Dordrecht NL

### Editorship professional journal/book series

YEAR	JOURNAL	ROLE	WHO	WHERE
2012	Yearbook Architecture in the Netherlands	Editorial Board	Avermaete	Rotterdam NL
2011/>	Real Estate Research Quarterly	Editor-in-Chief	Gruis	Amsterdam NL
2008/>	Imagine Book Series with NAI010 Publishers: 04 - Rapids(2010), 03 - Performance Driven Envelopes (2011), 05 - Energy (2011), 06 - Reimagining the Envelope (2012), 07 - Reimagine Housing (2012)	Editor	Knaack, Klein, Bilow	Rotterdam NL
2010/>	Advisory Board: Real Estate Magazine	Chairman	De Jonge	Amsterdam NL
2009/>	Tijdschrift voor de Volkshuisvesting (Dutch Journal for Housing)	Editor-in-Chief	Elsinga	The Hague NL

### Role in practice and policy making

YEAR	FIRM/ORGANISATION	ROLE	WHO	WHERE
2010/>	Int operating architectural firms: Claus and Kaan Architects, Mecanoo Architects, Neutelings Riedijk Architects, Tony Fretton Architects	high profile	Kaan, Van Gameren, Riedijk, Fretton	[various] EU
2010-12	NEN (NEderlandse Norm), Committee 'Moisture in Buildings' and Committee 'Cultural Heritage'	Member	Van Hees	Delft NL
2012/>	College van Rijksadviseurs	National advisor	Luiten	The Hague NL
2010/>	Arbitration Board for the Building Industry in the Netherlands	Member	Chao-Duivis	Utrecht NL
2006/>	Nederlandse Woonbond (Dutch National Tenants' Association)	Board member	Elsinga	Amsterdam NL

# 5

## Quality and relevance

### 5.1 Societal/scientific quality and relevance of the research

The Faculty's research interacts intensively with the practice of architecture, building technology, urbanism, landscape architecture, housing, management and geoinformation. Architecture, urban design, landscape architecture and housing are regularly the subjects of public debate in the Netherlands, Europe and beyond. The performance of buildings (including energy efficiency and user satisfaction) is vital for both the building industry and individuals. The effectiveness of building processes and the institutional arrangements behind them have an impact on our economy and influence the purchasing power of households. The impact of the Faculty's research is design-oriented and deals with dimensions such as cultural heritage, quality of life and sustainability. Valuable contributions to that practice are made by means of externally funded research projects (including PhDs), research in joint consortia involving scientific and societal partners, and through publications, exhibitions and events. Our work is generally not shielded from the public through patents or non-disclosure agreements.

### 5.2 Key indicators

The research undertaken in the Faculty of Architecture and the Built Environment can be assessed using the following indicators:

- the number of peer-reviewed academic articles published in periodicals that appear in scientific indexes (Web of Science, Scopus, Google Scholar)
- the number of books that appear in indexes (Web of Science Book Citation Index, Scopus, Google Scholar)
- the number of designs indexed in the Avery Index to Architectural Periodicals
- the number of citations and downloads
- the number of book reviews in media and journals
- the number of publications and products intended to influence professional, policy and lay communities
- media appearances (television, radio, internet)
- academic journals
- academic book series
- editorships of academic journals and book series
- boards of journals, book series and encyclopaedias
- invitations to make keynote speeches
- other academic presentations
- honorary functions of key staff on boards, panels and committees
- our significance/visibility in the international debate on the built heritage
- public lectures and debates
- the number of NWO/STW and EU/FP7 projects
- sponsors, funding bodies and project partners
- income for client-led research
- monitoring instruments, evaluations of new products/strategies/policies
- standards: ISO
- patents
- published and used (software application) prototypes (available on github, googlecode or bitbucket)
- long-term cooperation with government and industry
- application of scientific research output (such as methods, techniques and tools) in public & private sector projects

**Table a. Main categories of research output**

	2010		2011		2012	
	STAFF	GUESTS	STAFF	GUESTS	STAFF	GUESTS
Refereed articles	92	17	93	17	118	10
Non-refereed articles	24	5	27	4	9	3
Books	70	8	58	5	43	5
Book chapters	235	28	223	10	210	17
PhD theses	16	2	17	2	12	6
Conference papers	261	53	254	30	221	20
Professional publications	251	22	220	30	210	8
Editorships journals/book	82	8	64	2	77	1
<b>TOTAL PUBLICATIONS</b>	<b>1031</b>	<b>143</b>	<b>956</b>	<b>100</b>	<b>900</b>	<b>70</b>



Work places at the Faculty

## 5.3 Results and outputs

### KEY PROJECTS

#### THE POSTWAR EUROPEAN SHOPPING CENTRE: A PLACE FOR ENCOUNTER BETWEEN AVANT-GARDE DISCOURSE AND DAILY BUILDING PRACTICES, 1945-1973.

##### Programme

NWO-Veni 2012  
Grant: € 229.000  
Principal Researcher: Janina Gosseye  
Coordinator: TUDelft  
Duration: 1/2013 - 7/2016

The research focusses on a new urban figure that emerged in Western-Europe in the post-war period: the shopping centre. After the Second World War had ended, many Western European countries committed to the full deployment of a social welfare state system, which aimed at the redistribution of wealth, knowledge and political power through - amongst others - the construction of planning institutions, a new bureaucracy and, last but not least, new building programmes. From a social point of view, the post-war shopping centre (that was often privately developed) had much in common with the newly constructed welfare state centres; they both offered spatial centrality, public focus and human density. The recurrence of these qualities in both disparate developments is however not

coincidental. Following the apparent demise of pre-war modernism, the post-war avant-garde was concerned that people's sense of responsibility to their local communities was eroding and expected architecture and urban design, by causing people to identify with their immediate locale, to help buttress people's sense of belonging. Given the strong similarities between the newly developed welfare state centres and the post-war shopping centre, this research puts forth the hypothesis that cross-fertilization occurred between the work of the avant-garde and commercial "day-to-day" building practices. The shopping centre as a new urban figure will thus be used as the vantage point to research the interaction between these two ends of the architectural spectrum in post-war Western Europe.

#### CLIMATE PROOF CITIES

*Strengthening the adaptive capacity and reducing the vulnerability of the urban system against climate change and to develop strategies and policy instruments for adapting our cities and buildings.*

##### Programme

Knowledge for Climate  
(together with Urbanism and OTB)  
Grant: € 710.000  
Role: partner  
Principal Researcher:  
Andy van den Dobbelaer  
Coordinator: TNO  
Duration: 1/2010 to 1/2014

The aim of this research programme is to build up a multi-scale (from the level of buildings to city agglomerations), quantitative knowledge base on urban climate, the vulnerability of cities to climate change and expected impacts of possible future changes in climate. The consortium will generate knowledge on the technical and economical effectiveness of adaptation measures linked with an in-depth understanding of the governance processes needed

for implementation. To understand the effectiveness of measures, fact finding on the interaction of the city and the local climate (including urban heat islands) is essential. Based on the various impacts in cities and possible adaptation measures, an overview can be provided of costs and benefits of taking adaptation measures in various scenarios for the development of the global climate which will support decision makers in developing their adaptation strategies.

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## Programme

### IPDD

#### *Integrated Planning and Design in the Delta*

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NWO and FES funds  
Grant: € 241.339  
Role: coordinator  
Principal Researcher: Han Meyer  
Duration: 09/2011 to 09/2013

Delta regions are worldwide developing in high speed. There is a need to manage and balance values as safety, ecological quality, freshwater supply and the growing demands of cities such as the expansion of infrastructure and economic activities. The research focus of this project, called 'Integrated Planning and Design in the Delta' (IPDD), is the 'Zuidwestelijke Delta of

the Rijn, Maas and Schelde', located in The Netherlands. IPDD is part of a larger research program, called 'Urban Regions in the Delta' (URD). The main goal is to contribute to the state of knowledge about sustainable and integrated development of regions that are confronted with the complex challenge of intensively combining different land uses and functions.

## Programme

### FUTURA

#### *Future Value Chains of Architectural Services*

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NWO-Creative Industry  
Grant: € 443.778  
Role: main applicant  
Principal Researchers:  
Hans Wamelink, Leentje Volker  
Duration: 2013 -

One of the only two successful proposals by a school of architecture at the latest call for the creative industries by NWO, The Netherlands Organization for Scientific Research (the Dutch national research council). The project aspires to outline new roles of architects and to develop governance

models for architectural services in the value networks between architectural firms, their clients and other stakeholders. The project finances one PhD position at IMBE and another at Radboud University Nijmegen, our major partner in FuturA.

## Programme

### MASSIVE POINT CLOUDS

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NWO/eScience  
Grant: € 300.000  
Role: applicant  
Principal Researcher: Peter van Oosterom  
Duration: 3/2013 to 3/2015

Massive point clouds (several terabytes) are produced by many sensors and application. The problem is that they are too big to be handled efficiently by common ICT infrastructures. Within this project several novel and innovative eScience techniques will be developed: parallel ICT architecture, [2] new core support for point cloud data types

in the spatial DBMS, Web Point Cloud Service protocol (WPCS, progressive transfer from server to client based on multi-resolution representation), coherent point cloud blocks based exploiting spatial clustering & indexing, Point cloud compression (storage & transfer), caching strategy, etc.



Year: 2010

Publisher: Vantilt Publishers

Pages: 224

### THE DUTCH URBAN BLOCK AND THE PUBLIC REALM: MODELS, RULES, IDEALS

*Susanne Komossa*

In *The Dutch urban block and the public realm*, Susanne Komossa uses typomorphological research to analyse the development of the Dutch urban block as an architectural model over the past four hundred years. The urban block is the link between city dwellers' everyday lives and the

urban public realm. This clearly written and amply documented study calls for the small-scale urban economy and the public realm to be treated as essential components of the city when new urban plans and models are developed.



Year: 2011

Publisher: VDM Verlag Dr. Müller

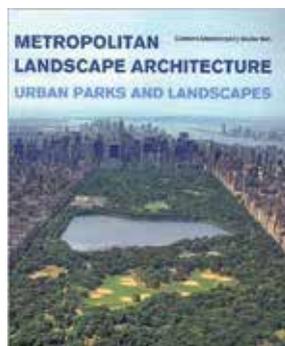
Pages: 300

### INTERACTIVE CORPORATE ENVIRONMENTS: DEVELOPING REAL-TIME INTERACTIVE CORPORATE ENVIRONMENTS INCORPORATING COMPUTATIONAL TECHNIQUES

*Nimish Bitoria*

The inter-disciplinary research book exemplifies upon a four year long research experiment to develop real-time interactive corporate office environments which addresses the behavioral patterns and preferences of its occupants with a strong underpinning in the domain of computation, interaction design and open system typologies. Rather than creating conventional inert structural shells (hard components), the development of a meta-system, or in other words creating a 'soft' computationally

enriched open systemic framework (informational) which interfaces with the 'hard', material component and the users of the architectural construct formulates the core agenda of the research work. This soft space/meta system serves as a platform for providing the users with a democratic framework, within which they can manifest their own activity oriented programmatic, spatial and ambient alterations in order to create self designed and customized spatial alternatives.



Year 2011

Publisher: THOTH

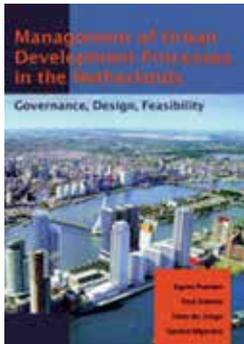
Pages 448

### METROPOLITAN LANDSCAPE ARCHITECTURE: URBAN PARKS AND LANDSCAPES

*Clemens Steenbergen, Wouter Reh*

The city does not exist without landscape, nor landscape without the city. The original landscape is always reflected in the form of the city. But how is architectonic coherence between the city and the landscape really achieved? This book sketches the development of the urban landscape from the Renaissance to the present. The examples include urban landscapes and parks in Rome,

Paris, London, Berlin, New York, Amsterdam, Barcelona, Boston, Hamburg, Frankfurt and Cologne. Here, for the first time, the architecture of the urban landscape is the subject of a systematic, visual study, with more than 450 drawings, maps and illustrations. This opens up a new, fascinating perspective on the role of landscape in shaping the metropolis today.



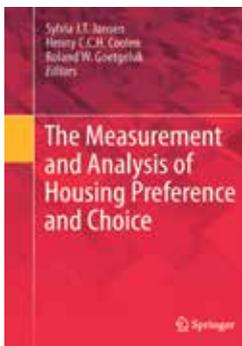
**Year:** 2011  
**Publisher:** Techne Press  
**Pages:** 248

## MANAGEMENT OF URBAN DEVELOPMENT PROCESSES IN THE NETHERLANDS

*Agnes Franzen, Fred Hobma, Hans de Jonge & Gerard Wigmans (eds.)*

This book provides a management view on urban area development. Urban area development has increasingly been influenced by the private sector, requiring the public sector to adapt. Network societies and global economies necessitate a more integrated approach to managing urban development. Management of Urban Development Processes in the Netherlands describes the changes taking place and the shared governance approach to urban development.

It describes the process of managing urban development and covers the full life-cycle of urban areas, from the initiation and planning of development projects to realisation and maintenance. It also provides an overview of current practice, acquired knowledge and instruments developed in the Netherlands. Process architecture, financial engineering, market influences and spatial quality are covered since they all affect the level (and perception) of success..



**Year:** 2011  
**Publisher:** Springer  
**Pages:** 274

## DEMOGRAPHIC CHANGE AND HOUSING WEALTH: HOMEOWNERS, PENSIONS AND ASSET-BASED WELFARE IN EUROPE

*John Doling, Marja Elsinga*

Across the EU, populations are shrinking and ageing. An increasing burden is being placed on a smaller working population to generate the taxes required for pensions and care costs. Welfare states are weakening in many countries and across Europe, households are being increasingly expected to plan for their retirement and future care needs within this risky environment. At the same time, the

proportion of people buying their own home in most countries has risen, so that some two-thirds of European households now own their homes. Housing equity now considerably exceeds total European GDP. This book discusses questions like: to what extent might home ownership provide a potential cure for some of the consequences of ageing populations by realizing housing.



**Year:** 2011  
**Publisher:** Routledge  
**Pages:** 208

## COHESION, COHERENCE, COOPERATION: EUROPEAN SPATIAL PLANNING COMING OF AGE?

*Andreas Faludi*

Since its foundation the European Union has developed policies, aimed at achieving increased economic and social cohesion. This book examines the most recent of these, the concept of territorial cohesion. Territorial cohesion is the pursuit of balanced development, competitiveness, sustainable development, and good governance. These concerns are most readily addressed by

the formulation of spatial strategies under the umbrella of spatial planning, that brings together a multitude of public and private actors in a process that requires cohesion, coherence and co-operation. This book traces the development of spatial planning at European level and argues that spatial planning can become a vehicle, not only for territorial cohesion, but for EU policy generally.

**MIND THE EVALUATION GAP: REVIEWING THE ASSESSMENT OF ARCHITECTURAL RESEARCH IN THE NETHERLANDS**

*Frank van der Hoeven*

**Publication Info**

Year: 2011  
 In: Architectural Research Quarterly  
 15(2), 177-187

The definition of research quality is directly linked to public funding access in countries like the United Kingdom, Australia and the Netherlands. Architecture, as a design discipline, faces the problem that it has limited access to these resources. It experiences a so-called evaluation gap. Its research performance does not easily fit the conventional moulds commonly used to assess quality. Assessments are increasingly based on the analysis of indexed journals, while indexes (such as the ISI) have, so far, mostly neglected the arts and humanities

to which architecture may be assumed to belong. Schools of architecture have to face this matter head-on if they want to survive in times of austerity, and they need to do so sooner rather than later. They have to decide whether they want to continue to push for the acceptance of discipline-specific performance indicators or whether they would rather adapt to the standards and dissemination practices that characterise more established fields of scientific research. The direction they choose will inevitably shape future research in architecture.

**HOMES FROM HOME: MEMORIES AND PROJECTIONS**

*Irene Cieraad*

**Publication Info**

Year: 2010  
 In: Home Cultures,  
 7(1), 85-102

This article presents an interpretation of home, in which home is not fixed in time and space, but is reinvented time after time in different locations. Memories and projections are the quintessential links in a lifetime cycle of home inventions. This is the predicament of most urbanites in Western countries for whom a lifetime stay in the natal home or the natal town

have become an exception. In concentrating on the material level of homemaking, especially on objects and object-related practices in the reinvention of home, this article addresses the intermediary role of objects, not only in reviving memories of past homes, but also in linking present homes to future homes.

**EFFECT OF MIXED IN CRYSTALLIZATION INHIBITOR ON RESISTANCE OF LIME-CEMENT MORTAR AGAINST NA CL CRYSTALLIZATION**

*Barbara Lubelli, Timo Nijland, Rob P.J. van Hees & Anke Hacquebord*

**Publication Info**

Year: 2010  
 In: Construction and Building Materials, 24(12),  
 2466-2472

Salt crystallization is a common cause of damage to porous building materials. In this paper, a pilot study is presented in which sodium ferrocyanide, a crystallization inhibitor for sodium chloride, has been mixed in a lime-cement mortar. Salt resistance of the mortar has been tested by means of a crystallization test. The results of the crystallization test show that the addition of the

inhibitor significantly improves the salt resistance of the mortar. Scanning electron microscope observations carried out on the surface of the cross section of the specimens demonstrate that the inhibitor modifies the habit of the salt crystals, as well inhibits the development of specific crystal faces.

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## VACUUM INSULATION PANELS FOR BUILDING APPLICATION: A REVIEW AND BEYOND

*Baetensa, R., Jellea, B.P., Thueb, J. V., Tenpierik, M. J., Grynninga, S., Uvsløkka, S., & Gustavsene, A.*

### Publication Info

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Year: 2010  
In: Energy and Buildings  
42(2), 147-172.  
Cited by: 93

Vacuum insulation panels (VIPs) are regarded as one of the most promising high performance thermal insulation solutions on the market today. Thermal performances three to six times better than still-air are achieved by applying a vacuum to an encapsulated micro-porous material, resulting in a great potential for combining the reduction of energy consumption in buildings with slim constructions. However, thermal bridging due to the panel envelope and degradation of thermal performance through time occurs with current technology. Furthermore, VIPs cannot be cut on site and the panels are fragile towards damaging. These effects have to be taken into account for building applications as they may diminish the

overall usability and thermal performance. This paper is as far as the authors know the first comprehensive review on VIPs. Properties, requirements and possibilities of foil encapsulated VIPs for building applications are studied based on available literature, emphasizing thermal bridging and degradation through time. An extension is made towards gas-filled panels and aerogels, showing that other high performance thermal insulation solutions do exist. Combining the technology of these solutions and others may lead to a new leap forward. Feasible paths beyond VIPs are investigated and possibilities such as vacuum insulation materials (VIMs) and nano insulation materials (NIMs) are proposed.

## POLYCENTRIC STRUCTURES IN LATIN AMERICAN METROPOLITAN AREAS: IDENTIFYING EMPLOYMENT SUB-CENTRES

*Ana MarÍa Fernández-Maldonado, Arie Romein, Otto Verkoren & Renata Parente Paula Pessoa*

### Publication Info

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Year: 2013  
In: Regional Studies,  
Published online: 03 May 2013  
Cited by: unknown

The significant spatial transformations that have occurred within Latin American metropolitan areas since the 1990s have triggered many local studies claiming the formation of polycentric structures. This study explores the extent of that process, identifying sub-centres of employment using the double threshold methodology of job concentration and employment density in Mexico City (Mexico), Lima (Peru) and

Fortaleza (Brazil). The results, although partial due to an absence of data on informal employment, indicate that Latin American metropolises are moving towards polycentric structures. But the identified employment sub-centres are mostly located in or near the metropolitan core, which practically excludes the formation of polycentric nodes in the metropolitan periphery.

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## THE POWER OF PLURALISM FOR URBAN STRATEGIES

*Monique Arkesteijn, Leentje Volker*

### Publication Info

Year: 2012  
In: *Cities*,  
31(4), 328-336

Although several strategy scholars have pleaded for a pluralistic approach, not many have empirically shown the actual implementation of pluralism in strategic real estate decisions. In this article we demonstrate the value of implementing pluralism for the design of a real estate strategy of a Dutch university campus. Three strategic projects – an Ideas Competition,

a Think Tank and a Campus Vision – made it possible to consider a wide range of options and to display the dynamic interrelations between the objects (buildings), the portfolio (the campus) and the urban context (the city). The results show that pluralism is a powerful approach to make decisions about real estate and urban planning strategies at a pragmatic as well as on a strategic level.

## 4D CADASTRES: FIRST ANALYSIS OF LEGAL, ORGANIZATIONAL, AND TECHNICAL IMPACT - WITH A CASE STUDY ON UTILITY NETWORKS

*Fatih Döner, Rod Thompson, Jantien Stoter, Christiaan Lemmen, Hendrik Ploeger, Peter van Oosterom & Sisi Zlatanova*

### Publication Info

Year: 2010  
In: *Land Use Policy*,  
27(4), 1068-1081

The increasing complexity and flexibility of modern land use requires that cadastres need an improved capacity to manage the third dimension. As the world is per definition not static, there also will be needs in relation to the representation of the temporal (fourth) dimension either integrated with the spatial dimensions or as separate attribute(s). In this paper, registration of utility networks

in cadastre are considered in this 3D + time (=4D) context. We researched the different approaches of three specific countries: Turkey, The Netherlands and Queensland, Australia. These are analysed to evaluate a solution that matches legal, organizational, and technical cadastral requirements in the most optimal way.

## THE IMPACT OF EUROPEAN PUBLIC CONTRACT LAW ON NETWORKS OF GOVERNANCE: A RELATIONAL APPROACH

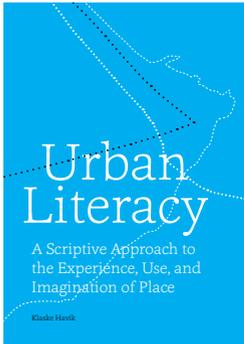
*Willem K. Korthals Altes, Tuna Taşan-Kok*

### Publication Info

Year: 2010  
In: *European Planning Studies*,  
18 (6), 971-988

Scholars increasingly stress the importance of relations rather than locations in planning. Consequently, planning research might not only focus on land use and land-use regulations, but also on the way relations between urban and regional actors are regulated. This paper reflects critically on the European directive on public contracts, which regulates specific relationships between

contracting authorities and economic operators, and its potential impact on urban and regional planning. The paper concludes that further juridification of these relations by procurement directive may result in the relative isolation of the actors involved in governance, both private and public, and may decrease the significance of these relational networks.



Year: 2012

Publisher: TU Delft

Pages: 243

## URBAN LITERACY: A SCRIPTIVE APPROACH TO THE EXPERIENCE, USE AND IMAGINATION OF PLACE

*Klaske Havik*

This research addresses the effect of energy performance regulations and occupant behavior on energy consumption for space and water heating in dwellings built after the introduction of the energy performance regulations in the Netherlands. The results of this research show that improving the energy efficiency of buildings alone is not

enough to decrease that energy consumption. The large differences found in the use of dwellings indicate that, especially in energy efficient houses, occupant behavior provides an opportunity for further reductions in the energy consumption for space heating which could boost the efforts to conserve energy worldwide.



Year: 2012

Publisher: TU Delft

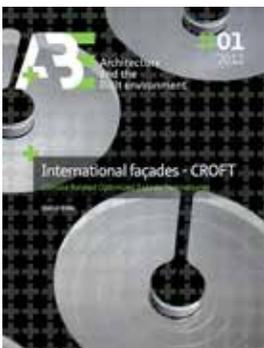
Pages: 440

## CITYMAKER. DESIGNING GRAMMARS FOR URBAN DESIGN

*Jose Beirao*

The goal of the project is the integration of design support tools to formulate, generate and evaluate urban designs. This thesis focuses on the development of generation tools for urban design, corresponding to the more design-oriented component of City Induction. It defines the theoretical model for an urban design tool called CItYMaker and presents two prototype implementations as proof of concept. As such, urban designers

will find the main contributions of this thesis in the discussion of design methods and conceptual tools to support an efficient, flexible, interactive, and responsive urban design process. Although integrated into the research, all the methods and tools developed in this thesis were designed to be autonomous, that is, to work and be used independently of the other City Induction modules.



Year: 2011

Publisher: TU Delft

Pages: 250

## INTERNATIONAL FAÇADES: CROFT CLIMATE RELATED OPTIMIZED FAÇADE TECHNOLOGIES

*Marcel Bilow*

Current architectural planning practices, such as the International Style, perceive the climate often as a problem, rather than an opportunity to work with it. This doctoral thesis presents a "Façade Expert Tool" (FET) that analyses the climate and the combination of the façade and building services. The goal of FET is to easily analyse the climate of a particular location and to then limit the possible combination of

façade and building services components to a practical level. Through FET Marcel Bilow has developed "Climate Responsive Optimised Façade Technologies" (CROFT). CROFT demonstrates the potential for sustainable building operation through the use new technologies that respond to the requirements posed on façades in climate zones as diverse as those found in Moscow, Singapore, Berlin and Dubai.



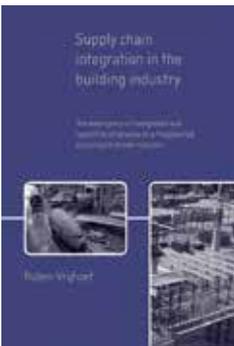
**Year:** 2011  
**Publisher:** TNO  
**Pages:** 371

## THE TRADITION OF MAKING: POLDER CITIES

*Fransje Hooimeijer*

Climate change brings larger and more frequent rainstorms and Dutch cities are confronted with water nuisance. The urban water systems are unable to deal with this change in the hydrological cycle in spite of the fact that the Dutch are dealing with this condition for centuries. The question is: What is the tradition of building in wet and soft soil conditions? There is a lack of systematic research into this matter and a base for

future development is missing. This research fills this gap for the tasks in the polder. A framework of seven phases offers insight into the relation between the landscape, the available technology and urbanization per phase. It becomes clear that the method of building-site preparation is crucial in the way the urban design is connected to the landscape as carrier of the hydrological system.



**Year:** 2011  
**Publisher:** IOS Press  
**Pages:** 336

## SUPPLY CHAIN INTEGRATION IN THE BUILDING INDUSTRY: THE EMERGENCE OF INTEGRATED AND REPETITIVE STRATEGIES IN A FRAGMENTED AND PROJECT-DRIVEN INDUSTRY

*Ruben Vrijhoef*

The building industry is a fragmented and project-driven industry with specific characteristics, which can sometimes result in negative effects. Reference has often been made to other industries, particularly manufacturing, that would function more effectively and efficiently. Major differences between building and manufacturing include the organization and coordination of the supply chain. Supply chain integration

has been suggested as a solution to the deficiencies experienced in the building industry. The premise is that the supply chain would function better if the building industry could aim for the standards of a more integrated and repetitively operating industry. This thesis aims to contribute to the theoretical and practical development of the concept of supply chain integration in the building industry.



**Year:** 2010  
**Publisher:** IOS Press  
**Pages:** 191

## PUZZLING NEIGHBOURHOOD EFFECTS. SPATIAL SELECTION, ETHNIC CONCENTRATION AND NEIGHBOURHOOD IMPACTS

*Wenda Doff*

Like other West European countries, the Netherlands are facing a growing uneasiness about its changing demographics. It is within this context that animated discussions concerning immigrant neighbourhoods dominate. The general opinion is that living in such neighbourhoods hinders the 'integration' of immigrants into Dutch society. This book contributes to the academic and policy

debate by not only examining the effects of ethnic concentration, but also by finding out how people are sorted into neighbourhoods. Bringing together different bodies of literature, this book offers a more holistic view of the creation of ethnic residential segregation and its potential significance for individual life chances..

## KEY EVENTS

### 12TH INTERNATIONAL DOCOMOMO CONFERENCE

*The Survival of Modern, From Coffee Cup to General Plan*

#### Info

*Date:* 2012, August 7-10

*Place:* Espoo, Finland

The concepts of space and scale in modernist architecture are challenged in an age of new ecological and economical needs for more building density and energy-saving technical solutions. In four sub-themes the concept of space and design in four different scales and offer views is examined on how the

fundamental urban qualities of modernism can be preserved and what they have to offer for contemporary planning. The sub-themes: Environment, Urban Space, Open Plan, Interior Design. Marieke Kuipers was member of the scientific committee.

### THE 5TH AESOP YOUNG ACADEMICS MEETING

*Diversity in Urbanism: Learning Across Cultures and Disciplines*

#### Info

*Date:* 2011, February 16-18

*Place:* Delft

The meeting is an annual event organised by the Association of European Schools of Planning (AESOP) Young Academics (YA) Network. It aims to bring together young planning scholars, who have just recently entered the academic world, and to provide a forum to debate and reflect upon their ideas with experienced researchers. Each year the meeting focuses on different issues and

challenges related to contemporary planning. This meeting focused on the issue of Diversity in Urbanism: Learning Across Cultures and Disciplines and consisted of three tracks: Cross-national Studies, Resilience Thinking and Climate Change, and Citizen and Community Engagement in Urban and Rural Development.

### 2ND INTERNATIONAL WORKSHOP ON 3D CADASTRES

#### Info

*Date:* 2011, November 16-18

*Place:* Delft, the Netherlands

*Organizers:* FIG, EuroSDR & TU Delft

*Number of Participants:* 96

The main purpose of this workshop was to have a fruitful exchange of ideas. There does not exist a single best solution for a 3D cadastre. In all cases for the establishment, legal, institutional and technical issues have to be addressed. The level of sophistication of each 3D cadastre will in the end be based on the user needs, land market requirements, legal framework, and technical possibilities.

Therefore, in line with the ISO 19152 Land Administration Domain Model it is the intention to explore the optimal trade-offs between 2D en 3D cadastral solutions. 3D parcels include land and water spaces, both above and below surface. However, what exactly is a 3D parcel is dependent on the legal and organizational context in the specific country (state, province).

# 6

## Earning capacity

### 6.1 Success and vision on how to obtain research projects

The key elements in our approach to obtain research projects are straight forward:

- consolidate research programmes
- improve competences and track record of staff
- motivate staff
- execute ongoing projects according to highest academic standards and report on the results obtained, demonstrating that the funds were well spent
- sign cooperation agreements with key players
- initiate and strengthen collaboration with universities and research institutes
- attract self-funded PhD researchers
- submit funding applications to specific programmes such the STW, NWO, FP7, JPIs, H2020
- organise international events
- be active in international organisations
- build reputation, which is relevant for finding partners for good international project proposals (and to be found by them)partners for good international project proposals (and to be found by them).

### 6.2 Overview of top-5 projects

#### *PLEEC*

PLEEC brings together academia and European cities as partners in learning how to improve energy efficiency by combining scientific knowledge and innovative best practice in a number of small cities. PLEEC aims to develop a more general model of energy efficiency and sustainable city planning. The project is led by Eskilstuna Energy & Miljö (Sweden) and involves partners from nine countries.

#### *Sustainable Urban Metabolism in Europe*

The Faculty is a partner in the FP7 project Sustainable Urban Metabolism in Europe (coordinated by the Österreichisches Institut für Raumplanung), concerned with the conceptualisation of sustainable urban development as a metabolic process. The Faculty is also a partner in TENLAW (coordinated by the University of Bremen), concerning rental law (and its relationship with social systems, for which cooperation with our Housing programme has been established), as well as a partner in the successfully established project DIVERCITIES, which began in 2013.

#### *Futura*

<<http://www.nwo.nl/onderzoek-en-resultaten/onderzoeksprojecten/44/2300179344.html>>. This is one of only two successful proposals by a school of architecture in response to the latest call for proposals in the creative industries sector by the NWO (the Netherlands Organisation for Scientific Research). The project (budgeted at EUR 443,778) aspires to outline new roles for architects and to develop governance models for architectural services in relation to the value networks established between architectural firms, their clients and other stakeholders. FuturA funds one PhD position at IMBE and one at Radboud University Nijmegen, our major partner in the project.

### **SuslabNWE**

This project has created a networked infrastructure for innovation that is focused on sustainability in the home environment. It enables user-centred testing and development in living laboratories and prototype housing at five locations (Interreg IVB North West Europe, 2012).

### **BiRadial Glass**

This STW project was developed on the basis of the need for free-form components in the building industry. It explores technologies for moulding systems, focusing on glass, a key material used in facades. The next step in the project is to investigate and develop the production process.

### **European Shopping Centre**

NWO-Veni project: European Shopping Centre: A Place for Encounters between Avant-garde Discourse and Daily Building Practices, 1945-1973.

### **3D Cadastre Russia**

The purpose of the Russian-Dutch project on 3D cadastre modelling in Russia was to assess the added value of 3D cadastre in the registration and recording of multilevel complex buildings and

constructions as well as subsurface networks such as gas pipelines and the rights related to them. The project included prototype development and a pilot project with cases selected in Nizhny Novgorod, Nizhegorodskaya Oblast. Experts from Rosreestr (the Russian Federal Service for State Registration, Cadastre and Cartography), central and local offices, cadastral chambers, technical inventory offices and cadastral engineers participated in the pilot project. A web-based prototype for 3D cadastral visualisation was developed, consisting of a 3D viewer that shows the cadastral objects in 3D space and allows the making of selections on the basis of parameters such as cadastral number, the name of the owner or the number of rooms. Based on the positive experiences gained from the project in general and from the pilot project in particular, recommendations for the future introduction of 3D cadastre have been formulated, including improvements in the Russian legal framework and the organisation of 3D cadastre.

**Table a. Research funding**

FUNDING	2010		2011		2012	
	K€	%	K€	%	K€	%
Direct funding	5.946	66%	5.788	55%	5.543	63%
External funding	3.632	34%	4.723	45%	3.264	37%
<b>TOTAL FUNDING</b>	<b>9.045</b>	<b>100%</b>	<b>10.511</b>	<b>100%</b>	<b>8.807</b>	<b>100%</b>

EXPENDITURE	2010		2011		2012	
	K€	%	K€	%	K€	%
Staff costs	7.063	91%	6.458	90%	5.497	92%
Other costs	660	9%	647	10%	456	8%
<b>TOTAL EXPENDITURE</b>	<b>7.724</b>	<b>100%</b>	<b>7.106</b>	<b>100%</b>	<b>5.954</b>	<b>100%</b>

CHAIRS EXTERNALLY FUNDED	2010		2011		2012	
	K€	%	K€	%	K€	%
Ontwerp & Politiek (AUT)	100		100		100	
St. Kennis Gebiedsontw. (ART)	421		170		311	
<b>TOTAL CHAIRS EXTERNALLY FUNDED</b>	<b>521</b>		<b>270</b>		<b>411</b>	

### 7.1 Means used to transfer knowledge

The Faculty uses a wide range of channels to transfer knowledge to society:

- books, book chapters and professional publications
- peer-reviewed journals
- open access publications
- lectures, workshops, presentations, exhibitions, debates, seminars, symposia and conferences
- TU Delft website, press releases, journals, newspapers, television and radio
- NWO/STW user committees
- structural multi-year cooperation with key organisations
- sharing of staff on temporary or permanent bases
- organising and delivering professional courses
- member of standardisation bodies and project/editorial teams
- knowledge centres and research funded by practice, industry and government
- MSc theses of students

### 7.2 Users of the knowledge

The knowledge that is produced by the Faculty of Architecture and the Built Environment is used along the entire construction chain, including decision-makers, developers, researchers, designers, engineers, producers, installers, contractors and end-users. In particular, we would like to mention:

- design practices, project developers
- start-up companies, construction industry
- research community, planning institutions
- policymakers, government institutions and ministries, local and regional governments
- civil society organisations, housing associations
- students and alumni
- professional and general press

### 8.1 Graduate School for Architecture and the Built Environment

The Graduate School for Architecture and the Built Environment (GS A+BE) encompasses all PhD research in the Faculty. It was launched in September 2011 as a 'local school' in the framework of the TU Delft Graduate School.

Our mission is to reinforce a research culture in this key design and engineering discipline; to educate leading international PhD students in architecture, building technology, urbanism, landscape architecture, geomatics, management of the built environment and housing; and to perform excellent and innovative research.

Reasons for developing the Graduate School  
The Bologna process defined PhD research as the third cycle of education, which puts greater emphasis on the responsibility of universities to ensure young researchers are taught the necessary academic skills. The fact that only a minority of PhD candidates will and can pursue an academic career has also reinforced the idea of improving doctoral education.

The new curriculum has been given a broader perspective to make it more relevant to a career in practice. A major part of the research undertaken at the University is done by PhD candidates. Therefore, the content and the output of PhD research is of the highest priority for ensuring the success of research programmes and the performance of the University overall. However,

success rates in recent years have not been very high, due to students frequently dropping out or the process taking too long. A major concern of the Graduate School is thus to improve the performance of PhD candidates.

The Graduate School offers a framework and infrastructure that provides the conditions for excellence in PhD research as well as the appropriate education for future academics. This consists of:

- assuring the quality of the PhD students through a selection process and the monitoring of progress
- improving and assuring the supervision by head and daily supervisors
- an obligatory PhD education programme

The University's Graduate School Board, with the assistance of support staff, is responsible for the development of the main elements of the programme as well as the regulations and facilities. This is further detailed within the local graduate schools, which also have a their own boards, as well as a director and dedicated staff.

### 8.2 PhD categories

The TU Delft Graduate School distinguishes between four categories of PhD candidate. The candidates in each category have different backgrounds, work under different conditions and have different obligations to the Graduate School. Candidates who are employed by the University for four years and receive a normal salary are called 'standard' PhD students. The newer category of 'contract' PhD students refers to candidates who have their own research plan and their own funding to work on a PhD for four years. The two other categories are not bound to the four-year period and candidates usually do not work fulltime on their PhD. These candidates are either 'internals', who are employed by the University but work no more than 0.5 FTE on their PhD, or 'externals', who are not employed by the University. While all candidates are members of

the Graduate School their obligations vary. Most importantly, only the standard and the contract candidates are obliged to follow the doctoral education programme.

### 8.3 Monitoring

#### *The applications*

One of the first things that the GS A+BE developed was a central procedure to process the PhD applications of candidates with their own funding (contract PhDs). In recent years, the majority of newcomers have been in this category. Prior to putting this procedure in place, applicants approached professors directly. This created a chaotic situation, which overburdened staff and did not always give applicants the correct information. The A+BE website now provides information about and access to the application process. Applicants are asked to provide all the necessary information about their Master's degree, their scholarship, research plan and level of English. The A+BE Graduate Office screens the application before forwarding it to the relevant professors who can concentrate on determining the quality of the candidate and their proposal.

#### *Go No Go*

The second development concerns a formal go/no-go procedure. Candidates are asked to present their research at the end of the first year of their PhD to determine their progress. On the basis of this, a decision is made about further continuation for the full period. The purpose of the meeting is to recognise unviable projects or candidates who may be struggling at an early stage and if possible to assist in finding solutions that will allow them to complete their PhD successfully. The committee includes at least one independent professor who is not from the same group. There are some uniform requirements concerning the portfolio which each candidate must present, the procedure for the presentation and the nature of the assessment. Usually, other external peers attend the sessions, which are interesting academic debates that

include both PhD candidates and other colleagues. This go/no-go session is followed up by annual progress meetings in the PhD Development Cycle.

#### *DMA*

All the official data and progress documents are stored in the University-wide Doctoral Monitoring System (DMA). Information on each candidate's progress in the doctoral education programme (both planned and completed courses) is also administered through the DMA. All of the data concerning PhD candidates who started under the umbrella of the Graduate School A+BE, as well as of those who started before September 2011, are included and updated in the DMA. This gives an excellent overview of the numbers, subjects, categories, stage of progress and supervisors involved. In the longer term, the system will also be used to monitor success rates, beginning with the first batch of fulltime PhD candidates ('standard' and 'contract') who will defend their theses within the next five years.

### 8.5 Supervision

The GS A+BE requires that at least two academics are responsible for supervision: the head supervisor (a professor) and a daily supervisor, who may also be an experienced senior researcher. At least one of the supervisors should hold a PhD. The DMA has been useful in monitoring this and ensuring that the supervision teams are appropriate.

In the first three months, the PhD candidate drafts a PhD agreement with their supervisors. This contains the research plan, the doctoral education plan and a schedule of supervision.

In the near future, the University Graduate School and the Graduate School A+BE intend to gain further knowledge of the nature of supervision and its quality and will develop courses for supervisors and start discussions within peer groups.

## 8.6 Mentors

Every department has appointed a mentor who has the task of supporting PhD candidates should they have any questions, problems with their supervisors or in finding suitable doctoral education courses.

### *PhD council*

The Graduate School A+BE has also taken the initiative to start a PhD council, which includes all PhD candidates in A+BE. Its meetings are intended to give candidates a chance to provide critical feedback on developments in the Graduate School and to organise debates about the content of the PhD projects or social events.

## 8.7 Doctoral Education

Since the establishment of the Graduate School A+BE, the completion of a doctoral education programme has been made obligatory for all fulltime PhD candidates who started after September 2011. The total workload is equivalent to 45 course days, including self-study and assignments, equally divided over three kinds of courses and activities:

Generic skills: concern the development or improvement of the PhD candidate's personal skills. This category of transferable skills is largely coordinated and/or facilitated by the University Graduate School. These skills are important in preparing PhD candidates for their future careers but are also applicable to daily PhD activities. These include skills such as providing feedback, personal effectiveness and time management, but also writing, presentation and language courses.

Research skills: improve the basic quality of research. Credits can be earned by following courses or by completing learning on the job activities such as the publication and presentation of an academic paper, conference contributions, invited lectures, organising a seminar or curating an exhibition.

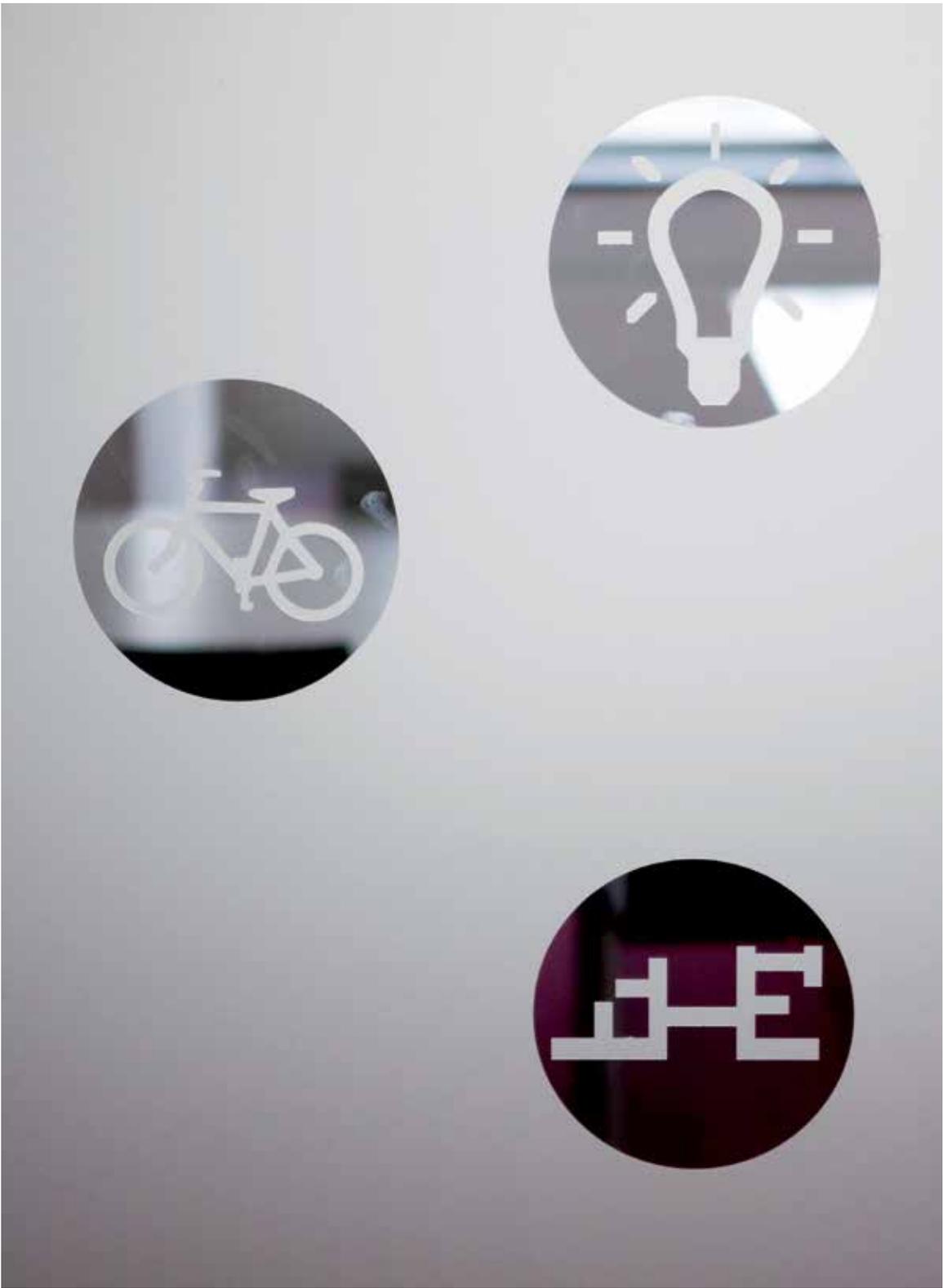
Discipline-related skills: courses can be followed at the Graduate School A+BE, related research schools and other departments or universities. These courses represent added value and/or greater breadth regarding the specific disciplinary knowledge involved in the doctoral research. The GS A+BE is connected to the external research schools of Nethur (national graduate school, focusing on urban research) and OSK (art history) which offer courses in discipline-related subjects and research methodology for a selection of PhD students in the Faculty. However, for many of our PhD candidates – those working in the domains of design and technology – there is no readymade package of discipline-related courses or methodological support. In 2013, we made an additional effort to find or develop the required courses.

## 8.8 Goals for the next years

PhD research will remain at the core of research in the Faculty. Creating an optimal environment for excellence in research is of great importance and the Graduate School A+BE is one tool that will support this.

The goals of the GS A+BE will be: High success rates (fulltime candidates finishing within four years).

Increasing the numbers of PhD dissertations completed each year. In recent years we have had approximately 22 per year. In 2013 the number will be higher, but this will mainly be due to high numbers of internal and external candidates coincidentally finishing in this year. Our aim is to achieve an average of approximately 30 PhDs completed each year, with a success rate of over 50%. To this end, it has also been proposed that we make a transition towards PhD theses that are based on a series of published articles rather than monograph form.



# 9

## SWOT-analysis

### STRENGTHS

A considerable and enviable resource base through the confederation of the Faculty of Architecture, the OTB Research Institute and the Berlage Institute, all with an extremely high international standing.

Staff is increasingly PhD-educated. The staff is well integrated into the rich practice of Dutch architecture, urban design, spatial planning, housing and the built environment.

A growing body of excellent PhD research, attracting PhD students from all over the world.

A sense of a vibrant young community of researchers interested in each other's work.

Successful in resolving the fragmentation of its research portfolio.

### OPPORTUNITIES

With its large contingent of PhD students, the Faculty of Architecture and the Built Environment can become a centre for research, not just in the Netherlands but in Europe and beyond.

Design and engineering are increasingly accepted as mature academic activities.

Cooperation with TUE and UTWente in the 3TU Federation Centre for the Built Environment.

New funding opportunities: Horizon 2020, Joint Programming Initiatives: JPI Urban Europe, and JPI Cultural Heritage & Global Change.

Top sector policies on Creative Industries and Energy Efficiency in the Built Environment pushes the boundaries of national research funding in these key areas.

### WEAKNESSES

The Faculty has not yet been successful enough in obtaining research grants from the Netherlands Organisation for Scientific Research (NWO), or the EU Framework Programmes.

The community of researchers is rather pessimistic about the time and energy that is required to develop bids.

External funding of specific research groups lags behind.

Rather weak academic journal culture.

Unsatisfactory PhD duration and completion rates.

Staff shortage in specific groups and vacancies.

Lack of leadership in some research groups.

### THREATS

TU Delft austerity measures have reduced direct funding of specific research groups.

On going crisis in the building sector.

Financial cut backs in governmental spending.

Increasing teaching duties.

A lack of prospect of tenure for promising young researchers.

### 10.1 Strategic planning

The Faculty of Architecture, the OTB Research Institute and the Berlage Institute have joined forces to benefit from their mutual strengths and reputations. While the Faculty of Architecture and OTB merged into the Faculty of Architecture and the Built Environment, the Berlage Institute remains a semi-autonomous unit that provides postgraduate education. However, all PhD research is integrated into the Faculty's Graduate School of Architecture and the Built Environment. The overall aim is to expand the body of PhD research through externally or self-funded PhD candidates. The GS A+BE will become the most strategic tool to improve the embedding, quality and effectiveness of PhD research.

Internationalisation will be a key requirement in the future. In this respect, the Faculty is planning to become more involved in research at the European level through projects funded in the frameworks of Horizon 2020, JPI Urban Europe and JPI Cultural Heritage & Global Change. Cooperation with other international partners will be facilitated through strategically positioned research centres such as those in Wuhan and Guangzhou.

The Faculty will continue to push to achieve the full spectrum of outputs that are characteristic of the discipline. In parallel, we will continue the process of rebalancing our publication output,

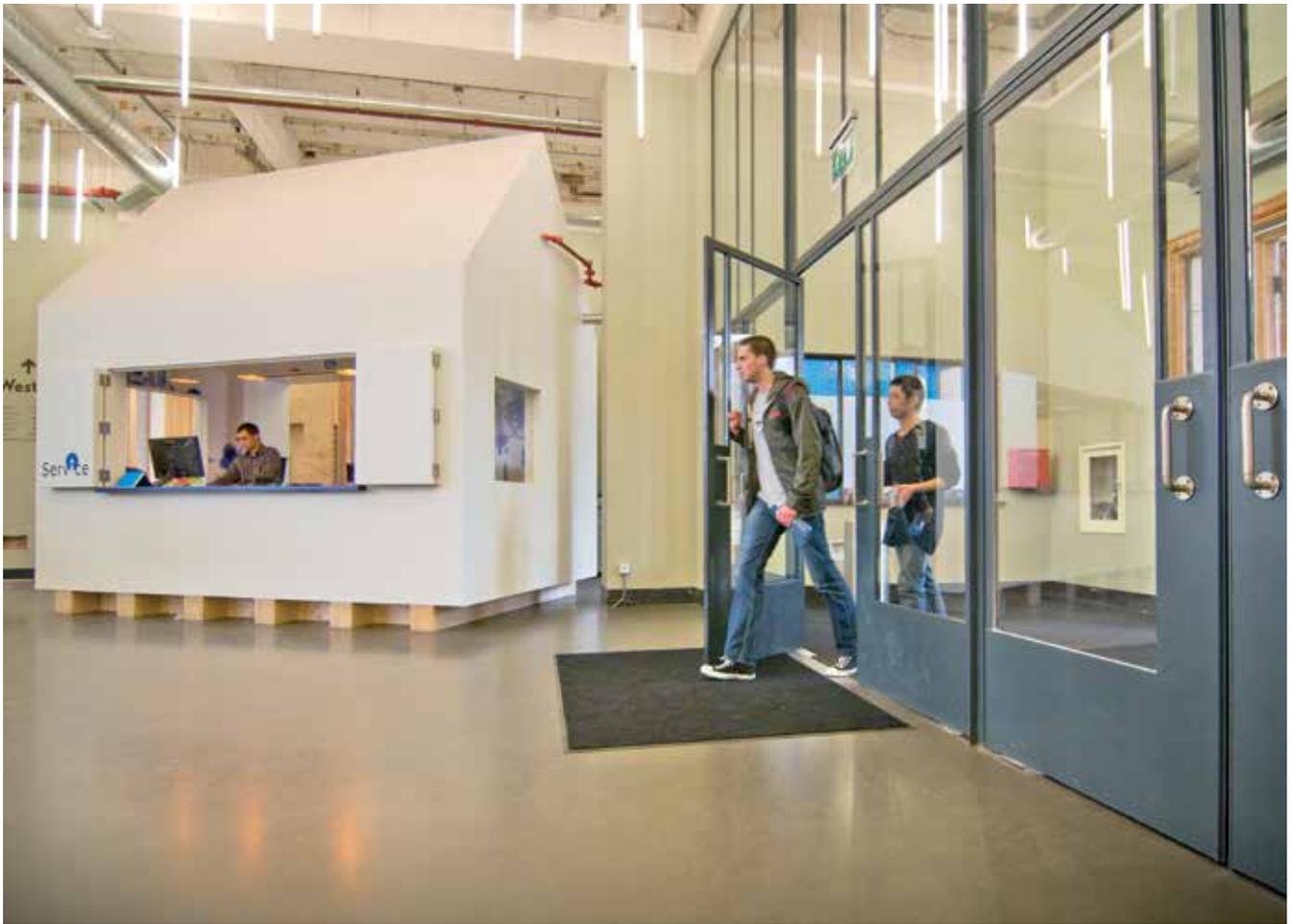
moving away from an emphasis on books and professional publications towards academic peer-reviewed papers. Our target is one good-quality academic paper per year by each member of academic staff.

### 10.2 New research topics and their prospects

We are rapidly taking up new research topics such as Energy Efficiency, Climate Change, Smart Cities and Urban Europe as they emerge in European research-funding programmes. Further topics are also being developed from the bottom up. Some examples of new topics that have been identified by the individual research groups include: architecture as public matter, the architectural project as a craft, the role of the architect, adaptive and robotic building systems, protoBIM, the legacy of the twentieth century, the challenge of vacant buildings, energy and climate, comfort and health, facades, 5D, open data, and adaptive reuse of the existing built environment.

### 10.3 Flexibility

The Faculty of Architecture and the Built Environment has moved away from PhD employees towards self-funded PhD candidates, significantly reducing staff costs. Realising a proper balance between permanent and temporary staff (i.e. stable levels of permanent staff and the growth in temporary staff) remains an important target.



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# Architectural Project and its Foundations

RESEARCH LEADERS: Prof. Dick van Gameren, Prof. Tom Avermaete PhD & Klaske Havik PhD

# 1

## Scope

### 1.1 Scientific and societal aims

This research programme focuses explicitly on architecture as *métier*, or ‘craft’ in the broadest sense of the word; a field in which making and thinking are inextricably linked. The programme regards the ‘architectural project’ as the cornerstone of architectural practice and reflection. It holds that the architectural project forms the junction where a complex combination of cultural, social, functional, economic and ecological factors is articulated as a concrete spatial proposal. This articulation requires a specific expertise that characterizes the discipline of architecture and is at the centre of the research programme. The aim of the research programme is to reposition architecture as a field of expertise with its own specific logic, rationale and instruments. While in recent years research in architecture has often implied the investigation of meta-theoretical perspectives (from the fields of philosophy, sociology, social geography, etc.), the focus on architecture as ‘craft’ and ‘project’ entails a return to the history, tools and paradigms of the discipline.

While the programme aims to ensure a better and more systematic dissemination of the research results within the larger international scientific community, its focus on the architectural project drives the inherently societal relevance of the research. This encompasses an in-depth investigation of how architectural projects can perform at the scale of the building, the city and the territory, and a study of existing approaches,

perspectives, instruments and disciplinary boundaries. Overall, the research programme articulates a sustainable frame for future research in which pressing societal questions can coexist in a coherent manner with timeless and fundamental questions pertaining to the discipline of architecture. It explores the status of architecture as a discipline that combines practical issues of design and the intellectual questions that underlie them. This status is also reflected in the department’s educational programme.

### 1.2 Where do we stand?

In recent years, The Architectural Project and its Foundations research programme has been able to select incoming PhD candidates on the basis of their engagement with the question of the architectural project as a cornerstone of architectural practice and reflection. The PhD projects of Nelson Mota, Jorge Meijia, Birgitte Louise Hansen and Oliver Sack are examples of investigations that have a clear focus on the role of the architectural project as a full-fledged instance of architectural knowledge.

The formation of different research groups has resulted in a greater integration of research ventures across departmental chairs. Whereas previously the research remained very limited to a single chair, nowadays people of different chairs collaborate on common research fields and projects. This has been the case in, for instance, the Borders and Territories, the Revisions, and the Positions research groups. This seems especially important for PhD candidates, who can participate in these different groups and engage in dialogue with a broader range of researchers.

The output of the research programme has always been internationally oriented, but in recent years we have managed to publish some of the research results in highly rated peer-reviewed journals (Web of Science/Scopus) – for example articles by Avermaete (Journal of Architecture 2012 (2), Footprint 2011, OASE 2012), Cieraad

(Home Cultures, 2010), Grafe (OASE 2012), Havik (Footprint, 2012, OASE 2012) Milani (Footprint 2010), Mota (Footprint 2011), Radman (Footprint 2012), Riedijk (OASE 2012), Schoonderbeek (Footprint, 2010) Schrijver (Architectural Theory Review 2011, Footprint 2012), Teerds (OASE, 2012), Theunissen (Arq, 2010) and van den Heuvel (Footprint 2011) – as well as in books published by well-known international publishers, such as NAI/010 Publishers (Schrijver, Lee), Menges (van den Heuvel, Avermaete) and Routledge (Avermaete, Grafe).

### **1.3 Where do we want to be next?**

In the coming years we want to develop the three fields mentioned above. That is, we want to:

- continue the focused selection of PhD candidates in order to strengthen research groups and explore with greater consistency certain research topics;
- improve the research groups in order to make them into laboratories of exchange and development;
- maintain a high pace of publishing in peer-reviewed journals (Web of Science/Scopus).

In addition, the Department of Architecture has defined collective research foci (see 12.2) to be pursued by all research groups of the programme. This definition of collective research foci is believed to contribute to the achievement of greater concentration in formulating funding proposals to be submitted to national and international funding bodies.

# 2 Composition

**Table a. Research staff at institutional and programme level**

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	34	24,9	33	24,8	34	24,7
Non-tenured staff	15	7,15	13	6,9	15	7,15
PhD students	25	13,00	30	14	34	16
Guests	18	5,0	23	10,0	26	12
<b>TOTAL RESEARCH STAFF</b>	<b>92</b>	<b>50,1</b>	<b>99</b>	<b>55,7</b>	<b>109</b>	<b>59,9</b>

**Table b. Research staff with position in practice**

WHO	ROLE	FIRM/ORGANISATION	WHERE
Prof. Dick van Gameren	Founder, director	Dick van Gameren architecten	Amsterdam NL
Prof. Michiel Riedijk	Founder, partner/director	Neutelings Riedijk Architecten	Rotterdam NL
Prof. Kees Kaan	Founder, partner/director	Claus en Kaan Architecten	Rotterdam NL
Prof. Tony Fretton	Founder, director	Tony Fretton Architects	London UK

# 3

## Research environment and embedding

### 3.1 International and national positioning

The research programme presents itself nationally and internationally as a centre of expertise for the public and private sectors, approaching important societal issues through the concrete spatial dimension of the architectural project. For many years the research programme has maintained a strong international reputation in the fields of design-oriented and typological research, as highlighted by the various international exhibitions, publications and keynote lectures by programme members. Due to the reputation of both the department and the Delft School of Design (DSD; since February 2013, the chair of Architectural Theory), the research group as a whole is well integrated into the architecture and the built environment community. It is involved in many active national and international partnerships, both within academia and in the professional field. These contacts include various institutions, publishers, research centres and scholars at other universities. They include municipalities – such as the city of Groningen – as well as the Netherlands Architecture Institute (NAi), NAi/O10 and Routledge publishers, VU University Amsterdam, Utrecht University, Leiden University, KU Leuven, the Bartlett, ETH Zurich and Princeton University, to name a few. The programme recently initiated a structural cooperation with the Jaap Bakema Research Centre (van den Heuvel, director) at the New Institute (Rotterdam), which will offer a direct connection to an international player in the field of architectural culture and a platform for research development and dissemination. This international outreach of the programme was evaluated positively during the midterm review and will remain an important point of attention in the forthcoming years.

### 3.2 Collaboration with stakeholders

The programme's researchers maintain intensive contacts with stakeholders in various fields.

Because of the presence of a large number of high-profile practitioners in this group (professors Tony Fretton, Dick van Gameren, Kees Kaan and Michiel Riedijk), the relation to stakeholders in contemporary architectural practice is continually activated, both formally and informally. The results of the research group are disseminated to broader groups of practitioners through lectures and debates.

Members of this research group engage with national and local governments to develop or apply their research. Examples are the research project and book 'De transformatie van het schoolgebouw' (The Transformation of the School Building) (van Dam, Komossa, et al.), which was developed in collaboration with the Netwerk Bureau Kinderopvang (Childcare Network Bureau) of the Dutch ministry of social affairs and employment, and the various studies that have been undertaken in the Mapping the Randstad group, which were collaborations with and commissions from the Province of Zuid-Holland.

### 3.3 Participation in consortia

Various members of the group have played central roles in national and international research bodies, such as the European Association for Architectural Education (EAAE), the European Architectural History Network (EAHN) and DOCOMOMO. In addition, they have acquired leading positions with academic journals and publications such as Journal of Architecture, Journal of Architectural Education JAE, OASE, Architectural Journal, DASH, Footprint, OverHolland, the Routledge Series on Interiors, and the DSD publication series on Architecture and Urbanism.

Members of the group have also participated in international research networks such as the COST action ISO904 – 'European Architecture beyond Europe' (Avermaete) and most recently the funding of an NWO network of scholars around the subject of 'Tacit Knowledge' (Schrijver). From the midterm review it appears that for this particular research program strengthening the presence in international networks for funding purposes can be further explored.

## 4

## Academic reputation

## Invitations to address major conferences

YEAR	CONFERENCE	WHO	WHERE
2011	Inaugural speech at School of Architecture, University of Granada	Kaan	Granada ES
2011	Rome Biennale conference	Schoonderbeek, Lee	Rome IT
2012	Congress for Arch and Interior Design 'Changes. Contracts and Contacts', Contractworld	Fretton	Hannover DE
2012	Int Symp on Architectural Theory 'New Brutalism - Turning Point of Postwar Architecture'	Avermaete, Heuvel	Berlin DE
2012	Conference 'Spatial Thinking' at Institut für Gestaltung	Hauptmann	Innsbruck AT
2012	Invited lectures at 'Border Aesthetics' Conference	Havik, Geerts, Schoonderbeek	Tromsøe NO

## Conference organisation activities

YEAR	CONFERENCE	ROLE	WHO	WHERE
2010	'Territories of Power', Delft University of Technology	Organisation	Hauptmann et al.	Delft NL
2011	'EAEA International conference', Delft University of Technology	Organisation	Breen, Stellingwerf	Delft NL
2012	'150 Jaar Synagoge Delft', Delft University of Technology	Organisation	Riedijk, de Haas	Delft NL
2012	'EAAE/ISUF conference 'New Urban Configurations', Delft University of Technology	Organisation	Komossa, Marzot, Cavallo	Delft NL
2012	Int Symp 'Architecture and the Welfare State', University of Liverpool	Co-organisation	Avermaete, van den Heuvel	Liverpool UK

## Involvement in scientific or professional event

YEAR	EVENT	ROLE	WHO	WHERE
2012	'The Craft of Architecture Reviewed' Plein 12, manifestation ArteZ	Speaker	Schrijver	Arnhem NL
2012	'Architecture Knowledge: Designerly, Tacit, Craft?', Philosophy Colloquium, Faculty of Technology, Policy and Management, TU Delft		Schrijver	Delft NL

## Prizes, awards, competitions

YEAR	PRIZES, AWARDS, COMPETITIONS	ISSUER	WHO	WHERE
2010	BNA Kubus (BNA Cube) Award for international oeuvre	BNA	Riedijk	Amsterdam NL
2012	Regio prijs Villa BNA (Royal Institute of Dutch Architects)	BNA	Van Gameren	Amsterdam NL
2012	Incentive Prize UfD-E.ON Arch students project 'Vertical Cities Asia'	E.ON	Dixit, Mitesh	Rotterdam NL
2012	PPP Supreme Court of The Netherlands, DBFMO (1st prize)	Supreme Court	Kaan	The Hague NL
2012	City History Museum MAS   Antwerp   20.000 m2 (1st prize)	City of Antwerp	Riedijk	Antwerp BE

## Honorary positions

YEAR	INSTITUTE	POSITION	WHO	WHERE
2008-09	State Prize 'Gouden Piramide' for Excellence in Commissioning Work	Jury Member	Havik	The Hague NL
2011	Research Program 'Complex Design Penser à la Grande Échelle', École Polytechnique Fédérale de Lausanne	Jury Member	Kaan	Lausanne NL
2012	Archiprix Netherlands 2012 (best national MSc graduation projects)	Jury Member	Schrijver	Rotterdam NL
2011	Competition 'Europas Suisse'	Jury Member	Kaan	Lausanne CH

### Election to academies or academic professional associations

YEAR	INSTITUTE	ROLE	WHO	WHERE
2012	Jaap Bakema Fellowship	Board Member	Avermaete	Rotterdam NL
2010/>	Foodprint Foundation	Board Member	Van den Heuvel	Delft NL
2013	Steering committee Research, Uni of Antwerp School of Architecture	Member	Schrijver	Antwerp BE
2010	European Association of Architectural Education (EAAE)	Board Member	Komossa	Leuven BE
2010-13	European Architectural History Network (EAHN)	Officer/treasurer	Avermaete	Delft NL
2012	Piet Zwart Institute, postgraduate studies in Art, Media & Design, the Willem de Kooning Academy	Board of Advisors	Hauptmann	Rotterdam NL
2011	Thesis Board, EKA Estonian Academy of Arts, Faculty of Architecture	Member	Havik	Tallinn EE

### Evaluator of research programme

YEAR	PROGRAMME	ROLE	WHO	WHERE
2012	Research Council of Norway, SAMKUL Programme	Evaluator	Avermaete	Oslo NO
	ETH Zürich for Merit Based Academic Promotions	External Reviewer	Hauptmann	Zürich CH
2011	Education and Research Programme, Flemish Universities	Evaluator	Riedijk	Brussels BE

### Editorship academic journal

YEAR	JOURNAL	ROLE	WHO	WHERE
2010/>	Architectural Theory Review	Advisory Board	Avermaete	New York US
2011/>	Nordic. Journal of Architecture	Editorial Board	Avermaete	Oslo NO
2008/>	OASE Architecture Journal	Editorial Board	Avermaete, Grafe, Havik, Teerds	Rotterdam NL
2008/>	Journal of Architectural Education	Editorial Board	Avermaete	Washington US
2008/>	OverHolland. Architectonische studies voor de Hollandse Stad. (NL & EN) English)	Editorial Board	Engel	Delft NL
2008/>	Journal of Architecture	Editorial Board	Grafe	New York US
2009/>	Routledge Interior Series	Editorial Board	Grafe	New York US
2008/>	Footprint. Delft Architecture Theory Journal	Editorial Board	Bracken, van den Heuvel, Schoonderbeek, Schrijver, Sohn	Delft NL
2009/>	DASH (Delft Architectural Studies on Housing)	Editorial Board	van Gameren, van den Heuvel, van der Putt, Teerds	Delft NL

### Editorship professional serial

YEAR	JOURNAL	ROLE	WHO	WHERE
2012	Yearbook Architecture in the Netherlands	Editorial Board	Avermaete	Rotterdam NL

### Role in practice and policy making

YEAR	FIRM/ORGANISATION	ROLE	WHO	WHERE
2010/>	Int operating architectural firms: Claus and Kaan Architects, Mecanoo Architects, Neutelings Riedijk Architects, Tony Fretton Architects	high profile	Kaan, Van Gameren, Riedijk, Fretton	[various] EU
2012	Development of new architectural archival policy (period 1945-2000) for Dutch Architecture Institute (NAi), published as Avermaete, Ibelings, et. Al, Keuzes Maken, NAi/Dutch Architecture Inst, 2012.		Avermaete	Rotterdam NL

# 5

## Quality and relevance

### 5.1 Societal/scientific quality and relevance of the research

The research group addresses societal concerns through the encompassing and integrating qualities of the architectural project. The architectural project, by its very definition, incorporates a wide range of aspects (such as the material, the social, the cultural, the economic and the ecological aspect) into a concrete spatial proposal. This offers the possibility of opening up a particular perspective on societal questions in the realms of dwelling (changing housing needs caused by shifting demographics), public buildings (new educational or care models) and interiors (spaces for a multicultural society). As such, the research programme offers an alternative to the highly specialized and disparate perspectives on these societal concerns that are typically put forward in fields such as technology, material studies, cultural theory and real estate. The architectural project not only brings these perspectives together, but also puts forward design proposals such as new typologies, alternative material solutions and reconfigurations of spatial organization. Both perennial issues, such as sustainability, and explicitly normative questions, such as 'How do we wish to live?', are of central concern in the research activities.

The peers at the midterm review underlined that the decision to take the architectural project as a lens to confront various societal problems is a very strong point of departure. The research program is advised to maintain, even strengthen,

this perspective and use that more actively in the formulation of new research proposals. The research network on tacit knowledge that has recently been funded forms a first step in this direction, but it is advised to keep this a strong focus for future research and funding proposals.

### 5.2 Key indicators

The Department of Architecture has a strong reputation and a unique international position in design-related research (plan analysis, project analysis, method & approach analysis). This has resulted in a strong history of exhibitions and publications in the field of design typology & analysis. This kind of work is only now being understood as systematic research that appeals to scientific expertise.

Architecture is a field of research that spans design-related research methods such as those in the Delft tradition, as well as a number of relatively well-established methodologies (informed by social sciences, the humanities and the natural sciences). The contribution of this research programme primarily consists of the connection of design-led and humanities-inspired research approaches. In the light of the current attention to intangible forces in the field of architectural research, the research programme focuses explicitly on a more systematic examination of the architectural project. As such, the programme aims to offer the paradigms and tools of the discipline a more central place in architectural research.

During the midterm review it was underlined that the role as well as the knowledge of the architect is nowadays undergoing a great transformation. The peers therefore advised to keep the further investigation of changing disciplinary roles and expertise at the center of the research program and future research projects



Kees Kaan, Netherlands Embassy, Maputo

Table a. Main categories of research output

	2010		2011		2012	
	STAFF	GUESTS	STAFF	GUESTS	STAFF	GUESTS
Refereed articles	4	0	10	0	11	0
Non-refereed articles	5	0	4	0	1	0
Books	19	0	12	0	17	1
Book chapters	51	6	54	0	44	4
PhD theses	5	0	1	0	5	0
Conference papers	7	0	20	0	8	0
Professional publications	13	0	17	1	19	0
Editorships journals/book	15	1	14	0	6	0
<b>TOTAL PUBLICATIONS</b>	<b>119</b>	<b>7</b>	<b>132</b>	<b>1</b>	<b>111</b>	<b>5</b>

## 5.3 Results and outputs

### KEY PROJECTS

#### Self-funded project

*Principal Researcher:*  
Dick van Gameren, Dirk van den  
Heuvel et al.  
*Coordinator:* Acciona  
*Duration:* 12/2009 >>

#### DASH

*Delft Architectural Studies on Housing*

DASH (Delft Architectural Studies on Housing) is a thematic journal that is wholly devoted to residential design. Inquiry into historical and contemporary projects and conditions is the central focus of DASH. New types of housing but also existing models and changing trends will be thoroughly charted and examined. The target is the future: with thought-provoking analyses, DASH aims

to give new impetus to innovative housing design. Over the past few centuries, the Netherlands has built up a housing tradition that is renowned throughout the world. With its periodical DASH, the Chair of Architecture and Dwelling of Delft University of Technology (TU Delft) intends to bring the richness of housing design back on centre stage.

#### Private commissioning

Netwerkbureau Kinderopvang  
(Child care)  
*Grant:* € 130.000  
*Principal Researcher:*  
Susanne Komossa  
*Duration:* 2010 - 2011

#### OLD SCHOOL NEW SCHOOL

*research on re-use of school buildings*

Commissioned by the Netwerkbureau Kinderopvang (childcare) the faculty of Architecture of the TU Delft did research to the possibilities of the transformation of existing school buildings. What are the possibilities of how to use an existing school building in an efficient way? What does this mean for the dimension of the spaces, the

positioning relative towards each other, the use of colours, the climate and the outdoor areas?  
The research cumulated in a book that presents twenty prototypical school buildings. The book shows a theoretical substantiation of the possibilities of transform existing school buildings into 'buildings for children'.

#### Programme

Canadian Centre for Architecture  
*Grant:* € 200.000  
*Principal Researcher:*  
Tom Avermaete  
*Duration:* 2012 - 2014

#### CHANDIGARH AND CASABLANCA

*Modern Urbanism, New Geographies*

This research documents two different but complementary urban realities that have played a fundamental role in the imagination, definition, and redefinition of the twentieth-century modern city: Chandigarh, planned by a team consisting of Le Corbusier, Jeanneret, Frey, Drew, and Indian architects and planners; and the new neighborhoods of Casablanca, conceived by Écochard and a team of young French and Moroccan architects. The contemporary

gaze shifts here from the symbolic use of architecture in the construction of monumental masterpieces to the formation of public space, housing, and social facilities. Structured in the form of a glossary that presents the concepts, actors, and international organizations that drove these developments, this exploration is reinforced by visual contributions by Yto Barrada and Takashi Homma—two non-Western photographers.

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## Programme

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NWO - Dutch Programme Council  
for Educational Research (PROO)

Grant: € 35.500

Role: Lead partner

Principal Researcher:

Lara Schrijver

Coordinator: TU Delft

Duration: 6/2010 - 6/2013

## TACIT KNOWLEDGE: ARCHITECTURE KNOWLEDGE AND SCIENTIFIC RESEARCH

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This Tacit Knowledge proposal builds on the supposition that there is an uncodifiable form of knowledge embodied in the material products of architecture from treatises and drawings to models and buildings 'that, in fact, we can' know more than we can tell' (Polanyi, 1968). Yet it also proposes that certain aspects of this tacit knowledge can be articulated. Therefore, it asks questions such as: what are the types of criteria that identify the knowledge specific to architecture, and how can we enhance traditional standards of scientific research through the knowledge generated in the studio and materialized in

professional practice?

As such, it focuses on material products as the basis for evaluation and analysis.

Departing from the idea that 'designerly ways of knowing' may contribute to the criteria and approaches of scientific research in general, this project draws together a network of European scholars already working at the crossroads of design, cultural analysis, history and philosophy. In combining the efforts of reflective cultural analysis and the material propositions of design, architecture stands as a test case for a new perspective on knowledge.

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## Programme

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NWO-Veni 2012

Grant: € 229.000

Principal Researcher: Janina Gosseye

Coordinator: TUDelft

Duration: 1/2013 - 7/2016

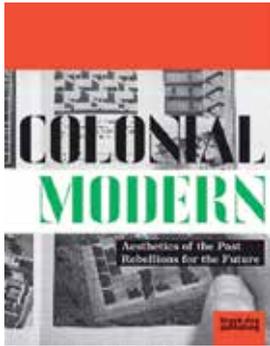
## THE POSTWAR EUROPEAN SHOPPING CENTRE: A PLACE FOR ENCOUNTER BETWEEN AVANT-GARDE DISCOURSE AND DAILY BUILDING PRACTICES, 1945-1973.

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The research focusses on a new urban figure that emerged in Western-Europe in the post-war period: the shopping centre. After the Second World War had ended, many Western European countries committed to the full deployment of a social welfare state system, which aimed at the redistribution of wealth, knowledge and political power through - amongst others - the construction of planning institutions, a new bureaucracy and, last but not least, new building programmes. From a social point of view, the post-war shopping centre (that was often privately developed) had much in common with the newly constructed welfare state centres; they both offered spatial centrality, public focus and human density. The recurrence of these qualities in both disparate developments is however not

coincidental. Following the apparent demise of pre-war modernism, the post-war avant-garde was concerned that people's sense of responsibility to their local communities was eroding and expected architecture and urban design, by causing people to identify with their immediate locale, to help buttress people's sense of belonging.

Given the strong similarities between the newly developed welfare state centres and the post-war shopping centre, this research puts forth the hypothesis that cross-fertilization occurred between the work of the avant-garde and commercial "day-to-day" building practices. The shopping centre as a new urban figure will thus be used as the vantage point to research the interaction between these two ends of the architectural spectrum in post-war Western Europe.



*Year:* 2010  
*Publisher:* Black Dog Publishing  
*Pages:* 311

### COLONIAL MODERN: AESTHETICS OF THE PAST, REBELLIONS FOR THE FUTURE

*Tom Avermaete, Karakayali Serhat, Marion von Osten*

Colonial Modern: Aesthetics of the Past, Rebellions for the Future is a reader on the relationship between modernism and the project of modernisation in architecture, as well as the intertwining of both in the context of colonialism and decolonisation. Colonial Modern is a reflection of contemporary research into architectural modernism and colonialism, and uses the

thesis of “negotiated modernism” to initiate new debates on conceptions of modernism — and inevitably postmodernism — in an interdisciplinary context.



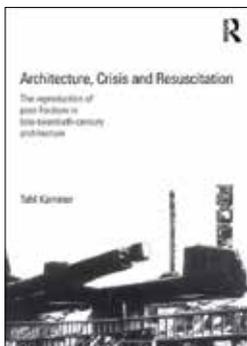
*Year:* 2010  
*Publisher:* Vantilt Publishers  
*Pages:* 224

### THE DUTCH URBAN BLOCK AND THE PUBLIC REALM: MODELS, RULES, IDEALS

*Susanne Komossa*

In The Dutch urban block and the public realm, Susanne Komossa uses typomorphological research to analyse the development of the Dutch urban block as an architectural model over the past four hundred years. The urban block is the link between city dwellers’ everyday lives and the urban public realm. This clearly written and

amply documented study calls for the small-scale urban economy and the public realm to be treated as essential components of the city when new urban plans and models are developed.



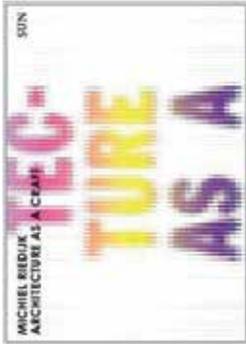
*Year:* 2011  
*Publisher:* Routledge  
*Pages:* 202

### ARCHITECTURE, CRISIS AND RESUSCITATION: THE REPRODUCTION OF POST-FORDISM IN LATE-TWENTIETH-CENTURY ARCHITECTURE

*Tahl Kaminer*

Studying the relation of architecture to society, this book explains the manner in which the discipline of architecture adjusted itself in order to satisfy new pressures by society. Consequently, it offers an understanding of contemporary conditions and phenomena, ranging from the ubiquity of landmark buildings to the celebrity status of architects. It concerns the period spanning

from 1966 to the first years of the current century — a period which saw radical change in economy, politics, and culture and a period in which architecture radically transformed, substituting the alleged dreariness of modernism with spectacle.



Year: 2011

Publisher: SUN architecture

Pages: 236

## ARCHITECTURE AS A CRAFT

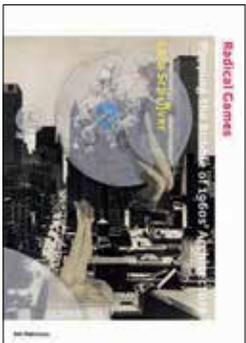
*Michiel Riedijk (ed.)*

The 15 essays in 'Architecture as a Craft' present a vision of the architectural discipline in which the essence is sought in the craft itself. The book is based on the symposium of the same name that the Delft University of Technology organised in 2009. The authors include the architects Michiel Riedijk, Sou Fujimoto and Gregg Pasquarelli.

Design without external influences Society imposes stringent demands on the designs of architects, for example in the field of sustainability. Programmes of requirements are drawn up for this purpose that exert a strong influence on the design. The contributors to 'Architecture as a Craft', however, consider that it is necessary to grasp the structure of a design without these external influences playing a role.

The craft of the architect is approached in this book from three perspectives: the Position adopted by the architect in the design and construction process, the Composition of the design, and the choice of Materials of the design. Design drawings, scale models and texts play an important role in this process. They are the products with which architects explain their position, the composition and the choice of materials of the design to others.

Michael Maltzan, Enrique Walker, Joan Ockman, Giorgio Grassi, Kersten Geers, Ungers, Emre Alturk, Gregg Pasquarelli, Sou Fujimoto, Mark Linder, Jan De Vylder, Alper Alkan, Stefano Milani, Michiel Riedijk, Christoph Gantenbein.



Year: 2010

Publisher: nai010 publishers

Pages: 248

## RADICAL GAMES: POPPING THE BUBBLE OF 1960S ARCHITECTURE

*Lara Schrijver*

Through three radical critiques of Modernist architecture, illustrated by the iconic--and very different--works of the Situationist International, Venturi Scott Brown and Archigram, Radical Games offers new perspectives on the architecture of the 1960s. It illuminates some of the pitfalls of contemporary architectural thought and questions a number of preconceptions that remain with us from the prevalent discourses of the 1960s. Perched on the cusp of Postmodernism and global capitalism, the critiques in this volume demonstrate a

perceptive understanding of Modernism, as well as contemporary conditions, such as our increasingly image-saturated society. It is also clear, however, that these radical projects were so entwined with Modernism that the architectural conversation of the 1960s was driven to an impasse, which the contemporary debate has not yet been able to escape.

## FLOWS FROM EARLY MODERNISM INTO THE INTERIOR STREETS OF VENTURI, RAUCH AND SCOTT BROWN

*Karin Theunissen*

### Publication Info

Year: 2010  
In: *Architectural Research Quarterly*,  
14(1), 53-62

In 1972 the famous diagram of the 'Decorated Shed' was introduced into the architectural discourse; it implied a definition of 'architecture as shelter with decoration on it'. The diagram was part of urban research into the commercial environment of Las Vegas that was interpreted by the researchers - Robert Venturi, Denise Scott

Brown and Steven Izenour - as 'a new type of urban form' that they meant 'to understand' in order 'to begin to evolve techniques for its handling'. Yet the critique on this and other research and designs by Venturi, Rauch and Scott Brown focused essentially on questions of form and more specifically of the image of architecture.

## HOMES FROM HOME: MEMORIES AND PROJECTIONS

*Irene Cieraad*

### Publication Info

Year: 2010  
In: *Home Cultures*,  
7(1), 85-102

This article presents an interpretation of home, in which home is not fixed in time and space, but is reinvented time after time in different locations. Memories and projections are the quintessential links in a lifetime cycle of home inventions. This is the predicament of most urbanites in Western countries for whom a lifetime stay in the natal home or the natal town have become an exception. In concentrating on the material level of homemaking, especially on objects and object-related practices in the

reinvention of home, this article addresses the intermediary role of objects, not only in reviving memories of past homes, but also in linking present homes to future homes. The case of Dutch university students is presented to illustrate not only the material conditions of a lifetime cycle of reinventions of home in different locations, but also the psychological conditions of home attachment as mirrored in the discursive transition of home.

## UTOPIA AND/OR SPECTACLE? RETHINKING URBAN INTERVENTIONS THROUGH THE LEGACY OF MODERNISM AND THE SITUATIONIST CITY

*Lara Schrijver*

### Publication Info

Year: 2011  
In: *Architectural Theory Review*,  
16(3), 245-258

The Situationist International introduced the creative, psychological, desiring individual as a counterweight to the utopian schemes of the modernist city. The resistance formulated throughout situationist principles underlies many contemporary activist urban practices. Nevertheless, the situationist approach to the city incorporated an affirmation of utopian thought. This totalizing aspect of modernist thought, still present in

contemporary discourse, constrains our understanding of the potential of micro-interventions in the city. Although the "right to the city" may be crucial to reclaiming an active engagement with our urban environment, this paper discusses some limitations of situationist ideas, arguing that current urban practice requires a new discourse beyond the by now well-known frame of resistance and negation.

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## BETWEEN POPULISM AND DOGMA: ÁLVARO SIZA'S THIRD WAY

*Nelson Mota*

### Publication Info

Year: 2011

In: *Footprint*,  
8(1), 35-58

In the early 1980s, Kenneth Frampton presented critical regionalism as an umbrella concept to frame some peripheral architectural practices that became instrumental to illustrate an alternative approach both to the modernist dogma and to post-modernist reactions. The architecture of Álvaro Siza was one of those marginal practices frequently used to illustrate that alternative position.

In this paper I will bring together critical regionalism and its critique to explore the possibility of its role as a mediator between dogmatic applications of the modern canon

and populism. Critical regionalism will be discussed within the broader frame of the redefinition of hegemonic relationships, especially postcolonial critique, and the relation centre-periphery. Using Siza's project for the Malagueira neighbourhood in Évora (Portugal) as support, I will argue that the architect's approach created a third way between populism and avant-garde, and represents a re-foundation of the avant-garde, where the gap between high culture and the everyday is shortened, through the use of a mediation strategy supported by the architectural project.

## 'NEUES BAUEN IN AFRIKA': DISPLAYING EAST AND WEST GERMAN ARCHITECTURE DURING THE COLD WAR

*Tom Avermaete*

### Publication Info

Year: 2012

In: *Journal of Architecture*,  
17(3), 387-405

The transfer of knowledge about urban planning and architecture from the socialist East and the capitalist West to the post-colonial South was in the case of Germany not only a matter of built projects or experts. Important vectors for the migration of architectural and urban knowledge were public exhibitions.

This paper focuses on the 1966 exhibition 'Neues bauen in Afrika: Ausstellung der heutigen afrikanischen Architektur' by the critic and historian Udo Kultermann in the Kongreshalle in Berlin, as well as on the 'German Mobile Exhibition' that travelled 24,000 km throughout Africa between 1961 and 1963 and in which German architecture and housing played an important role.

The first exhibition was commissioned by the Deutsche Afrika-Gesellschaft, a state-sponsored association that was initiated 'to clarify what may be expected in Germany of various territories in Africa and what we can

do for its development', while the second was a joint initiative of the ministries of Foreign Affairs and Development Aid that was considered as 'a countermeasure to the strong presence of the Eastern Bloc in the African region'. Indeed, both exhibitions were reactions to the architectural and urban policy of the DDR in Africa, which was presented to a broad public in the 1969 nationwide exhibition 'Architektur und Bildende Kunst. Ausstellung zum 20. Jahrestag der DDR' and defined in its turn as a weapon against imperialism and as assistance to the birth of post-colonial nations.

The paper argues that in 1960s' Germany exhibitions on architecture and urban planning in Africa were not only important vectors for the transfer of knowledge, but also the sites of a harsh symbolic battle between East and West that articulated a view of modern architecture as simultaneously oppressive and emancipatory.

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## BRIDGING: THE SPATIAL CONSTRUCTION OF KNOWLEDGE IN ARCHITECTURAL RESEARCH

*Klaske Havik*

### Publication Info

Year: 2012  
In: Footprint,  
10/11(1), 59-66

This contribution proposes an interdisciplinary approach to architectural research, and states that composition is a methodological act of research. It will first argue that architectural research and practice can gain from a multi-perspectival approach, bringing in knowledge from different fields – in this case the field of literature. Referring to the author's recently finished dissertation, it proposes a literary approach to architecture and the city, and explains how the ambiguities

of architecture (subject-object, author-user and reality-fiction) can be addressed by literary means. Then, it makes clear that bringing together knowledge from different fields requires an act of composition. It argues that knowledge can be seen as a spatial construction rather than a linear one, and that the mediating capacity of the architect offers researchers with a background in architecture the possibility to develop such spatial research compositions.

## THE RIVER AND THE FERRY: A BRIEF REFLECTION ON ALAN COLQUHOUN'S 'TYPOLOGY AND DESIGN METHODS'

*Michiel Riedijk*

### Publication Info

Year: 2012  
In: OASE Journal for Architecture,  
87(1), 104-111

'Typology and Design Methods' (1967), perhaps Colquhoun's most famous text, is a meandering text, argues Dutch architect Michiel Riedijk in his contribution. Colquhoun is looking for the link between form and meaning in architecture, a theme that remains unaddressed today. This is precisely why Riedijk considers the text still relevant today. Riedijk reads the text against the background of the debate waged several years after the publication of 'Typology and Design Methods', in which two extremes were

championed. On the one hand architecture was understood as a linguistic system, whereby perception was kept out of the picture, while on the other hand meaning was separated from form by linking it purely to decoration. German architect O.M. Ungers adopted an intermediate position, arguing that the link between form and meaning in architecture is layered and ambiguous. In the process, Riedijk argues, Ungers managed to circumvent the cultural dilemmas Colquhoun outlined in his text.

## KEY DISSERTATIONS



Year: 2010

Publisher: TU Delft

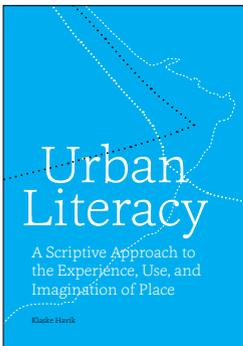
Pages: 388

### FROM PENSER LA VILLE TO FAIRE LA VILLE: BRUSSELS' AND ARCHITECTURE'S ENGAGEMENT WITH THE REAL

*Isabelle Doucet*

This dissertation looks at the multiple workings of the Brussels' 'real', and disentangles the multifarious agencies that are 'at work' in the production of architecture. At stake, therefore, is the careful understanding of why, in Brussels, architecture proves to be such a harsh business. At stake is also what nourishes and takes tremendously good care of the Brussels' 'fear of the new', which, four decades after the urban traumas of

Bruxellisation (referring to the destruction of a city by developers and architects) still haunts architecture. This dissertation attempts to problematise the production of architecture, because it allows for adopting partial, even unexpected perspectives on the 'Brussels Situation', while it looks into the workings of architecture theory, and the tensions that accompany theory's endeavours vis-à-vis architecture's agency in the world.



Year: 2012

Publisher: TU Delft

Pages: 243

### URBAN LITERACY: A SCRIPTIVE APPROACH TO THE EXPERIENCE, USE AND IMAGINATION OF PLACE

*Klaske Havik*

This research addresses the effect of energy performance regulations and occupant behavior on energy consumption for space and water heating in dwellings built after the introduction of the energy performance regulations in the Netherlands. The results of this research show that improving the energy efficiency of buildings alone is not

enough to decrease that energy consumption. The large differences found in the use of dwellings indicate that, especially in energy efficient houses, occupant behavior provides an opportunity for further reductions in the energy consumption for space heating which could boost the efforts to conserve energy worldwide.



Year: 2012

Publisher: Eburon

Pages: 308

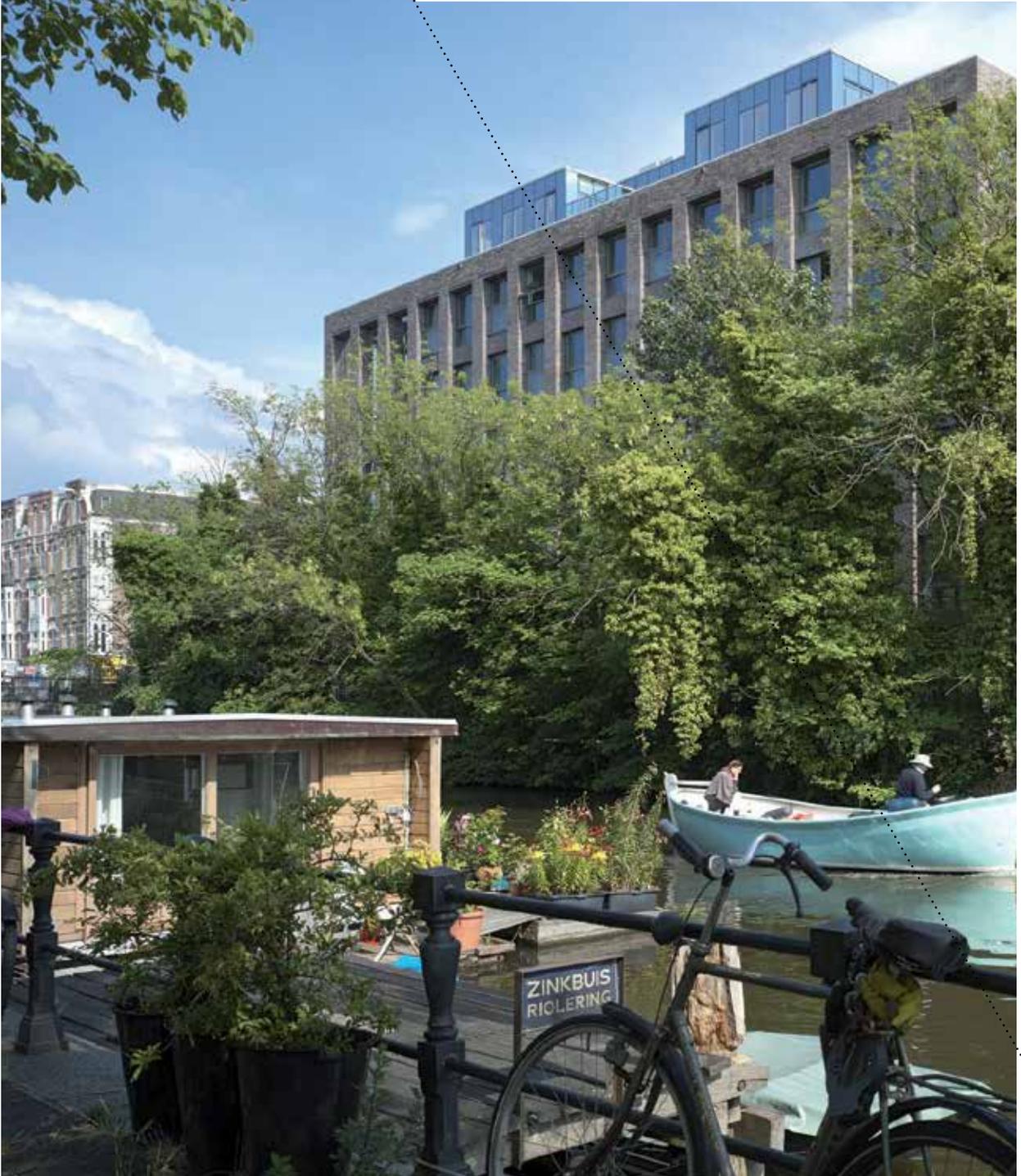
### DE TOEGEVOEGDE WAARDE VAN ARCHITECTUUR VOOR DE ZORG IN ZIEKENHUIZEN

*Colette Niemeijer*

The motivation for this study arose from the observation that the opportunities that architecture as an independent discipline has to offer in healthcare are yet to be fully explored. Architecture is generally viewed as a cost factor - constrained by predefined functional, material and financial specifications to dealing with little more than design and styling of healthcare buildings. At best, this

results in an attractive environment for employees and patients, while the potential contribution of architecture to value creation in the core business of the hospital often goes neglected. The objective of this thesis is to gain a better understanding of the 'added value of architecture' to healthcare in hospitals.

Tony Fretton, Solid 11, Amsterdam



## KEY EVENTS

### ENVISIONING ARCHITECTURE CONFERENCE 2011

*10th conference of the European Architectural Envisioning Association (EAEA)*

#### Info

*Date:* 2010, March 24th-25th  
*Place:* Delft

A call for abstracts for the 10th EAEA conference led this year to more than fifty proposals, from which forty papers have been selected for presentation and publication at the conference. The contributions will be from international institutions from Europe the United Kingdom, Germany, the

Netherlands, Belgium, France, Italy, Portugal, Poland, Slovakia, Austria and Turkey), the Americas (Brazil and the United States) and the Far East (Taiwan, Malaysia, the Philippines, Korea, Japan and New Zealand). All papers concentrate on the themes of composition, perception, representation and education.

### TERRITORIES OF POWER: "CONFLICT URBANISM & POLITICS"

*DSD colloquium*

#### Info

*Date:* November 5th 2010  
*Place:* Delft

The Delft School of Design (DSD) is to organise a colloquium on the topic 'Territories of Power: Conflict Urbanism & Politics'. Lecturers from the Netherlands and other

universities will shed their light on the theme of urbanism and politics. The colloquium is a collaboration between the departments of Architecture and Urbanism.

### ALISON & PETER SMITHSON, THE ART OF INHABITATION

*exhibition in NAIM/Bureau Europa*

#### Info

*Date:* 2011, Dec 2011-Mar 2012  
*Place:* Maastricht

The exhibition 'Alison & Peter Smithson, The Art of Inhabitation' compiled by Max Risselada shows the work of the English architecture couple Alison and Peter Smithson, and shows the Smithsons' ideas on private housing: a place the inhabitants should be able to 'make their own'. The spaces within the house should in other words offer the possibility

to accommodate the individual needs and patterns of use of the occupant. Through original drawings, numerous photographs and purpose-built scale models, the exhibition shows various projects, including homes and designs for various contests. In addition, Alison Smithson's collages, which served as anthropological forms studies, are on view.

### NEW URBAN CONFIGURATIONS

*EAAE / ISUF International Conference*

#### Info

*Date:* 2012, October 16th-19th  
*Place:* Delft

The Faculty of Architecture of TU Delft organized in cooperation with the EAAE and the ISUF the international conference 'New Urban Configurations'. The conference addressed the following sub themes:

- Innovation in building typologies;
- Infrastructure and architecture;
- Complex urban projects;
- Green spaces: the city and the territory;
- Delta urbanism: Living with water in the urban Deltas.

# 6

## Earning capacity

### 6.1 Success and vision on how to obtain research projects

The Department of Architecture has continually made efforts in recent years to participate in international research funding proposals, as collaborators or initiators/coordinators. The following are some of the projects we have participated in:

- January 2010: Participant in Humanities in the European Research Area (HERA) project 'Architecture and Cultural Identity in Europe 1945-2000' funding for elaboration of proposal.
- September 2010: Project 'Old School New School - research on reuse of school buildings', funded by Netwerk Bureau Kinderopvang, Ministerie van Sociale Zaken en Werkgelegenheid.
- March 2011: Nuffic scholarship - funded Tanovic PhD
- May 2011: Project 'Building a digital research environment as a tool to enhance transnational and comparative research on European colonial built heritage (1850-1970), funded by NWO (Dutch Research Council)
- September 2011: Coordinator - 'Nomadic Norms and Forms: Reconsidering the Transnational Practice of Urbanism (1945-1975)', NWO (Dutch Research Council) Internationalization of the Humanities project proposal.

Table a. Research funding

FUNDING	2010		2011		2012	
	K€	%	K€	%	K€	%
Direct funding	1012	72%	1010	83%	890	92%
External funding (total)	399	28%	209	17%	79	8%
Coverage Contribution	96	70	70	-	57	-
Results finished projects	-6	-	-5	-	3	-
Acquired project funds	309	-	144	-	19	-
<b>TOTAL FUNDING</b>	<b>1.411</b>	<b>100%</b>	<b>1.219</b>	<b>100%</b>	<b>969</b>	<b>100,00%</b>
EXPENDITURE	K€	%	K€	%	K€	%
Staff costs	1096	91%	1003	91%	790	92%
Other costs	112	9%	100	9%	66	8%
<b>TOTAL EXPENDITURE</b>	<b>1.208</b>	<b>100%</b>	<b>1.103</b>	<b>100%</b>	<b>856</b>	<b>100%</b>

- September 2011: Coordinator 'Negotiating Modernism: A New Perspective on Modern Architecture. Casablanca and Chandigarh Revisited.' Project proposal in programme Collaboration FWO (Flemish Research Council) and NWO (Dutch Research Council).
- October 2011: Huygens Scholarship - funded Komez PhD
- May 2012: 'Bloemkoolwijken' project funded by Bouwfonds
- May 2012: Partner - 'Standardization as Intercultural Translation.' Programme: Humanities in the European Research Area (HERA) JRP Outline
- October 2012: Coordinator 'Creative industry - Changing Public Realm, towards new architectural models of 'verdure'', NWO (Dutch Research Council) Creative industry programme
- October 2012: 'Creative Industry: The pre-design design - design as a strategic tool in the initial phase of complex projects.' NWO (Dutch Research Council) Creative industry programme
- March 2013: Partner: 'Material development to develop models for blind and visually impaired.', funded by Dutch Architecture Fund
- July 2013 Coordinator 'Health and the City. A survey of the health effects of architectural and urban interventions in Western and Central Europe, 1800-2000.' Programme: NWO (Dutch Research Council) - Free Competition Humanities

The department considers all of these submitted funding proposals as learning experiences. They have not only served as lessons in the writing of good research proposals, but have also helped to create a network of partners that can be activated when research opportunities emerge. The department is increasingly coordinating the formulation of funding proposals, and will continue to initiate and participate in research projects in the coming years. Moreover, the department has decided to prioritize particular themes of research

and to pursue these with greater intensity than previously. The department is in the process of formulating particular research foci that will be given more time and attention to develop funding proposals and research networks. This implies that within the research programme, proposals will be formulated with the participation of different groups and chairs.

## 6.2 Overview of key projects

- NWO-Veni: European Shopping Centre: A Place for Encounter between Avant-garde Discourse and Daily Building Practices, 1945-1973
- NWO: Tacit Knowledge.

# 7 Valorisation

## 7.1 Means used to transfer knowledge

The department has a long tradition in valorizing its research not only through standard academic channels, such as journals, lectures and books, but also through exhibitions and seminars for a broader public of professionals. The research results of this programme are typically disseminated through articles and books that are aimed not only at academics but also at a broader readership. In addition, many researchers publish public versions of their work in periodicals such as *De Architect* (the primary Dutch professional magazine on architecture) or on *Archined* (an important digital forum on architecture and urbanism).

International exhibitions play a central role in the dissemination of research results. Many of the outcomes of this research programme are presented as (or as parts of) major exhibitions at important cultural institutions and are reaching a broader audience, such as the Dutch Architecture Institute (NAi, Rotterdam), Architecture Biennale (Venice, Italy), Canadian Centre of Architecture (CCA, Montreal), Cité de l'Architecture et du Patrimoine (Chaillot, Paris), Design Museum (London) and Haus der Kulturen der Welt (HKW, Berlin).

## 7.2 Users of the knowledge

Many books and especially exhibitions resulting from this research programme are reviewed and discussed in the professional and general press (newspapers, magazines, websites). The introduction of the research results in the public media demonstrates the resonance of the research with broader societal concerns. The large variety of publications in which our researchers have a central role (*DASH*, *Footprint*, *Routledge Interior Architecture Series*, *DSD Series on Architecture and Urbanism*, *OverHolland*, *OASE*, *Journal of Architecture*) contributes to the broad sociocultural valorization of research results. As a result, many of the programme's research results either directly or indirectly influence design practices, as well as broader sociocultural debates on the built environment and related issues.

### 8.1 Topics

PhD candidates in the Architecture research group traditionally follow a relatively individualized research track, supported primarily by their supervisor(s) rather than coursework. This autonomous research track is supported by basic integration into the department's wider research groups, which share research topics and methodologies.

### 8.2 Supervision

The research programme itself offers a foundation for the PhD candidates to develop their skills: it is divided into projects that are staffed by researchers who differ in their degree of experience and involvement. Each project is headed by a senior researcher (a professor or associate/assistant professor level with a PhD) who has a more substantial research appointment. This project leader is supported by other experienced staff (associate/assistant professor level) and a limited number of junior researchers or other PhD candidates.

The department has been actively investing in the development and further professionalization of a three-fold system of support for PhD candidates. The primary supervision responsibilities are carried by the main supervisor (a professor within the department) and, when possible, an additional day-to-day supervisor (an associate or assistant professor with a PhD degree). At the secondary level (bringing together all PhD candidates within a research project or chair), we organize small PhD

seminars that are based on a close reading of texts and discussions on both method and content. The third level (bringing together all researchers in the department) consists of peer-review colloquia, which we organize two or three times a year. During these seminars, external specialists in the relevant research fields are invited to give their opinions on the work of the PhD candidates. A month prior to the colloquium, a reader containing texts by the candidates is prepared as a basis for these discussions. Each PhD candidate is required to participate in at least two peer-review colloquia, namely one after the first year of research (outline presentation) and one after approximately 2.5 years (chapter presentation).

### 8.3 Success rates

PhD candidates in the Architecture research group can generally be divided into two categories: staff members who have educational duties alongside their research duties, and PhD students who have a research contract (internally or externally funded). The latter complete their PhDs within the limits of the projected timeframe, whereas the former generally take longer than four years to complete their PhDs due to their heavy teaching load. Although the number of PhDs is not very high, the department has made substantial progress in recent years in attracting PhD researchers who have completed their research work.

### 8.4 Resources

PhD candidates of the Department of Architecture can benefit from the various general courses offered by the Graduate School of TU Delft (such as technical writing in English, software skills). Faculty-wide Graduate School courses focusing on developing research skills (writing abstracts, research methods, organizing data) are being developed.

In addition, to complement the university-level and faculty-level initiatives, the department of architecture is developing a stronger framework of specific research education. This will take the

form of PhD seminars focusing on architectural research approaches and methodologies, as well as on the specific themes of the research programme (postwar architectural culture, the instruments of architecture, etc.). These seminars are being developed in the various research groups.

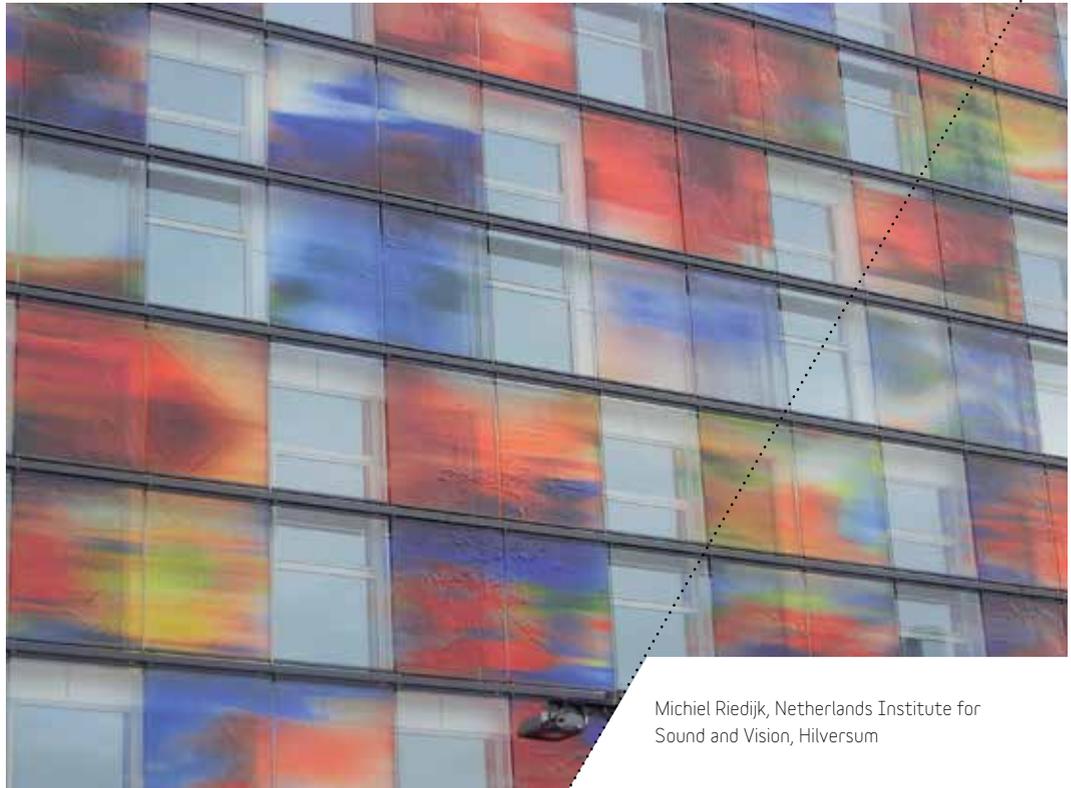
### 8.5 Funding

The funding of PhD research remains a strong concern for the department. Although a large portfolio of our PhD candidates come with their own funding, it is our ambition to obtain externally funded research projects that can support new PhD candidates.

### 8.6 Attractiveness

Given the large number of unsolicited PhD applications, most often by candidates from beyond the Netherlands, pursuing a PhD at the Department of Architecture seems to remain very attractive for a series of international candidates. The reputation of TU Delft's Faculty of Architecture and the Built Environment, as well as the international radiance of the research performed at the Department of Architecture of the TU Delft contributes undoubtedly to the attention that is given by PhD candidates to the research programme.

It is the intention of the Department of Architecture to keep this radiance as strong as possible in order to attract the PhD candidates that are able to offer the highest quality level of research, as well as contribute most effectively to the research priorities of the Department.



Michiel Riedijk, Netherlands Institute for Sound and Vision, Hilversum

# 9

## SWOT-analysis

### STRENGTHS

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One of the greatest strengths of the department is the diversity, energy and enthusiasm of its junior staff. This has endowed us with a strong innovative capacity and the ability to explore beyond the established boundaries of research and the structure of the chairs.

The department's international orientation has aided in improving intellectual exchange. Members of the research staff are active in both formal and informal international networks. In addition, there are a great number of foreign students at the Master's level, and most of them chose to study at Delft specifically because of the reputation of Dutch architecture.

### WEAKNESSES

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A significant weakness is the ability to acquire external funding. The faculty is mainly dependent on direct government funding. This poses a threat to the viability of research, particularly in the light of current budget constraints. The Netherlands Organisation for Scientific Research (NWO) does not have a category of research funding that accommodates the design disciplines. When requesting funds, the department must choose between the humanities, the applied sciences or the social & behavioural sciences. Although architecture shares characteristics with all of these areas, there is no perfect fit with any of them.

### OPPORTUNITIES

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The programme brings together the various research strands, allowing the different perspectives and methodological approaches to complement rather than compete with one another. The peer-review colloquia have played a central role in fostering an atmosphere of open academic debate, as well as offering PhD candidates the opportunity to connect with renowned international scholars.

### THREATS

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The main challenge in the coming years will be to create and maintain more cohesion than has previously been the case, without losing the energy generated by the personal efforts of individual researchers. In other words, we must guarantee a certain level of autonomy while encouraging greater collaboration and more exchange of ideas; this is the central task of the new research programme.

### 10.1 Strategic planning

The knowledge base of architecture resides not only in analytic study but also in the creative generation of design solutions found in the studios. A number of our most innovative studio teachers have begun to make systematic inventories of their studio approaches and results. It is the intention of the department to continue to evaluate the design studios as laboratories for research by design.

This same exploration of the discipline forms the strategy to approach the funding institutions. If architecture typically falls short by adhering to the traditional categories of scientific research, the Department of Architecture holds that it is time to put forward robust categories of academic research in the design disciplines. By emphasizing the qualities of the discipline itself, such as the exploratory qualities of design and the scientific aspects of analysis, the department stands to encourage innovative research in the field itself, and perhaps achieve more success in acquiring funding along the way. Indeed, the focus of the department on the architectural project as a lens to investigate societal issues is considered a strength, which should as well be brought to the fore in acquiring research funding.

The Department of Architecture, through its size and its active members in various professional networks, is well connected. It is the ambition of the department to strengthen this presence in international networks and to use our international

connections for joint projects and applications. Furthermore, the department aims to solidify the program by even more clearly formulating the foci along which the different groups within the program are developing their research. These foci will play a role in filtering the many PhD applications the Department receives.

### 10.2 New research topics and their prospects

The department has recently defined three main collective research foci that will be pursued by different groups. The foci are:

#### ***Architecture as Public Matter***

A central focus of the department's research programme is the public character of architecture. In contradistinction to conceptions of architectural design as an isolated act of form-finding and form-making, the research programme proposes to regard architecture as a public matter that actively engages with its urban or territorial condition. This implies investigations into the various ways that architecture can contribute to innovative definitions of the public realm through the articulation of large interiors, public buildings, housing and complex projects.

#### ***The Architectural Project as Craft***

The department's research programme explicitly focuses on architecture as a *métier*, or craft. While in recent years, research in architecture has often implied a quest for intangible forces, the focus on architecture as 'craft' and 'project' entails a return to the memory, tools and paradigms that are at the core of the discipline. This encompasses an in-depth investigation of how architectural projects can perform at the scale of the building, the city and the territory (The Architectural Project sub-programme) as well as a study of existing approaches and perspectives, instruments and disciplinary boundaries (the Foundations sub-programme).

#### ***The Role of the Architect***

The department's research programme examines the development of modern architectural practice,

Dick van Gameren, Villa 4.0, Naarden



focusing on the changing definitions and positions of the architect, with the goal of providing new perspectives on how we design and build today. The focus is on the positions that architects have been taking vis-à-vis clients, construction industries, other artistic practices (fine arts, photography) and design professions (engineering, industrial design) as well as the related definitions of the figure of the architect, ranging from artistic genius to facilitator and developer.

### 10.3 Flexibility

The Department of Architecture has an enormous investigative capacity from the perspective of both design-led research and more academically oriented research. This capacity should be

activated for departmental research projects. We believe that The Architectural Project and its Foundations research programme can obtain a certain flexibility by coupling fundamental and applied research in more strategic ways. By defining the mentioned collective research foci the Department has set out to bring fundamental and applied research together, indeed allowing to implement the theoretical outcomes of this fundamental research into various and changing applied research projects.

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# Design & History

RESEARCH LEADERS: Marie-Thérèse van Thoor PhD & Cor Wagenaar PhD

### 1.1 Scientific aims

#### *Vision*

The Design & History research group is a joint venture of the three chairs of RMIT and the History chair. The group cooperates with the chair of Cultural Landscape Design, which is integrated in the department of Urbanism. The basis of the research programme is a shared vision: the interaction and integration of all relevant aspects pertaining to the reconstruction, restoration, preservation, revitalization and transformation of the built heritage as well as to the building technologies of the past and newly developed methods used in restoration work. The programme encompasses all scale levels, namely building materials, individual buildings and urban ensemble. It functions as a platform where scholars from different scientific backgrounds continuously exchange and enrich each other's work, either in the context of concrete objects or at a more theoretical level.

#### *Mission*

The Design & History research group aims to promote a scientifically sound approach to the built heritage, inspiring all stakeholders to carefully examine the full range of possibilities inherent in the Modification (the scale of the material), Intervention (the scale of the building) and Transformation (the urban scale). History, critical historiography, the analysis of historical building materials and the exploration of ways to prevent these from

decaying, the design of interventions ranging from material preservation to radical transformation, all these aspects require a precise assessment in order to facilitate useful and responsible interventions.

#### *Objectives*

The objectives of the Design & History research group are threefold: to inform the general public of the historical values embedded in the built environment; to provide decision makers, planners and designers with the intellectual and practical tools needed to approach conservation and restoration interventions in the most responsible way that scientific research and practical expertise can provide; and to unravel the often quite explicit philosophical, social, cultural and theoretical implications involved in specific design approaches. Interventions of whatever type obviously require a thorough knowledge of historical technologies and the latest innovations in dealing with historical building substances.

### 1.2 Societal concerns and issues

The transformation of the built heritage has become the principal design challenge, and this will remain the case for the foreseeable future. Knowledge of the qualities that are intrinsic to the existing building stock and of the stock's technical state of conservation will become vital for realizing the full potential inherent in the built heritage. Value assessment is of the essence to distinguish those aspects that should be kept or enhanced from less vital features. What are these qualities and which among them can be seen as most relevant? Did the buildings and urban ensembles play a role in the evolution of architectural and urban typologies? What changes have occurred since their original conception? Which qualities can be seen as vital? How do the existing qualities of the built environment and the cultural values they represent relate to future interventions?

### 1.3 Research area

The research carried out by the Design & History group focuses on the built heritage. Various mutually interconnected fields can be distinguished:

#### ***Architectural history***

- Interaction between the evolution of the disciplines and the social, economic and cultural context, including building typologies;
- 'spatial philosophies': utopias and concepts of style.

#### ***Policy, Process & Heritage Theory***

- Administrative and legal procedures in the production of architecture and urbanism, with a focus on conservation issues, including the European scale level;
- Urban conservation and regular planning;
- Unesco World Heritage;
- Design with Heritage;
- the Dutch Belvedere experience.

#### ***Mapping history***

- Mapping Randstad Holland (12th–21st century);
- Database of European colonial heritage 1850–1970;
- Urbanization in the Netherlands 1000–2000.

#### ***Interventions: Reflections & Design***

- Biographies of great buildings/monuments (restoration, intervention and practical analysis);
- Buildings of the faculty and the TU Campus: history and transformation;
- Connecting values;
- Digital highway of interventions (materials, technology, structures, maintenance, functions).

#### ***Innovative Conservation, Materials & Technology***

- The reuse of buildings and the preservation of the historic, artistic, authenticity, etc. value of existing materials and the durability of the intervention have to be balanced;
- Mastering and balancing of both aspects can only be achieved on the basis of in-depth knowledge.

### 1.4 Position

Although the Design & History group acts as a consistent and unified research group, its members belong to one of two departments: Architectural Engineering & Technology, or Architecture. If plans to incorporate the chair of Cultural Landscape Design go ahead, the department of Urbanism will also be involved. Within these departments it is taken for granted that these members provide their services to all departments of the Faculty of Architecture.

# 2 Composition

Table a. Research staff at institutional and programme level

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	14	9.80	16	11.0	15	10.40
Non-tenured staff	8	5.20	8	5.40	6	3.80
PhD students	14	3	14	3	15	4
Guests	31	0	26	0	20	0
<b>TOTAL RESEARCH STAFF</b>	<b>67</b>	<b>18</b>	<b>64</b>	<b>19.4</b>	<b>56</b>	<b>18.2</b>

Table b. Research staff with position in practice

WHO	ROLE	FIRM/ORGANISATION	WHERE
Prof. Jo Coenen	Founder, Owner	Jo Coenen Architects & Urbanists	Amsterdam, Maastricht NL
Prof. Paul Meurs	Co-founder + owner	Steenhuismeurs B.V.	Schiedam NL
Prof. Rob van Hees	Senior Researcher	TNO - Netherlands Organisation for Applied Scientific Research	Delft NL
Dr. Barbara Lubelli	Research Scientist	TNO - Netherlands Organisation for Applied Scientific Research	Delft NL
Prof. Marieke Kuipers PHD	Specialist	Cultural Heritage Agency	Amersfoort NL
Visiting Prof. Dirk Jan de Vries PHD	Specialist	Cultural Heritage Agency	Amersfoort NL
Job Roos	Co-founder + owner	Braaksma en Roos Architectenbureau	The Hague NL
Bert van Bommel	Adv. Heritage Care	Government Building Agency	The Hague NL



Exhibition Rietveld's Universe in Centraal Museum Utrecht, October 2010-February 2011.

# 3

## Research environment and embedding

### 3.1 International and national positioning

The work of the Design & History research group is internationally acknowledged as leading in its field, a position that is enhanced by the unique combination of fundamental historical research, material research and the exploration of appropriate design approaches. Its status and its unique expertise in research at different scale levels, ranging from the urban landscape to building materials and combined with historical expertise, is illustrated by the numerous international contacts and the participation of its members as organizers, members of scientific committees and/or keynote speakers at international conferences, ranging from hospital architecture to the prevention of damage caused by different damage processes in ancient buildings, and the Randstad urbanization project.

### 3.2 Collaboration with stakeholders

The scholars and scientists of the Design & History research group are well connected to national and international scientific networks. They are linked with organizations such as:

- Netherlands Organisation for Applied Scientific Research TNO;
- Cultural Heritage Agency of the Netherlands RCE;
- Royal Dutch Archeological Association KNOB (and its journal Bulletin KNOB);
- Unesco;
- ICOMOS;
- Docomomo;
- architectural offices.

### *National research institutes*

- Government building agency (RGD);
- Dutch University Institute for History of Art in Florence (NIKI).

### *National universities*

- TU-Eindhoven;
- University of Amsterdam;
- University of Utrecht;
- University of Groningen, including the University Medical Center Groningen);

### *Universities abroad*

- TU-Berlin;
- ETH-Zürich;
- KU Leuven;
- Politecnico di Milano;
- University of Granada;
- Università Federico II in Naples.

### 3.3 Participation in consortia

The members of our research group are linked to TNO, the Cultural Heritage Agency, the Government Buildings Agency, WTA, Unesco, Docomomo and Icomos Rilem, various publishing firms, the University of Groningen, the University Medical Centre Groningen (UMCG), several internationally renowned universities, the Dutch University Institute for Art History of Art in Florence, Università Federico II in Naples and Politecnico Milano (see above).

# 4

## Academic reputation

### Invitations to address major conferences

YEAR	CONFERENCE	WHO	WHERE
2010	At 'Patrimoia, la historia en al conservacion del Patrimonio Edificado'	Meurs	Quito EC
2012	Symp 'Present and Future of Preservation of Modern Architecture', Kyoto Inst of Techn	Van Thoor, Zijlstra	Kyoto JP
2012	At 'Renaissance Society of America, Session Early Modern Artists'	Korthals Altes	Washington US
2012	International Conference ICOMOS-France / ROCARE	Lubelli	Paris FR
2012	Conference Healing Architecture	Wagenaar	St. Petersburg RU

### Conference organisation activities

YEAR	CONFERENCE	ROLE	WHO	WHERE
2010	First international EAHN Conference	Advisory Comm	Nevzgodin	Guimarães PT
2011	Vijftig jaar Monumentenwet in Nederland, Symposium KNOB/@MIT/ Leiden 50 jaar Monumentenstad	Organiser & Chair	Van Thoor	Leiden NL
2012	4de Vlaams-Nederlandse Natuursteendag: Stenen van binnen, stenen van buiten - Natuursteen in de Jonge Bouwkunst	Chair, Organiser	Van Hees, Quist	Delft NL
2012	The Survival of Modern - from Coffee Cup to Plan, 12th International Docomomo Conference	Scientific Committee	Kuipers	Espoo FI
2012	Architectural exchanges between Italy and the Low Countries, 21th Annual NIKI Conference	Organiser & Chair	Van Thoor	Delft NL

### Involvement in scientific or professional event

YEAR	EVENT	ROLE	WHO	WHERE
2011	'Giuria dei Premi' for the Premio Nazionale IN/ARCH-ANCE IV Edizione, Istituto Nazionale di Architettura	Jury member	Van Bergeijk	Rome IT
2012	Prijs Vlaams Bouwmeester	Jury member	Wagenaar	Brussels BE

### Exhibitions

YEAR	EVENT	ROLE	WHO	WHERE
2010-11	'Rietveld's Universe', Centraal Museum Utrecht, Oct 2010 - Feb 2011; venues in MAXXI Rome 2011 and Vitra Museum Weil am Rhein 2012	Concept and organization	Van Thoor	Utrecht NL
2011	'Hoe zit dat?', Stedelijk Museum Kampen, July-August 2011	Concept and organization	Van Wijk	Kampen NL

### Prizes, awards, competitions

YEAR	PRIZES, AWARDS, COMPETITIONS	ISSUER	WHO	WHERE
2010	Winner of the Karel van Manderprijs 2010 for PHD thesis (Utrecht University, Leiden 2003)	Ver. van Nederl. Kunsthistorici	Korthals Altes	Utrecht NL
2010	Design project MosaeForum in Maastricht, winner of the 2010 International Architecture Award	The Chicago Athenæum	Coenen	Chicago US
2011	Rietveld's Universe, Rotterdam 2010: winner of the CICA Julius Posener Exhibition Catalogue Award 2011	CICA	Dettingmeijer, dan Thoor & van Zijl	Paris FR
2011	BK City TU Delft, winner of the European Union Prize for Cultural Heritage / Europa Nostra Award 2011	Europa Nostra	Roos (coordinating architect)	The Hague NL

### Honorary positions

YEAR	INSTITUTE	POSITION	WHO	WHERE
2010-12	Scientific committee on Natural Stone, ICOMOS	Repr. Netherlands	Van Hees	Paris FR
2010-12	Docomomo International Specialist Committee on Register (ISC/R)	Vice-chair	Kuipers	Barcelona ES
2010-12	Vereniging Hendrick de Keijser	Advisor	Kuipers	Amsterdam NL

### Election to academies or academic professional associations

YEAR	INSTITUTE	ROLE	WHO	WHERE
2012	JPI (Joint Programming Initiative) Cultural Heritage	Scientific board	Van Hees	Rome IT
2010-12	RILEM TC SAM (Strategies for the assessment of historic masonry structures with NDT) and RILEM TC SGM (Re-attachment grouting)		Van Hees	Bagneux FR
2010-12	WTA- NL- VL, (Wetenschappelijk-technische groep voor aanbevelingen inzake bouwrenovatie en monumentenzorg - Nederland Vlaanderen)	Chairman	Van Hees	Delft NL
2010-12	International Planning History Society (IPHS)	Council member	Nevzgodin	London UK

### Evaluator of research programme

YEAR	PROGRAMME	ROLE	WHO	WHERE
2012	'Innovatiegerichte Onderzoeksprogramma's IOP's', Agentschapnl, Ministry of Economic Affairs	Evaluator proposals	Van Hees	The Hague NL
2010-2013	Postdoc and Postgrad Fellowships, Irish Research Council for Science, Engineering and Technology (IRCSET)	Expert assessor	Zijlstra	Dublin IE
2011	Evaluation for grants for basic and applied research projects, financed by the Slovenian Research Agency (ARRS)	Expert assessor	Zijlstra	Ljubljana SI
2011-12	Rubicon commission, Netherlands Org for Scientific Research (NWO)	Member	Kuipers	The Hague NL
2012	Review Commission of the Arch and Build Heritage sections, KU Leuven	Member	Kuipers	Leuven BE

### Editorship academic journal

YEAR	JOURNAL	ROLE	WHO	WHERE
2010/>	Bulletin KNOB (in Dutch)	Editor-in-chief	Van Thoor	Delft NL
2010-12	Simiolus: Netherlands Quarterly for the History of Art	Editor	Korthals Altes	Amsterdam NL
2010-12	Bulletin KNOB (in Dutch)	Editor	Kuipers, Rutte	Delft NL

### Editorship professional journal

YEAR	JOURNAL	ROLE	WHO	WHERE
2010-11	Praktijkreeks Cultureel Erfgoed, Sdu Uitgevers	Editor	Van Bommel	The Hague NL
2010	Historisch-Geografisch Tijdschrift	Editor	Rutte	Utrecht NL

### Role in practice and policy making

YEAR	FIRM/ORGANISATION	ROLE	WHO	WHERE
2010-12	field "Materials" of ECTP-FACH (EU Construction Technology Platform - Focus Area Cultural Heritage)	Co-ordinator	Van Hees	Brussels BE
2010-12	NEN (Nederlandse Norm), Committee 'Moisture in Buildings' and Committee 'Cultural Heritage'	Member	Van Hees	Delft NL
2012/>	Kwaliteitscommissie Bond van Nederlandse Bouwhistorici	Member	Van Thoor	NL

# 5

## Quality and relevance

### 5.1 Societal/scientific relevance of the research programme

Finding the best ways to deal with the built heritage will be the main challenge for architectural and urban designers for the foreseeable future. The built environment incorporates a myriad of values (historical, cultural, authenticity, economic aspects, functional qualities). Reconciling them requires that they are assessed in their mutual relationships, and that is the essence of the Design & History programme. A profound knowledge of all these qualities is needed in order to explore design interventions that enrich rather than destroy them. This often confronts designers with the dilemma of whether to solve technical problems caused by decay, or simply to accept the processes of ageing. Here, the specific expertise of technological scientists is required. The Design & History research group has this expertise, and develops knowledge on risk assessment.

The quality of the publications produced by our research group meets high international standards, as illustrated by numerous reviews in the international press. Although the number of research staff has shrunk, resulting in fewer publications, the quality and the scope of publications have increased (as illustrated by a number of prizes).

The Design & History group contributes to practices and policies at various levels.

For example:

- The Damage Atlas and the MDDS (Monument Damage Diagnostic System, a cooperation with TNO) inform architectural practitioners about the prevention of damage in specific building materials;
- The Stone Atlas helps to assess the type of natural stone used in historical buildings;
- The Randstad Atlas provides valuable information on the urbanization processes of the past and can be used to inspire future policies (partly geared toward the reuse of run-down areas);
- The hospital design manual offers designers in this field a wide range of elemental choices they will have to consider.

The diffusion of these tools in the practice of conservation is effected by organizing workshops and conferences. Moreover, members of the group contribute to practices and policies in the field of cultural heritage by participating in national and international commissions that develop norms and approaches to cultural heritage.

#### **Scientific quality and relevance**

The quality of the work guided by the four chairs has been generally acknowledged. Its relevance will continue to increase since restoration, conservation and transformation make up a growing share of current practices.

The conservation and transformation of the architectural and urban heritage in a broad sense have become important aspects of the practice of architecture. However, the approach, attitude and toolbox of architects, planners and decision makers are not keeping pace with this reality. To improve and innovate the spatial quality and process quality of interventions in the built environment, it is necessary to reflect on the history of architectural ideas and how they have materialized, on conservation, and on current and previous practice of restoration and conservation. The Design & History group provides such instruments to architects, historians and actors involved in restoration, concentrating particularly on the legacy of the twentieth century.

Within the Faculty of Architecture and the Built Environment, the Design & History group embodies the historical dimension of architecture and urbanism. It expands and modifies existing fields of knowledge and positions the work of its members in the broader context of international knowledge production. Its research findings support and are directly applied in the educational activities in both the Bachelor's and the Master's programme; the renewal of the Bachelor's programme has been used to strengthen this link. The group is engaged in preserving the memory of architectural history and architectural traditions, and considers this to be a primary condition for a full understanding of the present situation and the issues involved in today's transformation processes, including that of the interventions in older buildings that took place in the twentieth century.

- The research report on the building history and assessment of the condition of and damage to the Rubenshouse portico and pavilion (a joint venture of the Design & History Group, TNO and KIT Brussels) is a key example of the impact of our work.

## 5.2 Key indicators

To measure the impact of the programme, various criteria are valid. For publications: the number of reviews. For research projects: the ability to attract funding. For the societal relevance: the role in the (international) debate on the built heritage. For the visibility of the staff members: the number of invitations for conferences and lectures at other university. In all of these fields, the Design & History Group appears to be doing quite well.

### Evidence of impacts

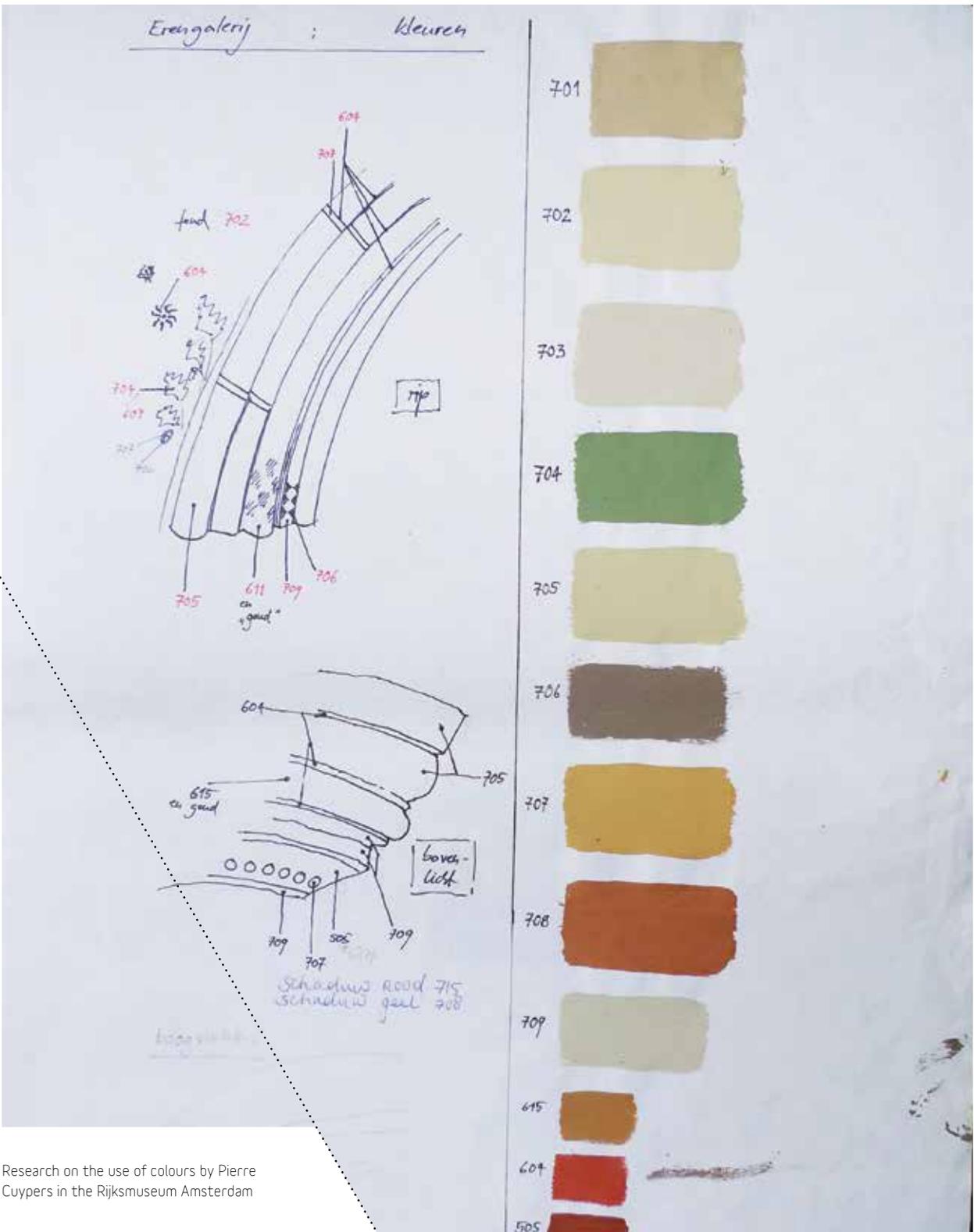
- Combined @MIT/Unesco research has resulted in a Conservation Management Plan for Olinda, and Intervention Strategies for World Heritage cities Paramaribo, Willemstad and Djenné;
- The Building Conservation (= Modification) chair of @MIT is involved in developing the Strategic Research Agenda for Focus Area on Cultural Heritage (FP7 / Horizon 2020) and is also a member of the scientific board of the JPI Cultural Heritage;

Table a. Main categories of research output

	2010		2011		2012	
	STAFF	GUESTS	STAFF	GUESTS	STAFF	GUESTS
Refereed articles	5	2	5	2	9	0
Non-refereed articles	3	5	0	0	1	0
Books	11	9	12	1	1	0
Book chapters	55	11	34	4	22	2
PhD theses	1	0	1	2	0	0
Conference papers	17	0	11	1	12	0
Professional publications	13	4	7	6	3	1
Editorships journals/book	19	2	15	0	11	0
<b>TOTAL PUBLICATIONS</b>	<b>124</b>	<b>33</b>	<b>85</b>	<b>16</b>	<b>59</b>	<b>3</b>



Reconstruction by Stichting Restauratie Atelier Limburg in the Rijksmuseum in Amsterdam during the recent restoration & transformation (finished 2013).



Research on the use of colours by Pierre Cuyper in the Rijksmuseum Amsterdam

## 5.3 Results and outputs

### KEY PROJECTS

#### RIETVELD'S UNIVERSE

*Research Exhibition and Research & Editing Publication 'Rietveld's Universe'*

##### Commissioner

Centraal Museum Utrecht  
Grant: € 90.000  
Role: coordinator/partner  
Principal Researcher:  
Marie-Thérèse van Thoor  
During: 2010

This engrossing exhibition sets out to challenge some preconceptions. Its premise is that Gerrit Rietveld (1888-1964) is still primarily thought of for just two early designs, the Red Blue Chair (1918/23) and the Schröder House (1924), and that much of his long career is overlooked. Rietveld's Universe almost refrains from giving star billing to

the house and chair. Organised thematically rather than chronologically, with displays devoted to such subjects as 'Liberating Space' and 'Simplicity and Experiment', it absorbs them both into a larger narrative. Published alongside the exhibition, the book Rietveld's Universe explores his career and critical reception in a dozen essays.

#### DIGITAL RESEARCH ENVIRONMENT EUROPEAN COLONIAL BUILT HERITAGE

*Building a Digital Research Environment as a Tool to Enhance Trans-national and Comparative Research on European Colonial Built Heritage (1850-1970)*

##### Programme

NWO -Investment Subsidy  
Medium  
Grant: € 510.000  
Role: coordinator  
Principal Researcher: Cor Wagenaar,  
Pauline van Roosmalen  
Duration: 09/2011 to 09/2014

This project involves building a multilingual repository containing digitised resources (printed material, still and moving images, archives) about European architecture and town plans realised in European colonies from 1850 until 1970. The rationale for this project is that although since the 1980s various studies on European colonial architecture and urbanism built between 1850 and 1970 have been produced, the emergence and significance of colonial modern architecture

and planning in a national and international context is often missing. In this respect research on colonial architecture and urbanism greatly lags behind other historical studies. To overcome the geographic, economic and language barriers that are the predominant causes of this hiatus - separating researchers and their resources - an open access multilingual digital repository will be constructed that facilitates online access to digitised sources.

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## Programme

### ENHANCING SELF-HEALING OF MORTARS BY BUILT-IN CRYSTALLIZATION INHIBITORS

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Agency NL (Agentschap NL)

IOP Self-Healing Materials

Program

Grant: € 325.000, acquired in 2012

Role: coordinator

Principal Researcher:

Rob van Hees, Barbara Lubelli

& Sanne Granneman

Duration: 3/2013 to 3/2017

Salt crystallization is one of the most diffused decay factors of building materials in a wide range of environments. Historic buildings are most in danger, due to salt accumulation over time. The high salt load is also a severe threat for new plasters and mortars used for restoration and repair. Restoration mortars on the market show a limited durability to salt decay and a low compatibility with the existing fabric. Van Hees and Lubelli will try to tackle this problem by the development of self-healing mortars, able to react to the

crystallization process at the very moment of damage initiation, i.e. by a responsive chemical reaction. Van Hees and Lubelli think this very promising and innovative approach may have spin-off to other materials like concrete in roads, bridges and buildings that are suffering from damage due to de-icing salts as well. Self-healing mortars will lead to a considerable improvement of construction materials, prolonging service life by enhancing durability and promoting sustainability.

## Commissioner

### RESTORATION OF THE MONUMENT OF MAARTEN TROMP

*Old Church in Delft*

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Government Buildings Agency

Role: member of the commission

Principal Researcher:

Barbara Lubelli

Duration: 2010-2012

The monument of Tromp, completed in 1658, in the Old church in Delft, is one of the most relevant funeral monuments in the Netherlands.

A survey of the monument, carried out in 2009, showed the presence of severe structural and material damage. A mirror commission with experts from different

fields was set up to support the restoration work. Dr. Barbara Lubelli was invited to take part to this committee, as expert in the field of salt damage in porous materials. In the past months the monument was dismantled, restored and reassembled. In October 2013 the monument has been re-opened to the public.



Year: 2010

Publisher: NAI Publishers

Pages: 272

### RIETVELD'S UNIVERSE

*Rob Dettingmeijer, Marie-Thérèse van Thoor & Ida van Zijl (eds.)*

The book *Rietveld's Universe* accompanies an exhibition of the same name at the Centraal Museum in Utrecht from 20 October 2010 to 11 January 2011, marking the Rietveld Year in 2010. Gerrit Rietveld (1888-1964) is one of the best known Dutch design professionals of the twentieth century. In this lavishly illustrated book, leading international scholars bring Rietveld's ideas to life and show how

his work and methods were influenced by his surroundings, his professional circle, and the social tendencies of his day. Rietveld was affiliated with De Stijl and played an important role within the Modern Movement in architecture. With more than one hundred built architectural works and many pieces of furniture to his name, he is among the pioneers of modern culture.



Year: 2010

Publisher: SUN Architecture

Pages: 248

### NOTIES

*Jo Coenen, Maarten Mesman*

This book is a series of lectures given by architect and professor Jo Coenen at the Faculty of Architecture of the TU Delft. The book is made up of eleven chapters, divided into three sections. In the first section, Coenen follows a short introduction to his vision on architecture with a statement of three central themes: Landscape and borders,

architectural 'ensembles', and continuity and innovation. A fourth theme in the book is the public nature of buildings. The book ends with a summary which discusses the Ceramique project, the wellknown magnum opus of this idiosyncratic architect, professor, ex- chief government architect, and inspirer.



Year 2010

Publisher NAI Publishers

Pages 280

### ZONNESTRAAL SANATORIUM: THE HISTORY AND RESTORATION OF A MODERN MONUMENT

*Paul Meurs, Marie-Thérèse van Thoor (eds.)*

Designed by architects Jan Duiker and Bernard Bijvoet in 1925, the former Zonnestraal Sanatorium is an icon of the Nieuwe Bouwen style, the Dutch branch of the International Style of modernism: as one of the genuine highlights of twentieth-century architecture, it has been considered for the UNESCO World Heritage List. The complex, whose name means "ray of sunshine," was originally created as a treatment center for tuberculosis patients. By the early 1960s, the buildings, which had been constructed for

limited use in concrete, steel and glass, were in ruin. After four decades of research and planning, its restoration is nearing completion under the supervision of the architects Hubert-Jan Henket and Wessel de Jonge. This publication traces the former sanatorium's past, emphasizing the battle for recognition of the Zonnestraal site's importance, its complex restoration process and providing a critical dossier on the general management of modern monuments.



*Year:* 2011

*Publisher:* 010 publishers

*Pages:* 640

## TOWN PLANNING IN THE NETHERLAND SINCE 1800. RESPONSES TO ENLIGHTENMENT IDEAS AND GEOPOLITICAL REALITIES

*Cor Wagenaar*

This overview of town planning in the Netherlands begins in the late 18th century, recording the way the Dutch rebuilt the cities they inherited from the 17th century. While focusing on the Netherlands, this study is embedded in its international setting. It is composed of seven 'geopolitical' clusters that combine - and sometimes interrelate - European and global economic structures, and contain the intellectual epicentres that inspired Dutch urbanism. Underlying the evolution of Dutch urbanism are the ideas fostered by the Enlightenment, ideas which ushered in the end of the Republic of the Seven Provinces and resurfaced time and

again; modernism, for instance, is presented as determined by them. The combination of Enlightenment ideas and geopolitical realities sheds new light on the multitude of events related here - the emergence of a national railway network that replaced the historical water-based infrastructure; the reconstruction of the landscape, first in order to boost agriculture and then to accommodate suburban sprawl; the creation of planning techniques respected throughout the world; and finally, their replacement by the sometimes nebulous forms of public-private partnerships.



*Year:* 2011

*Publisher:* College van Rijksadviseurs

*Pages:* 96

## TOEKOMST BESCHERMD GEZICHT? STADS- EN DORPSGEZICHTEN, ARCHEOLOGIE EN CULTUURLANDSCHAP

*Paul Meurs (ed.)*

Dit boek verkent verleden, heden en toekomst van gebiedsbescherming. Prof. dr. Paul Meurs formeerde een onderzoeksteam, dat een drietal essays schreef. De auteurs - Paul Meurs, Catherine Visser en Eric Luiten - reflecteren vanuit hun expertise op het bestaande instrumentarium, elk van de auteurs neemt een werkkerrein voor zijn/haar rekening.

In de monumentenzorg (in steden en dorpen), de archeologie en het landschap gaat men op verschillende wijze om met middelen tot bescherming en ontwikkeling. Het Nationaal Restauratiefonds zet zich in voor het in stand houden van monumenten, door financiering,

advisering en uitbetaling van subsidies. Het Restauratiefonds werkt daarbij nauw samen met overheden en financiële instellingen en heeft in de afgelopen jaren diverse keren onderzoek gedaan naar en gepubliceerd over beschermde stads- en dorpsgezichten. De essays worden gevolgd door een advies, waarbij ingegaan wordt op het vitaliseren van het instrument van het beschermd stads- en dorpsgezicht, zodat het toegepast kan blijven worden. Voor iedereen met belangstelling voor de erfgoedwereld kan deze bundel tot reflectie en inspiratie dienen en de discussie rondom de voortzetting van het instrument starten.

## DESALINATION OF MASONRY STRUCTURES: FINE TUNING OF PORE SIZE DISTRIBUTION OF POULTICES TO SUBSTRATE PROPERTIES

*Barbara Lubelli, Rob P.J. van Hees*

### Publication Info

Year: 2010

In: *Journal of Cultural Heritage*,  
11(1), 10-18

Cited by: 11

Desalination is a relatively new intervention in the field of conservation of architectural heritage. Especially the desalination of immovable objects, such as masonry structures, is still a trial-error practice. In the field, different desalination materials and methods are used, sometimes with unsatisfactory results. Better understanding of the desalination process is needed in order to support the conservator with clear guidelines for choosing a suitable desalination material and method. The research presented in this paper constitutes the first step towards the development of a modular system of poultices, which can be adapted, i.e. fine-tuned to different types of substrates. Starting point is to make use

of advection, i.e. the transport of salt ions with water flow. This transport mechanism is faster than diffusion and the application on immovable objects is relatively easy. In order to optimize salt extraction, a poultice working by advection should have smaller pores than the substrate. Starting from this principle the pore sizes of different desalination materials (sand, cellulose, kaolin and bentonite) mixed in different proportions, have been measured. Interesting results were obtained, showing that the desalination materials commonly used in the field are often not the most suitable ones. On the basis of the results, recipes for poultices, adapted to a specific substrate, can be formulated.

## EFFECT OF MIXED IN CRYSTALLIZATION INHIBITOR ON RESISTANCE OF LIME-CEMENT MORTAR AGAINST NA CL CRYSTALLIZATION

*Barbara Lubelli, Timo Nijland, Rob P.J. van Hees & Anke Hacquebord*

### Publication Info

Year: 2010

In: *Construction and Building  
Materials*, 24(12),  
2466-2472

Cited by: 2

Salt crystallization is a common cause of damage to porous building materials. Recent research has shown that some chemical compounds may inhibit salt crystallization or alter the mode of crystallization, thus limiting salt damage development, provided that the inhibitor was introduced prior to salt crystallization. In this paper, a pilot study is presented in which sodium ferrocyanide, a crystallization inhibitor for sodium chloride, has been mixed in a lime-cement mortar.

Salt resistance of the mortar has been tested by means of a crystallization test. The results of the crystallization test show that the addition of the inhibitor significantly improves the salt resistance of the mortar. Scanning electron microscope observations carried out on the surface of the cross section of the specimens demonstrate that the inhibitor modifies the habit of the salt crystals, as well inhibits the development of specific crystal faces.

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## URBANIZATION IN THE NETHERLANDS. A THOUSAND YEARS OF SPATIAL DEVELOPMENT. (VERSTEDELIJKING IN NEDERLAND. DUIZEND JAAR RUIMTELIJKE ONTWIKKELING BEKEKEN EN VERGELEKEN)

*Jaap Evert Abrahamse, Reinout Rutte*

### Publication Info

Year: 2011

In: *Historisch-Geografisch Tijdschrift* 29(3), 106-118

Cited by: unknown

The Cultural Heritage Agency of the Netherlands and the Faculty of Architecture of the Delft University of Technology decided to launch the Atlas of Dutch Urbanization. This research project, the first results of which are presented in this article, aims at describing and explaining the growth of cities from early mediaeval times up till the present. This long-term overview of urbanization explains the locations, structures and appearances of our present-day cities. Many questions about city design, transformation and heritage protection can only be answered on the base of such an overview. In this article, an overall picture of Dutch urbanization is presented on the basis of a classification by their origins of today's 35 largest cities. From this classification five groups of cities emerge. The oldest cities developed in the 11th and 12th century, all situated on the borders of wide rivers, on locations throughout the Netherlands. A second group of cities formed in the 13th and 14th century on the borders of smaller rivers. The third group of late mediaeval

cities consists of Amsterdam, Rotterdam and The Hague, the three largest cities of our time. The first two are located on the fringes of the core area of the province of Holland, on locations excellently connected to the sea and the hinterland, while The Hague developed as the administrative centre from the 16th century onwards. From around 1400 AD, no new cities emerged until the 19th century. From 1870 onwards, new cities arose along the new railway infrastructure in the sandy areas in the east and south as a result of rapid industrialization. At the same time, suburbanization led to the emergence of residential towns. After World War II, a number of new towns were created to absorb the rapid population growth of the big cities in the west. In this period, the roadway infrastructure played a leading role. These first observations show that the emergence and growth of cities is connected to their original functions, but also to the landscape in which they are located, and their location with regard to the main infrastructures.

## CULTURAL FOUNDATIONS OF THE MONUMENTS AND HISTORIC BUILDINGS ACT. (CULTURELE GRONDSLAGEN VAN DE MONUMENTENWET)

*Marieke Kuipers*

### Publication Info

Year: 2012

In: *Bulletin KNOB*, 111(1), 10-25

Cited by: unknown

In comparison with other European nations, the Netherlands was very late in introducing a Monuments and Historic Buildings Act. Not until 1961 did a definitive Act come into effect in order to protect 'monuments of history and art' in peace time against undesired decline and defacement. The cultural foundations for this were laid much

earlier, particularly in the nineteenth century, simultaneously with the forming of nations and the rise of new journals, organisations and scientific disciplines. This article examines how the definition of the concept of monument in the first Section of the Act was founded on the preceding debates and interpreted afterwards.

One of the three principal criteria is 'beauty'. In relation to the concept of 'art' this has the advantage of appealing to both the classical Bildung values and the romantic fascination for ruins and visible traces of a distant past. Another criterion is the 'significance for scholarship'. In this context the advocates of protection of monuments and historic buildings active around 1910 chiefly had the humanities in mind. Especially because of their irreplaceable historical materiality monuments and historic buildings are of importance as sources of knowledge on living, working, building and development of taste in the course of time. Recently, designation of scientific value is limited to objects or buildings specifically constructed

for the exercise of (exact) sciences, such as a laboratory or radio telescope.

The third criterion, 'folkloric value', relevant for e.g. bakehouses and other 'small' monuments, was cancelled when the old Act was replaced by the new one in 1988. Almost without being noticed it was substituted by the term 'cultural-historical value'. This caused friction when assessing the 'traces of the Second World War': they are reminiscent of a culture of oppression and collaboration, not of civilization.

In the most recent amendment the minimum age of fifty years as a criterion was abandoned, but for the moment the Euromast in Rotterdam is the youngest protected monument.

## IDEALISMUS UND ANARCHISMUS IN DER NIEDERLÄNDISCHEN ARCHITEKTUR

*Herman van Bergeijk*

### Publication Info

Year: 2010

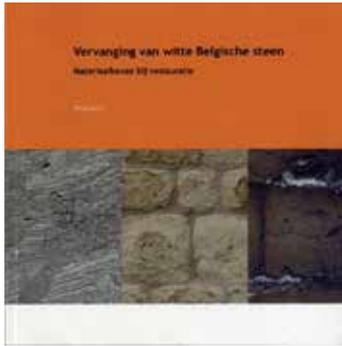
In: *L'architecture engagée: Manifeste zur Veränderung der Gesellschaft.*

[anlässlich der Ausstellung "L'Architecture Engagée.

Manifeste zur Veränderung der Gesellschaft" im Architektur-museum der TU München in der Pinakothek der Moderne München, 14. Juni - 2. Sept 2012] 132-153.

In den Niederlanden fanden sich in der ersten Hälfte des 20. Jahrhunderts einige hoffnungsvoll gestimmte Initiativen von Idealisten, Pazifisten, Anarchisten und Utopisten, die erste Schritte in Richtung einer friedvolleren und besseren Welt unternehmen. Viele dieser Initiativen wurden nicht nur durch ideelle Denkmuster angetrieben, sondern auch durch architektonische Visionen. Einige von ihnen wurden teilweise realisiert, während andere mit großem Aufwand präsentiert wurden, um dann schließlich in Vergessenheit zu geraten. Es ist jedoch auffällig, dass stets die gleichen Personen agierten und wenn nicht gar dieselben, dann doch ähnliche Orte des Geschehens ausgewählt wurden. In den meisten Fällen suchten die

Protagonisten eine größtmögliche Nähe zur Natur. Dünenlandschaften, Sandflächen und Waldstücke sollten eine reinigende Wirkung haben und so die Möglichkeit zu einem Neubeginn für die Menschheit schaffen. Wille zur Reform und der Glaube an Anarchismus gehen dabei oft Hand in Hand. Die kontinuierliche Wiederkehr der Protagonisten ist dabei signifikant und es lassen sich zahlreiche Querverbindungen und Wechselwirkungen aufzeigen. In den Niederlanden war der Aktionsradius dieser progressiven Gemeinschaft so überschaubar, ihre Mitglieder waren untereinander gut vernetzt. Anhand von zwei Projekten lässt sich das Spektrum dieser »Friedensbewegung« mit seiner unerwartet andersartigen architektonischen Wirkung aufzeigen.



Year: 2011

Publisher: Delftdigitalpress

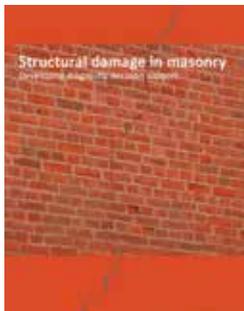
Pages: 326

### REPLACEMENT OF WHITE BELGIAN SANDY LIMESTONE. CHOICE OF MATERIAL FOR CONSERVATION (VERVANGING VAN WITTE BELGISCHE STEEN. MATERIAALKEUZE BIJ RESTAURATIE)

*Wido Quist*

This thesis deals with the decision process leading to the replacement of white Belgian sandy limestone in Dutch listed buildings in the period ranging from the late nineteenth century to the end of the twentieth century. Both the criteria used for the selection of suitable stone types for the substitutions and the consequences of the substitutions were studied. The study further aimed

at understanding whether durability and compatibility also played a significant role in the considered period. The importance of this work lies further in the contribution to the present approach in conservation: the knowledge resulting from the analysis of interventions in the past can be applied in new interventions: "Learning from our interventions to know how to intervene".



Year: 2011

Publisher: IOS Press

Pages: 276

### STRUCTURAL DAMAGE IN MASONRY: DEVELOPING DIAGNOSTIC DECISION SUPPORT

*Ilse de Vent*

This thesis deals with the diagnosis of structural damage in traditional masonry: cracks, deformations and tilts. Establishing the cause of this type of damage can be difficult. This research project has aimed to improve and facilitate the diagnostic process by offering support in the initial phase in which hypotheses are generated. The more precise hypotheses are formulated, and the

more accurate they are classified, the more effective the further process of verification will be and the greater the probability that the final diagnosis is correct. This study has specifically focused on characteristics that can be assessed in a first survey, either visually or with the help of some simple tools or archive material.



Year: 2012

Publisher: Eburon

Pages: 308

### DE TOEGEVOEGDE WAARDE VAN ARCHITECTUUR VOOR DE ZORG IN ZIEKENHUIZEN

*Colette Niemeijer*

Niemeijer onderzoekt de toegevoegde waarde van de architectuur voor de zorg en de bedrijfsvoering van het ziekenhuis. Zij beschouwt het als een doodlopende weg om het vraagstuk van de ziekenhuisbouw uitsluitend te benaderen vanuit een financieel of vastgoedperspectief. De nieuwe opgave voor architectuur van ziekenhuizen is het in samenhang ontwikkelen van

nieuwe gebouwen én nieuwe zorg- en bedrijfsconcepten. De ziekenhuisarchitectuur wordt zo een integraal onderdeel van het realiseren van strategische doelstellingen van ziekenhuizen. Hiertoe heeft Niemeijer op basis van grondig onderzoek een waardemodel ontwikkeld dat de kwaliteit van architectuur en de kwaliteit van zorg verbindt.

## Info

## SYMPOSIUM VIJFTIG JAAR MONUMENTENWET IN NEDERLAND

*Date:* 2011, December 9

*Place:* Stichting Utopa-Weeshuis,  
Leiden, NL

Georganiseerd door de Koninklijke Nederlandse Oudheidkundige Bond (KNOB) in samenwerking met RMIT (Faculteit Bouwkunde, TU Delft) en Monumenten & Archeologie Leiden. In het lezingenprogramma werden diverse

aspecten van de monumentenwet belicht, waarbij de sprekers terugblikten, maar ook nadrukkelijk vooruitkeken naar de toekomst van de monumentenzorg en de nieuwe monumentenwet. Marie-Thérèse van Thoor was betrokken als organisator en voorzitter.

## Info

## VIERDE VLAAMS-NEDERLANDSE NATUURSTEENDAG

*Stenen van binnen, stenen van buiten*

*Date:* 2012, February 15

*Place:* Delft, NL  
participants: 140

Deze titel heeft een dubbele betekenis, tijdens de Jonge Bouwkunst (1850-1965) worden in vele gebouwen, zowel binnen als buiten, natuursteen aangewend. Daarnaast wordt ook steeds meer en meer gebruik gemaakt van geïmporteerde natuursteen, vooral afkomstig uit Frankrijk en Duitsland. Dagvoorzitter was Rob van Hees. Inleidend betoog werd gegeven door Job Roos over de transformatie van het voormalige hoofdgebouw van de TU Delft tot wat het nu is: BK-CITY, de symposiumlocatie voor de ochtend. De volgende spreker, Timo Nijland,

ging in vogelvlucht een grote hoeveelheid steensoorten langs die kenmerkend zijn gebleken voor de Jonge Bouwkunst. Vervolgens was het de beurt aan Roland Dreessen en Veerle Cnudde die ingingen op de grote variëteit in het gebruik van witte Franse kalkstenen in België. Deze witte kalkstenen waren ook het onderwerp van de volgende voordracht door Wim Dubelaar, hij ging echter specifiek in op de Savonnières en Euville. Rob van Hees was voorzitter van de organisatie, Wido Quist was organisator.

## Info

## 12TH INTERNATIONAL DOCOMOMO CONFERENCE

*The Survival of Modern, From Coffee Cup to General Plan*

*Date:* 2012, August 7-10

*Place:* Espoo, Finland

The concepts of space and scale in modernist architecture are challenged in an age of new ecological and economical needs for more building density and energy-saving technical solutions. In four sub-themes the concept of space and design in four different scales and offer views is examined on how the

fundamental urban qualities of modernism can be preserved and what they have to offer for contemporary planning. The sub-themes: Environment, Urban Space, Open Plan, Interior Design. Marieke Kuipers was member of the scientific committee.

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## Info

### TU-TNO WORKSHOP NIEUWE ONTWIKKELINGEN EN KENNIS OP HET GEBIED VAN RESTAURATIE EN DIAGNOSE

*Date:* 2012, January 19  
*Place:* Delft, NL

A TU-TNO workshop was given to underline the importance of a well-considered technical approach in restoration and reuse projects, as a guarantee of the preservation of the quality of the buildings. This approach reflects the philosophy of @MIT.

The aim of the workshop was to transfer knowledge to restoration architects and other specialists in the sector. To achieve an optimal knowledge dissemination, besides lectures, the participants were given the opportunity to work with an innovative instrument for knowledge transfer, MDDS

(Monument Damage Diagnostic System).

MDDS is used within @MIT as a teaching tool for MSc students. Knowledge derived from research and PhD theses is constantly implemented in the system.

The speakers of the workshop were Job Roos (the Context of the Workshop, @MIT), Prof. Rob van Hees (TNO Project on Rising Damp), Barbara Lubelli (EU Project Desalination) and Ilse de Vent (PhD on Identification of Crack Patterns in Historic Constructions – in practice). The workshop was organized by Silvia Naldini.

## Info

### PRIJS VLAAMS BOUWMEESTER 2012

*Date:* 2012  
*Place:* Brussel, Belgium

De Prijs Bouwmeester wordt uitgereikt door de Vlaamse regering op initiatief van Vlaams Minister van Bestuurszaken Geert Bourgeois en van Vlaams Bouwmeester Peter Swinnen, en bekroont publieke en semi- publieke bouwheren die kwaliteit hoog in het vaandel dragen. Daarbij wordt niet enkel het resultaat

in beschouwing genomen, maar vooral het, vaak complexe, proces dat daaraan voorafging. De prijs wordt jaarlijks uitgereikt, telkens in drie wisselende categorieën. De categorieën van 2012 waren: Kunst in Opdracht, Zorg, en Publiek-Private Samenwerking. Cor Wagenaar was betrokken als lid van de jury.

## Info

### FIRST INTERNATIONAL MEETING EAHN

*European Architectural History Network*

*Date:* 2010, June 17-20  
*Place:* Guimarães, Portugal

In accordance with the EAHN mission statement, this meeting was organised to increase the visibility of the discipline, to foster transnational, interdisciplinary and multicultural approaches to the study of the built environment, and to facilitate the exchange of research results in the field. Though the scope of the meeting is European, members of the larger scholarly community were invited to submit proposals related not

only to Europe's geographical framework, but also to its transcontinental aspects.

The main purpose of the meeting was to map the general state of research in disciplines related to the built environment, to promote discussion of current themes and concerns, and to foster new directions for research in the field. Ivan Nevzgodin was member of the Advisory Committee.

## 6

## Earning capacity

### 6.1 Success and vision on how to obtain research projects

The D&H research group has successfully managed to obtain a considerable part of external funding from different institutes, like NWO, governmental institutions (AgentschapNL - Ministry of Economic Affairs), municipal and private institutions, recognizing the high quality reached by the D&H research group.

Success has also been obtained by initiating and strengthening the collaboration with universities and research institutes (e.g. University of Amsterdam, Technical University of Eindhoven, TNO, Cultural Heritage Agency, Government Buildings Agency) and by defining and exploring new research questions and new multidisciplinary approaches.

For the coming years participation in national (NWO, STW) and European programs (JPI-JHEP, Horizon 2020) is foreseen. Success will be enhanced by actively seeking and consolidating coalitions with leading universities and research centers and by contributing to the definition of the national and European research agendas. Prof Rob van Hees is member of the coordinating team of FACH (Focus Area Cultural Heritage of the ECTP - European Construction Technology Platform) and also member of the Scientific Board of the JPI on Cultural Heritage and Global Change.

Besides, funding for research will be pursued by enhancing exploitation/valorization and applicability of the research results, through collaboration with different actors in practice, such as architectural offices, museums, local authorities (municipalities with large numbers of monuments), and healthcare institutions.

Finally for the field of building conservation, together with TNO and RCE an initiative is started to come to programmatical collaboration, aiming at common knowledge development and dissemination.

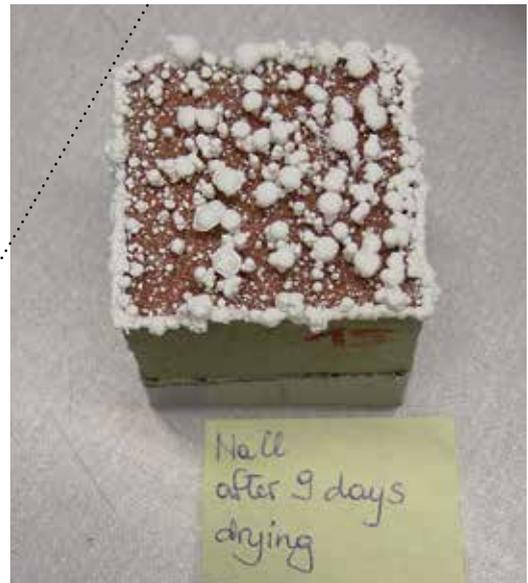
It is expected that the above described D&H strategy will be able to tackle the hazards related to an increased competition in raising research funds, which results from the increased number of applicants and the reduced available funding.

Table a. Research funding

FUNDING	2010		2011		2012	
	K€	%	K€	%	K€	%
Direct funding	526	83%	528	32%	497	65%
External funding (total)	109	17%	1.129	68%	272	35%
Coverage Contribution	0	-	6	-	20	-
Results finished projects	0	-	0	-	43	-
Acquired project funds	109	-	1.123	-	209	-
<b>TOTAL FUNDING</b>	<b>635</b>	<b>100%</b>	<b>1.657</b>	<b>100%</b>	<b>769</b>	<b>100%</b>
EXPENDITURE	K€	%	K€	%	K€	%
Staff costs	556	92%	525	91%	441	92%
Other costs	51	16%	53	9%	36	8%
<b>TOTAL EXPENDITURE</b>	<b>607</b>	<b>100%</b>	<b>578</b>	<b>100%</b>	<b>477</b>	<b>100%</b>

## 6.2 Overview of top-5 projects

The top-5 projects of Design & History (see key-project list) cover different subjects related to restoration, from the study of European colonial built heritage to the development of self-healing materials. A great part of these projects are financed by national organizations (NWO, Agentschapnl and Government Buildings Agency), some others are supported by private and municipal organizations (e.g. Centraal Museum Utrecht). Most projects includes a PhD or post-doc position, contributing to (temporary) enlargement of the research group.



Salt crystallization on the surface of a brick in the absence (left) and in the presence (right) of a crystallization inhibitor. The inhibitor favours salt crystallization at the surface, in the form of fluffy efflorescences: this has a positive effect on the damage. By mixing a crystallization inhibitor in a mortar during its preparation, salt crystallization damage may be limited. This is investigated in the currently running research project, financed by AgentschapNL within the IOP Self-healing materials (see description in key projects section).

# 7

## Valorisation

### 7.1 Means used to transfer knowledge

First of all, the research results of the Design & History group are implemented in the educational programme within the Faculty, the Delft University, across the Netherlands and abroad. For example, members of RMIT are lecturing at the post-initial master's education RLICC 'Raimond Lemaire International Centre for Conservation' at Leuven University, PMIA (Post-Master Institute for Architecture and Urbanism), NPD Academy (National Renovation Platform), and the Cultural Heritage Agency of the Netherlands (RCE). Members of the History Department lecture in Groningen and have been invited to participate in the course of the Strelka University in Moscow. They are invited as guests at numerous conferences. Next to scientific and professional publications and participation to national and international events, knowledge is transferred by D&H members through the organization of conferences, workshops and exhibitions. Examples of such activities is the organization of the exhibition 'Rietveld's Universe', which had venues in Utrecht, Italy and Germany, the bi-annual Flemish-Netherlands Stone Congress, workshops on building conservation for restoration architects.

The transfer of knowledge is implemented also by the development and use of specific digital tools. An example is the 'Masonry Damage Diagnostic System'. This expert system, originally developed by TNO (and partners from different EU countries) aims to support actors involved in restoration projects during survey and diagnosis of the state of conservation of a building. At TU Delft this system

is updated with new knowledge deriving from PhD researches and consequently used to transfer knowledge to master students, restoration architects, owners and persons responsible for monuments in the practice.

Participation of D&H members to international committees for standardization in the field of conservation (e.g. CEN Committee 346 - Cultural Heritage and RILEM) contributes to the transfer of knowledge into recommendations and norms.

### 7.2 Users of the knowledge

Users of knowledge developed at Design & History are very diverse.

Bachelors and masters students of the Faculty of Architecture are the first beneficiaries (but also contributors) of the research outcomes. Students of other faculties (Civil Engineering) or universities (KU Leuven, RU Groningen, Frederico II Napoli the TU-Berlin, TU-Budapest and recently the Strelka University in Moscow) are also addressed thanks to invited lectures and workshops.

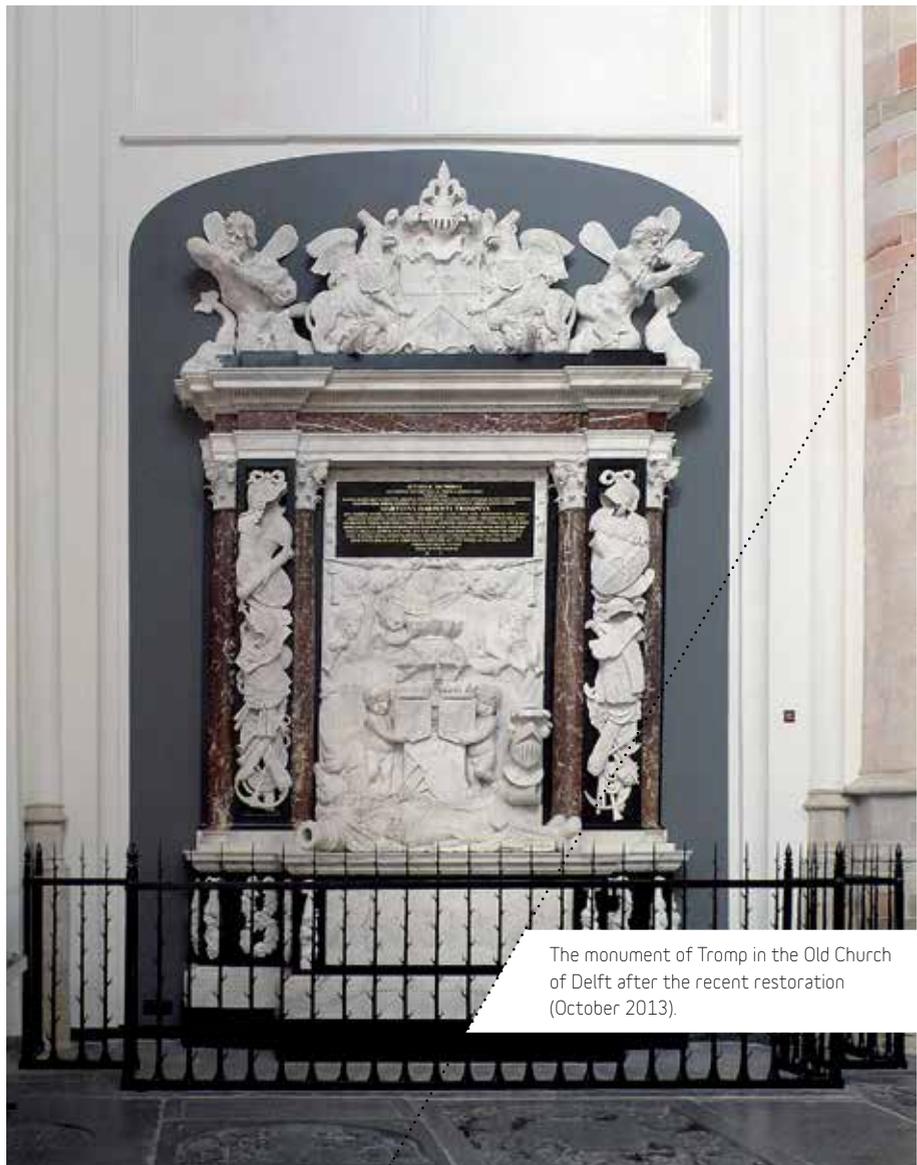
Another target group is constituted by actors in practice: restoration architects, conservators, art historians, persons responsible for the maintenance of the building assets (monumental and not) benefit from the results of D&H research. This can take place directly, i.e. in commissioned research (an example is the research commissioned by Cultural Heritage Agency on historic concrete), or indirectly, by participation to events organized by Design & History members (an example is given by the workshop 'New development and knowledge in the field of restoration and diagnosis', addressing restoration architect and conservators).

Another group of users of the knowledge developed at Design & History is constituted by the national and international scientific community, reached by publications in peer review journals and books and by presentations at international conferences. Knowledge developed at Design & History addresses both practical and theoretical issues involved at different scales of architecture (from urban development to material conservation)

and addresses therefore a wide public of researchers.

PhD research will remain an important component of the Design & History portfolio. The work in this field will be revitalized as soon as the vacancies of the two main chairs have been solved. Part of the present PhD-projects started before the previous holders of these chairs retired; new

PhD-projects will inevitably reflect the personal views and preferences of their successors. In the interregnum, several associate professors act as 'second' promoter for PhD-projects for which promoters outside of the Design & History group are formally responsible, and many of these would remain under within the framework of the group had there been no vacancies.



The monument of Tromp in the Old Church of Delft after the recent restoration (October 2013).



## PhD research

### 8.1 Topics

The objectives of the Design & History research group are clear: to continue in, expand and explore new fields, and to strengthen the imbedding of research and research tracks in the faculty's educational curriculum.

Both the bachelor and the master programme contain obligatory history modules, which implies that the history sections serves the entire student population - some 300 bachelors, next year almost 450 master students. rMIT staff members provide design studios that, on average, attract 125 students each semester. The rMIT / History minor accommodates 40 students. The programme's structure will be enhanced on the basis of its inherent qualities, depending partly on the way the faculty organizes its research in the near future (either a somewhat limited range of topics covered by larger research groups, or very specific topics covered by cooperative teams that are also linked to groups outside the faculty or even the university). In practical terms, the programme will be streamlined (e.g. in the Graduate School), the internal cooperation will be strengthened, and links with colleagues abroad will be intensified by organizing at regular intervals themed seminars and PhD reviews.

### 8.2 Supervision

As two of the key chairs are vacant (the History chair will be occupied from September 2014 at the latest), the supervision of junior members has been delegated to senior members. The support of the research group has, of course, proven to be indispensable. Since the profiles of the chairs determine the profile of the Design & History group, it is indispensable that the vacancies will be dealt with as soon as possible.

### 8.3 Success rates

In terms of academic recognition, involvement in practical design projects and links to public opinion, the success rates have been satisfactory and can therefore be further improved. Naturally, this is a prerequisite for finding external funding in a very competitive market.

### 8.4 Resources

There are several parallel initiatives to improve education at Delft (e.g. in cooperation with TU Eindhoven) and to find ways to overcome the shortage of personnel trained as historians working specifically on twentieth-century topics (this implies the possibility to graduate as a historian rather than a designer). Since RMIT and the History chair are severely understaffed, the balance between research and education is very difficult to maintain, and education is consuming far too much of our personnel resources.

# 9

## SWOT-analysis

### STRENGTHS

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The Design & History research group benefits from being part of a major technological university with expertise in research and education in adjacent fields. The long-standing Dutch tradition in planning and research, which fostered the emergence of freelance markets capable of delivering state-of-the-art scientific and scholarly research, provides our work with a context that, from an international perspective, is unique. Moreover, the field it covers has become increasingly important, and will become even more so in the near future. Three quarters of today's building stock is part of the existing context. The post-war building stock is now in need of restoration and transformation.

### WEAKNESSES

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The division of the group's members between the department of Architectural Engineering & Technology and the department of Architecture, results in a management structure whose flaws are exacerbated by the fact that the two main chairs are vacant. The cooperation between scientists and scholars from different backgrounds offers opportunities to inspire each other's fields from different perspectives. This, however, implies more mixed groups and mutual contacts than we have been able to manage so far. A relatively large number of projects is carried out by individual researchers, suggesting that these topics only answer to individual fascinations, whereas they should strengthen the programme's coherent nature.

### OPPORTUNITIES

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The emergence of new geopolitical frameworks trigger scientists to question the inherent relations between modernism and the European and later American domination of the 'western' world. The awareness that a part of the scientific body of knowledge is tainted by propaganda also tends to reconfigure international cooperation in this field. Another trend is the awareness that in architectural history links between theory and materialization have until now been neglected. Moreover, the scope of our work should include Central and Eastern Europe. Due to the crisis, the building industry has had to focus on transformation: redevelopment and reuse have become major topics.

### THREATS

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Rather than facing serious competition, the management of the Design & History research group is concerned about the lack of adequate personnel (in addition to the vacant chairs).

### 12.1 Strategic planning

Although the Design & History group functions very well in terms of output, recognition and contents, its institutional embedding has to be reconsidered. Furthermore the group intends to strengthen its internal cooperation by means of joint projects that reflect the diversity of the scientific aspects and stress the integral approach that has been identified as one of our strongest points.

The wide range of affiliations will be maintained and new cooperation incentives will be explored. Recently acquired research projects have initiated or strengthened collaboration with internationally recognized universities and research institutions. In the nearest future the Design & History group increases its efforts to secure grants from NWO, JPI, Horizon 2020, and will take initiatives for closer contact with research groups in the German speaking world, focusing on 'Bauforschung'.

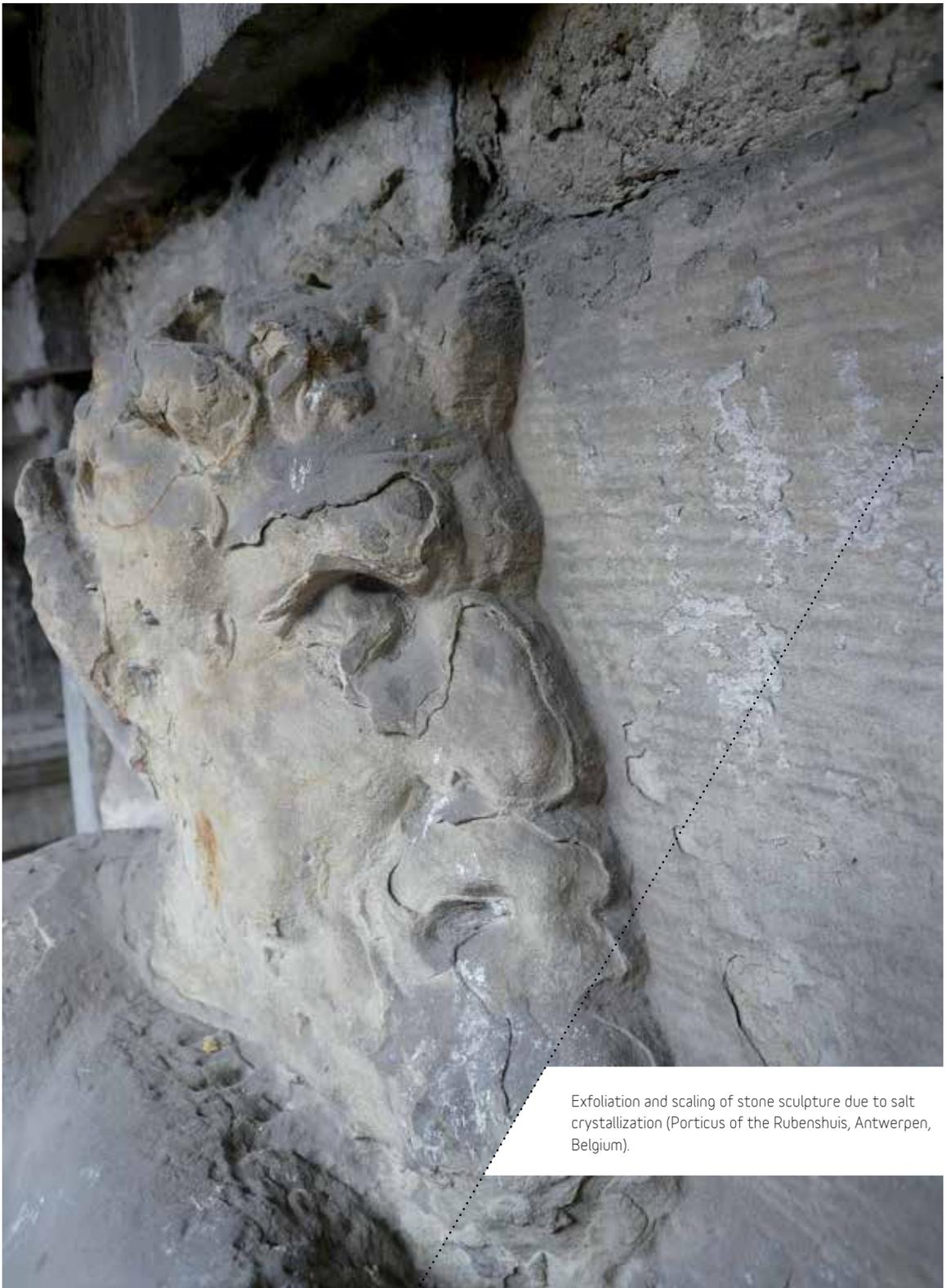
### 12.2 New research topics and their prospects

- Comparative urbanism: identification of key concepts in urbanism during the Cold War (mapping the context: socialism vs. welfare state);
- The Americanization of European architecture and urbanism;
- The legacy of the 1970s: Germany and the Netherlands;
- Healthcare architecture: a design manual;
- The legacy of the 20th century: building;
- Production, conservation policy, materialization;

- The legacy of the 20th century: theory of heritage and conservation after 1975;
- Architecture, urbanism & health;
- Compatibility of new or repair materials with existing materials;
- Assessment of material performance;
- Risk assessment of interventions;
- Improvement of diagnostic and decision-making processes;
- Development of smart conservation materials;
- The challenge of vacant buildings (mostly offices);
- Building Archeology/Bauforschung.

### 12.3 Flexibility

The members of the Design & History research group anticipate future changes – namely less funding for a widening field, an insufficient number of qualified personnel and the emergence of new topics in the international academic world – by actively seeking coalitions with stakeholders and universities in the Netherlands and abroad. By strengthening the technical and historical education at Delft, the group seeks to broaden the basis of the field in which it is working.



Exfoliation and scaling of stone sculpture due to salt crystallization (Porticus of the Rubenshuis, Antwerpen, Belgium).



# Green Building Innovation

RESEARCH LEADER: Prof. Ulrich Kneack PhD

## 1.1 Scientific aims

### Vision

Society must undergo a transition towards an economy that is based on renewable or recyclable resources and a built environment that is largely self-sustaining. The greatest challenge lies in the alteration of existing areas: as more than 90% of the building stock of the near future is already built, effective improvements can only be achieved by taking immediate action to improve entire regions, cities, districts, neighbourhoods, buildings or building components. In our vision, these changes can best be effected when the comfort and the health of people are kept in focus. In addition, the quest for research unison is deeply rooted in what we consider to be research that is relevant to future developments.

### Mission

The mission of the Green Building Innovation (GBI) research group is to expand the realm of possibilities in architecture and urban design, and to help guide the construction sector to a more sustainable future. GBI aims to be an excellent research group in the area of sustainable technology for the built environment, and to build a worldwide reputation for its science-based green innovation at various scale levels. Both the building industry and research funding institutes should consider the GBI group the foremost partner for research involving sustainability and innovation.

### Objectives

The GBI group aims to continuously enhance its basic competencies in order to promote the long-term intrinsic value of our area of science. For the medium-term viability of its research focus, the group focuses on socially urgent themes that often straddle the boundaries of building technology – key themes include sustainability, carbon neutrality, climate adaptability, the use/reuse of buildings and materials, and the ageing of the population. The programme itself is organized via the four basic competencies, these being Energy & Climate, Comfort & Health, Building Envelopes and Product & Process (formally Building Elements & Components). For its short-term financial feasibility, the group responds to the day-to-day demands of society and commerce. Wherever and whatever the scientific challenge, GBI research in the productive field of building technology is sure to respond.



# 2 Composition

**Table a. Research staff at institutional and programme level**

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	17	10.70	16	10.3	17	11.8
Non-tenured staff	12	7.43	10	6.9	6	3.8
PhD students	28	24	31	28	32	29
Guests	13	0	12	0	11	0
<b>TOTAL RESEARCH STAFF</b>	<b>70</b>	<b>45.7</b>	<b>69</b>	<b>47</b>	<b>66</b>	<b>45.2</b>

**Table b. Research staff with position in practice**

WHO	ROLE	FIRM/ORGANISATION	WHERE	
Prof. Mick Eekhout	Director	Octabube International bv	Delft	NL
Arjan van Timmeren	Founder, partner/director	Atelier 2T	Haarlem	NL
Prof. Thijs Asselbergs	Director	aTA Architectuurcentrale	Haarlem	NL
Prof. Patrick Teuffel	Director	Teuffel Engineering Consultants	Stuttgart	DE
Prof. Ulrich Knaack	Prof. For Design & construction	Hochschule OWL	Detmold	DE
Prof. Ulrich Knaack	Co-founder, consultant	Imagine envelope b.v.	The Hague	NL
Leo Gommans	Senior advisor sustainable building	B00M Maastricht	Maastricht	NL
Dr. Marcel Bilow	Owner	Imagine envelope b.v.	The Hague	NL
Dr. Tillman Klein	Consultant	Imagine envelope b.v.	The Hague	NL
Prof. dr.ir. Andy van den Dobbelaar PhD	Associated member	Council for the Environment and Infrastructure (Rli)	The Hague	NL
dr. ir. Wim van der Spoel	Consultant R&D	Landstra bureau voor bouwfysica Midden BV	Arnhem	NL
dr.ir.arch. Martin Tenpierik	Board member	Nederlands-Vlaamse Bouwfysica Vereniging	Arnhem	NL
dr.ir. Peter van de Engel	Researchcoordinator	Deerns Consulting Engineering Netherlands	Rijswijk	NL
Prof.Peter Luscuere	Director/Founder	Inspired Ambitions	Pijnacker	NL
Prof.Peter Luscuere	Commissioner in Supervisory Board	Van Dorp Installaties BV	Zoetermeer	NL

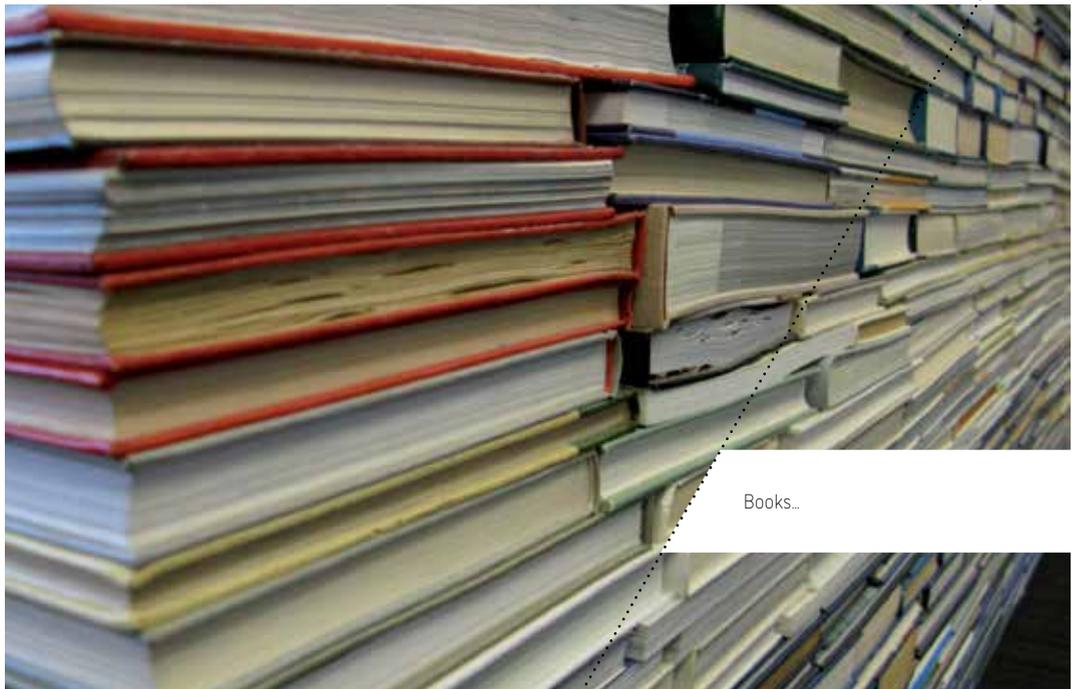
# 3

## Research environment and embedding

### 3.1 International and national positioning

The GBI research group has a strong position in the academic world, not only within its own faculty but also within other faculties of TU Delft (the faculties of Industrial Design Engineering, Civil Engineering & Geosciences, and Applied Sciences). Other research partners include numerous universities and funding organizations, such as Agentschap NL, Stichting BouwResearch, FES programmes (e.g. Knowledge for Climate), STW/NWO and the EU. Within the Netherlands, the

GBI group regularly works in partnership with the universities of Eindhoven, Twente and Wageningen. International partnerships include those with the University of Bath, Hochschule Luzern, Hochschule OWL (Germany), TU Darmstadt, Copenhagen Royal Art Institute, University of Copenhagen, Catholic University of Leuven, Penn State University, Istanbul University of Technology, Carnegie Mellon and Queensland University of Technology. Moreover, the group's staff members participate in international networks with various actors from academia and commercial practice, such as IEA (Annex 39, 44, 45), CIB (W116), Passive and Low-Energy Architecture (PLEA), European and national norm commissions and the European Façade Network (EFN).



Books...

### 3.2 Collaboration with stakeholders

The following list of stakeholder partnerships demonstrates the diversity and depth of the GBI group's involvement:

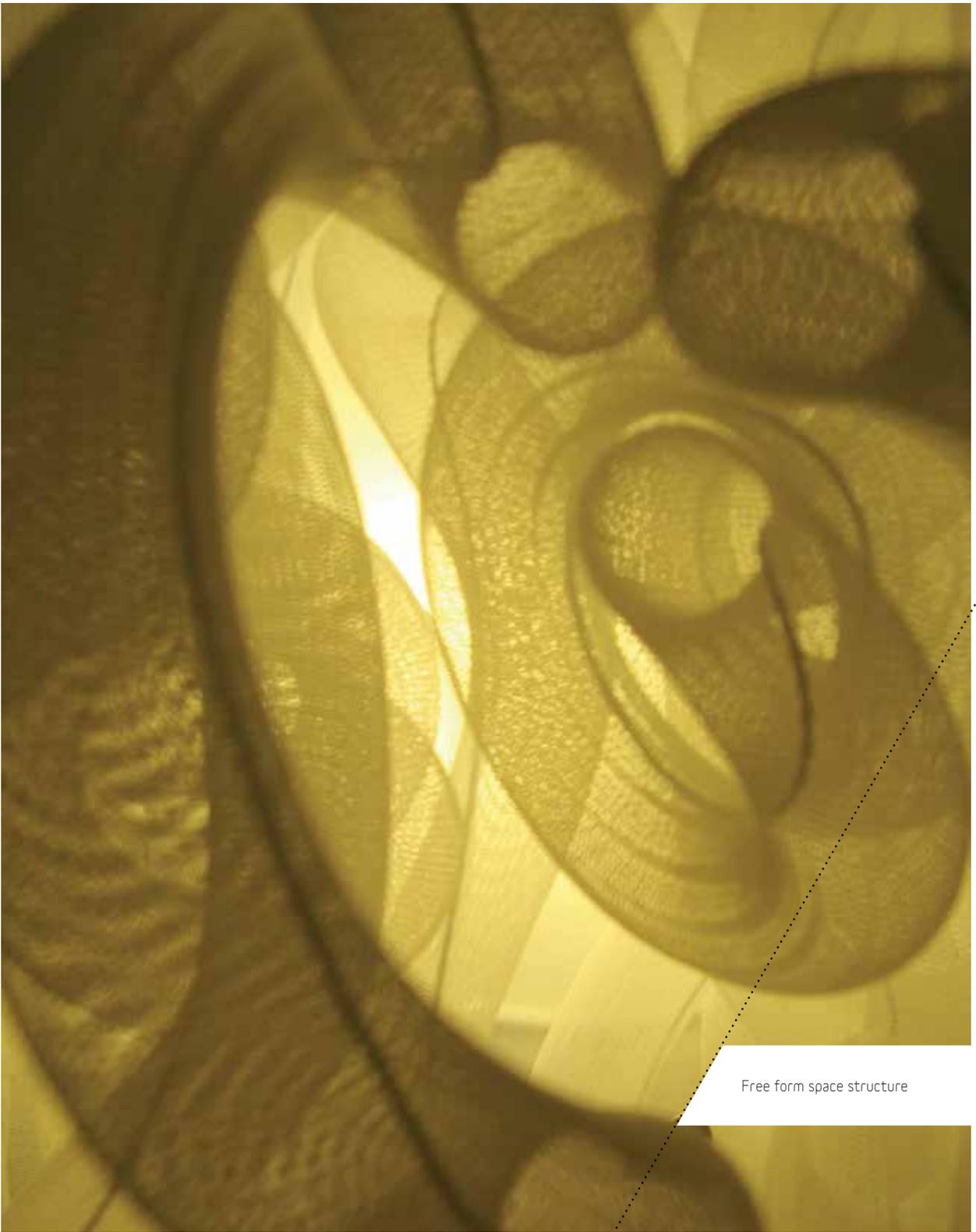
- Better Airport Regions, funded by the Urban Regions in the Delta programme of NWO, led by the GBI group, involving ETH Zürich and TU München, the airports of Schiphol, Zürich and München, and local public and private stakeholders;
- Climate Proof Cities, funded by the Knowledge for Climate programme, led by TNO with the GBI group playing a leading role, involving the Universities of Eindhoven, Wageningen, Utrecht and Nijmegen, AND the cities of Amsterdam, Rotterdam, the Hague, Utrecht, Tilburg, Arnhem and Nijmegen;
- CELSIUS, an EU-funded international project led by Göteborg, involving knowledge institutes, Universities and energy companies from the cities of Göteborg, London, Geneva and Rotterdam;
- City-zen, an EU-funded international project led by KEMA, involving the cities of Amsterdam and Grenoble, and housing corporations, industries and knowledge partners related to these cities;
- Closing Cycles in the Built Environment, a PhD project funded by DuraVermeer, Unica, Search and Delta Energy (Houten);
- CO2-neutral cities, a PhD project funded by the City of Rotterdam and involving local stakeholders;
- Energy Potential Mapping studies for various public and private institutions (De Groene Compagnie, Hoogezand-Sappemeer, Veenkoloniën, Oostland) as well as the national heat mapping study for Agentschap NL;
- PGDEPW (Projectgroep Duurzame Energie in Projectontwikkeling van Woningbouw): Agentschap NL funded interdisciplinary long-term EOS research, in partnership with the universities of Eindhoven and Maastricht, and Cauberg Huygen engineers, in cooperation with EIA Annex 44 (finished in 2012);

- The various REAP, REAP2, REAP+ and REAP++ studies (Rotterdam Energy Approach & Planning): funded by the Rotterdam Climate Initiative, Port of Rotterdam and Clean Tech Delta, together with local architects and urban planners, Rotterdam Public Works and the City Planning & Traffic Department;
- SREX (Synergy of Regional Planning and Exergy): Agentschap NL funded interdisciplinary long-term EOS research, together with the universities of Wageningen and Groningen, Hogeschool Zuyd Heerlen, and TNO Building and Underground (completed in 2011);
- VMRG - Dutch Association of Metal Façade manufactures: several research projects, a SenterNovem IPC research grant project and collaboration in education.

### 3.3 Participation in consortia

The GBI group participates and plays an active role in the following on-going or recently launched consortia:

- The Climate Proof Cities, Better Airport Regions, CELSIUS and City-zen projects have been mentioned previously and are examples of consortia (including stakeholders);
- Concept House: funded by a consortium of market parties (Eneco, Faay, Rotterdam GW, Living Lab, Raab Karcher, Renon, R&R systems, Schöck, Unica, Uniline, VDM), with the first real-time case studies built as the Concept House Village in the Rotterdam City Harbours for Clean Tech Delta in 2012;
- IPC (Innovation Performance Contract) studies with the VMRG on the Add-on Façade (partially funded by ASW gevelbouw, Solarlux, and Hallington Doors) and on the Breathing Window (partially funded by Facadis, Merford, Heycop, Kremers Aluminium, De Groot en Visser, Licotec Daklicht, Van Hengstum bv, and Vorsselmans);
- NEND: a FP7 Interreg IV research project with the regions Groningen (the Netherlands) and Niedersachsen (Germany).



Free form space structure

## 4

## Academic reputation

## Invitations to address major conferences

YEAR	CONFERENCE	WHO	WHERE
2012	Key Note Conference "Smart Interfaces" at Messe Stuttgart in Collaboration with Baunetz	Knaack	Stuttgart DE
2012	Key Note SASBE2012: "Cities Ready for Energy Crises"	Dobbelsteen	Sao Paolo BR
2012	Invited Lecture TEDx Wageningen: "Cities Resilient to Energy Crises"	Dobbelsteen	Wageningen NL

## Conference organisation activities

YEAR	CONFERENCE	ROLE	WHO	WHERE
2011	National Congres "Energie & Ruimte" (Energy and Space)		Dobbelsteen, Broersma, Fremouw	Delft NL
2011	Int Conf Series The Future Envelope, edition 5 "Technology Transfer"		Knaack, Klein	Delft NL
2011	National Building Physics Conference "Kennisdag Bouwfysica"	Organisation	Tenpierik	Eindhoven NL

## Involvement in scientific or professional event

YEAR	EVENT	ROLE	WHO	WHERE
2011	Welcome Symposium for Michael Braungart as Visiting Professor	Speaker	Luscuere	Delft NL
2012	Opening Concept House		Eekhout	Heijplaat NL
2012	Invited Lecture at Nazerbayev University: "Cities Without Fossil Fuel"	Speaker	Dobbelsteen	Astana KZ
2012	Invited Speech Melbourne Forum: "Building for Future Generations"	Speaker	Dobbelsteen	Melbourne AU

## Prizes, awards, competitions

YEAR	PRIZES, AWARDS, COMPETITIONS	ISSUER	WHO	WHERE
2010	Choice Outstanding Academic Titles Award for 'Indoor Environment Handbook: How to Make Buildings Healthy and Comfortable	Choice Reviews Online	Bluyssen	Chicago US
2010	ZEROprize: The Re-Skinning Award for large commercials (Sparkasse Vorderpfalz)	ZEROfootprint	Knaack, Klein, Bilow	Toronto CA
2012	Knight in the Order of the Dutch Lion	HM Queen of The Netherlands	Eekhout	Delft NL
2012	Certificate of Excellence in Reviewing for Energy and Building	Elsevier	Tenpierik	Doetichem NL
2011	ZEROprize: The Re-Skinning Awards for Institutional Herkraftwerk Aachen	ZEROfootprint	Knaack, Klein, Bilow	Toronto CA

### Honorary positions

YEAR	INSTITUTE	POSITION	WHO	WHERE
2005-10	Building Research Unit, Nottingham University Research Unit, Nottingham University	Special Prof	Eekhout	Nottingham UK
2007/>	Tianjin University	Visiting Prof	Luscuere	Tianjin CN
2011	Pennsylvania State University	Guest Prof	Knaack	State College US
2012	Istanbul University of Technology	Guest Prof	Knaack	Istanbul TR
2012	Honorary Position as MSSSI Visiting Fellow, University of Melbourne	Visiting Fellow	Dobbelsteen	Melbourne AU

### Election to academies or academic professional associations

YEAR	INSTITUTE	ROLE	WHO	WHERE
2003	Royal Dutch Academy of Arts and Sciences (KNAW)	Member	Eekhout	Amsterdam NL
2003	Academy for Technology & Innovation	Member	Eekhout	Amsterdam NL

### Evaluator of research programme

YEAR	PROGRAMME	ROLE	WHO	WHERE
2012	Research Review Committee of the Faculty of Architecture / TU München	Member	Eekhout	München DE

### Editorship academic journal/book series

YEAR	JOURNAL	ROLE	WHO	WHERE
2012	Publication Grant "Open Access Journals" from the NWO for the "Journal of Façade Design and Construction"	Editor	Knaack, Klein	The Hague NL
2012	The Future Envelope Series with IOS Press Publisher: No 3	Editor	Knaack, Klein	Delft NL
2008/>	Imagine Book Series with NAI010 Publishers: 04 - Rapids(2010), 03 - Performance Driven Envelopes (2011), 05 - Energy (2011), 06 - Reimagining the Envelope (2012), 07 - Reimagine Housing (2012)	Editor	Knaack, Klein, Bilow	Rotterdam NL

### Role in practice and policy making

YEAR	FIRM/ORGANISATION	ROLE	WHO	WHERE
2013/>	Council for the Environment and Infrastructure (Raad voor de Leefomgeving en Infrastructuur)	Associate Member	Dobbelsteen	The Hague NL

# 5

## Quality and relevance

### 5.1 Societal/scientific quality and relevance of the research

GBI group's research is closely linked to societal issues in the field of sustainable development, in interaction with the existing technology and technological innovation. Many of its research projects, both completed and on-going, were initiated with parties from the public and commercial market and have served both scientific development in new areas and dissemination in the built environment or building industry. This would not be possible without a solid foundation of financial, material and human resources. The Department of Architectural Engineering + Technology and the GBI programme in particular have always had a strong bond with the market.

The impact of the GBI group's research is generally highly visible: the results have been adopted by stakeholders outside the university, such as in the planning, design and manufacturing sectors. These can be seen in the general studies and publications by the group's architectural staff, which are based on strong relationships between private practice and academia. Energy potential studies have been integrated into official plans such as the Provincial Environmental Plan (POP) of Groningen, Rotterdam Energy Approach and Planning (REAP) and the application of the bent scale elements developed and tested by our group in high-quality architectural projects. Further examples are the design and use of renovation facades on German offices and NEXT, an innovative solution for a service-integrated façade. A number of prototypes have been manufactured (e.g. in the Building Technology Laboratory) and used in presentations to academic and industrial audiences. Numerous conferences and seminars have been organized by the GBI group, for example the Future Envelope conference series, an annual conference in collaboration with the University of Bath for academia and commercial practice. These enterprises demonstrate the relevance of the group's work to architecture and the built environment.

Table a. Main categories of research output

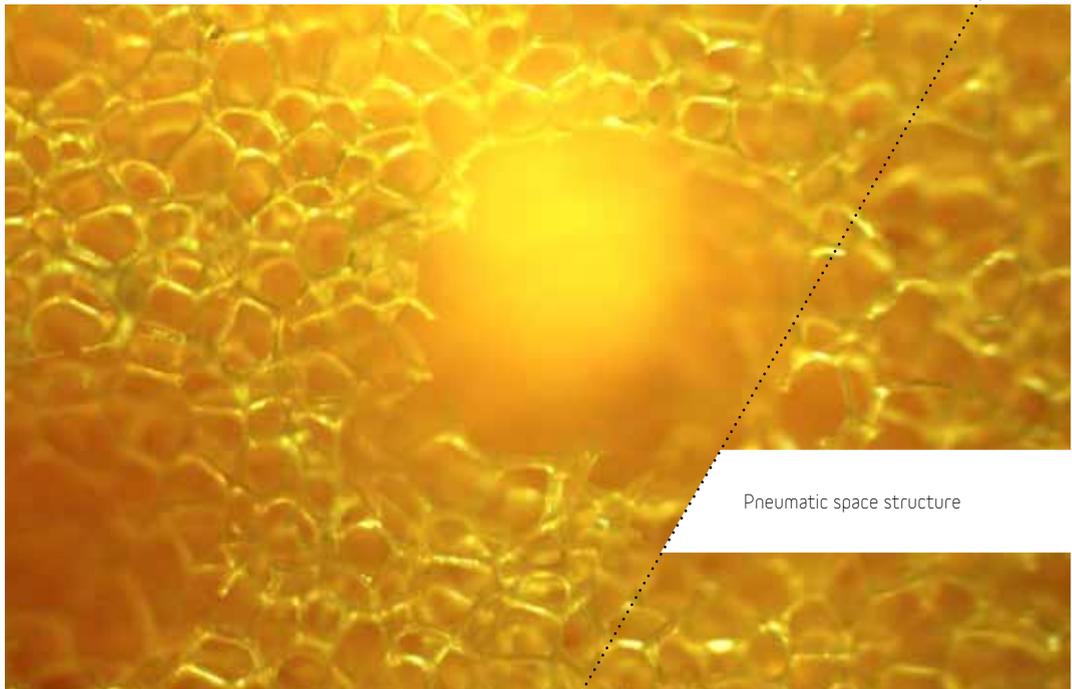
	2010		2011		2012	
	STAFF	GUESTS	STAFF	GUESTS	STAFF	GUESTS
Refereed articles	3	0	8	0	9	1
Non-refereed articles	2	0	4	0	1	0
Books	2	3	3	2	2	2
Book chapters	15	1	19	1	4	0
PhD theses	2	0	0	0	5	0
Conference papers	39	8	28	3	9	2
Professional publications	13	6	23	0	10	0
Editorships journals/book	7	1	3	2	1	0
<b>TOTAL PUBLICATIONS</b>	<b>83</b>	<b>19</b>	<b>88</b>	<b>8</b>	<b>41</b>	<b>5</b>

## 5.2 Key indicators

The GBI group traditionally covers technical aspects of the indoor environment, the outdoor environment and the dividing line between the two, as well as the essential flows that enable living, working, travelling and ageing: energy, water and materials. These latter aspects have led the group to propose innovative concepts at various scales. Based firmly on existing knowledge and experience, the GBI group focuses on themes that are currently significant in terms of their societal and scientific value. As described previously, such themes include circularity in the means of closing cycles of technologies, construction and materials, the carbon-neutrality of buildings, climate adaptation, the use/reuse of buildings and materials, and the ageing of the population. The best evidence of the value placed on these contributions by stakeholders is probably the continuing demand for contributions in the form of research and consultancy, as well as repeated

requests for the presentation of earlier findings and proposals. Provinces, municipalities and the building industry continue to approach the group's research staff concerning innovative projects that are seen as cutting edge in both the market and the academic world.

Other evidence lies in the honorary functions of the GBI group's key staff on boards and committees, most notably the position of Eekhout in the Royal Dutch Academy of Arts and Sciences (KNAW) and his special professorship at the University of Nottingham (UK), Luscuere's guest professorship in Tianjin (China), and Knaack's professorship at Detmold Hochschule (Germany) together with his guest professorship at Pennsylvania State University (USA) in 2011 and Istanbul University of Technology (Turkey) in 2012. Dobbelsteen received an honorary position as MSSSI Visiting Fellow at the University of Melbourne (Australia) in 2012.



Pneumatic space structure

## 5.3 Results and outputs

### KEY PROJECTS

#### BETTER AIRPORT REGIONS

*Models and development pathways for sustainable urban transformation.*

##### Programme

NWO

Grant: € 900.000

Role: coordinator

Principal Researcher:

Andy van den Dobbelsteen

Arjan van Timmeren

Coordinator: TU Delft

Duration: 2011 to 2013

Better Airport Regions is a two-year research project by Delft in cooperation with 'Airports and Cities' by ETH Zurich and TU Munich. Airports are often situated near towns and cities and significantly stimulate further urbanisation in the surrounding region. 'Better Airport Regions' looks at the urban regions surrounding international airport hubs and examines how airports could

contribute to more sustainability, resilience and flexibility in major urban regions. The project aims to develop guidelines for the integration of airports and urbanised areas and for the transformation of current airport regions. 'Better Airport Regions' is specifically examining the cycles (energy, water, food and traffic), urban development and management of the airport regions of Schiphol and Zürich..

#### FREE-D FACADE MANUFACTURING

*An adjustable mould to make double-folded panels of glass, concrete, and composites.*

##### Programme

STW-VG2

Grant: € 200.000

Role: project leader

Principal Researcher: Karel Vollers

Coordinator: TU Delft

Duration: 1/2010 to 1/2012

The 'Pinbed Wizard' is a mould with two hundred simultaneously moving pins, which has been developed thanks in part to funding from STW and the help of the Electronic and Mechanical Support Division of TU Delft. A flexible surface is applied on top of the Pinbed Wizard pins, and on top of that, the material to be moulded or transformed.

This makes it possible to make concrete panels by reshaping the mould at just that point during the hardening process that the concrete has the right level of viscosity. With the Pinbed Wizard surface integrated with a glass bending surface, a glass panel when turned soft at 570°C, transforms with the flexible surface on which it rests.

#### UCER

*User Centered Energy Reduction.*

##### Programme

TKI EnerGO

Grant: € 200.000

Role: Partner

Principal Researcher: Truus Hordijk

Coordinator: PRIVA, de Lier

Duration: 12/2012 to 12/2014

Today energy reduction in commercial buildings like offices are mostly got by upgrading the energy performance of the building envelope and the building services. Recently, research has shown under laboratory circumstances that energy reductions can also be find with good individual comfort at the workplace and lower comfort conditions in the environment. The aim of the UCER project is to develop

innovative heating and cooling systems at the individual workplace in order to get further energy reductions. The task of the TUDelft is to do the survey of the comfort of the user in real office buildings. In the TKI EnergyGo programmes industry and universities work together in innovative research and product development. The industry has the lead in these kind of projects.

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## CLIMATE PROOF CITIES

*Strengthening the adaptive capacity and reducing the vulnerability of the urban system against climate change and to develop strategies and policy instruments for adapting our cities and buildings.*

### Programme

Knowledge for Climate  
(together with Urbanism and OTB)  
Grant: € 710.000  
Role: partner  
Principal Researcher:  
Andy van den Dobbelen  
Coordinator: TNO  
Duration: 1/2010 to 1/2014

The aim of this research programme is to build up a multi-scale (from the level of buildings to city agglomerations), quantitative knowledge base on urban climate, the vulnerability of cities to climate change and expected impacts of possible future changes in climate. The consortium will generate knowledge on the technical and economical effectiveness of adaptation measures linked with an in-depth understanding of the governance processes needed

for implementation. To understand the effectiveness of measures, fact finding on the interaction of the city and the local climate (including urban heat islands) is essential. Based on the various impacts in cities and possible adaptation measures, an overview can be provided of costs and benefits of taking adaptation measures in various scenarios for the development of the global climate which will support decision makers in developing their adaptation strategies.

## CONCEPT HOUSE

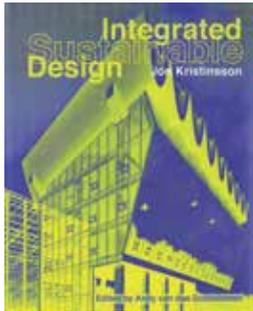
*A fully sustainable prototype of a city apartment that researchers from TU Delft's faculties of Industrial Design Engineering and Architecture and the Built Environment have developed together with parties in the construction industry and area developer Woonbron*

### Privately funded research

Grant: € 200.000  
Role: coordinator  
Principal Researcher: Mick Eekhout  
Coordinator: TUDelft  
(jointly with Faculty of Industrial Design Engineering)  
Duration: 4/2009 to 4/2012

The Delft Prototype is an apartment of a hypothetical Concept House Urban Villa in 4 floors, each containing 4 apartments with the characteristics of high level industrial production, energy positive in use, built with an extreme low ecological footprint and suitable for stacked affordable housing. This research, development, production & built project has resulted in an unique novelty on the Dutch building market: a sustainable zero-energy apartment system for medium

rise housing. The development was initiated in close collaboration with a consortium of partners from the SME building supply industry. The collaboration with the TU Delft resulted at the partner industries in partial innovation of their component products in the prototype on an individual base. Innovation progresses further in these partner industries.



Year: 2012

Publisher: Delftdigitalpress

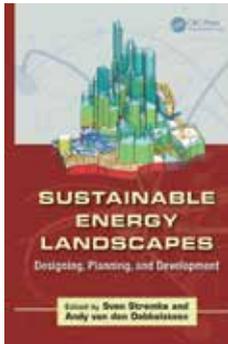
Pages: 312

### INTEGRATED SUSTAINABLE DESIGN

*Jon Kristinsson & Andy van den Dobbelsteen (eds.)*

Jón Kristinsson (Reykjavik, 1936) is the godfather of sustainable building in the Netherlands and probably elsewhere in the world. Already in the 1970s and 1980s he invented and applied designs and technology that still to date are unequivocal in the built environment. With the completion of his masterpiece, Villa Flora (Venlo, 2012),

Kristinsson again sets the benchmark for sustainable architecture. This abundantly illustrated book guides the reader through Jón Kristinsson's vision, theory, technological innovations, plans for infrastructure and cities, ideas and of course his integrated sustainable design.



Year: 2012

Publisher: CRC Press

Pages: 528

### SUSTAINABLE ENERGY LANDSCAPES: DESIGNING, PLANNING, AND DEVELOPMENT. APPLIED ECOLOGY AND ENVIRONMENTAL MANAGEMENT

*Sven Stremke & Andy van den Dobbelsteen (eds.)*

This book presents state-of-the-art knowledge in the exciting new field of sustainable energy landscapes. The editors and team of contributing authors aim to inspire readers, providing a comprehensive overview of sustainable energy landscapes, including principles, concepts, theories, and examples. The book describes various methods, such as energy potential mapping and heat mapping, multicriteria decision

analysis, energy landscape visualization, and employing exergy and carbon models. It addresses how to quantify the impact of energy transition both on landscape quality and energy economy, issues of growing importance. The text infuses readers with enthusiasm to promote further research and action toward the important goal of building energy landscapes for a sustainable future.



Year: 2012

Publisher: Birkhäuser Architecture

Pages: 136

### PREFABRICATED SYSTEMS: PRINCIPLES OF CONSTRUCTION

*Ulrich Knaack, Sharon Chung-Klatte & Reinhard Hasselbach*

For a number of years, modular construction the use of prefabricated elements in architecture has once again become a subject of lively discussion and debate. Long written off as monotonous, today's building components are actually highly differentiated and capable of supporting and enhancing the architect's creativity. Numerous structures work with prefabricated components; for single-family homes the figure is ninety-eight percent, and modular systems are available

that meet high aesthetic standards.

This book provides an overview of the various different systems and their possible uses, particularly in the areas of housing, office, and industrial buildings. It explains the processes and components of modular construction and the behavior of the various materials when this construction approach is used. The authors offer strategies for planning and designing with prefabricated systems so that the architect can use them productively.



Year: 2011

Publisher: nai010 publishers

Pages: 128

## ENERGY - IMAGINE 05

*Ulrich Knaack, Thomas Auer, Marcel Bilow & Linda Hildebrand*

Climate design and climate engineering are nowadays standard in the design process. Interestingly, the reduction in energy used in a climate-efficient building during its lifetime is equal to the energy consumption necessary to produce and install the building. This aspect triggers us to reconsider the design potentials of focusing on less energy in the construction. Which materials make sense energy-wise? Do we need to build with

simple materials for 500 years or should we go high-tech and design the complete life cycle for a perfect reuse with maximum recyclable materials? Or should we build out of materials that can be used as energy after being a building? This publication focuses on the embodied energy aspects of building materials, their life cycle and their potentials for reuse as energy or in construction, and presents some far-reaching design ideas.



Year: 2012

Publisher: nai010 publishers

Pages: 128

## REIMAGINING THE ENVELOPE - IMAGINE 06

*Ulrich Knaack, Thaleia Konstantinou, Marcel Bilow & Bert Lieverse*

Increasingly, it is being acknowledged that to renovate a building and its façade, also known as the 'envelope', can hold out great advantages. Not only does it improve the quality of life and the performance, it can save energy and increase the building's market value. This makes renovation an interesting proposition for owners, users and architects alike. The façade research group at Delft University of Technology, working with the

Dutch façade builders' association VMRG, carried out a three-year research project that yielded a number of basic requests, strategies and practical examples which it then developed together with several enlightened companies. Reimagining the Envelope reports on this exchange of ideas between science and practice. The result is a variety of strategies for renovating the envelope and examples of successful projects.



Year: 2012

Publisher: nai010 publishers

Pages: 128

## IMAGINE 07. REIMAGINING HOUSING

*Ulrich Knaack*

Architects much prefer to design new buildings. It gives a clear style and language, defines a position and contributes to developments in architecture. But today's reality is that most buildings we will use in the future have already been built. We are required to reimagine them, whether refurbishing them for a better performance or giving them an entirely new duty. This is the theme Reimagining Housing is targeting: the potentials of refurbishing an existing building not just to better insulate

it but also to generate a new idea for the existing house, whether in the sense of retaining its spirit, refreshing it, spicing it up or renovating it completely. This theme is placed in relation to the various existing dwelling and housing types in the region that combines the provinces of Groningen in the Netherlands and Niedersachsen in Germany - a typical non-urban European region. The book concludes with a welter of ideas, sketches and concepts that will challenge and provoke the thinking of architects.

**ENERGY POTENTIAL MAPPING FOR ENERGY-PRODUCING NEIGHBORHOODS***van den Dobbelsteen, A., Broersma, S., & Stremke, S.***Publication Info***Year:* 2011*In:* International Journal of Sustainable Building Technology and Urban Development, 2(2), 170-176.*Cited by:* 2

Over the past five years, the method of energy potential mapping (EPM) has evolved from a cartoonish charting of climatic features with energy consequences to a detailed methodology for the development of spatial plans based on energy-effective foundations. By means of EPM the rudimentary features and properties of an area are analyzed, made discrete and translated into maps of the specific area (be it a region, city, district or neighbourhood) depicting potentials for energy supply and generation. In the latest studies in accordance with EPM, these energy

potential maps are presented as a stack at different heights (above the surface) and depths (underground), showing the maximum potential of an area. Based on these, a proposal can be made for the spatial organization of the area. In the full paper we will discuss the methodology of EPM and exemplify the method by means of recent studies, in particular De Groene Compagnie ('The Green Campaign'), a new development area in the north of the Netherlands, which turned out to have the potential to become energy-productive.

**VACUUM INSULATION PANELS FOR BUILDING APPLICATION: A REVIEW AND BEYOND***Baetensa, R., Jellea, B.P., Thueb, J. V, Tenpierik, M. J., Grynninga, S., Uvsløkka, S., & Gustavsene, A.***Publication Info***Year:* 2010*In:* Energy and Buildings 42(2), 147-172.*Cited by:* 93

Vacuum insulation panels (VIPs) are regarded as one of the most promising high performance thermal insulation solutions on the market today. Thermal performances three to six times better than still-air are achieved by applying a vacuum to an encapsulated micro-porous material, resulting in a great potential for combining the reduction of energy consumption in buildings with slim constructions. However, thermal bridging due to the panel envelope and degradation of thermal performance through time occurs with current technology. Furthermore, VIPs cannot be cut on site and the panels are fragile towards damaging. These effects have to be taken into account for building applications as they may diminish the

overall usability and thermal performance. This paper is as far as the authors know the first comprehensive review on VIPs. Properties, requirements and possibilities of foil encapsulated VIPs for building applications are studied based on available literature, emphasizing thermal bridging and degradation through time. An extension is made towards gas-filled panels and aerogels, showing that other high performance thermal insulation solutions do exist. Combining the technology of these solutions and others may lead to a new leap forward. Feasible paths beyond VIPs are investigated and possibilities such as vacuum insulation materials (VIMs) and nano insulation materials (NIMs) are proposed.

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## THE EXERGY APPROACH FOR EVALUATING AND DEVELOPING AN ENERGY SYSTEM FOR A SOCIAL DWELLING

*Jansena, S.C., Terés-Zubiagab, J., & Luscuere, P.G.*

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### Publication Info

Year: 2012

In: *Energy and Buildings*, 55(), 693-703.

Cited by: 3

In this paper the energy and exergy performance of a social dwelling of a multi-family building from the 1960s in Bilbao (Spain) is presented and various improved energy concepts based on exergy principles are proposed and investigated. The aim of this paper is to explore and demonstrate the usefulness of the exergy approach in the assessment and development of an energy system for the dwelling under consideration. The total energy supply system is analysed, including the demand (space heating, domestic hot water and electricity), the system components (for conversion, storage

and distribution) and the energy input from energy resources (primary energy and renewable resources). The study includes a comparison of the primary energy input of all cases considered and an analysis of the energy and exergy losses of each system component. The study has shown that the exergy analysis reveals thermodynamic losses that are not revealed using energy analysis and secondly, that the development of an improved energy system based on exergy principles has resulted in a significantly reduced primary energy input compared to the reference situation.

## IN VITRO EXPOSURE OF HUMAN LUNG CELLS TO EMISSIONS OF SEVERAL INDOOR AIR SOURCES CREATED IN A CLIMATE CHAMBER

*Bluyssen, Ph. M., Alblas, M. J., & Tuinman, I. L.*

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### Publication Info

Year: 2013

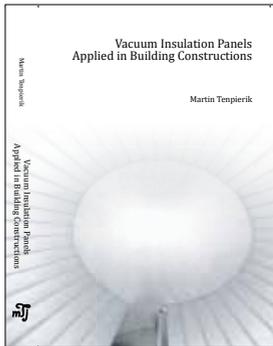
In: *Sustainable Environmental Research*, 23(2), 101-112.

Cited by: 26

In the last decade, studies on indoor air pollution suggest a link between exposure to indoor particulate matter and compounds, in particular ultrafine particles and secondary organic aerosols, and several health effects. The mechanisms of how those complex mixtures relate to health effects are still not fully understood. In vitro testing, i.e., performing a given procedure in a controlled environment outside of a living organism, provides an additional source of information next to the exposure of persons or animals to controlled environmental conditions in a laboratory environment. Possible endpoints that can be determined with such a system are oxidative stress, inflammation and cell-death. The applicability of an in vitro system with human lung cells as an

instrument to evaluate possible biological effects of emissions of several indoor air sources (scented candles, hair and water resistant spray) created in a climate chamber was studied. Results demonstrate that the procedure for testing the emissions of scented candles and two sprays resulted in reproducible test conditions and reproducible toxicological results. In vitro testing seems to have potential as a means to get more and better understanding of the mechanisms and causes for health effects of 'real-life' complex mixtures caused by sources such as burning candles and using spray cans. More tests with different indicators and endpoints, different concentrations and exposure time are required.

## KEY DISSERTATIONS



Year: 2010

Publisher: TU Delft

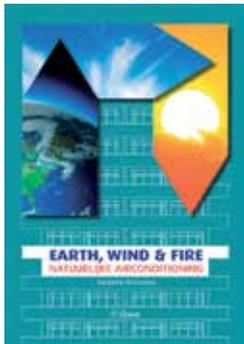
Pages: 590

### VACUUM INSULATION PANELS APPLIED IN BUILDING CONSTRUCTIONS

*Martin Tenpierik*

Increasing the insulation value of the envelope of buildings may contribute to this reduction of primary energy use. One such effective thermal insulator is a vacuum insulation panel, abbreviated as VIP. This reduction of thickness is among the most promising features for large-scale application of VIPs in the building industry. However, integration of VIPs into buildings must be performed very meticulously for several

reasons. This dissertation therefore looks into many of these aspects, presents several calculation tools and shows how VIPs can be applied in façade panels, EPS insulation boards and as under-floor insulation. With the wide-spread proliferation of VIPs in buildings a more sustainable and healthy environment can then be achieved.



Year: 2013

Publisher: Eburon

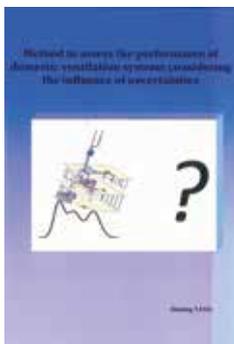
Pages: 250

### EARTH, WIND AND FIRE: NATUURLIJKE AIRCONDITIONING

*Ben Bronsema*

Collaboration between the Universities of Technology in Delft and Eindhoven has resulted in the development of a new concept for natural air conditioning of buildings. In this concept, no fans or air handling units are utilized; instead, air conditioning is accomplished by the employment of the free, available environmental energy in earth mass, wind, and the sun. The energy use for air conditioning of office buildings can, therefore, be substantially reduced.

To make this possible, three responsive architectural elements have been developed: the Ventec-Roof, the Climate Cascade and the Solar Chimney by which the architect can play a significant role as technical and artistic co-designer of the climate system. The intensive cooperation between architect and HVAC engineer will, in principle, result in an improved building air quality at reduced failure costs.



Year: 2010

Publisher: TU Delft

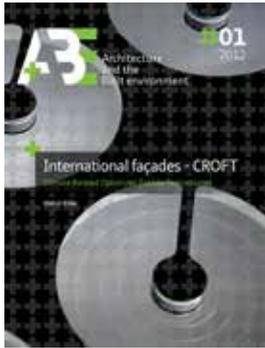
Pages: 276

### METHOD TO ASSESS THE PERFORMANCE OF DOMESTIC VENTILATION SYSTEMS CONSIDERING THE INFLUENCE OF UNCERTAINTIES

*Zhiming Yang*

The ventilation system plays an important role in the indoor environment of a domestic building. The main outcome of this research, i.e. the assessment method, consists of three main parts: 1) the methods used to define the assessment criteria for domestic ventilation systems; 2) the methods used to identify

and estimate the uncertainties in the input parameters for calculation models used to assess domestic ventilation systems; and 3) the uncertainty quantification techniques used to analyse the uncertainties and the steps required to carry out the calculations.



Year: 2011

Publisher: TU Delft

Pages: 250

## INTERNATIONAL FAÇADES: CROFT CLIMATE RELATED OPTIMIZED FAÇADE TECHNOLOGIES

*Marcel Bilow*

Current architectural planning practices, such as the International Style, perceive the climate often as a problem, rather than an opportunity to work with it.

This doctoral thesis presents a “Façade Expert Tool” (FET) that analyses the climate and the combination of the façade and building services. The goal of FET is to easily analyse the climate of a particular location and to then limit the possible combination of

façade and building services components to a practical level. Through FET Marcel Bilow has developed “Climate Responsive Optimised Façade Technologies” (CROFT).

CROFT demonstrates the potential for sustainable building operation through the use new technologies that respond to the requirements posed on façades in climate zones as diverse as those found in Moscow, Singapore, Berlin and Dubai.



Year: 2013

Publisher: TU Delft

Pages: 226

## INTEGRAL FAÇADE CONSTRUCTION: TOWARDS A NEW PRODUCT ARCHITECTURE FOR CURTAIN WALLS

*Tillmann Klein*

Integral Façade Construction focuses on the future development of the curtain wall. While the requirements on facades have slowly increased over the last decades, the curtain wall has evolved from craftsmanship oriented constructions to highly developed facade systems. But its constructional principle is still the same. Simplified, it can be described as a two-dimensional stick system with infill.

With the latest requirements of almost energy neutral buildings, faster building processes and increasing technicalisation of the building envelope this constructional principle is reaching its limits. The curtain wall system has reached a state of maturity; and it needs a new approach to guaranty that this successful product will meet the challenges of the future.

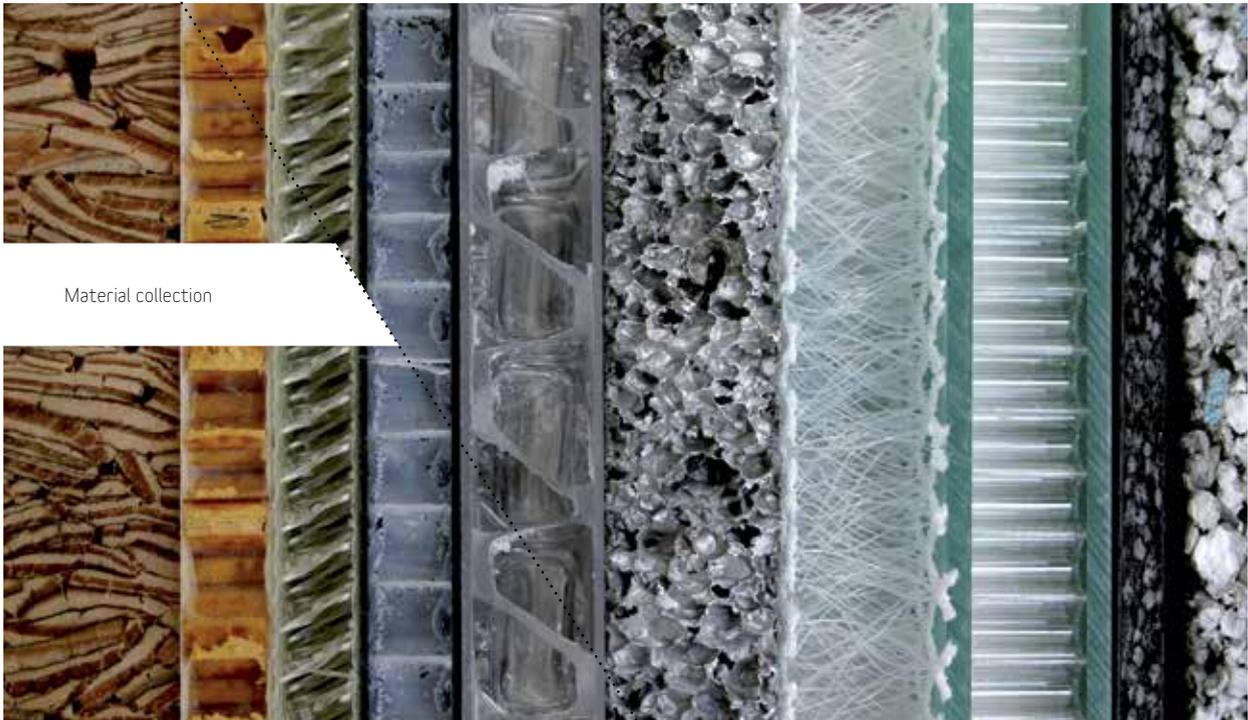
# 6

## Earning capacity

- Greater recognition and impact by focussing more on scientific publication in peer-reviewed journals (the 'paper meter' action);
- Continuing and improving the constant search for and development of future projects with a broader group of senior researchers;
- Long-term oriented strategic acquisition of senior staff, for example Prof. Philomena Bluysen and Dr Craig Martin, in addition to promoting staff members to the position of assistant professor for example doctors Martin Tenpierik, Till Klein and Marcel Bilow;
- Long-term oriented activity to link to EU funded research (H2020) via faculty activities.

### 6.1 Success and vision on how to obtain research projects

Believing in the potential of and societal need for the basic competencies in the areas of Energy & Climate, Comfort & Health, Building Envelopes and Product & Process, the GBI programme developed strategic steps to establish and continue the acquisition of external research funding. In recent years, this has taken the form of:



## 6.2 Overview of top-5 projects

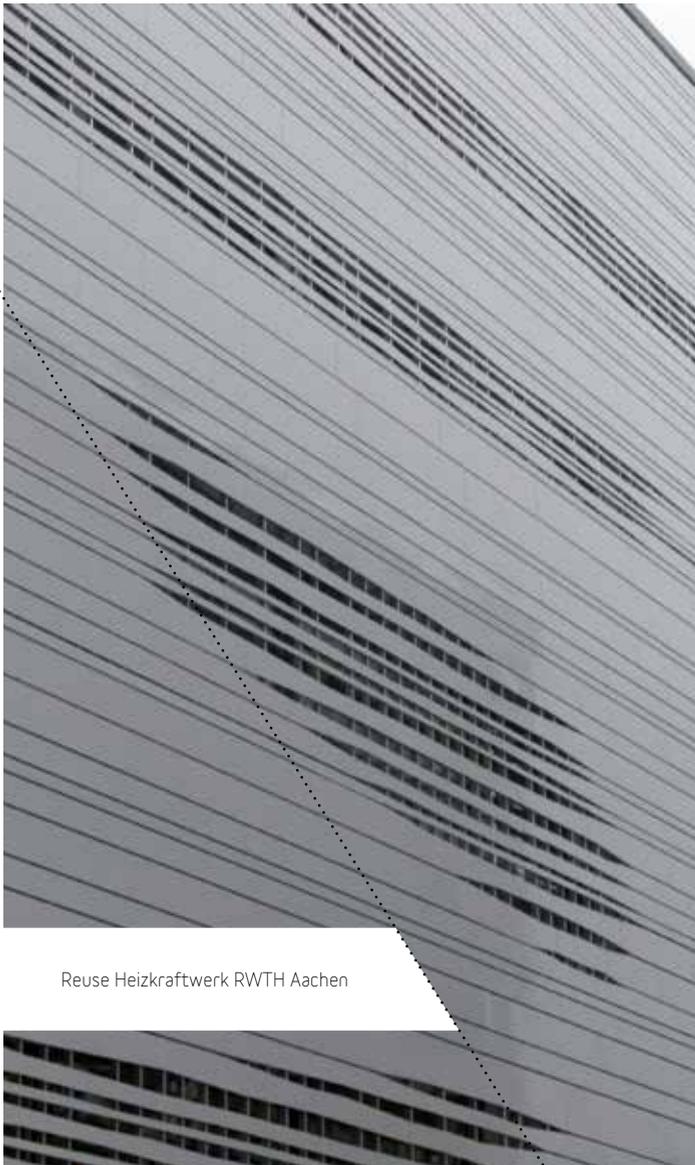
- *Climate Proof Cities* – Andy van den Dobbelsteen, Laura Kleerekoper, Nico Tillie (including team members from Urbanism). This programme, which is funded by Knowledge for Climate, studies the effects and modelling of climate change, the vulnerabilities of cities to climate change, measures and strategies, and governance. It is executed by a consortium of universities (Delft, Wageningen, Eindhoven, Utrecht, Nijmegen) and knowledge institutes (TNO, Deltares) using case studies in seven Dutch cities (Amsterdam, Rotterdam, The Hague, Utrecht, Tilburg, Arnhem, Nijmegen). Two international parties (universities of Manchester and Kassel) are involved for their expertise;
- *Better Airport Regions, models and development pathways for sustainable urban transformation* – Andy van den Dobbelsteen, Bob Geldermans, Michiel Fremouw (including staff from Urbanism). This international project is funded by the NWO-URD programme and involves ETH Zürich and TU München. It focuses on closed cycles of essential flows (energy, water, materials, food, mobility) in airport regions, taking into account the complexity of these regions and logistics, and translating them into a spatial planning approach and governance model. Amsterdam Schiphol Airport is the key case, but various other international cases are studied for reference;
- *Earth, Wind and Fire* – Ben Bronsema, Regina Bokel and Willem van der Spoel. This is an EOS project on the possibilities to use wind, sun and water for natural air-conditioning in order to minimize the use of natural resources. Within the project, a Solar facade, a Ventec roof and a Climate Cascade are being developed, simulated and tested in practice.
- *User Centered Energy Reduction* – Truus Hordijk. This UCER project started in December 2012 and focuses on further reducing the energy consumption in commercial buildings by developing innovative individual heating and cooling systems at the workplace;
- *Free-D facades manufacturing* – Karel Vollers. Based on the need for free-form components in the building industry, this STW project investigates the technologies for moulding systems, focussing on the key material for facades: glass. The next technological development in this project is to investigate and develop the production process.

Table a. Research funding

FUNDING	2010		2011		2012	
	K€	%	K€	%	K€	%
Direct funding	857	46%	789	41%	687	49%
External funding	989	54%	1.121	59%	712	51%
<i>Coverage Contribution</i>	494	-	496	-	307	-
<i>Results finished projects</i>	60	-	47	-	83	-
<i>Acquired project funds</i>	434	-	578	-	322	-
<b>TOTAL FUNDING</b>	<b>1.846</b>	<b>100%</b>	<b>1.910</b>	<b>100%</b>	<b>1.399</b>	<b>100%</b>
EXPENDITURE	K€	%	K€	%	K€	%
Staff costs	905	91%	784	91%	610	92%
Other costs	85	9%	79	9%	50	8%
<b>TOTAL EXPENDITURE</b>	<b>990</b>	<b>100%</b>	<b>863</b>	<b>100%</b>	<b>660</b>	<b>100%</b>

# 7

## Valorisation



Reuse Heizkraftwerk RWTH Aachen

### 7.1 Means used to transfer knowledge

The research by the GBI group combined with its basic competencies creates a high potential for knowledge transfer and implementation of technologies in the fields of process, planning, construction and production. Depending on the focus, public or private planning sectors request support and consultancy in the fields of strategic development and planning as well as in product and technology development.

### 7.2 Users of the knowledge

The output of the GBI group's staff members includes scientific publications in journals and books, as well as expert publications for the market and prototypes for academia and industry. Our strategy is to disseminate research findings and ideas for the improvement of the built environment or the building industry through a balanced cross-section of media. This is achieved through not only scientific journal articles but also our own Journal of Façade Design and Engineering and peer-reviewed book publications, for example the series *imagine* and *Principles of Construction* by the façade research group, as well as publications in specialist magazines, on websites and in newspapers. This 'media' knowledge dissemination includes for example a regular GBI column in the daily building newspaper *Cobouw* and two successful blogs *Buckllay* (<http://buckylab.blogspot.de/>) and *imagine* (<http://imagineblog.tumblr.com/>). The feedback and frequency of requests are evidence of the success of this approach.

# 8

## PhD research

### 8.1 Topics

There is a strong link within the GBI group between PhD research and MSc theses – a link that is rarely found in architecture faculties. The group's International Façade Master's programme is a clear example of this. The GBI group encourages MSc students to choose a research subject that fits the research themes of the group's programme. To do this, biannual presentations are held on the latest research projects and topics related to the GBI programme, so that they can be taken up by students.

The GBI group addresses themes that include the basic competencies of the scientific areas involved, as well as urgent societal and scientific themes. PhD candidates working within the group usually fall under one of these themes, but they may also overlap with more than one theme. General meetings are held both for the programme as a whole and on a thematic basis, under the coordination of a responsible staff member of the GBI group. Continuous background research and involvement in academic and market groups enhance our specialisms.

### 8.2 Supervision

Depending on the complexity or multi-disciplinarity of the project, PhD students are supervised by one or more professors. PhD candidates also have a day-to-day supervisor (usually an associate professor or senior researcher who has already

obtained a PhD). Candidates need to show their progress and research plan after approximately nine months, and a 'go/no go' decision will be made concerning continuation after one year. PhD candidates who receive a 'go' decision present their work to their supervisors and group members on various occasions in the later years of their research. Supervisors critically review the contents and progress, and also help candidates to further their progress. In addition, the GBI group's PhD candidates fall under the Graduate School, which provides a broader platform for exchange. PhD candidates are encouraged to contribute to and participate in national and international conferences, symposia and workshops, to present and obtain feedback on their results so far, to build up an international network and to learn from other research projects. All PhD candidates draw up a personal education plan with their supervisors and discuss their progress (or otherwise) in annual result & development meetings, for which annual reports are written and an evaluation form is filled in by the candidate and the supervisor.

### 8.3 Success rates

The GBI group started as a faculty with a limited tradition of fundamental research and few PhD projects, but over the past seven years has developed increasing numbers of PhD projects of good to very good quality. Because of the country's four-year PhD model, the group has only recently begun to produce significant numbers of finished doctorates, receiving honours appreciation above the TU Delft average of 10%. It should be emphasized that a high number of PhD candidates will finish their doctoral research during or shortly after this research review. Despite the difficult financial situation in which the university and faculty find themselves, the acquisition of new GBI PhD candidates who are fully externally funded has continued. This has kept PhD numbers in balance, while continuing to ensure improvements in PhD supervision, guidance and output performance.

## 8.4 Resources

TU Delft offers an excellent infrastructure for courses on starting a PhD, design research methods, presentation skills, writing a dissertation and scientific writing in English to improve research skills. These courses are organized by the faculty's graduate school.

## 8.5 Funding

Our research is carried out at the level of projects and at that of individual PhD candidates. Depending on the project and the possibilities, candidates are either fully or partly financed by projects or individual grants.

Our academic system has four forms of funding:

- Government funding, which is channelled to the faculty by the university. Due to the limitations of the last years within TU Delft, this currently only finances the key organization of the programme and the supervision of PhD candidates;
- Indirect funding, which is provided by national or European public grant agencies. These funds finance projects and, within them, PhD candidates. A significant number of our research staff and PhDs are positioned in this field;
- Contract funding, which comes from industry and is designated for specific projects. Here, the delivery of results is the focus of the activity; the individual research by the PhD needs to be adjusted to the project. Similar to the indirect funding, a significant number of staff and PhDs are financed by this method;
- The fourth form of funding is mostly linked directly to PhD candidates. Here, either an individual grant is given, or a company positions one of their researchers within our environment in order to secure specialist knowledge and thus support the success of the project and the PhD candidate. For this last option, the research group requests a bench fee from the grant-giving institution in order to provide the PhD candidate with resources for travel, publication and education (courses).

## 8.6 Attractiveness

A significant number of requests to participate in the GBI programme are received from potential PhD candidates. All applications are assessed by our research organization in order to maintain quality.

# 9

## SWOT-analysis

### STRENGTHS

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The GBI group is run by relatively young associate professors and experienced professors who cooperate well together. All are eager to take on new assignments and to collaborate with other academic, institutes and market parties. The group's programme is relevant and urgent to society and science. The group's staff includes a growing proportion of PhD candidates and staff who have already completed PhDs themselves. Productivity per FTE research staff is relatively high. The GBI group's published output is well-balanced between scientific, expert and popular publications. The department of Architectural Engineering and Technology has excellent connections and partnerships and is a forerunner in inter-university collaboration.

### OPPORTUNITIES

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There are many possibilities for funding and partnerships in the area of sustainability, climate and energy. Many parties both from academia and the market have shown an interest in cooperating with the GBI research group. Significant moves in the acquisition of new staff have been made. Assistant/associated professors have been placed in the section of climate, product and facades. Further, a full-time professorship in indoor comfort has been financially supported for 5 years by the university. It is evident that the integration of the existing MSc programmes in Architectural Engineering with that of Building Technology and its sub-programmes of Climate, Structure and Facade has a great research potential.

### WEAKNESSES

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As with other groups in the Faculty of Architecture, the GBI group has so far received little funding from major scientific funding organizations, such as NWO/STW, who do not provide many opportunities for technology or design-focused research. More effort could be put into the acquisition of funding in several subject areas.

The GBI group still can improve publications in international peer-reviewed CFIS journals. It has been recognized that the group should concentrate on its competencies and not risk going beyond its recognized fields.

Finally, cooperation within the group itself should be promoted in order to develop more interaction.

### THREATS

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Cuts in direct government funding will reduce funds for fundamental or specialist research in the basic GBI competency areas; this may lead to too much focus on short-term. Decoupling primary research funding from output performance removes the incentive to publish more and to improve the quality of publications. Much time is spent on preparing project proposals, instead of on research itself. Related to the problem of research funding is the pressure within the university system to engage in education activities in order to reduce costs. As a consequence, a significant number of staff are required to teach rather than being allowed to carry out research.

### 10.1 Strategic planning

The GBI group aims to produce viable and suitable project proposals, in cooperation with partners from the academic world, consulting companies and other commercial and industrial bodies, each in their respective role. There is still a world to be won out there.

With the TU Delft Valorisation Centre and 3TU. BOUW (the 3TU Federation Centre of Competence for the Built Environment) and the activities for the faculty at E2BA (EU-linked cooperation for grand developments and acquisition in Brussels), a structural approach to major scientific funding organizations, such as the EU and NWO/STW, will enable us to learn about the qualities of a good proposal from other faculties and through reviewing processes.

Our intention is to keep the number of PhD candidates constant or growing. This can only be realized with external funding, and is therefore related to larger research projects. Where externally funded PhDs are not possible, we will admit self-funded PhD candidates for topics that are relevant to the programme. Together with the Graduate School, PhD candidates will receive proper supervision and encouragement. This will be made possible by an additional tier between the professors/associate professors and the PhD candidates, formed by young doctors who can take responsibility for day-to-day doctoral supervision and research project leadership. There will be a strong emphasis on publications in international peer-reviewed CFIS journals, starting with PhD candidates at their earliest stages.

GBI group professors receive many requests to supervise PhD candidates, some of whom are self-funded. The selection process is very stringent in order to select the very best candidates and to keep the number per professor at a level that ensures proper supervision. As a general guideline, GBI group professors should supervise no more than 12 PhD candidates.

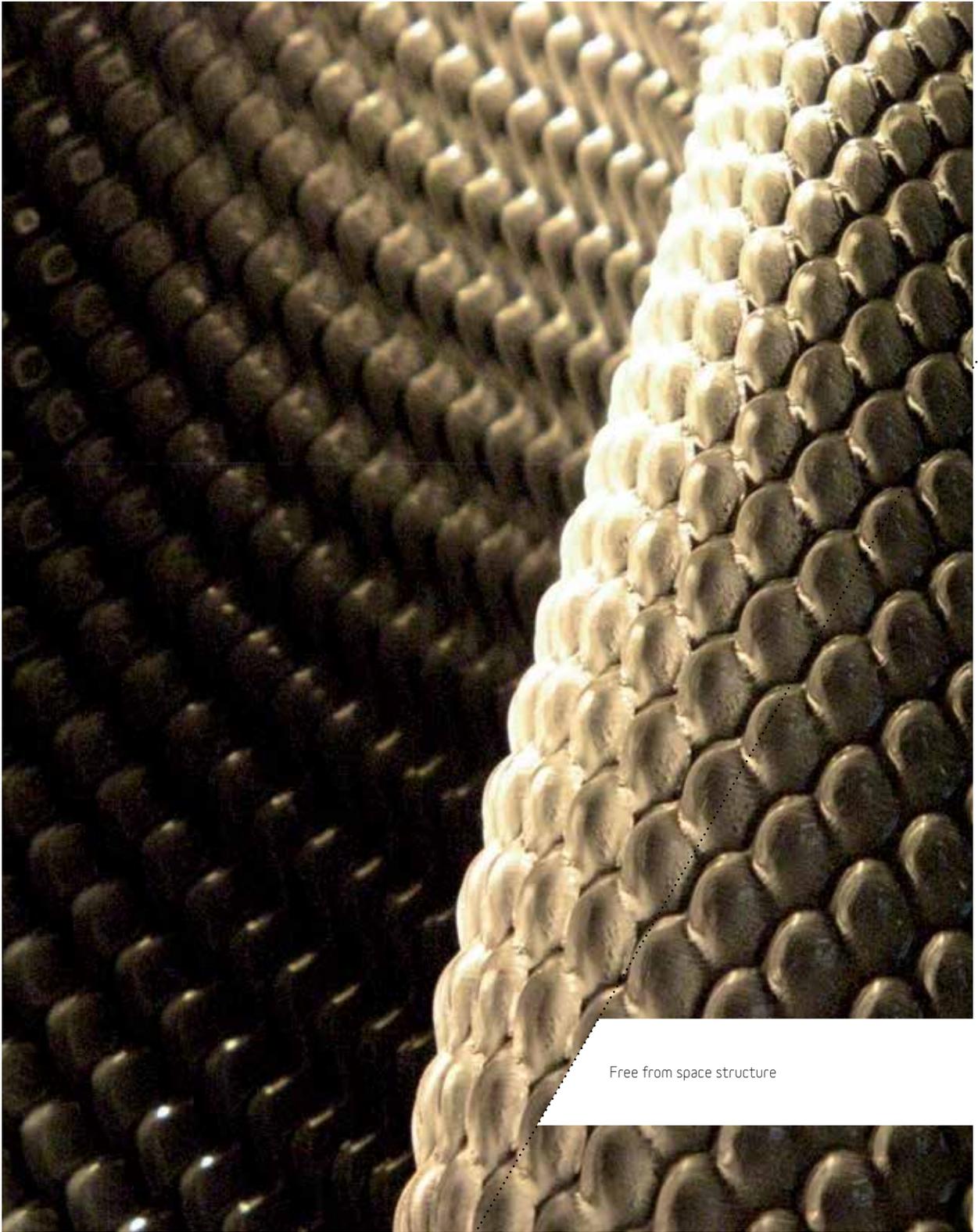
### 10.2 New research topics and their prospects

As with the GBI group as a whole, the research programme is based on stable, permanent basic competencies, which in the coming 5 to 10 years will focus on the temporary sustainability themes as presented. Sustainability, technologies, materials and innovation will remain important issues, and be organized via the four themes Energy & Climate, Comfort & Health, Facades and The Making (formally Building Elements & Components). This is an open-ended issue, but GBI themes may vary in the near future, as instigated by the parties involved. It is quite possible that in the near future the focus will be on becoming 'fossil-free' and 'fully reusable' in production and performance, on smart grids and networks in the built environment, on sustainable mobility or adaptivity and functionality of components, on a health-supporting and health-stimulating environment for both the elderly and young people – developments that can already be seen in our recent projects.

### 10.3 Flexibility

In view of recent financial difficulties, we intend to become relatively independent of government funding (initially coming from the ministry of education) by acquiring external funding for our projects. In fact, we have already been realizing this intention for several years.

Prerequisite to this will be a direct coupling of these finances to the group involved, so that where funds are attracted in, money can be spent. The faculty is currently working on the preliminary stage of this transition.



Free from space structure



# RESEARCH LEADERS

RESEARCH LEADERS: Prof. Sevil Sarıyıldız PhD & Prof. Joop Paul PhD



## Scope

### Scientific and societal aims

The developments in architecture, building design and the built environment are driven by attempts to achieve step changes in performance. The most important way to attain this is to develop innovative computational tools, techniques and methods in the design, manufacturing and construction process. Considering performance as a driver in the building design and planning process is a prerequisite to achieving buildings and built environments that perform, function and operate better, consume fewer resources in construction and operation, and offer a healthier and more comfortable environment to their inhabitants, while still being economically viable and sustainable.

#### Scientific aims

The mission of the Computation & Performance (C&P) research programme is to improve the design and performance of buildings and the built environment through scientific inquiry into novel ways of conceptualizing, evaluating and influencing building performance using computational methods for open design systems, measurement, prediction and simulation of the performances of buildings and built environments, form finding, design generation and analysis, information modelling, decision making and design communication. Performance in this context refers to technical performance as well as qualitative performance – which deals with both hard and soft aspects of architectural & building design and the built environment.

Therefore the research areas are the performance and computation driven design of buildings and the built environment: structural design and analysis; performative morphologies; glass and transparency; decision support systems for sustainable buildings and built environment; adaptive material systems; interactive architecture; building information modelling, file-to-factory and digital manufacturing; urban prediction, generation and simulation models; collaborative design and engineering; nonstandard architecture and generative geometry and spatial planning; parametric and algorithmic design; and the use of computational intelligence techniques, conceptualization of embedded robotics in smart building components and methods to develop tools in the abovementioned topics.

Through a multidisciplinary approach, we aim to address two scientific challenges, namely:

- To define building performance and quality, and to develop the computational means to assess in design the many various aspects that constitute them in a loop of form finding, performance evaluation and optimization.
- To continually re-examine the relations between performance/quality, function, materials, systems, society and architectural form within an investigation of computationally enhanced holistic design strategies.

#### Societal aims

In recent years there has been a clear change in perspective on the efficiency of the built environment, driven by the appreciation that resources of materials and energy are not endless and that the environmental performance of the built environment should be improved drastically. This has reinforced the observation that many facilities comprising the built environment – particularly offices, residences and various public-building types – underperform. ‘Performance’ in this context denotes the ability of buildings to meet technical and non-technical requirements (e.g. physical as well as non-physical, hard and soft aspects) imposed upon them by their owners, users and society at large.

Through a multidisciplinary approach, we aim to meet the following societal challenges:

- To apply the understanding of performance and quality to the computational design process, so as to plan, construct and operate buildings whose reality meets or exceeds the aspirations that motivated their production.
- To develop design, communication and decision-making practices, and their computational support, that enable stakeholders to effectively apply the understanding of building performance and quality in an informed and balanced way so as to achieve mutually acceptable outcomes.

### **1.2 Where do we stand?**

- The C&P research group plays a prominent role internationally in the area of computational design research and its application to performative architecture in practice.
- The Hyperbody research group plays a dominant role in the area of interactive architecture, real-time collaborative design and nonstandard architecture. The Hyperbody group is one of the leading groups internationally that deals with interactive architecture and develops 1:1 nonstandard, interactive building components. Other groups within the EU such as Bartlett and ETHZ develop small-scale interactive prototypes and employ robotic fabrication, while in the USA, Carnegie Mellon develops modular small-scale interactive components and MIT focuses on the application of biotechnology to architecture.
- The Design Informatics group has a prominent role in performative computational design and its applications in the international arena. Especially the use and the development of computational intelligence techniques and methods in performance-based design and optimization is a unique and well-respected topic in building science in the international community. The research of the design informatics is practice oriented and pragmatic.

In recent years, especially the applications of the scientific research of the group in methodologies and theories, including computational ones, has focused on energy, sustainability and the indoor environment, passive solar strategies, spatial analysis, spatial configurations, computational urban design and planning, and design information modelling (DIM).

- Although small, the Structural Design group plays a prominent role in the international research on structural glass, and also works in various fields of structural design research, such as form finding and structural optimization. Its research has resulted in numerous conference papers and a patent application. To develop this patent application, a VG1 grant was applied for and awarded. A VG2 grant application has now been made.

Through collaborations with other prominent researchers and research groups, the C&P research group actively participates in a strong, international research network. The group's contribution to the international SmartGeometry Group evidences its prominence in both research and practice. Group members also collaborate closely through commissioned design and research with industry partners and public and semi-public organizations.

### **1.3 Where do we want to be next?**

The general aim of the C&P programme is to maintain its leading position in the development of computational tools and innovative techniques and methods in designing best-performing buildings and built environments, by applying innovative scientific outcomes in built-environment practice; and to keep its leading position in nonstandard and interactive architecture. In addition, we aim to extend our expertise areas to configurative urban design and analysis, syntactic architectural design, embedded robotics in spatial environments and structural glazing.



# Composition

**Table a. Research staff at institutional and programme level**

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	18	14,45	15	10,1	14	9,3
Non-tenured staff	6	3,6	3	2,8	3	2,8
PhD students	17	11	22	17	21	17
Guests	4	0	7	0	8	0
<b>TOTAL RESEARCH STAFF</b>	<b>45</b>	<b>30,8</b>	<b>47</b>	<b>31,6</b>	<b>46</b>	<b>31</b>

**Table b. Research staff with position in practice**

WHO	ROLE	FIRM/ORGANISATION	WHERE	
Prof. Kas Oosterhuis	Principal	ONL	Rotterdam	NL
Prof. Joop Paul PHD	Managing Director	Arup Netherlands	Amsterdam	NL
Rob Nijse	Managing Partner	ABT bv	Velp	NL
Andre Chaszar PHD	Owner	O Design Consulting and Research	New York	US
Florian Heinzelmann	Partner	SHAU	Rotterdam	NL
Jeroen Coenders	Senior engineer	Arup Netherlands	Amsterdam	NL
Michael Bittermann PHD	Design executive	Bittermann & Weiss Holzhaus GmbH	Gerchsheim	DE
Michela Turrin	Partner	Novarc*Studio	London	UK
Jelle Feringa	Partner	EZCT Architecture & Design Research	Paris	FR
Jelle Feringa	Partner	EZCT Architecture & Design Research	Paris	FR

The C&P research programme combines chairs and groups from the Department of Architectural Engineering + Technology, namely Design Informatics (DI), Structural Design (SD) and Hyperbody (HY), as well as from the Faculty of Civil Engineering and Geosciences, namely Structural Mechanics (SM) and BEMNext Lab (BNL). The resulting interdisciplinary research group is nationally and internationally embedded in architecture (e.g. BNA – Royal Institute of Dutch Architects) and building and civil engineering (e.g. Research School Integral Design of Structures), in computational design (e.g. SmartGeometry Group, eCAADe – European CAAD association), nonstandard and interactive architecture

(e.g. ICCHA, International Cold Climate Housing Association), and structural design and engineering (e.g. IASS – International Association for Shell and Spatial Structures, IASBE – International Association for Bridge and Structural Engineering). Originally, in 2003, the research group was divided into four parts, with a large part contributing to the BLOB-ICT research programme, and a smaller part contributing to the ZAPPI research programme, the Hyperbody research group (which had just started) and the Structural Design Lab in the Faculty of Civil Engineering. Since then, the research portfolio has been realigned and consolidated.



# Research environment and embedding

## 3.1 International and national positioning

We consider ETH Zurich, MIT, Carnegie Mellon University, National University of Singapore and South China University of Technology our main competitors (and partners). In comparison, we take a leading role internationally in interactive architecture and performative architecture & computational intelligent design. In addition to these particular areas, we also embrace a wide range of other research areas and topics under the umbrella of C&P. This enables us to attract strongly motivated international PhD students of a high calibre who are able to explore and develop their own research interests and topics. The breadth of research and knowledge available at the faculty, as a whole, further supports this.

- Prof. Sariyildiz appointed as Distinguished Guest Professor at Pennsylvania State University at the departments of Architecture, Landscape Architecture and Architectural Engineering - USA in 2011 ;
- Prof. Sariyildiz appointed as Dean of the Faculty of 'Architecture, Interior and Environmental Design' at Yaşar University - Turkey since October 2012-2013;
- Rudi Stouffs PhD is appointed as visiting Associate professor at NUS-Singapore in 2011 and 2013-2014;
- Bige Tuncer PhD is appointed as visiting professor at ETH-Zurich in 2011;
- Bige Tuncer PhD is appointed as visiting scholar at MIT-USA in 2012-2013;

- Bige Tuncer PhD is appointed as associate professor at Singapore University of Technology and Design since August 2012;
- Prof. Oosterhuis appointed as distinguished member of the International Cold Climate Housing Association;
- Prof. Oosterhuis appointed as distinguished visiting professor at University of Sydney in 2013.

## 3.2 Collaboration with stakeholders

We actively collaborate with other researchers and research groups, architectural and engineering offices, industry and public and semi-public organisations. Our university partners are:

- ETH Zurich (Prof. Schmitt, Prof. Ludger Hovestadt);
- MIT (Prof. Knight, Prof. Sass);
- Carnegie Mellon University (Prof. Krishnamurti, Prof. Omer Akin, Prof. Gross);
- Simon Fraser University (Prof. Robert Woodbury);
- Pennsylvania State University (Prof. Chimay Anumba);
- Keio University Japan (Associate prof. dr. Hiroya Tanaka);
- South China Institute of Technology (Prof. Yimin Sun);
- Harvard University (Prof. Rivka Oxman);
- Rensselaer Polytechnic (Prof. Evan Douglas);
- University of Michigan (Prof. von Buelow);
- Istanbul Technical University (Prof. Cagdas);
- Middle East Technical University (Prof. Savas);
- Yaşar University (Prof. Arif Hepbasli, Prof. Levent Kandiller, prof. Fatih Tasgetiren);
- University Iuav of Venice (Prof. Siviero, Prof. Majowiecki);
- University of Ghent (Prof. van Impe);
- TU Eindhoven (Prof. de Vries, Prof. Patrick Teuffel);
- University of Kassel (Prof. Manfred Grohmann);
- University of Montpellier (Prof. Motro);
- TU Lisbon (Prof. Jose Duarte);

- Clemson University (Prof. Green);
- Aristotle University of Thessaloniki (Assoc. Prof. Voyatzaki, Assoc. Prof. Spiridonidis);
- Harbin Institute of Technology (Prof Dr Mei Hongyuang);
- University of Rome La Sapienza (Prof Antonino Saggio);
- Utrecht University (Faculty of Social Sciences)
- Ghent University(Belgium);
- Salford University (UK);
- University of Minhao, Porto, Portugal;
- TU Wien (Vienna);
- University IUAV of Venice (Italy);
- University of Torino (UNITO);
- University of Parma (UNIPR);
- Princeton University (USA);
- University of Tennessee (USA);
- Universidade Federal da Bahia (Brasil);
- Kyoto University (Japan);
- Hanyang University (South Korea);
- Southeast University (SEU) (China);
- National university of Singapore (NUS);
- UTS (University of Technology Sydney);
- IAAC Barcelona (Spain).
- Partners from the professional field are:
- Arup;
- Crux Consultants;
- Witteveen & Bos;
- Berenbak Structural Design;
- ABT;
- Arcadis;
- Blauwhoed;
- Mountain Network;
- Markant;
- Hurks;
- Heijmans;
- BAM;
- Ballast Nedam;
- DuraVermeer;
- Janssen de Jong;
- UN Studio;
- ONL;
- EGM Architects;
- Mecanoo;
- Broek & Bakema Architects;
- Cepezed;
- Zaha Hadid Architects;
- Open Project Office;
- Studio Tecnico Majowiecki;
- Bollinger + Grohmann;
- Van Noordenne Groep;
- Festo;
- Philips;
- Bentley Systems;
- Autodesk;
- Dutch Government Building Agency (Rijksgebouwendienst);
- Rijkswaterstaat;
- SBRCurnet;
- Bouw Informatie Raad;
- Polkima (Composite Materials);
- BIR [Bouw Informatie Raad].

We also collaborate with researchers from other research programmes/groups within the university and faculty, especially Green Building Innovation and Urbanism.

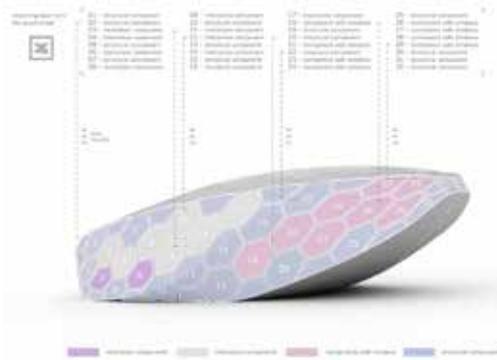
### Participation in consortia

- Turkish Technical Universities Long-term -International Project (TULIP): cooperation between TU Delft, -Middle East Technical University and Istanbul Technical -University, including joint PhDs (led by Prof. Sevil Sariyildiz PhD);
- International Fire Group: research cooperation between TU Delft, TNO, Efectis, Worcester Polytechnic institute, University of Texas and Michigan State University- (co-organised by Prof. Kees van Weeren);
- SmartGeometry Group - Partnership between practice, research and academia; Foster+Partners, KPF, -Grimshaw, ArupBuro Happold, Architectural Association, MIT, University of Bath (TU Delft core -members Jeroen Coenders);
- Research School Integral Design of Structures: Inter-university research institute, accredited by the KNAW (the Royal Netherlands Academy of Arts and Sciences), with participation from TU Delft, TU Eindhoven and University of Twente;

- Joint application (in collaboration with the Green Building Innovation research group) with the University of Tennessee for the U.S. Department of Energy Solar Decathlon 2011 (started in 2009), in preparation for the Solar Decathlon Europe 2012 - The consortium included numerous industrial companies.
- Hyperbody has participated in consortia

involved in doctoral education with ENSHA EAAE such as Observatory (<http://www.enhsa.net/main/observatory/>), post-graduate education E-Archidoct (<http://www.e-archidoct.eu>) and graduate education Continuum (<http://www.f2f-continuum.eu>);

- Hyperbody is associate partner, Meta-Body (EU Culture Program, [www.metabody.eu](http://www.metabody.eu)).



protoSPACE 4.0 consisting of protoCELLS that are integrated, customizable, multi-functional building blocks, has been implemented with students tutored by O. Slootweg, C. Kievit, and J. Feringa



# Academic reputation

## Invitations to address major conferences

YEAR	CONFERENCE	WHO	WHERE
2012	Keynote at ICONARCH-2012, Edition Architecture and Technology	Sariyildiz	Konya TR
	Keynote at ITU KAMU	Sariyildiz	Istanbul TR
2010	Keynote at Architectural Digital Technology Education Conference of China	Oosterhuis	Chongqing CN
2011	Keynote International Design Seminar (INDESEM)	Oosterhuis	Delft NL
2012	Invited Speaker, Workshop IV Integrated Resource and Urban Modelling for Sustainable Liveability, National University of Singapore	Stouffs	Singapore SG
2011	Invited Speaker Int Conf EAAE-ENHSA Rethinking the Human in Technology-driven Architecture	Bier	Crete GR
2011-12	Invited Speaker Empowering Infrastructure Globally Conference	Biloria	New Delhi IN

## Conference organisation activities

YEAR	CONFERENCE	ROLE	WHO	WHERE
2012	Computational Design int symposium & workshop, Izmir Yasar University	Organisation	Sariyildiz, Bitterman	Izmir TR
2010	Nat Symposium Decision Support Systems for Sustainable Buildings	Organisation	Sariyildiz	Delft NL
2011	National Symposium Arts & Mathematics	Organisation	Sariyildiz	Delft NL
2011	7th International Seminar of the Structural Morphology Group (SMG) IASS, Imperial College London	Co-chair	Borgart	London UK

## Involvement in scientific or professional event

YEAR	EVENT	ROLE	WHO	WHERE
2012	2nd Int Conf on Design and Modeling in Science, Education and Technology: DeMset	Member Program Committee	Sariyildiz	Orlando US
2010	6th Int Conf on Innovation in Architecture, Engineering & Construction	Scientific Comm.	Sariyildiz	Penn US
2011	Open Systems and Methods for Collaborative Built Environment Modeling, CAAD Futures Workshop	Co-chair	Stouffs, Tuncer	Liege BE
2010	Decision Support Systems for Sustainable Buildings Symposium	Organizer/ Chair	Stouffs	Delft NL
2012	X Agendas for Architecture, Capita Selecta Series	Organising Comm.	Bier	Delft NL
2013	Annual eVolo Skyscraper Competition	Jury Member	Oosterhuis	US
2010	Int Conf on Innov in Arch, Engineering and Construction (AEC) series	Scientific Comm.	Sariyildiz, Tuncer	PennState US

## Exhibitions

YEAR	EVENT	ISSUER	WHO	WHERE
2012	Residency and Interactive Performance at the ProtoSPACE Lab	Hyperbody	Vandoren	Delft NL
2012	Hyperbody Graduation Projects K. Gornicki (Warsaw Cultural Centre) and R. Palfi (Oslo Aquarium) Nominated at Archiprix BK	Archiprix	Gornicki / Palfi	Delft NL

## Honorary positions

YEAR	INSTITUTE	POSITION	WHO	WHERE	
2009>	International Cold Climate Housing Association (ICCHA)	Honorary Member	Oosterhuis	Harbin	CN

## Election to academies or academic professional associations

YEAR	INSTITUTE	ROLE	WHO	WHERE	
2010>	Int Association of Computer Science and Inf Technology (IACSIT)	Senior Member	Bier	Singapore	SG
2012>	Association for Education and Research in Computer Aided Architectural Design in Europe (eCAADe)	Administrative Council	Stouffs	Liverpool	UK

## Evaluator of research programme

YEAR	PROGRAMME	ROLE	WHO	WHERE	
2010>	Eurostars Technical Expert, EUREKA and the European Community	Evaluator	Stouffs	[various]	
2012	Swiss National Science Foundation (SNSF)	Evaluator	Stouffs	Bern	CH
2012	Flemish Government Agency for Innovation by Science and Technology	Evaluator	Stouffs	Brussel	BE

## Editorship academic journal

YEAR	JOURNAL	ROLE	WHO	WHERE	
2010>	Architectural Engineering and Design Management	Editorial Board	Sariyildiz	Rotterdam	NL
2010>	Footprint	Editorial Board	Bier	Delft	NL
2013>	Next Generation Building Journal	Editor-in-Chief	Oosterhuis	Berlin	DE
2007>	Journal of the International Association for Shell and Spatial Structures	Editorial Board	Borgart	Madrid	ES
2011	Automation in Construction Journal	Reviewer	Tuncer	Rotterdam	NL

## Software

YEAR	APPLICATION	ISSUER	WHO	WHERE	
2012	Energy Neutral Neighbourhood Engine (ENNE)	TU Delft	Bitterman	Delft	NL
2010	PhD: CLIP (Computational support for Lifecycle Integral building Performance assessment ) in coll with State Building Agency	EPI-CREM European Project	Gürsel	Delft	NL

## Role in practice and policy making

YEAR	FIRM/ORGANISATION	ROLE	WHO	WHERE	
2010-12	At Arup involved in the design of the following buildings: Canton Tower, Guangzhou; Rijksmuseum, Amsterdam; Stedelijk Museum, Amsterdam; NIOO, Wageningen	Europe Board Director	Paul	Amsterdam	NL
2010-12	At office ONL [Oosterhuis_Lénárd] recently completed the int extensively published buildings CET in Budapest and the LIWA tower in Abu Dhabi	Co-director	Oosterhuis	Rotterdam	NL
2010-11	Revolt House: Energy Adaptive Floating Unit, at Solar Decathlon Europe	Advisor	Stouffs	Delft	NL
2010-11	Innovation Platform ICT, Domotica & Smart Living	Core Group	Stouffs	Amsterdam	NL



# Quality and relevance

## **5.1 Societal/scientific quality and relevance of the research**

### ***Quality and scientific relevance***

The C&P research programme is very well received in both academia and practice. Nonstandard and interactive computational performative design are considered important in today's academic and professional world. The quality of the research is reflected in research results, such as scientific publications and international requests to collaborate, and invitations to attend scientific events and to sit on international scientific committees.

### ***Significance of the contribution to the field***

The complexity of building and built environment design and planning can be seen in immaterial aspects, such as configuration, form, aesthetic, functional, social, cultural, comfort, safety and sustainability, as well as physical aspects such as structure, construction, climate and energy aspects. These aspects must be addressed during the conceptual phase of the design process, in order to achieve the maximum optimality of buildings/built environments. To deal with such complexity, we develop computational tools, techniques and methods that enable designers to formulate the design needs, requirements and rules, and to translate them into algorithms that generate designs; this approach exceeds the use of computation as a representational or drafting tool. In this way, we are pushing the borders of existing design/ planning tools and methods by implementing our scientific research for innovations in design practice.

### ***Socio-cultural, technical and/or economic quality***

With the spin-off of our research, we aim to contribute to the quality improvement and the efficiency of buildings and built environments. As a starting point, we want to achieve a human-centred design approach. A computational integral design approach, with the emphasis on both soft and hard aspects of performance, is essential to our research approach and is also emphasized in commissioned research, design explorations and public exhibitions. These projects commissioned by industry partners and public and semi-public organizations, such as Festo, Philips, the Dutch government's Building Agency (Rijksgebouwendienst), Netherlands Board for Healthcare Institutions (Bouwcollege), etc., also illustrate the growing attention to valorisation within the research programme.

In this respect the results/highlights are:

- Development of the protoCELL - building blocks acting as autonomous agents
- Development of parametric building component with embedded robotics
- Computational support for Lifecycle Integral Performance assessment (CLIP) software tool developed for use by the Dutch Government Building Agency (Rijksgebouwendienst-DI)
- Key knowledge contributions to practices and policies are:
- Knowledge on semantic information modelling in conceptual design to Mecanoo and Philips, 2007 [DI]
- Knowledge on thermal performance evaluations considering summer overheating, daylight and wind and their impact on the design of a large roof structure in Bologna for the Open Project Office, Bologna, 2009 [DI]

### ***Evidence of the appreciation***

Presenting our research findings at meetings (symposia, workshops, network meetings, stakeholder meetings, tradeshow, exhibitions, etc.) with societal stakeholders (in industry, practice, public and semi-public organizations) yields wide approval. The best evidence of this is follow-up projects commissioned by the same

or related stakeholders, and also the numerous invitations to international conferences as keynote speakers. Our staff member's invitations to accept appointments at various internationally well-known universities are also important evidence. We receive frequent requests from international students to join our research group to do their PhD research with their own funding and grants. We have recently signed an agreement with SCUT on the exchange of Master's and PhD students.

#### **Quality of the scientific publications**

The research group has grown over the review period, as has its output. This growth, however, is not only quantitative, but also qualitative. Most of the chairs/groups participating in the programme do not have a very long research history, and they have developed and matured their research activities significantly during the review period. This qualitative growth is also apparent in the scientific publications, with an emphasis on conference papers during the first years, while there is a better balance between

journal papers, books, conference papers and professional publications in the second half of the review period. The last year, however, reveals a remarkably different figure, following the faculty fire in 2008 and the recent financial cutbacks. We aim to rebuild and strengthen the trend towards quality, emphasizing journal papers and books even more, without neglecting other publications.

#### **5.2 Key indicators**

- Published books, peer-reviewed journals, refereed papers and published and used (software application) prototypes;
- Application of scientific research outputs (such as methods, techniques and tools) in public & private sector projects.

**Table a. Main categories of research output**

	2010		2011		2012	
	STAFF	GUESTS	STAFF	GUESTS	STAFF	GUESTS
Refereed articles	2	0	6	2	3	5
Non-refereed articles	1	1	1	0	1	0
Books	0	0	1	0	0	0
Book chapters	2	0	6	0	1	1
PhD theses	1	0	1	0	0	1
Conference papers	29	3	32	2	14	0
Professional publications	6	0	5	0	3	0
Editorships journals/book	2	0	0	0	2	0
<b>TOTAL PUBLICATIONS</b>	<b>43</b>	<b>4</b>	<b>52</b>	<b>4</b>	<b>24</b>	<b>7</b>

## 5.3 Results and outputs

### KEY PROJECTS

#### Programme

Intelligent Energy Europe

Grant: € 58.000

Role: subcontractor

Principal Researcher:

Rudi Stouffs

Coordinator: Ministerie van VROM,  
Rijksgebouwendienst

Duration: 12/2007 to 6/2010

#### EPI-CREM

*Energy Performance Integration in Corporate Public Real Estate Management*

EPI-CREM aims to improve energy efficiency and rational use of energy across public building stock in Europe by embedding energy issues in decision making processes within Corporate Real Estate Management (CREM) at the strategic level, and translating those decisions into tactical and operational levels of building management. This way

the decision making process surrounding energy saving measures is embedded in the CREM-process, and is made structural and more cost effective. To reach these goals EPI-CREM provides a strategy and a set of tools enabling building owners and users to make the energy aspect an integral aspect of Corporate Real Estate Management.

#### Programme

Erasmus Lifelong Learning

Programme

Grant: € 40.000

Role: partner

Principal Researcher: Henriette Bier

Coordinator: University of  
Birmingham

Duration: 1/2008 to 1/2012

#### E-ARCHIDOCT

*Demographic Change and Housing Wealth*

The e-archidoct project is a tool being developed by a partnership of 14 European Schools of Architecture aimed at the creation of a collaborative post-master educational virtual environment, which will support their third-cycle programmes by:

- Enhancing and reinforcing their presence in the international competition of higher education institutions;
- Offering distance-learning e-modules addressed to the candidates of those programmes;
- Facilitating researchers in the doctorate programmes of the participating institutions to keep working and collaborating virtually with the host institutions;
- Creating a media and data library to be used by the students of the e-campus.
- Developing virtual international doctorate committees to be supervised through e-meetings;
- Creating common assessment criteria and qualifications for doctoral studies in architecture;

- Creating a network of post-master researchers through direct contacts over the Internet.

E-archidoct offers, in parallel, a series of sessions (lectures, reports, presentations, data, etc.) for graduates and practicing architects from all European Countries to inform them about the state of the art in architectural thinking, about current trends of architectural design and construction, about new materials and technological advances, about recent achievements in the domain of architectural research and experimentation. The aim of these sessions will be to keep professionals updated about the fast changing architectural trends and to provide a forum for debate on theory and design.

The partners of the program work on the development of:

- A virtual European post-master course as a taught first part of doctorate studies;
- A European virtual master course specialized in architectural research as a specific professional expertise.

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## Programme

### CONTINUUM

*Architectural design and manufacturing from the school lab to the fabrication workshop*

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Erasmus Lifelong Learning

Programme

Grant: € 20.000

Role: partner

Principal Researcher:

Henriette Bier

Coordinator: Aristotle University  
of Thessaloniki

Duration: 2007 to 2010

The aim of the CONTINUUM is to support the quality of the education and research on architectural design and construction offered by schools of architecture of the consortium by reinstating the channels of communication and information flow between schools of architecture and those enterprises who are applying digital fabrication technologies to

produce new building materials, full scale components and prototypes as well as surface structures. The broad and publicized availability of these channels will also enable practising architects to be in a continuum of information from their life as students to their current life as professionals.

## Programme

### METABODY

*Media Embodiment Tékhnē And Bridges of Diversity*

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Culture Programme of the  
European Union

Grant: € 200.000

Role: associate partner

Principal Researcher:

Nimish Biloria

Coordinator: Reverso

Duration: 7/2013 to 7/2018

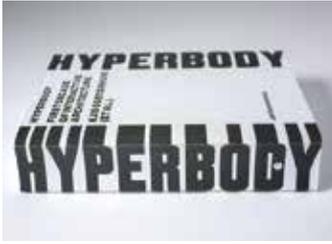
METABODY is a 5 years project starting July 2013, with the support of the European Commission and the participation of 28 partners from 14 countries, coordinated by Reverso.

Metabody will elaborate a critical study of cultural homogenisation, social control and global surveillance in Information Society and develop new technocultural paradigms that highlight embodied differentials: the irreducible and changing differences of bodies and contexts, expressions and relations, not for the sake of predicting, but of developing a social ecology that foregrounds unpredictability and emergence, exceeding capitalistic appropriation and preemption. The project will undertake a critical study of contemporary aesthetics of control, in which quantification of all activities via reduction to information patterns permeates all areas of life, subduing it increasingly to an implicitly militaristic regime of control while being

presented as a desirable condition where connectivity equates liberation, and control becomes a hidden variable of the fallacious equation.

At the same time Metabody will develop new technological paradigms that take into account the changing differences of bodies, contexts and movements in their irreducibility, valuing and highlighting the importance of unpredictability for a livable life and generating the conditions for a new social ecology.

In the 4th year the project will develop a mobile experimental architecture containing interactive multisensorial laboratories for performances, installations, workshops, seminars, residencies and continuous research, that will tour throughout 9 European cities in the last year of the project as an observatory of diversity and a laboratory of difference.



*Year:* 2012

*Publisher:* Jap Sam Books

*Pages:* 624

## HYPERBODY: FIRST DECADE OF INTERACTIVE ARCHITECTURE

*Kas Oosterhuis et al.*

HYPERBODY explores interdisciplinary spatial domains via specific practices and academic collaborations in order to develop in-house cutting-edge design tools, techniques and methods for the making of complex non-standard, customized, interactive architectures. HYPERBODY's architecture is based on swarm theory, wherein the built environment is defined as a space that is formed and informed by smart components that interact with each other and users like birds interact in a swarm. Such interactions have been developed and tested in the protoSPACE laboratory, which is operated

by HYPERBODY within the larger Internet of Things and People. HYPERBODY explores digital manufacturing using in-house large industrial robots, laser cutting and rapid prototyping facilities in order to physically construct, analyse and engineer complex parametric building components and their mutual interconnections. HYPERBODY's vision in today's mediated context is geared towards developing strategic design methodologies in order to propagate socially, environmentally and economically performative design solutions and to demonstrate their buildability by developing 1:1 prototypes.



*Year:* 2011

*Publisher:* VDM Verlag Dr. Müller

*Pages:* 300

## INTERACTIVE CORPORATE ENVIRONMENTS: DEVELOPING REAL-TIME INTERACTIVE CORPORATE ENVIRONMENTS INCORPORATING COMPUTATIONAL TECHNIQUES

*Nimish Biloria*

The inter-disciplinary research book exemplifies upon a four year long research experiment to develop real-time interactive corporate office environments which addresses the behavioral patterns and preferences of its occupants with a strong underpinning in the domain of computation, interaction design and open system typologies. Rather than creating conventional inert structural shells (hard components), the development of a meta-system, or in other words creating a 'soft' computationally enriched open systemic framework (informational) which interfaces with the 'hard', material component and the users of

the architectural construct formulates the core agenda of the research work. This soft space/meta system serves as a platform for providing the users with a democratic framework, within which they can manifest their own activity oriented programmatic, spatial and ambient alterations in order to create self designed and customized spatial alternatives. The otherwise static/inert hard architectural counterpart, enhanced with contemporary technology thus becomes a physical interface prone to real-time spatial/ structural and ambient augmentation to optimally serve its users.



*Year:* 2011

*Publisher:* Jap Sam Books

*Pages:* 124

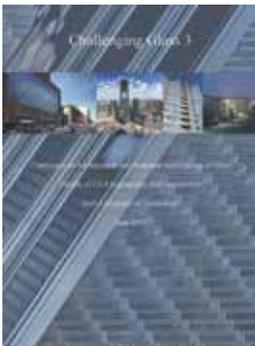
#### **IA#4 - QUANTUM ARCHITECTURE**

*Kas Oosterhuis, Han Feng, Xin Xia (eds.)*

The scientific reading of natural systems and phenomena has recently been adopted as the main driving force for new development in architecture. Due to the study of flocks of birds, genetic coding, fractal geometry and neural networks, various abstract computational machines have been invented. They have facilitated our ability to realize new kinds of spatial and material organization, and hence enriched our understanding of the inner logic of space and architecture. The fourth issue of the iA bookzine presents quantum theory as a new stimulus for architecture debate. Quantum theory, as the most precise explanation of our physical world, has not only triggered a tremendous technical improvement, but has also introduced a revolutionary quantum world view that considers the material world as a

non-deterministic construct, deciphered with probability and interactivity. From this point of view, true interaction can be envisioned between users and their constructed environments, and between designers and their computational tools.

Papers collected in iA#4 come from both the theoretical perspective that adopts quantum paradigm as the conceptual model to examine the new condition of cultural, social and spatial organization, and the computational perspective that presents a novel computational concept and strategy, based on the quantum world view and its related reflections. Quantum physicists, architects, sociologists, researchers and students come together in this issue of the iA bookzine to challenge the new territory of Quantum architecture.



*Year:* 2012

*Publisher:* IOS Press

*Pages:* 1005 (electronic)

#### **CHALLENGING GLASS 3: CONFERENCE ON ARCHITECTURAL AND STRUCTURAL APPLICATIONS OF GLASS**

*Freek Bos, Christian Louter, Rob Nijssse, & Fred Veer (eds.)*

This book presents papers from the third Challenging Glass Conference (CGC3), held at the Technical University (TU) Delft, the Netherlands, in June 2012. The conference brings together glass engineering, research and design specialists. Papers are grouped under seven topic headings: project and case studies; joints, fixings and adhesives; strength, stability and safety (a category which includes

a quarter of all the papers presented at the conference); laminates and composite design; curved and bended glass; architectural design and lighting and finally, glass in facades. Glass remains one of the most exciting materials available to designers and architects today. This book will be of interest to all those involved in working with glass in an architectural and structural context.

## INFOMATTERS, A MULTI-AGENT SYSTEMS APPROACH FOR GENERATING PERFORMATIVE ARCHITECTURAL FORMATIONS

*Nimish Bitoria*

### Publication Info

Year: 2011

In: *International Journal of Architectural Computing*, 9(3), 656-675

Cited by: 2

The research paper describes a selforganizing multi-agent system based simulation methodology for generating resultant spatial formations, in time, based on the impacts of the parametric relationships between the aforementioned data sets is eventually embarked upon. This implies, understanding the site as a dynamic information field within which interdependent ecology of agents (representing typology of people, program, structure, speed, desired social interaction etc) with multi-level relational affinities amongst each other as well as the dynamic urban information field. The resultant self-organized multi-agent formations are iteratively mined for identifying logical three-dimensional structural patterns or subjected to programmatic and environmental need driven additional layer of structural simulation with pre-embedded material restraints. An optimized system of multi-performative components that

not only populates but also serves as an integrated structural + skin system of the results obtained from the agent based simulations (based upon the degree of inclusion/exclusion of parameters such as the amount of light, sound, wind etc) is subsequently generated. These experimental projects attained the status of self-evolving ecologies of multi-dimensional agents with embodied behavioural profiles, thus providing engaged, highly interdependent design by simulation outputs. The outputs showcase a dynamic system's driven approach towards sustainable design by stressing upon the idea of cohesively binding information and material systems from the very beginning of the design process. Such approaches help in reducing post-optimization of built form and consequently allow for rational understanding of performance criteria and its impact on formal articulations throughout the design process.

## DESIGN EXPLORATIONS OF PERFORMANCE DRIVEN GEOMETRY IN ARCHITECTURAL DESIGN USING PARAMETRIC MODELING AND GENETIC ALGORITHMS

*Michela Turrin, Peter von Buelow & Rudi Stouffs*

### Publication Info

Year: 2011

In: *Advanced Engineering Informatics*, 25(4), 418-437

Cited by: 30

In this paper we discuss the benefits derived by combining parametric modeling and genetic algorithms to achieve a performance oriented process in design, with specific focus on architectural design. The key role played by geometry in architecture is discussed in relation to performance oriented design, in which evaluations based on engineering criteria are integrated into the conceptual phase of the design. The performance attained by a specific geometric solution is considered along with its complexity in an interdisciplinarity process.

ParaGen is presented as a tool to support the exploration of the parametric design alternatives. ParaGen combines parametric modeling, performance simulation software and genetic algorithms, together with a database to store and retrieve the solutions for subsequent exploration. A description of the tool and its possible uses by designers is provided. Applications of this tool are illustrated for both education and research, with specific reference to two examples in the field of modular long span roofs.

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## TOWARDS A METHODOLOGY FOR FLEXIBLE URBAN DESIGN: DESIGNING WITH URBAN PATTERNS AND SHAPE GRAMMARS

*José P Duarte & José Beirão*

### Publication Info

Year: 2011

In: *Environment and Planning B: Planning and Design*,  
38(5), 879 - 902

Cited by: 4

Traditional urban plans use definitive design systems, without the flexibility required to deal with the complexity and change that characterize contemporary urban societies. To conceive urban plans with increased flexibility, a shape grammar-based design methodology is proposed which is capable of producing various design solutions instead of a single rigid layout. In this approach the plan is a design system encoding a set of alternative solutions, rather than a single, specific solution. This methodology was developed on the basis of the analysis of existing plans and on a series of experiments undertaken

within the controlled environment of design studios. Results show that shape grammars produce urban plans with nondefinitive formal solutions, while keeping a consistent design language. They also provide plans with explicit and implicit flexibility, thereby giving future designers a wider degree of freedom. As a result, they are particularly appropriate for dealing with complexity and change throughout the legal lifespan of the plan. Finally, they provide students with a concrete methodology for approaching urban design, fostering the development of additional design skills.

## STRUCTURAL RESPONSE OF SG-LAMINATED REINFORCED GLASS BEAMS; EXPERIMENTAL INVESTIGATIONS ON THE EFFECTS OF GLASS TYPE, REINFORCEMENT PERCENTAGE AND BEAM SIZE

*Christian Louter, Jan Belis, Frederic Veer & Jean-Paul Lebet*

### Publication Info

Year: 2012

In: *Engineering Structures*,  
38(March 2012),  
292-301

Cited by: 4

This paper investigates the effects of glass type (annealed, heat-strengthened and fully tempered), reinforcement percentage (hollow section and full section) and beam size (1.5 and 3.2 m) on the structural response of SG-laminated reinforced glass beams. This is done by means of bending tests on 5 different series of beam specimens. From the results it is concluded that the applied glass type has a significant effect on both the initial failure strength - due to a difference in apparent strength of the glass types - and the post-breakage performance - due to a difference in fracture pattern of the glass types - of the reinforced glass beams. Furthermore, it is

concluded that the reinforcement percentage has a significant effect on the structural performance of the reinforced glass beams, as it influences the initial height of the compression zone and the post-breakage strength and stiffness of the beams. Next, as the small and large beams investigated in this research demonstrate largely similar structural behaviour, it is concluded that the structural behaviour is only affected to a minor extent by beam size. Finally, it is concluded that the 3.2 m beams tested in this research provide sufficient lateral stability, even when the glass is extensively cracked.



**Year:** 2013  
**Publisher:** TU Delft  
**Pages:** 366

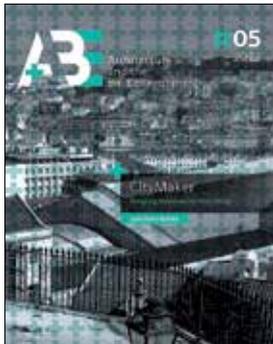
## TOWARDS A METHODOLOGY FOR COMPLEX ADAPTIVE INTERACTIVE ARCHITECTURE

*Tomasz Jaskiewicz*

Quality of architectural adaptation can be significantly improved by replacing traditionally centralised and hierarchical architectural systems by ones that are largely distributed, open and extensible.

It implies the creation of buildings consisting of very large numbers of adaptable building components. Such buildings are to operate as complex adaptive systems, making them

capable of much higher degrees of adaptation, autonomy and robustness than any centralised architectural system could ever permit. Components in such architectural complex adaptive systems are to develop and maintain interactions with inhabitants of architectural systems and among each other. Those interactions are to function as main drivers of these systems' adaptation.



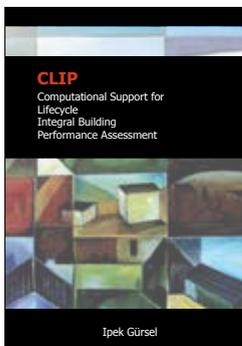
**Year:** 2012  
**Publisher:** TU Delft  
**Pages:** 440

## CITYMAKER. DESIGNING GRAMMARS FOR URBAN DESIGN

*Jose Beirao*

The goal of the project is the integration of design support tools to formulate, generate and evaluate urban designs. This thesis focuses on the development of generation tools for urban design, corresponding to the more design-oriented component of City Induction. It defines the theoretical model for an urban design tool called CItYMaker and presents two prototype implementations as proof of concept. As such, urban designers

will find the main contributions of this thesis in the discussion of design methods and conceptual tools to support an efficient, flexible, interactive, and responsive urban design process. Although integrated into the research, all the methods and tools developed in this thesis were designed to be autonomous, that is, to work and be used independently of the other City Induction modules.



**Year:** 2010  
**Publisher:** TU Delft  
**Pages:** 298

## CLIP- 'COMPUTATIONAL SUPPORT FOR LIFECYCLE INTEGRAL BUILDING PERFORMANCE ASSESSMENT'.

*Ipek Gursel*

CLIP addresses the need of computational support for Lifecycle Building Performance Assessment (LBPA) by developing a computational model: Computational support for Lifecycle Integral Performance assessment (CLIP). CLIP comprises flexible, modular, and extensible data structures and algorithms for the representation, transformation, integration, and visualization of LBPA related information. CLIP is a conceptual

reference model that addresses a broad range of LBPA practices, capturing the concepts and functions common to most LBPA practices. At the same time, CLIP encourages context-specific data analysis functions to be developed and integrated per context. CLIP facilitates the development of applications supporting existing LBPA practices, and therefore can be considered as a development platform.

## KEY EVENTS

### Info

### AUTOMATIC-ARCHITECTURE

*Date:* 2010, December 15th-17th  
*Place:* Delft

Architects Pim Marsman, Sander Boer and Pim van Wylick organised jointly with the Computation & Performance research group of the Faculty of Architecture and Rhinocentre.nl automatic-architecture. automatic-architecture is a workshop for architects and students in order to show the use of computational design (specifically Grasshopper) for architectural development by cross-fertilization of knowledge.

Each participant works individually on a task within one of the workshop cases. These cases are provided by actual design problems from the practice of real estate developers, and have been prepared under the auspices of an academic chair. They will focus on feasibility and sustainability. The guidance is in the hands of international tutors who have great experience in computational design.

### Info

### AUTONOMY OF ARCHITECTURE: THE IMPACT OF FILE-TO-FACTORY ON ARCHITECTURAL PRACTICE

*Date:* 2011, June 11th  
*Place:* Delft

The Autonomy of Architecture conference deals with how file-to-factory processes impact architectural practice. Computational Architecture has a polarizing effect on architecture; on one hand the development of

new design tools for architectural conception allow us to deal with more abstract design notions, on the other hand these designs are pushed beyond description, towards definition.

### Info

### ROB | ARCH 2012

*Conference Robot Workshop Rotterdam*

*Date:* 2012, December 14th-16th  
*Place:* Rotterdam

The Rob|Arch 2012 Rotterdam took place at Hyperbody's robotics lab at the RDM Innovation dock in Rotterdam. The workshop was co-taught by Jelle Feringa [1] and Wes Mcgee [2] and ran simultaneously with other Rob|Arch workshops that took place from the 14th to 16th of December. This effort is part of the International conference on Architectural Robotics, an initiative of the Association for Robots in Architecture. The workshop explored material processes that support an architecture of volume. By means of Robotic Hot Wire Cutting, a vaulting structure was erected, by casting concrete

from EPS molds. A third robotic cell cut stone using a hydraulic powered diamond wire saw, exploring the potential of robotic masonry. The workshop provided participants with a unique chance to explore large scale robotic fabrication and will provide useful insights on the production process of robotic fabrication. While non-standard design has traditionally been associated with costly manufacturing methods, robotic hotwire cutting (RHWC) breaks with this trend given that complex formwork can be delivered for the approximate cost of normative formwork.



# Earning capacity

## 6.1 Success and vision on how to obtain research projects

Hyperbody participated in 2007-13, there are made increasingly efforts to obtain NWO-STW and TKI Energo projects. There is a sense of urgency to develop products that address the need for personalized, interactive environments and climates while ensuring increase of efficiency and environmental friendliness. Our industry partners have already shown a longstanding interest in such systems, and see collaboration as an opportunity for a breakthrough, precisely because with relatively small investments such developments can be implemented.

Design Informatics group has been successful in NWO , government funded and industry funded projects till the last few years. Due to the success,

researcher's such as Rudi Stouffs and Bige Tuncer and other PhD graduates got offered jobs in internationally well-known universities. Secondly, due to the financial crisis in the building sector it has been very hard to get funding and the lack of skilled staff members to initiate and coordinate the external funding.

- Dr.-Ing H. Bier coordinated EU-funded projects E-Archidoct (<http://www.e-archidoct.eu>) and Continuum F2F (<http://www.f2f-continuum.eu>) in 2008-10;
- Prof. Dr. Ir. Sariyildiz received funding (2008-2011), amounted to 200.000 Euros, for setting up collaboration with Turkish technical universities (the TULIP project);
- Dr. Ipek Gursel received funding from the State Building Agency of the Netherlands (Rijksgebouwen Dienst) 250.000 Euros, in 2010 for developing a prototype software application for integral life cycle assessment of buildings in the Netherlands, which is being used by the aforementioned agency at present;
- Dr. Michael Bittermann received 15.000 Euros for an energy efficient neighborhood project in Rijkswijk, in 2011;
- Dr. N. Bioria coordinates EU-funded project Meta-Body (<http://www.metabody.eu>) in 2007-2013.

Table a. Research funding

FUNDING	2010		2011		2012	
	K€	%	K€	%	K€	%
Direct funding	763	70%	624	93%	688	82%
External funding (total)	330	30%	46	7%	148	18%
Coverage Contribution	121		48	-	56	-
Results finished projects	154		-2	-	82	-
Acquired project funds	55		0	-	10	-
<b>TOTAL FUNDING</b>	<b>1093</b>	<b>100%</b>	<b>670</b>	<b>100%</b>	<b>836</b>	<b>100%</b>
EXPENDITURE	K€	%	K€	%	K€	%
Staff costs	806	91%	620	91%	611	92%
Other costs	75	9%	62	9%	51	8%
<b>TOTAL EXPENDITURE</b>	<b>881</b>	<b>100%</b>	<b>682</b>	<b>100%</b>	<b>662</b>	<b>100%</b>

## Overview of top-5 projects

### *Commissioned research by societal actors*

- Adaptive apartment systems, 2013, Client: Blauwhoed developers, budget 15k€
- Concrete-app for smartphones, 2012, Client: Curnet, Gouda, budget 6 k€
- Knowledge model for performance analysis of conceptual urban designs for project Rijswijk Zuid, client: Municipality of Rijswijk, budget 6 k€, 2011(DI)
- Eneco-Energy company, 2012, short term research -12 k€.(DI)

### *EU funded research*

- EPI-CREM European project with State Building Agency (<http://www.epi-crem.org/>)
- Archidoct (<http://www.e-archidoct.eu>)
- Continuum (<http://www.f2f-continuum.eu>)
- Meta-Body (<http://www.metabody.eu>)

### *NWO/STW funded research*

- Innovative joint for glass structures, STW vg1 project, 25.000 euro's, January to July 2013



prototype showing interactive skin components developed by V. Ondejcik within Hyperbody's graduation lab tutored by H. Bier, N. Bioria, M. Sobota, and L. Lignarolo(2012)



# Valorisation

- Knowledge on nonstandard and interactive architecture developed at Hyperbody is being valorized by establishing start-up companies (such as Hive Systems) and by collaborating with industry partners (such as Blauhoed, Arcadis and Oskomera) in order to develop and bring to the market, for example, reconfigurable building systems and climate control systems embedded in building components, respectively.
- Knowledge on urban network analysis is embedded in a prototype software application as an alpha version (<http://www.grasshopper3d.com/group/cheetah>) of a commercial package: CONFIGURBANIST. We (at DI) are developing plans of collaboration with our research network with partners from TU Vienna, Bauhaus and ETH for a joint H2020/FP7 application on this matter.
- Knowledge on configurational analysis and generation in architecture is being put into an integrated design methodology (Designing with Space Syntax), which has been released as an alpha software prototype (<http://www.grasshopper3d.com/group/space-syntax>), to be marketed as a commercial package later.

## 7.1 Means used to transfer knowledge

- The Structural Design group has applied for a patent on a novel connection for glass structures that will make possible safe main loadbearing structures of glass. The research is supported by IFS and ABT. A VG1 grant has been received and a VG2 grant has been applied

for. Upon receipt of the VG2 grant, a company will be formed to market the system in close collaboration with TU Delft, ABT and IFS.

- 2012 Hyperbody developed with Blauhoed within the MSc 2 'Reconfigurable apartments' studio and 2013 MSc 1&3 studios focus on climate issues that will be further developed with industry partners such as Arcadis and Oskomera. The aim is to transfer knowledge through education (lectures, seminars and reviews) and to advance knowledge through the involvement of researchers collaborating with engineers from practice.
- The Design Informatics group has a strategy to transform the research outputs into various levels of architectural education in Bachelor's and Master's programmes. We have also disseminated our knowledge through international seminars and workshops. We recently set up a collaboration within our Master's education with the international firm Polkima (based in Izmir, Turkey), which produces composite materials, in order to exemplify a completely digital design and manufacturing process.
- Design Informatics has been inviting architectural offices, such as UN Studio, KCAP Architecten, Zaha Hadid and Broek&Bakema, to participate in our education programme in order to exchange knowledge and experiences and to set up collaborations.
- Design Informatics PhDs are working intensively with the industry.

## 7.2 Users of the knowledge

- The entire construction chain from developer, researcher, designer, engineer, producer, installer, contractor to user can benefit from our research. The results of our research are not only shared among our partners but are also made available to the larger research community and the construction industry.
- Our research results are also relevant for planning institutions, municipalities, decision makers, project developers and computer scientists.



# PhD research

## 8.1 Topics

PhD research topics concern all the areas of performance and computation driven design of buildings and the built environment that are named in section 1.1 of this report.

## 8.2 Supervision

At least one professor and one co-supervisor or day-to-day supervisor (usually a senior researcher who holds a PhD) supervise each PhD student. The supervisor and co-supervisor are always from the chair/group with which the PhD student is affiliated. If the interdisciplinary character of the research project warrants a second supervisor (again, a professor) from a different chair/group or research programme, this second supervisor is brought into the research project. Double supervision will become more and more the norm in order to increase collaboration and cross-fertilization. PhD students have monthly meetings with all their supervisors, and more frequent meetings with their day-to-day supervisors. PhD students are encouraged to participate in symposia, workshops and international conferences in order to learn from other participants and to receive feedback on their work.

## 8.3 Success rates

The number of PhD students has grown over the review period. At the same time, success rates have increased and the average duration of a PhD research has shortened as the chairs/groups in the programme have developed and matured their research activities. The need and support for PhD students to complete

their PhD within four years has increased significantly as a result of new financial discipline and the increase in self-funded PhD students (or those who have their own scholarships). While the increase in success rates may not be fully obvious from Table b in section 7, the PhD inflow has increased further since 2006 and the majority of candidates are on track to complete their PhD in four to five years.

## 8.4 Resources

The faculty has a wide range of study and research facilities, including:

- The faculty library.
- The Building Technology laboratory: allows the production of scale 1:1 designed building elements (or parts thereof), and contains special facilities for research on glass.
- The CAM-Lab: equipped with two 3D printers (one colour, one b&w), four laser cutters (two large-format, two small-format) and one 3-axis milling machine.
- The protoSPACE laboratory for multidisciplinary collaborative design and new media research established by Hyperbody in 2006, as well as 2009-13 ProtoFAB (<http://www.hyperbody.nl/protofab/>) and RoboFAB (with 2 ABB robots) which are Hyperbody's CNC and robotic fabrication laboratories.

## 8.5 Funding

It is realistic, for the moment, not to have big ambitions for funding, due to the crisis in the building sector. Still, we shall continue to apply for EU and national research foundation funding..

## 8.6 Attractiveness

Research into computational and performative design production and operation processes as well as nonstandard and interactive architecture is considered essential in today's academic and professional world. This is evidenced by the huge amount of interest in joining our research group as PhD students or postdocs that is shown by researchers.



Prototype implemented by MSc 2 students tutored by J. Feringa from Hyperbody in collaboration with EZCT, ROK, and BLOCK from ETHZ (2012)





# SWOT-analysis

## STRENGTHS

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Our research bridges fundamental technical research and application design, and includes both mono-disciplinary and interdisciplinary research. Staff members with a strong scientific background in architecture, civil engineering, material science and/or computer science contribute the fundamental technical research, while part-time researchers with a position in practice keep a finger on the pulse with respect to social needs and changes. The laboratories established by Hyperbody (such as protoSPACE for multidisciplinary collaborative design and protoFAB and roboFAB for digitally- and robotically-driven fabrication) are one-of-a-kind research and experimental development environments.

## WEAKNESSES

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We must acknowledge that we are not successful enough in obtaining funding from national and European research and science foundations (e.g. NWO, STW, European Commission). This is a problem common to most research groups within the faculty, partly because there have not been many opportunities to perform research on design and technology for the built environment. Thus, greater effort is required. Our research output in international, peer-reviewed journals (preferably with significant citation index ranking) should also be increased.

## OPPORTUNITIES

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There is increasing pressure from developers/users and from legislation to increase building and built-environment performance and to improve design quality and reduce the total costs related to building/built-environment forms and configurations. This drives the way forward to automated processes. Increasing use of parametric modelling, BIM and computational design processes integrated with automated evaluations and optimizations, the exploration of real-time collaborative design processes, and the study of dynamically adaptive buildings and building systems, offer opportunities to support this revolution. Researchers and PhD students elsewhere are increasingly interested in joining us.

## THREATS

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Financial cutbacks are not only reducing the size of the research group but also requiring research staff to spend more time on teaching and other activities. This threatens to have an impact on the necessary critical mass to develop and maintain a research group and programme, and to reduce the supervisory support available to PhD students to develop their research projects and their own research capacity. We must also guard against joining the rat race of proposal writing and chasing funding opportunities from national and European research and science foundations. In the same vein, we must refrain from focusing only on short-term successes while failing to maintain our strategic advantages.



# Strategy

## 10.1 Strategic planning

In the past (2005-07), we invested heavily in building a critical body of PhD students. We are now considering a different strategy. Firstly, increasing the number of self-funded PhD students (or those who have their own scholarship). Second, postdocs may prove to be a better financial investment. They tend to be easier to assess (as applicants) based on past experience, they can be productive much sooner, they can be assigned to upcoming projects more easily or can actively participate in seeking external funding, and they can strengthen the support structure for PhD students. In order to increase our access to external funding, it is important that we collaborate even more with other research groups within and outside the faculty in order to gain both critical mass and the multidisciplinary knowledge and expertise that is often necessary to target the changing societal concerns and research topics to be addressed in funding programmes.

## 10.2 New research topics and their prospects

Considering our current research activities and the opportunities presented in section 11, we can identify the following research topics for future development:

*Adaptive and robotic building systems:* instant adaptation of the building to environmental impacts and user behaviour, such as sun, wind, temperatures, function, occupancy and sociocultural aspects. Multidisciplinary approach

brings together researchers from different subgroups and the Green Building Innovation research group and opens up opportunities for funding applications.

*Eco-city modelling:* applying our knowledge of and expertise in information and knowledge modelling to sustainable planning at urban or regional level. Builds upon current PhD research and collaborations with the Green Building Innovation research group, ETH Zurich and TU Lisbon.

*Configurative urban design and planning:* a network approach to city modelling, analysis and design.

This new research topic has been the driver of a tool suite for walkability analysis and pedestrian neighbourhood design: <http://www.grasshopper3d.com/group/cheetah>

*Syntactic architectural design:* a graph theoretical approach to architectural design, integrated with real-time spatial assessment through the theory of space syntax. We have published a tool suite for this research-oriented design process:

<http://www.grasshopper3d.com/group/space-syntax>

*Computational Comprehension for Conscious Decision Support in Architectural Design.* In this research, a high-level of comprehension of design space is sought. Computational intelligent techniques should be studied for this purpose.

*protoBIM:* the next generation of BIM must be a dynamic BIM in support of both parametric modelling and the design and operation of dynamic buildings, right from the conceptual level to the detail level of any building project. Real-time links with multiple stakeholders of varying specializations through cutting-edge adaptive interfaces and dynamic database systems would define a major step change in computation and performance for the built environment.

*MyClimate:* [a system for distributed and intelligent climate control that is embedded in building components, controlled by wirelessly networked small- and micro-scale components, and driven by

users' preferences and external climatic conditions. Current themes in Hyperbody's research clustered under (A) Next Generation Building, (B) Embedded Robotics and (C) InfoMatters are as follows:

- Design information modelling
- Simulation techniques and the changing architectural landscape
- Complex systems for interactive architecture
- Environmental robotics
- Cognitive sciences and participatory architectural pedagogy
- Information and material systems (InfoMatters)
- Implicit fabrication
- Applied swarm intelligence
- Parametric building components.

### 10.3 Flexibility

We specifically chose not to fully centralize any decision-making on research directions within the C&P research group, but to retain and foster strong research subgroups with their own research foci, while facilitating and encouraging collaboration between subgroups at both the strategic and the research activity level. This decentralized approach offers subgroups the flexibility to foster and develop their own strengths and makes the research group less dependent on individual key researchers. Above all, we must ensure that we maintain a positive, creative and challenging atmosphere in which researchers remain highly motivated and strive to bring out the best in themselves.



Front view of InteractiveWall developed by Hyperbody, Delft University of Technology in collaboration with Festo



# Geoinformation Technology and Governance (GITG)

RESEARCH LEADER: Prof. ir. Peter van Oosterom PhD

# 1

## Scope

### 1.1 Scientific aims

The scientific aim of this research programme is to investigate how both technology and governance aspects of the spatial information infrastructure – which is also called the spatial data infrastructure (SDI or geoweb) – can be further strengthened in order to solve complex social, industrial and management activities in the built environment. The information infrastructure serves numerous application domains, such as urban planning and design, climate change, disaster management, infrastructure planning and management, transport, water management, etc. Two application domains are given more attention and have become part of the programme: land

administration and crisis management. The research within this programme develops both concepts and tools to facilitate sharing, exchange, integration, update and reuse of information sources within the SDI. The information is not limited to traditional 2D maps, but increasingly involves extra dimensions (height, time, scale): 3D.nD. When reusing information, legal and organizational issues (such as privacy, copyright and databank rights, business models) play an increasingly important role. Our societal aim is to investigate, apply and test open data policies in order to underpin their success, maximize the benefit for society and provide sustainable information management for the increasingly complex built environment.

### 1.2 Where do we stand?

The Geo-information Technology and Governance programme was created in 2013 based on the complete GIS Technology (GIST) programme and parts of the Governance of Geo-information and Land Development (GiLD) programme. The former theme groups ‘Land tenure and property rights’ (focus on the content of the legal relations between people and land, especially in the field of the multiple use of space), ‘Geo-information studies’ (focus on the institutional arrangements whereby spatial information is provided for the public sector by private companies and

private persons), ‘Crisis management’ (focus on applications that require fast response of sharing and integration of information) and ‘Spatial Data Infrastructure’ (focus on generic tools to support SDI) form the core of the new programme. The figure below shows the relationship between our two sub-programmes (Geo-information Technology and Geo-information Governance) and our three application domains (SDI, crisis management, and land administration).

Within the context of the programme (and its two predecessors), new research lines have been initiated. Initial research suggests that these lines indeed have high potential. International recognition of these new research lines is becoming clear, via paper citations, requests to develop joint project proposals, requests for keynote speeches, and international guest researchers/professors wanting to do research within our group. A few examples of the new research lines initiated by our group are 5D geo-information, 3D cadastres, indoor modelling and institutional arrangements concerning spatial information (including open data and crowd-sourced data).

The scores awarded for various aspects of our research work in the assessment for the period 2003-06/09 compared with that for 2000-03, indicate that we are going in the right direction. We are proud of our scores and aim to increase them further (Table 1).

### 1.3 Where do we want to be next?

We have identified many research challenges to provide appropriate services, protocols and standards for national and international SDI. How often do we need to collect, update and/or archive sensor data (including crowdsourcing)? Which models are most appropriate for specific geo-information? How can we ensure the prompt delivery of data to users with time-critical needs, while maintaining quality control and accessibility for lower-priority users? How can we integrate crowd-sourced data and official government data? How should we prepare geo-information for different display devices? How can heterogeneous data flows be processed quickly enough to prevent data volumes from overwhelming managers and users? How can data be recorded in such a way as to enhance search capabilities? Answers to these questions will be explored along the initiated research lines in our programme: 5D geo-information (also indoor), open data, etc.

**Table 1. Scores obtained at the previous research assessment (scale from 1 to 5)**

SECTION & PERIOD	QUALITY	QUANTITY	RELEVANCE	VIABILITY	AVERAGE
GIST 2000-2003	4.0	3.0	3.0	4.0	3.50
GILD 2000-2003	3.0	3.0	4.0	4.0	3.50
GIST 2003-2006	4.6	3.2	4.6	4.6	4.25
GILD 2003-2009	5.0	5.0	5.0	4.0	4.75



## Composition

**Table a. Research staff at institutional and programme level**

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	13	6.94	13	6.50	13	6.07
Non-tenured staff	5	0.89	3	0.73	3	0.74
PhD students	4	3.31	4	3.32	7	4.91
Guests	3	0	4	0	6	0
<b>TOTAL RESEARCH STAFF</b>	<b>25</b>	<b>11.1</b>	<b>24</b>	<b>10.6</b>	<b>29</b>	<b>11.7</b>

**Table b. Research staff with position in practice**

WHO	ROLE	FIRM/ORGANISATION	WHERE	
Jantien Stoter PhD	Consultant Product and Process Innovation	Kadaster	Apeldoorn	NL
Bastiaan van Loenen PhD	Expert	Geonovum	Amersfoort	NL
Wilko Quak PhD	Expert	Geonovum	Amersfoort	NL
Prof. Hendrik Ploeger PhD	Extraordinary professor Land Law and Land Registration	VU University Amsterdam Faculty of Law	Amsterdam	NL

Table a shows the number of FTE (full-time equivalent) research staff and two types of PhD candidates. It should be noted that these numbers do not include the external PhD candidates (for full list of PhD graduates/candidates and their research topics, see section 10). As indicated in section 1, the current GiTG research programme is rooted in the earlier programmes of GIS Technology (GIST) and parts of Governance of Geo-information and Land Development (GiLD). Due to this integration, the staff members in the current GiTG programme are from two different sections: GIST (all staff members) and GiLD (some staff members). Composition of the permanent staff within the GIST section (on the date of writing this report) in FTEs: 1 full professor (Van Oosterom), 1.5 associate professors (Zlatanova, Stoter), 3.2 assistant professors (Ledoux, Tijssen, Verbree, Lemmens), 1.8 researchers (De Vries, Quak) and 1.0 project manager (Fendel).

Composition of the temporary staff within the GIST section (with an appointment for at least 1 year): 1 NWO/ eScience staff member with secondment at TU Delft (Martínez Rubi), 2 postdocs (Meijers & Zhao), 4 PhD students with a staff position as an ‘assistant in training’ (Dutch abbreviation: AIO) (Arroyo Ogori, Biljecki, Peters and Šuba), 4 PhD students with a scholarship (Alam, Liu, Mobasheri & Wang) and 4 foreign guests (Huang, Yeting, Zhang & Zhou).

Composition of the relevant staff within GiLD section: 2 associate professors (Kok & Ploeger), 1 assistant professor (Van Loenen), 1 researcher (Welle Donker), 1 PhD student (Nushi) + 1 guest (Van Asperen).

In addition there are on average about 10 MSc graduate students (MSc Geomatics and MSc GIMA); some are housed at TU Delft, others work at a distance.

# 3

## Research environment and embedding

### 3.1 International and national positioning

At an international level, researchers actively participate in the Association of European Schools of Planning (AESOP), especially in the theme group on Planning Law and Administration and its offspring organization, the International Academic Association on Planning, Law, and Property Rights (PLPR). They can also be found in the:

- European Network of Housing Research (ENHR), especially in its Housing Law working group;
- International Federation of Surveyors (FIG);
- International Society for Photogrammetry and Remote Sensing (ISPRS);
- Open Geospatial Consortium (OGC);
- Association of Geographical Information Laboratories in Europe (AGILE);
- Urban Data Management Society (UDMS);
- EuroSDR (European Spatial Data Research);
- Scientific Council of Integrated Research on Disaster Risk (IRDR), as part of the International Council for Science (ICSU) and the Global Spatial Data Infrastructure Association (GSDI).

External activities of the group's researchers:

- Bas Kok is the past president of the Global Spatial Data Infrastructure Association (GSDI);
- Bastiaan van Loenen chairs the GSDI legal and socioeconomic committee. The group also has contacts with international organizations such as UN Habitat, the World Bank and the FAO in this field;

- Jantien Stoter chairs the EuroSDR Commission 4 on data specifications;
- Sisi Zlatanova and Jantien Stoter are involved in several OGC standards and domain working groups (SWG and DWG);
- Sisi Zlatanova is a member of a standard drafting team. She is involved in ISPRS Commission IV (Geodatabases and Digital Mapping) and more specifically in Working Group IV/7 '3D indoor modelling and navigation', which she chairs. She is also a member of the UDMS Board and a member of the IRDR Scientific Committee;
- Peter van Oosterom is chair of the FIG Working Group on 3D Cadastres.

### 3.2 Collaboration with stakeholders

The group collaborates with several other groups, especially within the Faculty of Architecture and the Built Environment (with a focus on the department OTB - Research for the Built Environment); for example with Housing Systems on housing markets in relation to land markets, with Housing Quality and Process Innovation on building regulations, with Urban Renewal and Housing on the organization of urban renewal, with Urbanism on analysing GPS (and other positioning technology) traces and with Design Informatics on 3D modelling and BIM (building information modelling).

Two researchers have part-time appointments at other organizations, thus strengthening the links with these bodies. These are the chair of Real Estate Law at VU University Amsterdam, Hendrik Ploeger, and the SDI advisor of the Netherlands Kadaster (Cadastre) in Apeldoorn, Jantien Stoter. The involved researchers participate in the activities of two largely Dutch-based research schools. Researchers with a legal background working on land tenure and property rights belong to the Property Law section of the Ius Commune Research School. Other researchers in the group are associated with NETHUR, the Netherlands Graduate School for Urban and Regional Research.

### 3.3 Participation in consortia

The programme participates in international and national networks with such diverse partners as the European Commission (European Location Framework with 30 partners); Rijkswaterstaat, the Ministry of I&M; the Ministry of Economic Affairs, the Netherlands Centre for Geodesy and Geo-informatics, sector associations such as Geonovum, the national Spatial Data Infrastructure (NSDI) executive committee in the Netherlands; local authorities, market players and their professional organizations.

Staff members of the programme actively participate in standardization activities via membership of various committees and expert groups both at national and international levels (the Dutch Standards Institute NNI and the ISO respectively); the ISO 19152 (Land Administration Domain Model) committee and the NNI Geo-information committee. They also support and participate actively in the Dutch Geo-information Association (Geo-Informatie Nederland; GIN) and the Netherlands Centre for Geodesy and Geo-informatics (NCG) and two of its sub-commissions (Geo-information Infrastructure and Core Spatial Data).

Collaboration with the international geo-ICT industry is essential for our research (Oracle, Bentley Systems, Safe Software). These companies participate in the Geo Database Management Centre (GDMC), a research and development centre that is hosted by TU Delft ([www.gdmc.nl](http://www.gdmc.nl)). On 21 April 2012, a memorandum of understanding was signed by two organizations in Korea (University of Seoul, Cadastre Korea) and three in the Netherlands (TU Delft, University of Twente, Cadastre Netherlands) expressing the intention to collaborate in the area of land administration with a focus on 3D cadastres for a three-year period (to start with).

On 12 November 2012, the agreement between Wuhan University (China) and TU Delft on the establishment of a Wuhan University-TU Delft Joint Research Centre on Spatial Information (JRC-SI) was signed. The agreement covers the whole spectrum of scientific geo-information

disciplines: geo-information & governance, geo-information systems, remote sensing & its applications, global navigation satellite systems and geodesy. Peter van Oosterom is TU Delft's scientific director of the JRC-SI. Wuhan University is the world's largest university in the field of spatial information science with about 4500 students and 350 academic staff members in this discipline. The formalization of the cooperation follows an earlier phase of more than 10 years of partnership (Wuhan staff members visiting Delft, joint organization of international scientific events, etc.).

A link between education and research is formed by the Geomatics Open Guest Lectures (OGLs), in which leading researchers from within and outside TU Delft deliver a guest lecture in the context of a specific course, but open to all. During the period 2010-12, thirteen presentations were given by representatives of outstanding companies and institutions from all over the world:

- Oracle;
- Augmented Reality Lab & TU Delft;
- TU Delft - Faculty of Aerospace Engineering;
- Serious Games Institute;
- Google Earth;
- Brentjes Geo-ICT;
- Oslandia Ecosystem;
- Municipality of the Hague;
- University of the Basque Country - Computer Graphics Group;
- Wuhan Technical University of Surveying and Mapping;
- Tensing and Layar Technical Support.



Crisis management

# 4

## Academic reputation

### Invitations to address major conferences

YEAR	CONFERENCE	WHO	WHERE
2011	Keynote 5th Int. Workshop on Semantics and Conceptual Issues in Geo Information Systems (SeCoGIS 2011)	van Oosterom	Brussels BE
2012	Keynote at CEIG 2012: XXII Spanish Computer Graphics Conference	van Oosterom	Jaén SP
2012	Keynote at ISG 2012: 11th International Symposium & Exhibition on Geoinformation	van Oosterom	Kuala Lumpur MY
2011	Working Party on Land Admin (WPLA); Workshop Land Admin in a Networked Society	Stoter	Amsterdam NL
2011	Keynote IUGG Congress on 3D GIST for Disaster Management	Zlatanova	Melbourne AU

### Conference organisation activities

YEAR	CONFERENCE	ROLE	WHO	WHERE
2011	UDMS 2011, 28th Urban Data Management Symposium	Organisation	Zlatanova/ Fendel	Delft NL
2011	2nd International FIG/EuroSDR Workshop on 3D-Cadastres	Organisation	van Oosterom/ Stoter/Fendel	Delft NL
2012	3rd International FIG Workshop on 3D-Cadastres	Workshop Leader/ Co-organisation	van Oosterom	Shenzhen CN
2012	15th ICA/EuroSDR Workshop on Generalisation and Multiple Representation Representation	Workshop Leader	Stoter	Istanbul TR
2012	Gi4DM 2012, The Eighth Int Conf on Geo-info for Disaster Management	Organisation	Zlatanova	Enschede NL

### Involvement in scientific or professional event

YEAR	EVENT	ROLE	WHO	WHERE
2010	5th International Conference 3D GeoInformation	Scientific Committee	Ledoux/ van Oosterom / Zlatanova	Berlin DE
2008-12	Chair ISPRS WG IV/8 '3D Spatial Data Integration for Disaster Management and Environmental Monitoring'	Chair	Zlatanova	Antalya TR
2011	Workshop 'Open geo-data' with Geonovum and ICTU	Workshop Leader	van Loenen	Delft NL
2012	Geospatial World Forum	Speaker	Stoter	Amsterdam NL
2012	7th International 3DGeoInfo Conference	Scientific Committee	Ledoux/van Oosterom/ Zlatanova	Quebec CA

### Prizes, awards, competitions

YEAR	PRIZES, AWARDS, COMPETITIONS	ISSUER	WHO	WHERE
2010	Prof. J.M. Tienstra Onderzoeksrij 2010	KNAW-NCG	van Loenen	Amsterdam NL
2011	3DIM Award to Honor "excellent achievements in 3D standardization"	Open GeoSpatial Consortium	Stoter	Boulder US
2012	Winner of OSGIS Open Nottingham Best Presentation Award	ICA Commission on Open Source Geospatial Techn	Arroyo Ochori	Nottingham UK
2012	U.V. Helava Award - Best Paper 2011 during the 22th ISPRS Congress	ISPRS/Elsevier B.V./ Leica Geosystems	Ledoux	Melbourne AU

### Honorary positions

YEAR	INSTITUTE	POSITION	WHO	WHERE
2012/>	Wuhan University - TU Delft Joint Research Centre on Spatial Inform	Delft Scient. Dir.	Van Oosterom	Delft NL

### Election to academies or academic professional associations

YEAR	INSTITUTE	ROLE	WHO	WHERE
2010/>	Netherlands Geodetic Commission (NCG) at the KNAW	Member	van Oosterom	Amsterdam NL
2010/>	NCG - Subcommission Geo-Information Infrastructure	Member	Quak / van Loenen	Amsterdam NL
2010/>	NCG - Subcommission Core Spatial Data	Member	van Oosterom / Stoter	Amsterdam NL

### Evaluator of research programme

YEAR	PROGRAMME	ROLE	WHO	WHERE
2010/>	Several Research Progr of the EU's Seventh Framework (FP7)	Evaluator	Zlatanova	Brussels BE
2010/>	Several Research Projects of the Swiss National Science Foundation	Evaluator	van Oosterom	Bern CH

### Editorship academic journal

YEAR	JOURNAL	ROLE	WHO	WHERE
2010/>	Computers, Environment and Urban Systems (special issues)	Guest Editor	van Oosterom	Oxford UK
2010/>	Journal Computers, Environments and Urban Systems	Editorial Board	Stoter	Doetinchem NL
2012/>	Geography Journal	Editorial Board	Stoter	London UK
2010/>	ISPRS International Journal of Geo-Information (IJGI)	Editorial Board	Zlatanova	Paris FR
2010/>	Computers & Geosciences (CAGEO)	Associate Editor	van Oosterom	Oxford UK
2011/>	International Journal of 3-D Information Modeling (IJ3DIM)	Editor-in-Chief	Zlatanova	Hershey US

### Editorship professional journal

YEAR	JOURNAL	ROLE	WHO	WHERE
2008/>	GIM International	Senior editor	Lemmens	Lemmer NL
2011/>	GIM International	Contributing Editor	van Loenen	Lemmer NL

### Role in practice and policy making

YEAR	FIRM/ORGANISATION	ROLE	WHO	WHERE
2009/>	Kadaster (position in practice)	Researcher	Stoter	Apeldoorn NL
2009/>	Geonovum	Researcher	van Loenen, Quak, Stoter	Amersfoort NL
2011-15	Ministry of Infrastructure and the Environment; Rijkswaterstaat Centrale Informatie Voorziening (RWS CIV)	Lead TU Delft	van Oosterom	Delft NL

# 5

## Quality and relevance

### 5.1 Societal/scientific quality and relevance of the research

Geo-information technology (GIS technology or geo-ICT) and geo-information governance are part of the more general discipline of geo-information science. Geo-information has been applied throughout the world for many centuries or even millennia, so why bother doing scientific research in this area? The answer is that the unprecedented increase in the volume of geo-information means that we need to find improved ways of handling it. Both the impact and the potential of geo-information are growing, because the information and the services needed to deal with it can be readily transported by electronic means via wireless networks and geo-information is more and more combined with emerging sensor, visualization and interaction technologies. Spatial data infrastructure (SDI) nodes throughout the world are increasingly using underlying geo-DBMSs (geo-data base management systems) to store the geo-information involved. Many applications make use of geo-information and related technologies. The GIS Technology group devotes particular attention to developing (open source) geo-information technology and knowledge for use in crisis management and spatial information infrastructures.

SDI is a complex concept and much work remains to be done, both in science and practice, before it can be operational in an effective and efficient manner. Important organizational steps are currently being taken, for example the EU Directive INSPIRE and the EU GMES

(Global Monitoring for Environment and Security) Initiative. Several areas of EU FP7 (the European Commission's Seventh Framework Programme) and other programmes support research and development through various projects covering such topics as agreed (formal, machine-processable) definitions of key data sets, definitions of a range of key services (catalogues, viewing systems, data, and processing services such as coordinate transformations and buffers), future geo-information handling systems (vario-scale spatio-temporal 3D/4D models and processes), open data policies, crowd-sourced data, and organizational and legal arrangements. SDIs are developed within global initiatives (the Global Spatial Data Infrastructure; GSDI), national initiatives such as the 'stelsel authentieke basisregistraties' (authentic basic registration system) in the Netherlands, or by single organizations such as Rijkswaterstaat (the Directorate-General for Public Works and Water Management) and the multinational company Shell. The applications within the research programme focus on the societal relevance (application-oriented research) are: land administration (LA), spatial data infrastructure (SDI) and crisis management (CM).

## 5.2 Key indicators

- Scientific journal publications;
- Awarded NWO/STW and EU/PF7 projects;
- Standards: On 1 November 2012, the Land Administration Domain Model (LADM) was approved as an ISO standard (after a decade of preparation, the last four years of which within ISO);
- Patents: In 2012, the patent 'Method and system for generating maps in an n-dimensional space' was granted to Peter van Oosterom and Martijn Meijers (No. N2006630).
- Increasing use of our Open Source Software: (see <http://www.gdmc.nl/projects/> and available on github, googlecode or bitbucket: pprepair, prepair, val3dity and Python gems).
- Long-term cooperation with government and industry, e.g. Kadaster, Rijkswaterstaat, Geonovum, Bentley and Oracle.

Table a. Main categories of research output

	2010		2011		2012	
	STAFF	GUESTS	STAFF	GUESTS	STAFF	GUESTS
Refereed articles	15	1	14	0	9	0
Non-refereed articles	0	0	0	0	0	0
Books	2	0	4	0	2	0
Book chapters	15	2	10	2	13	1
PhD theses	0	0	2	1	2	0
Conference papers	30	8	33	4	29	6
Professional publications	32	1	28	1	34	0
Editorships journals/book	4	1	2	0	6	0
<b>TOTAL PUBLICATIONS</b>	<b>98</b>	<b>13</b>	<b>93</b>	<b>7</b>	<b>95</b>	<b>7</b>

## 5.3 Results and outputs

### KEY PROJECTS

#### Programme

#### 5D DATA MODELLING: FULL INTEGRATION OF 2D/3D SPACE, TIME AND SCALE DIMENSIONS

##### STW VIDI

*Grant: € 800.000*

*Role: applicant*

*Principal Researcher:*

Jantien Stoter

*Duration: 06/2011 to 06/2016*

A Geographic Information System captures, stores, analyses, manages, and presents data that are linked to a location on the earth surface. This geographic data represents real world phenomena that can be divided into two abstractions: discrete objects (a house, a gas-pipe) and continuous fields (noise level at a location, changes of objects). The geometrical description of geographic data is usually annotated by x-, y-, and z-coordinates (or longitude, latitude, and elevation) to represent the data in three dimensions. The fourth dimension of geographic data is time. In my research I identify a fifth dimensional characteristic which is scale: some applications require detailed data, while other applications require data that give overview. Although (multi-)scale is a well-known concept in the geo-information technology

domain, regarding it as an extra dimension of geographic data, integrated with the other dimensions, is new. Within this Vidi, I propose to lay the foundation for integrating these five dimensions in one formal data representation. The formal definition of geographic data in a conceptual 5D continuum will enable managing and querying geographic data most efficiently via one integrated approach. In addition it will assure consistency across scale and time dimensions. The research will result in a new theory and method for multi-dimensional geographic data modelling, validated through prototype implementations, and therefore it opens a new research domain that has potentials to advance the field of geo-information technology.

#### Programme

#### VARIO-SCALE GEO-INFORMATION

##### STW OTP

*Grant: € 395.000*

*Role: applicant*

*Principal Researchers:*

Peter van Oosterom &

Martijn Meijers

*Duration: 07/2011 to 08/2015*

The scale of a map is defined as the ratio of a distance on the map to the corresponding distance on the ground. Humans have been using the concept of map scale since the early days. When moving to a digital environment, the old map scale concept is maintained and for each different scale the whole data of a map are separately produced and stored.

This is a labor intensive and expensive process and in practice results in inconsistencies. We propose a new concept named "vario-scale", where the data once stored in a vario-scale data structure can be used for generating all wanted scales in a smooth digital way.

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## Programme

### THREE-DIMENSIONAL METHODS

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STW OTP

Grant: € 215.000

Role: applicant

Principal Researcher:

Hugo Ledoux

Duration: 04/2012 to 05-2016

Digital terrain models (DTMs) are databases which represents in 3D the surface of the Earth or the seafloor. The use of new sensors such as earth laser-scanners means that the size of DTMs is continuously growing, and as a consequence we have difficulties analysing them with computers. To be processed, DTMs need to be simplified/generalised.

This research project aims at investigating and developing new simplification algorithms that: (1) use 3D tools and 3D data structures;

(2) permit us to define 3D features--valleys, peaks and ridges--and consider these while simplifying. The knowledge of the features will permit us to remove unimportant points and focus only on those of interest for a given application. The results of the project, a prototype released under an open-source licence, will allow us to automatically identify terrain features and to simplify, remove or even exaggerate them.

## Programme

### MASSIVE POINT CLOUDS

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NWO/eScience

Grant: € 300.000

Role: applicant

Principal Researcher:

Peter van Oosterom

Duration: 3/2013 to 3/2015

Massive point clouds (several terabytes) are produced by many sensors and applications. The problem is that they are too big to be handled efficiently by common ICT infrastructures. Within this project several novel and innovative eScience techniques will be developed: parallel ICT architecture, new core support for point cloud data types in

the spatial DBMS, Web Point Cloud Service protocol (WPCS, progressive transfer from server to client based on multi-resolution representation), coherent point cloud blocks based exploiting spatial clustering & indexing, Point cloud compression (storage & transfer), caching strategy, etc.

## Programme

### 3D SPATIAL DATA INFRASTRUCTURE

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Next Generation Infrastructures, powered by Maasvlakt2

Grant: € 222.000

Role: applicant

Principal researcher:

Sisi Zlatanova

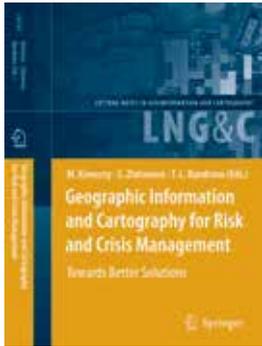
Duration: 01/2012 to 10/2013

Partners: Municipality and Port of Rotterdam & TU Eindhoven

The continues developments of Port of Rotterdam and specifically the construction of Maasvlakte 2, have posed high requirements to the information management needed for maintenance of infrastructure, facilities, logistics and other assets. Within this project a 3D data model was developed, which makes use of national and international concepts and allows integrated management of 3D GIS and BIM data.

The model was tested in two case studies: utilities and quays. Several prototypes were developed to demonstrate the use of the model for different purposes such as query and visualisation of 3D pipes and cables, 3D cross section and clips (needed for design and renewal) , use of concept libraries for design of BIM model of quays and clash& change detection between designed quays and existing 3D data (needed for final approval).

## KEY BOOKS



Year: 2010

Publisher: Springer

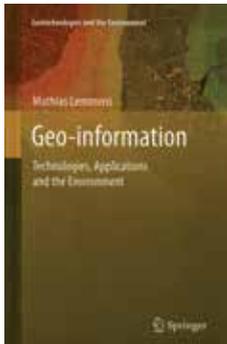
Pages: 446

### GEOGRAPHIC INFORMATION AND CARTOGRAPHY FOR RISK AND CRISIS MANAGEMENT - TOWARDS BETTER SOLUTIONS

*Milan Konecny, Sisi Zlatanova & Temenujka L. Bandrova (eds.)*

Cartography and geographic information (GI) are remarkably appropriate for the requirements of early warning (EW) and crisis management (CM). The new generation of cartographic visualisations based on standardization, formal modeling, use of sensors, semantics and ontology, allows for the better adaptation of information to the needs of the users. In order to design a

new framework in pre-disaster and disaster management safety/security/privacy aspects of institutions and citizens need to be considered. This book outlines research frontiers and applications of cartography and geographic information in early warning and crisis management. The book is prepared in collaboration between the working groups on EW and CM of ICA and ISPRS.



Year: 2011

Publisher: Springer

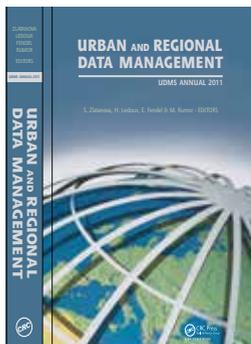
Pages: 315

### GEO-INFORMATION: TECHNOLOGIES, APPLICATIONS AND THE ENVIRONMENT

*Mathias Lemmens*

Geomatics has seen major changes in the last decade, as mapping and observation systems become ever more sensitive and sophisticated. This book is a unique and in-depth survey of the field, which has a central role to play in tackling a host of environmental issues faced by society. Covering all three strands of geomatics

- applications, information technology and surveying - the chapters cover the history and background of the subject, the technology employed both to collect and disseminate data, and the varied applications to which geomatics can be put, including urban planning, assessment of biodiversity, disaster management and land administration.



Year 2012

Publisher Taylor & Francis Group

Pages 253

### URBAN AND REGIONAL DATA MANAGEMENT

*Sisi Zlatanova, Hugo Ledoux, Elfriede Fendel & Massimo Rumor (eds.)*

This book contains a selection of the best 19 out of 42 full papers that were submitted for UDMS 2010. The topics covered represent current trends in urban and regional data management. UDMS 2011 is divided in four parts: (1) 3D modeling and applications; (2) Data management for local government; (3) Environmental monitoring and assessment;

(4) Remote sensing for urban applications, and will prove to be useful source information for urban, regional and rural data-related professionals, such as scholars, GIS engineers, geomatics professionals, photogrammetrists, land surveyors, mapping specialists, urban planners and researchers, as well as for postgraduate students and lecturers.



Geofort

**4D CADASTRES: FIRST ANALYSIS OF LEGAL, ORGANIZATIONAL, AND TECHNICAL IMPACT - WITH A CASE STUDY ON UTILITY NETWORKS**

*Fatih Döner, Rod Thompson, Jantien Stoter, Christiaan Lemmen, Hendrik Ploeger, Peter van Oosterom & Sisi Zlatanova*

**Publication Info**

Year: 2010  
 In: Land Use Policy, 27(4), 1068-1081  
 Cited by: 23

The increasing complexity and flexibility of modern land use requires that cadastres need an improved capacity to manage the third dimension. As the world is per definition not static, there also will be needs in relation to the representation of the temporal (fourth) dimension either integrated with the spatial dimensions or as separate attribute(s). In this paper, registration of utility networks

in cadastre are considered in this 3D + time (=4D) context. We researched the different approaches of three specific countries: Turkey, the Netherlands and Queensland, Australia. These are analysed to evaluate a solution that matches legal, organizational, and technical cadastral requirements in the most optimal way.

**ASSESSING GEOGRAPHIC INFORMATION ENHANCEMENT**

*Bastiaan van Loenen & Jaap Zevenbergen*

**Publication Info**

Year: 2010  
 In: International Journal of Spatial Data Infrastructures Research, 5: 244-266  
 Cited by: 1

Assessment of geographic information infrastructures is increasingly attracting the attention of researchers in the geographic information (GI) domain. Especially the assessment of value added GI appears to be complex. The paper details the enhancing process that must be employed to turn raw geographic information into new services and products regardless of the organisation

performing the enhancement. The framework is applied to two types of GI in the United States and Europe. The presented research shows that the framework allows for true comparison of GI enhancement in different jurisdictions. This should result in better understanding of the level of GI enhancement in a specific jurisdiction.

**GEO SHARED LICENCES: A BASE FOR BETTER ACCESS TO PUBLIC SECTOR GEOINFORMATION FOR VALUE-ADDED RESELLERS IN EUROPE**

*Frederika Welle Donker, Bastiaan van Loenen & Jaap Zevenbergen*

**Publication Info**

Year: 2010  
 In: Environment and Planning B: Planning and Design, 37(2), 326 - 343  
 Cited by: 6

Public sector geoinformation (PSGI) is potentially a vital link in the addedvalue chain. Yet private sector value-added resellers (VARs) still face a number of barriers to using PSGI. Price and the complexity of licences and restrictive licence conditions of PSGI are some of the obstacles. This paper explores the current PSGI licences to assess the

actual restrictions and how current obstacles can be levelled. The Creative Commons licensing concept is explored and adapted. The concept of Geo Shared licences is a means to harmonise licence conditions for PSGI. Our research shows that the Geo Shared concept can be a valuable contribution to further harmonisation of PSGI licences..

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## MODELLING AND ANALYSING 3D BUILDINGS WITH A PRIMAL/DUAL DATA STRUCTURE

*Pawel Boguslawski, Christopher M. Gold & Hugo Ledoux*

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### Publication Info

Year: 2011  
In: ISPRS Journal of Photogrammetry and Remote Sensing, 66(2), 188-197  
Cited by: 13

While CityGML permits us to represent 3D city models, its use for applications where spatial analysis and/or real-time modifications are required is limited since the possibility to store topological relationships is limited. We present a new topological data structure, the dual half-edge (DHE), which permits us to represent the topology of 3D buildings (including their interiors) and of the

surrounding terrain.

The DHE permits us to store attributes to any element. We have implemented the DHE and have tested it with different CityGML models. Our technique allows us to handle important query types, for example finding the nearest exterior exit to a given room, as in disaster management planning.

## 3D GEO-DATABASE RESEARCH: RETROSPECTIVE AND FUTURE DIRECTIONS

*Martin Breunig & Sisi Zlatanova*

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### Publication Info

Year: 2011  
In: Computers & Geosciences, 37(7), 791-803  
Cited by: 22

Geo-databases may serve as platforms to integrate 2D maps, 3D geo-scientific models, and other geo-referenced data. However, current geo-databases do not provide sufficient 3D data modelling and data handling techniques. New 3D geo-databases are needed to handle surface and volume models. This article first presents a 25-year retrospective of geo-database research. Data modelling, standards, and indexing of geo-data

are discussed in detail. New directions for the development of 3D geo-databases to open new fields for interdisciplinary research are addressed. Two scenarios in the fields of early warning and emergency response demonstrate the combined management of human and geophysical phenomena. The article concludes with outlines open research problems.

## INDOOR PEDESTRIAN NAVIGATION USING FOOT-MOUNTED IMU AND PORTABLE ULTRASOUND RANGE SENSORS

*Gabriel Girard, Stéphane Côté, Sisi Zlatanova, Yannick Barette, Johanne St-Pierre & Peter van Oosterom*

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### Publication Info

Year: 2011  
In: Sensors, 11(8): 7606-7624  
Cited by: 7

Many solutions have been proposed for indoor pedestrian navigation. Some rely on pre-installed sensor networks, which offer good accuracy but are limited to prepared environments. Others track the user with the help of global sensors, but they may have low accuracy. Offline tracking has been proposed to increase accuracy, however this prevents users from knowing their

position in real time. This paper describes a real time indoor navigation system that does not require prepared building environments and provides tracking accuracy superior to previously described tracking methods. The system uses a combination of four techniques: foot-mounted IMU (Inertial Motion Unit), ultrasonic ranging, particle filtering and model-based navigation.

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## A SEMANTIC-RICH MULTI-SCALE INFORMATION MODEL FOR TOPOGRAPHY

*Jantien Stoter, Thomas Visser, Peter van Oosterom, Wilko Quak & Nico Bakker*

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### Publication Info

Year: 2011

In: *International Journal of Geographical Information Science*, 25(5), 739-763

Cited by: 11

National mapping agencies maintain topographic data sets at different scales. Keeping the data sets consistent, for example by means of automated update propagation, requires formal knowledge on how the different data sets relate to each other. This article presents a multi-scale information model that, first, integrates the data states at the different scales and, second, formalises semantics on scale

transitions. This is expressed using the Unified Modelling Language (UML) class diagrams, complemented with Object Constraint Language (OCL). The model is evaluated through a prototype database implementation. The results show that UML/OCL provides an appropriate formalism to model rich semantics on both multi-scale data content and scale transitions.

## ESTABLISHING A NATIONAL STANDARD FOR 3D TOPOGRAPHIC DATA COMPLIANT TO CITYGML

*Linda van den Brink, Jantien Stoter & Sisi Zlatanova*

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### Publication Info

Year: 2012

In: *International Journal of Geographical Information Science*, 27(1), 92-113

Cited by: 4

This article describes a national standard for 3D geoinformation. The standard was developed as part of a Dutch pilot (run between March 2010 and June 2011). The 3D standard was established through several steps. First, a comparison between the existing 3D computer-aided design and GIS standards was carried out that selected CityGML as the optimal 3D standard to

align to. Second, the equivalent concepts in CityGML and the existing national standard for large-scale topography (Information Model Geography [IMGeo]) were identified. Third, IMGeo was extended to 3D following the principles of CityGML Application Domain Extensions. The model was tested by applying it to real data.

## 3D CADASTRE IN THE NETHERLANDS: DEVELOPMENTS AND INTERNATIONAL APPLICABILITY

*Jantien Stoter, Hendrik Ploeger & Peter van Oosterom*

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### Publication Info

Year: 2012

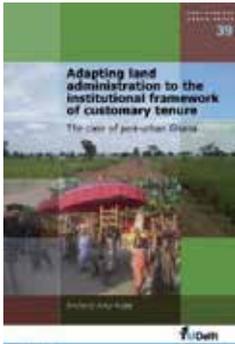
In: *Computers, Environment and Urban Systems*, 40, 56-67

Cited by: 2

This paper presents the design and implementation of the cadastral system extension for registration of 3D rights and restrictions in the Netherlands fitting within the ISO 19152, Land Administration Domain Model (LADM). The implementation is conducted in two phases. The first phase does not require a change of the legal

and cadastral frameworks. A procedure to improve the registration is developed that includes an extension of the cadastral system to accept 3D descriptions in 3D pdf format as part of the deed. The second phase is research in progress and comprises the actual inclusion of the 3D data in the registration, enabling complete validation.

## KEY DISSERTATIONS



Year: 2011

Publisher: IOS Press

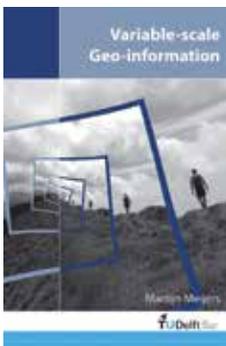
Pages: 282

### ADAPTING LAND ADMINISTRATION TO THE INSTITUTIONAL FRAMEWORK OF CUSTOMARY TENURE: THE CASE OF PERI-URBAN GHANA

*Anthony Arko-Adjei*

Historical experience in many Sub-Saharan African countries demonstrates that an alternative approach to conventional land administration methods is required to appropriately secure tenure and administer land rights in customary areas. The research is about dealing with the dynamics of customary tenure and with land governance and institutional capacity issues necessary to implement land administration at the

local level. Methods for implementing land administration systems at the local level have been presented in a three-phased tenure model. The conclusion is that customary tenure institutions have their own mechanisms for adapting to societal change, and a desirable solution would therefore be to adapt land administration to the institutional framework of customary tenure.



Year: 2011

Publisher: KNAW/NCG

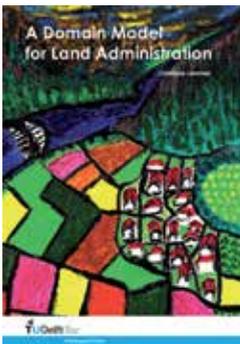
Pages: 244

### VARIABLE-SCALE GEO-INFORMATION

*Martijn Meijers*

The use of geo-information is changing by the advent of new mobile devices, such as tablets that harness a lot of computing power. However, current state-of-the-art solutions for storing, maintaining and disseminating digital maps still mimic the analogue map-series concept in the sense that for every map scale in the series (e. g. 1:25k, 1:50k, 1:250k) a different digital copy with independent data is kept and maintained at the producers site. Vario-scale data

structures try to avoid this redundancy of the geometric description of the map by storing references to composing map elements of the highest level of detail for any other element of a lower level of detail. The overall aim of this PhD research has been to investigate variable-scale geoinformation, by defining theoretical underpinnings of vario-scale geo-information and improving the initial tGAP structures.



Year: 2012

Publisher: KNAW/NCG

Pages: 234

### A DOMAIN MODEL FOR LAND ADMINISTRATION

*Christiaan Lemmen*

A Domain Model for Land Administration is designed. There is a need for domain specific standardisation to capture the semantics of the land administration domain on top of the agreed foundation of basic standards for geometry, temporal aspects, metadata and also observations and measurements

from the field. A standard is required for communication between professionals, for system design, system development and system implementation purposes and for purposes of data exchange and data quality management. The designed model is validated and published as ISO 19152.



Year: 2012

Publisher: KNAW/NCG

Pages: 363

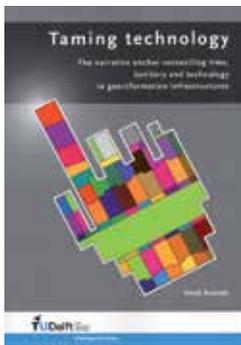
## DEVELOPMENT METHODOLOGY FOR AN INTEGRATED LEGAL CADASTRE - DERIVING PORTUGAL COUNTRY MODEL FROM THE LAND ADMINISTRATION DOMAIN MODEL

*João Paulo Hespanha*

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Analysis of the technical, juridical, administrative and institutional aspects of a cadastre based on the Land Administration Domain Model (case Portugal). Based on the principles of the model driven approach a prototype has been realized. This thesis describes the research process followed in order to achieve a development methodology applicable to the reform of cadastral systems with a legal basis. It was motivated by the author's participation in one of the first surveying and mapping operations for a digital cadastre in Portugal, and the problems faced by the cadastre, and more generally, the Land

Administration System in Portugal. After approaching Delft University of Technology (more specifically OTB Research Institute) with a research proposal mainly applied and restricted to the Portuguese cadastral situation, it was suggested to propose a new Cadastral Data Model, to be derived from the (then called) Core Cadastral Domain Model. This last model has evolved into the current Final Draft International Standard ISO 19152 - Land Administration Domain Model (LADM). Supervisors: Peter van Oosterom (TU Delft) and Jaap Zevenbergen (Twente University).



Year: 2011

Publisher: IOS Press

Pages: 264

## TAMING TECHNOLOGY: THE NARRATIVE ANCHOR RECONCILING TIME, TERRITORY AND TECHNOLOGY IN GEOINFORMATION INFRASTRUCTURES

*Henk Koerten*

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It is often assumed that innovative technology is an essential resource for the establishment of an information infrastructure. This study on geoinformation infrastructures convincingly demonstrates that technology is an important and far more complex factor than much geoinformation practitioners want us to believe. Three Dutch cases were studied, of which two were intended to develop an infrastructure deliberately applying innovative technology. Due to a constant stream of innovations these cases failed to bring about a working infrastructure. The third case was aimed at establishing a system of large-scale basemaps. These maps acted as a 'narrative anchor',

a non-tangible interface between innovating technology and the infrastructure to be developed. Through the narrative anchor, this infrastructure has already existed for over 35 years and is likely to continue. Its success can be attributed to the ability of the narrative anchor to reconcile different types of technology through time, both innovative and conservative. The conclusion of this thesis is that lasting and reliable future (geo) information infrastructures need to have a narrative anchor that will act as an interface between ever-innovating technology and infrastructure itself.

## KEY EVENTS

### Info

### 2ND INTERNATIONAL WORKSHOP ON 3D CADASTRES

*Date:* 2011, November 16-18  
*Place:* Delft, the Netherlands  
*Organizers:* FIG, EuroSDR & TU Delft  
*Number of Participants:* 96

The main purpose of this workshop was to have a fruitful exchange of ideas. There does not exist a single best solution for a 3D cadastre. In all cases for the establishment, legal, institutional and technical issues have to be addressed. The level of sophistication of each 3D cadastre will in the end be based on the user needs, land market requirements, legal framework, and technical possibilities.

Therefore, in line with the ISO 19152 Land Administration Domain Model it is the intention to explore the optimal trade-offs between 2D en 3D cadastral solutions. 3D parcels include land and water spaces, both above and below surface. However, what exactly is a 3D parcel is dependent on the legal and organizational context in the specific country (state, province).

### Info

### 15TH ICA/EUROSDR WORKSHOP GENERALISATION AND MULTIPLE REPRESENTATION

*Date:* 2012, September 13-14  
*Place:* Istanbul, Turkey  
*Organizers:* ICA & EuroSDR  
*Number of Participants:* 40

This time the workshop has explored in particular new challenges and solutions in the domain of automated generalisation for on demand mapping and the changing context of map use. In one of the breakout sessions, the workshop participants discussed how NMAs can work more closely together on the challenges that are posed by new production lines, specifically new data models supported by automated generalisation. It was agreed to organise a joint workshop in 2013

dedicated to this question. This workshop is held in March 2013 at ICC, Barcelona. The workshop NMAs exchanged experiences and issues of introducing automation within their new production line. The workshop also explored how a closer collaboration can be realised, for example by sharing generalisation algorithms or by defining a common vocabulary on data models and generalisation requirements.

### Info

### 8TH INTERNATIONAL CONFERENCE ON GEO-INFORMATION FOR DISASTER MANAGEMENT

*Date:* 2012, December 12-14  
*Place:* UT Twente, Enschede, the Netherlands  
*Organizers:* TU Delft, UvA, Public Safety District Kennemerland, UT Twente  
*Number of participants:* 125

Gi4DM 2012 is specifically important because it is initiated by the Public Safety Districts of the Netherlands. They want to share several years of experience with one common emergency management system. This conference is the place to exchange experiences, knowledge and ideas towards finding appropriate solutions to crisis response challenges. Researchers will be able

to talk with officers to check and validate their direction of research. Technicians will be able to work with their prototype systems in real field tests. Vendors will be able to show products that can collaborate on interoperability. Officers will be able to see tests and demo's displaying the state-of-the-art technologies.

# 6

## Earning capacity

### 6.1 Success and vision on how to obtain research projects

The direct funding was reduced by 20% during the assessment period, as result of government cutbacks and TU Delft ‘herijking’. The total funding increased however. This can be explained by the increase in the second flow of funds (NWO/STW, EU/FP7 and funding for education (Internal TU Delft), while at the same time the third flow of funds remained stable. The money for education cannot be spent directly on research projects. However, stable funding for education is also beneficial for research because of the tight links, for example MSc students doing thesis projects and staff members including the latest research results in their courses, and the Geomatics Open Guest Lectures (OGLs).

This is our approach:

- Execute the on-going project according to highest academic standards and report on the obtained results, demonstrating that the funds were well spent (this is good indicator for possible future funding);
- Sign cooperation agreements with national key players e.g. Rijkswaterstaat, Kadaster or Geonovum;
- Submit to specific programmes such as the Partnership Programme of STW.
- Organize international events (3D GeoInfo, LADM workshop, UDMS, 3D Cadastre, etc.).
- Be active in international organizations (OGC, ISO/TC211, EuroSDR, GSDI, FIG, etc.);
- Build reputation, which is relevant for finding partners for good international project proposals (and to be found by them).

### 6.2 Overview of top-5 projects

#### 3D Cadastre Russia

The purpose of the Russian–Dutch project on 3D cadastre modelling in the Russian Federation was to assess the added value of a 3D cadastre for better registration and recording of multilevel complex buildings and constructions and subsurface networks such as gas pipelines, and rights related to them. The project included prototype development and a pilot project with use cases selected in Nizhny Novgorod, Nizhegorodskaya Oblast. Experts from Rosreestr (Russian Federal Service for State Registration,

Table a. Research funding

FUNDING	2010		2011		2012	
	K€	%	K€	%	K€	%
Direct funding	646	56%	561	56%	479	55%
External funding	509	44%	445	44%	392	45%
<b>TOTAL FUNDING</b>	<b>1,155</b>	<b>100%</b>	<b>1,006</b>	<b>100%</b>	<b>871</b>	<b>100%</b>
EXPENDITURE	K€	%	K€	%	K€	%
	Staff costs	804	61%	661	65.06%	683
Other costs	520	39%	355	34.94%	369	35%
<b>TOTAL EXPENDITURE</b>	<b>1,324</b>	<b>100%</b>	<b>1,016</b>	<b>100.00%</b>	<b>1,052</b>	<b>100%</b>

Cadastre and Cartography) central and local offices, cadastral chambers, technical inventory offices and cadastral engineers participated in the pilot project. A web-based prototype for 3D cadastral visualization was developed consisting of a 3D viewer that shows the cadastral objects in 3D space, and permits the making of selections on e.g. cadastral number, name of the owner, number of rooms, etc. Based on the positive experiences gained from the project in general and from the pilot project in particular, recommendations for the future introduction of 3D cadastre have been formulated, including improvements in the Russian legal framework and the organization of 3D cadastre.

### **3D pilot project**

Jantien Stoter is initiator and chair of the national 3D pilot project/3D SIG (Special Interest Group). In this project, over 100 consortium partners collaborate on a 3D test bed aiming at establishing and implementing a 3D reference model in the Netherlands. The project consortium established a national 3D standard within the current national SDI framework (first one in the world) that meets both national and international standards, and has developed implementation tools for the 3D standard. The 3D pilot project/SIG and its achievements have received a lot of national and international attention (including two international awards: the OGC's 3D DIM award and the Geospatial World Forum Policy Award).

### **NGInfra Open Data and Beyond**

This project researches the legal, organizational and technological requirements that need to be fulfilled in order to implement open data policies successfully in the utility company Liander. The project also develops a framework for the assessment of the impact of the open data policies.

### **Top Sector Energy project CERISE-SG**

CERISE-SG integrates the flows of information from the geo, public and smart grids domain. CERISE SG (Combining of Energy and Spatial Information standards as Enabler - Smart Grids)

is a Top Sector Energy project within the TKI Smart Grids 2012 regulation. CERISE-SG focuses in particular on basic registrations within the public domain and the geo-domain. Within the project the involved flows of information are analysed via use cases. The information integration (based on mapping/linking) is tested in one or more experimental test beds. These links are also based on semantics (the meaning of information). Using these links enables new functionality and large savings. It also means opportunities for suppliers who can develop more attractive products and services for the large international smart grids market. Consortium partners: TNO (leader), Alliander, Geonovum, Geodan and TU Delft.

### **HydroCity**

HydroCity is a platform where several knowledge institutes and Dutch private and public organizations in the water and earth-observation sectors have joined forces to help cities improve their flood resilience. Water run-off modelling applied within urban areas requires an appropriate detailed surface model represented by a raster height grid. Accurate simulations at this scale level have to take into account small but important water barriers and flow channels given by the large-scale map definitions of buildings, street infrastructure and other terrain objects. Thus, these 3D features have to be rasterized such that each cell represents the height of the object class as accurately as possible given the cell size limitations. The GIST section has contributed to a height grid generalization approach in which the surface characteristics that most influence the water run-off flow are preserved. A comparison between the original AHN2 height grid and the semantically enriched and then generalized height grids shows that water barriers are better preserved with the new method. This research confirms the idea that topographical information, mainly the boundary locations and object classes, can enrich the height grid for this hydrological application. The results will be presented at the 8th 3D GeoInfo Conference / ISPRS WG II/2 Workshop on 27-29 Nov 2013, Istanbul, Turkey.

### 7.1 Means used to transfer knowledge

A large range of activities are conducted in order to valorize our research results. The following gives an indication of these types of activities.

- NWO/STW User committees: committee for OTP simplification of terrain models and a joint committee for Vidi 5D geo-information and OTP vario-scale geo-information;
- Structural multi-year cooperation with key organizations: RWS (now in second 4-year framework cooperation), Geonovum (now in second 3-year framework cooperation), Kadaster (permanent via shared staff);
- Sharing of staff either on a permanent basis (Jantien Stoter 50/50 Kadaster/TU Delft) or by the secondment of staff members (Bastian van Loenen, Jantien Stoter, Wilko Quak for respectively one, one and two days per week in recent years, and intention to continue);
- Organizing and delivering professional courses; e.g. INSPIRE course;
- Initiate, organize and host seminars, workshop, symposia, conferences (in the context of NCG, EuroSDR, ISPRS, UDMS, FIG, GSDI, etc.);
- Applying for patents;
- Via the Geoinformation Governance Knowledge Centre (in Dutch 'Kenniscentrum Open Data') focuses on the governance of geo-data; how current institutional, legal and organizational barriers may best be overcome; and which frameworks should be developed to optimize the sharing of geo-data by governments, knowledge institutes, companies and citizens. The knowledge centre was established in May

2012 by TNO and TU Delft and it is currently focussing on open data policy of government;

- Via the Geo-Database Management Center (GDMC), the research and development centre for geo-information technology. The GDMC was established in 2000 in order to organize the cooperation and joint research activities with the geo-ICT industry. At the moment the partners are Oracle, Bentley and Safe Software; cooperation is conducted in various forms, such as participation in projects, organizing events, internships, etc;
- Member of standardization bodies and project/edit teams: e.g. Peter van Oosterom is member of the ISO 19152 (Land Administration Domain Model; LADM) project team. LADM was approved as an ISO standard on 1 November 2012 (after a decade of preparation, the last four years of which within ISO). Peter van Oosterom is also member of the INSPIRE Data Specification and Harmonisation drafting team. Wilko Quak is editor of the INSPIRE Land Use thematic work group. Sisi Zlatanova is member of the OGC IndoorGML drafting team;
- Presentation at various national and international platforms; e.g. Peter van Oosterom: Maps4Science presentation at GBN meeting 'Geo onder Rutte 1' (GeoBusiness Nederland), Cappemini Nederland, Utrecht, 15 Nov 2011.

### 7.2 Users of the knowledge

Most of the users of our research have been mentioned in the above subsection. At the top level we make distinction between government (which is often responsible for collecting, maintaining and dissemination geo-information) and the geo-ICT industry (creating software solutions, both generic such as DBMS, CAD, GIS, or specific applications; in addition, industry also has important tasks in geo-information collection and maintenance).

# 8

## PhD research

### 8.1 Topics

Current and completed PhD projects are:

- Paul van Asperen, Land tenure and land registration in Africa;
- Nazmul Alam, Shadow effect on 3D city modelling for photovoltaic cells;
- Ken Arroyo Ohori, Realizing the foundations of a higher dimensional GIS;
- Filip Biljecki, The concept of level of detail in 3D city modelling;
- Michiel Jellema, Dynamics between government organization and geo-information supply;
- Liu Liu, Indoor semantic modelling to support path-finding;
- Amin Mobasher, Designing formal semantics of geo-information for disaster response;
- Bujar Nushi, STIG: a stress-test for infrastructures of geographic information;
- Ravi Peters, Medial axis-based feature identification and generalization in digital surface models;
- Radan Šuba, Content of variable-scale maps
- Marian de Vries, Building blocks for geographic information exchange via Internet and mobile networks;
- Frederika Welle Donker, Reuse of government information;
- Zhiyong Wang, Integrating spatio-temporal data into agent-based simulation for emergency navigation among moving obstacles.

### 8.2 Supervision

The supervision of PhD candidates is usually performed by a small team consisting of a day-to-day supervisor (who holds a PhD degree) and a professor (promotor = supervisor); in some cases (e.g. in the case of collaboration with an external party), a third person is part of the supervision team.

PhD students who started during the last two years have been included in the programme of the ABE graduate school. However, PhD students who started earlier follow a very similar programme, as in our group we have a long-standing tradition of systematic supervision, which is clearly described in the individual PhD plan of every student. These plans are published, each with its own ISBN number, in our report series (ISSN series number 1569-0245). There are regular progress meetings (every 2 or 3 weeks, in addition to ad hoc meetings), which are all documented in concise 1- or 2-page progress reports divided into three parts: 1) results since the last meeting, 2) deviations from planned activities since the last meeting and 3) the most important goals for the coming meeting. In addition, internal PhD students are also included in the annual human resource 'Results and Development' (R&D) cycle: agreements are made at the start of the year; after six months, a progress meeting is held (with intermediate results and possibly new/changed agreements); at the end of the year there is reflection on all results and a formal assessment. For first-year PhD students, this coincides with the go/no go decision for the last three years of the PhD research.

### 8.3 Success rates

Success rates are difficult to express in general terms as we have different categories of PhD students.

- For the category of PhD students with an 'assistant in training' (AIO) position, the success rate is high (all students who started in the last ten years have either finished or are well on track, with the exception of one AIO).
- For students with a scholarship/grant, the success rates have been too low: quite a

number of PhD students were given a no-go after their first year (about 50% over the last decade). We of course try to learn from these experiences and have become even more careful and critical, especially during the selection/ acceptance phase, as a result of which we have not had any dropouts in the last three years.

- The category of PhD ‘students’ that consists of our own fixed staff is in general not successful, with some positive exceptions (e.g. Jantien Stoter obtained her PhD in the planned time as a staff member; she is now an associate professor). However, four other staff members have not yet completed their PhD.
- The last category of PhD students consists of external PhD students, who often have a fixed position at another organization (e.g. ITC, Kadaster, University of Aveiro, Queensland Government). Their success rate is high.

#### 8.4 Resources

Due to cooperation with the geo-information practice, there are sufficient resources: datasets, software and, if needed, equipment. We are often allowed to access these resources free of charge. Further, although the facilities are getting more advanced and powerful, the prices of the resources are dropping. We recently acquired a medium-sized server for database and webservice testing, namely an HP DL380 (with operating system Linux Red hat v6) with the following specifications:

- CPU 2 x 8 cores (32 threads), 2.9 GHz, 128 Gb main memory;
- SSD (solid state disk) 400 Gb;
- SAS (serial attached SCSI (small computer system interface)) disks effective about 5 Tb, 22 \* 300 GB disks, 15 K, RAID 5 (relatively good read/write);
- SATA (serial ATA (Advanced Technology Attachment)) disks effective about 88 Tb, 26 \* 4 TB disks, 7.2 K, RAID 6 (relatively good read).

In addition, the general office and IT resources of TU Delft (Internet access, desktop PCs, printers, scanners, etc.) are at a good level. For hardware tools specific to geo-information (e.g. GPS receivers

for outdoor positioning or Wi-Fi scanners for tracing moving objects), there are also some resources often in the context of a specific project.

#### 8.5 Funding

The various categories of PhD students have their own flows of funding: AIOs often obtain funds from NWO/STW projects, and PhD students with scholarships who often obtain funds from various foreign funding organizations (China is the most important one).

#### 8.6 Attractiveness

When we have PhD (AIO) staff member vacancies, we usually receive applications from about 50 candidates, most of whom have the required background and talents. A shortlist of the six most promising candidates is drawn up and the top three are invited to attend an interview, after which the best candidate is given the position.

In addition, a significant number of spontaneous requests for a PhD position are received (typically 50 per year) both with and without own funding/ scholarship. After careful selection and based on funding possibilities, on average one new PhD student per year starts as a result of making such a spontaneous request.

One aspect we should like to see improved is our attractiveness to Dutch PhD students, as we should like to have more of them. Unfortunately, the number of MSc Geo-information students is relatively low in the Netherlands, and most of the Dutch graduates opt for a position within industry or government (good job opportunities).

The involved supervisors are leading researchers in their field and act as magnets to young new talent. Also the positive experiences of the recently graduated and on-going PhD candidates results in being an attractive geo-information research centre. Finally, every two weeks a GIST lunch seminar is held, which enables and stimulates academic debate. The format of the lunch seminar is that at least one geo-information topic is presented, which almost always leads to a lively and constructive discussion.

# 9

## SWOT-analysis

### STRENGTHS

The position within Architecture/OTB provides a dedicated research context for use-based scientific research. Within Architecture/OTB there are several research groups with which cooperation works very well. The group's multidisciplinary approach provides excellent opportunities for this kind of research, as societal problems related to geo-information technology and governance are the concern of more than one discipline. The group publishes an increasing number of international peer-reviewed articles, and has many national and international contacts. The group has a healthy mix of funding sources, including several NWO/STW/EU-financed projects, and multi-year cooperation agreements with the Dutch geo-information practice (Rijkswaterstaat, Geonovum, Kadaster).

### WEAKNESSES

The field the programme addresses is rather wide, which makes it a challenge to cover all aspects of the programme at the level we desire (i.e. an internationally leading position). The Governance of Geo-information sub-programme is understaffed at the moment, as a result of the departure of two key researchers (Jaap Zevenbergen and Jaap Besemer). The staff members involved in the programme are from two different sections, and although there is good collaboration at the individual level, collaboration at the group level could be improved. Finally, the number of staff members with a PhD degree should be higher.

### OPPORTUNITIES

The combination of our geo-information expertise and the application knowledge within Architecture/OTB provides great opportunities for cooperation, sharing and disseminating knowledge and new ways to collect research data. The present crisis on the property market has resulted in a societal awareness that we need better geo-information, more specifically for the themes addressed in the research programme. The MSc in Geomatics has recently been repositioned and moved to Architecture; this also provides good opportunities for research. The new Wuhan-Delft Joint Research Centre on Spatial Information provides an excellent opportunity for research collaboration and shared PhD supervision.

### THREATS

The financial crisis, the negative impact on university funds and the decision of TU Delft to reduce the OTB's first flow of funding by 20% is a threat to long-term continuity. Other groups are also facing these challenges and need to look for other sources, such as research grants and contract research commissioned by public authorities and private parties. This results in a stiff competition for the scarce funds that are still available. The group has experienced that even proposals assessed as 'excellent' have not been funded.

### 10.1 Strategic planning

The aim is to implement the recently defined six-year GiTG (2013-18) research plan, which is based on the scientific pillars of geo-information technology (focus: 5D geo-information) and governance (focus: open data). The knowledge is applied to and assessed within the context of our three key application domains, namely Spatial Data Infrastructure, Crisis Management and Land Administration. Our approach is characterized by tight integration of education and research, internationalization (Wuhan/China, Korea), participation in standardization bodies (ISO, OGC, NEN), making developed software available as open source, and close cooperation with industry and government, while ensuring that some of the academic output remains at its current high level (publications), while increasing the level of other output (PhD graduates).

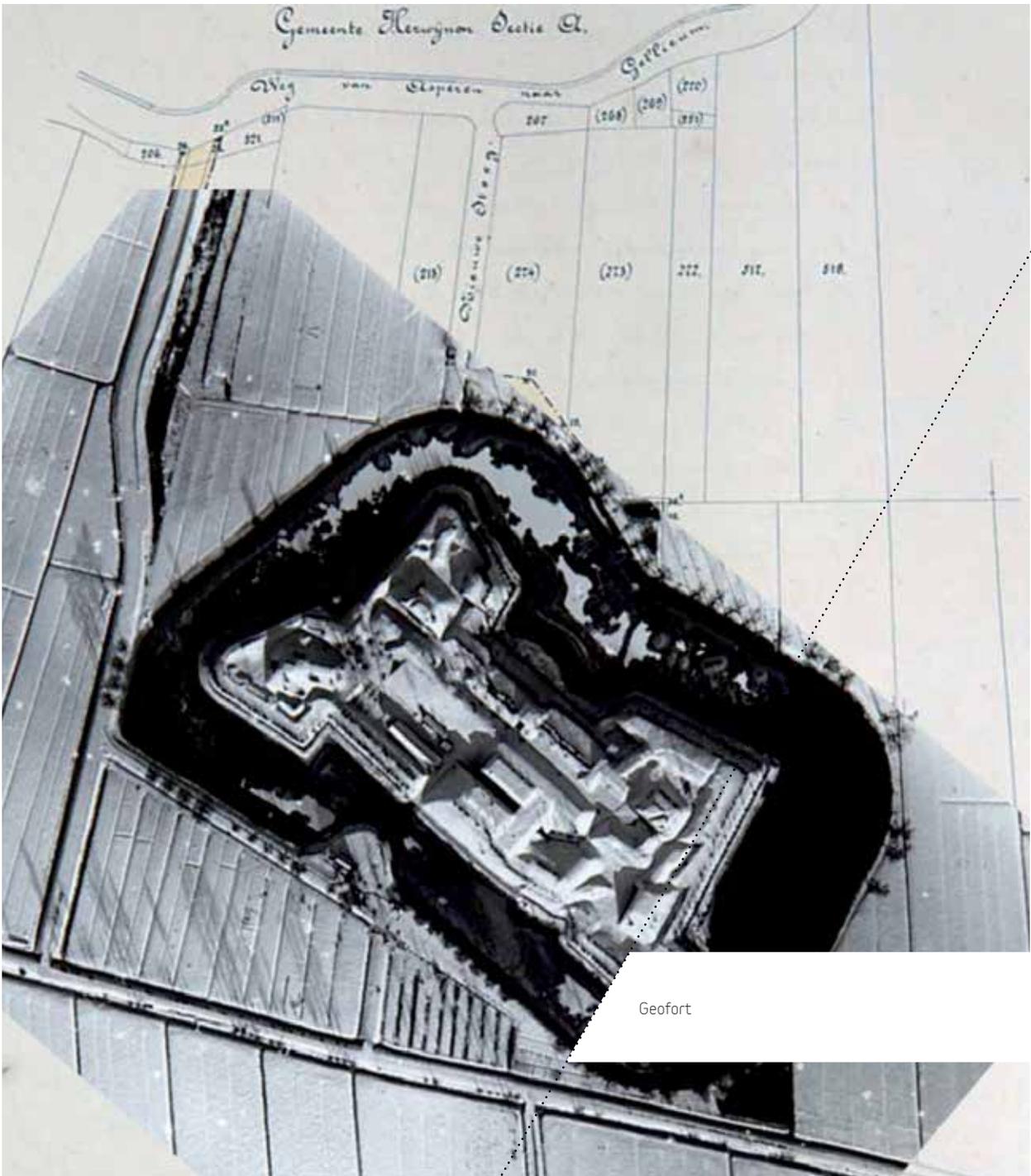
### 10.2 New research topics and their prospects

The two main research topics - 5D and open data - offer good opportunities to become world leaders in these areas. However, there should be sufficient emphasis on continuing the second and third flows of funding (as the first flow of funding - direct funding from the government - has been reduced by 20%). Good opportunities are offered

by the STW Maps4Society cooperation programme (M4S). This programme was initiated by Peter van Oosterom (among others) and the call for project proposals is expected soon with project proposals to be submitted by December 2013 and the decision on funding research projects to be announced in the first half of 2014.

### 10.3 Flexibility

Realizing the proper balance between permanent and temporary staff (permanent staff stable, and growth of temporary staff) is an important target. For the GiTG programme, there are two goals, in addition to higher flexibility: (1) more PhD research is needed as part of the realization of the ambitious new research programme 2013-18, and (2) we need to reinforce the understaffed 'government' part of the programme. It is therefore the intention to attract each year three new PhD students (on average two in technology and one in governance), and also to have three PhD students graduating, which is an increase compared to the number of graduated PhD students in recent years. The number of permanent staff positions is to remain stable, even though the 'government' is currently understaffed. This is because of the reduced direct funding (first flow of funds), but the issue will be resolved by means of temporary positions and/or secondments where appropriate. In this context, we intend to attract talented young postdocs from elsewhere (e.g. in the context of JRC-SI Wuhan-Delft).



Geofort



# Urbanism

RESEARCH LEADER: Prof. Vincent Nadin



# Scope

## 1.1 Scientific and societal aims

The urban environment is a subject of intense public concern. The impact of rapid change in the physical form and distribution of urban development on the quality of the environment, economic competitiveness, social cohesion and cultural identity is widely debated. The patterns and effects of urban change, their wider impacts on society and the appropriate means of intervention are all of increasing complexity and uncertainty. There is a great demand for basic research to inform understanding of urbanization processes and their effects, and for applied research to assist policymakers and professionals.

The Urbanism group applies itself to these issues. Its core task is to use its multidisciplinary knowledge, skills and reputation in research on creating more sustainable living environments. The priority is to contribute solutions to the urgent challenges of urbanization in the context of economic, social and environmental change. We want to achieve excellence in research, international recognition for the quality and value of our scientific work, and raise the standing in science and society of urbanism as an academic research discipline.

## 1.2 Where do we stand?

The evidence presented below shows that the Urbanism group has a world-class international

reputation for its socially relevant applied research and scholarship, and for its contribution to educational programmes. We are also making good progress on strengthening the group's academic profile, reputation and productivity. The Urbanism group is a preferred partner of some of the world's leading universities and attracts leading international visiting professors. Individual staff have outstanding reputations in their specialisms and there is great demand for research posts.

We should stress that the position of the Urbanism research group is distinctive: it is one of the few research centres in the world that is effectively bringing together expertise in design, policy and research. Its multidisciplinary staff cover the breadth of the urbanism field, including environmental technology, landscape architecture, urban design, spatial planning and urban studies. It can claim a truly international perspective and capability with a staff and PhD candidate body representing many countries in Europe, Asia and Latin America.

## 1.3 Vision and objectives

Our vision is to create a leading urbanism research group that is widely recognized as being among the very best in the world. Our distinctive contribution aims:

- to combine understanding and methods in the design, engineering and social science disciplines to deepen knowledge and achieve academic excellence in our priority research themes;
- to make a strong contribution to finding practical solutions to critical urban problems whilst stimulating critical thinking about the nature and role of urbanism;
- to build on deep experience and principles of urbanism in the Netherlands to advance understanding of urbanism under very different conditions around the world; and
- to blend high-level research with educational programmes to provide a stimulating research-led teaching programme at Masters level.

Our academic research objective is to have a significant proportion of our work recognized as being of world leading quality, with a significant reach as measured by citations and prestigious research funding. We also aim to raise our international profile further through continued engagement with the academic and practitioner communities on novel and pioneering questions of scientific and professional interest in urbanism.

To achieve our objectives urbanism is concentrating attention and resources around a small number of disciplinary-based research groups, and eight cross-cutting research themes as shown in Figure 1. Our research focus applies to research funding proposals, the selection of future PhD candidates, and the use of existing research resources. Urbanism staff members undertake scholarship and occasional publication in other subject areas, notably education in urbanism, and some topics may develop into substantial themes as the track record develops.

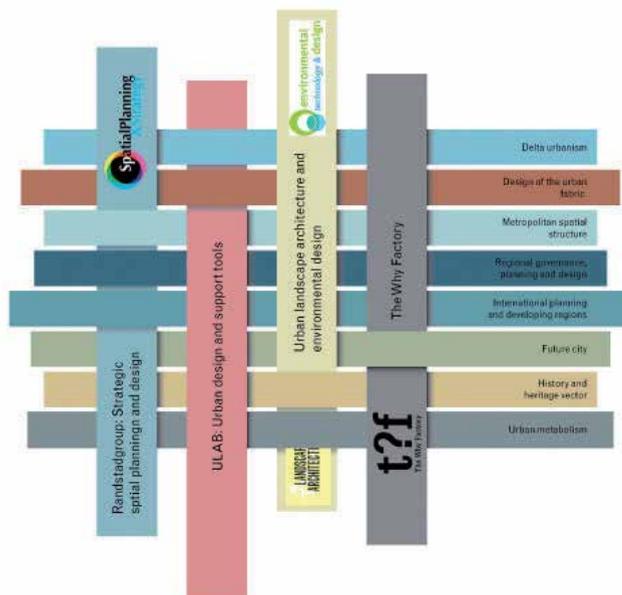


Figure 1: Urbanism disciplinary groups and cross-cutting themes

#### 1.4 Research area

Urbanism has four disciplinary groups shown as vertical columns in Figure 1.

*The Randstad Centre for Strategic Spatial Planning and Design* critically examines approaches and methods of spatial planning and regional design. It draws from experience of the Randstad Holland - an archetypal example of a poly-nuclear urban region - in research on regions around the world.

*U-Lab* seeks a renewal of the techniques and instruments of urban design. New challenges in urban development, for example as a result of climate-change, make a reappraisal of the techniques and processes of urban design and its collaboration with other disciplines.

*Urban Landscape Architecture & Environmental Design* is concerned with the transformation of urban landscapes through continuing urbanisation, changing land use and climate change is creating unprecedented challenges for the designs of their design.

*The Why Factory* was founded in 2008 and intends to bring argumentation to the world of architecture and urbanism. It critically addresses the role of the architect in our society and encourages closer collaboration with all parties involved in the making of the city.

These four primarily disciplinary groups collaborate on cross-cutting themes as listed in Figure 1. Each group leads on specific themes. We do not underestimate the challenge of interdisciplinary working in urbanism. Whilst much of the rhetoric in research promotes interdisciplinarity, most academic schools are located in either design or policy/social science settings which differ substantially in their research cultures. The Urbanism Group has already demonstrated considerable success in developing externally funded cross-cutting research projects and there is a positive attitude among staff that supports this approach.



**Table a. Research staff at institutional and programme level**

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	34	26,01	34	27,31	31	25,8
Non-tenured staff	21	13,2	19	11,3	21	12
PhD students	47	30,0	53	34,0	52	36,0
Guests	21	0	22	0	18	0
<b>TOTAL RESEARCH STAFF</b>	<b>123</b>	<b>69,21</b>	<b>128</b>	<b>72,61</b>	<b>122</b>	<b>73,8</b>

**Table b. Research staff with position in practice, industry or government**

WHO	ROLE	ORGANISATION	WHERE	
Nijhuis	Advisor	Council of State(Raad van State), in case Windturbinepark Hatten Oldebroek, Natuurbeschermingswe	The Hague	NL
Luiten	Executive member	Research and Education Network on Heritage and Space (Netwerk Erfgoed en Ruimte)	The Hague	NL
Luiten	National advisor	Landscape and Water, Atelier Rijksbouwmeester	The Hague	NL
Maas	Co-founder and director	MVRDV Architects	Rotterdam	NL
Meyer	Member reflection-group	Dutch Delta Programme	The Hague	NL
Meyer	Advisor	Climate Change Adaptation Lisbon research program, University of Lisbon 2011 - 2013 (prof. H. Meyer)	Lisbon	PT
Meyer	Chairman	Advisory Committee 'Making Kaoshiung Resilient', Kaoshiung (Taiwan) 2012 (prof. H. Meyer).	Kaoshiung	TW
Meyer	Member	Coastal Best Practices Advisory Committee of the Center for Planning Excellence (CPEX) and the Coastal Protection and Restoration Authority (CPRA),	Louisiana	US
Nadin	Advisor	Strategic Planning for Reservoirs in South Taiwan	Tainan	TW
Salij	Advisor	MinBuZa: Dutch Design Fashion Architecture	Rotterdam	NL
Sijmons	Chairman	Quality team Ruimte voor de Rivier.	The Hague	NL
Sijmons	Chairman	Experts meeting, sector analysis landscape and landscape architecture, for Federal Council of the Arts.	The Hague	NL

# 3

## Research environment and embedding

### 3.1 International and national positioning

The Urbanism programme has a deep involvement with international networks arising from a long history of successful collaboration particularly in Asia and Latin America, and now extending to North America. It has been facilitated by a truly international group of staff, PhD candidates, post-Master's and Master's students, funding from Alfa-Ibis and EU sources, and a growing body of international alumni.

Evidence of the high esteem of the Urbanism programme includes the many invitations for staff (at all levels) to make keynote contributions at international conferences (see section 4); staff positions in advisory roles for foreign agencies and governments; and the great demand for PhD positions from international students. The Urbanism programme is a preferred partner for a number of high-ranking international research departments; for example, there is extensive collaboration with Nordregio (Nordic Centre for Spatial Research).

Recognition of the value of urbanism research is strongly evidenced by the sponsorship of two chairs: the chair of Politics and Design is sponsored by the ministry of Infrastructure and Environment, and the Van Eesteren Chair is sponsored by the Van Eesteren-Fluck and Van Lohuizen (EFL) Foundation with a view to developing research on the Delta programme 'IJsselmeergebied'.

### 3.2 Collaboration with stakeholders

The Urbanism programme collaborates with stakeholders primarily through the participation of users in funded research projects. For example, the programme collaborates with the province of South Holland on a number of projects, and with the Veldacademie Rotterdam on the proposed Buytenland van Rhooon landscape park. The Urbanism programme works closely with ESRI Nederland, which supports and sponsors GIS in landscape architecture and planning research and education. The EU F7 project on Planning for Energy Efficient Cities (PLEEC) involves collaboration with a number of European cities that are at the forefront of energy conservation (see below).

### 3.3 Participation in consortia

The Urbanism programme participates in many consortia. Almost all research projects involve collaborating with other institutions, and we are developing deeper, more strategic relations with key partners both in the Netherlands and abroad.

Examples of international collaboration include (more details in the programme):

- The Centre for Urban Systems and Environment: a collaboration between TU Delft and South China University of Technology, Guangzhou. It is funded by both universities and involves eight Urbanism staff (Dubrowski, He, Lei, Nadin, Stead, Tai, van Dorst).
- The International Forum on Urbanism (IFOU): it was established by Rosemann (a former professor at TU Delft) and continues to provide opportunities for Urbanism staff and PhD candidates to collaborate with key partners in Asia (Bekkering, Bruyns, Calabrese).
- Urban Knowledge Network Asia: spans China, India, Europe and the USA, and enables extensive research exchanges. Funded by the EU IRSES programme.

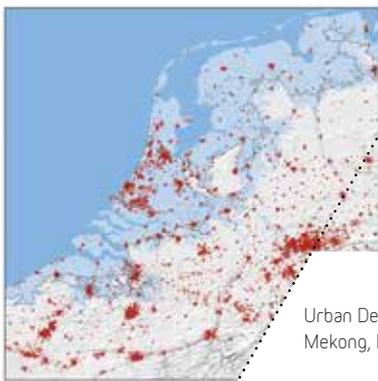
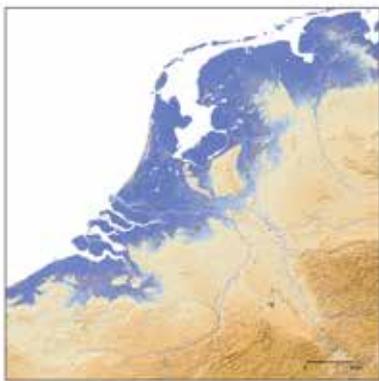
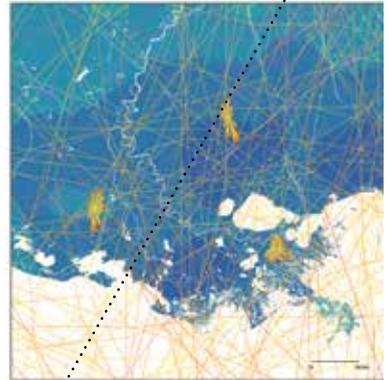
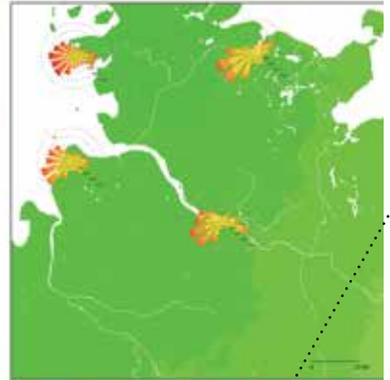
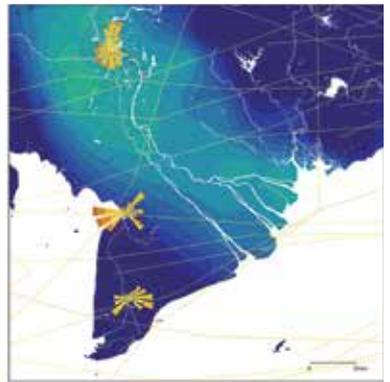
- The Salzburg Congress on Urban Planning and Development: brings together leading international experts from North America, Europe and the Middle East to debate critical issues (Rocco, Nadin).
- The New York Rebuild-by-Design initiative: promotes resilience post-hurricane Sandy through innovative planning and design (Meyer, van Veelen & Nillesen).
- The EU Cost Action MOVE: seeks to improve methods for extracting and using data on moving objects (van Spek).
- Greater New Orleans Urban Water Plan (2012-2013). Commissioned by Greater New Orleans Inc. Consortium: Waggonner&Ball Architects (lead), Arcadis Engineers, Bosch&Slabbers Landscape Architects, H+N+S Landscape Architects, Palmbout Urban Landscapes, Manning Architects, Tulane University, TU Delft, City of Rotterdam, City of Amsterdam.
- the Salzburg Congress on Urban Planning and Development which brings together leading international experts from North America, Europe and the Middle East to debate critical issues (Rocco, Nadin);
- the New York Rebuild-by-Design initiative promotes resilience Post-Sandy through innovative planning & design (Meyer, van Veelen & Nillesen);
- the EU Cost Action MOVE which seeks to improve methods for extracting and using data about moving objects (van der Spek);
- Examples of strong collaboration in the Netherlands include
- the alliance with Wageningen University through its Centre for Geo-information on the application of GIS in visual landscape research (Nijhuis); and its Landscape Architecture Group on design-related research methodology;
- contributions to the university level alliance with Leiden University and Erasmus University, Rotterdam, for example in consort with the Leiden Institute of Environmental Sciences and Social Psychology on urban biodiversity; and the new Centre for Global Heritage and Development, established in 2013.
- The Urbanism Programme is also deeply engaged with partners within TU Delft, particularly in the Department RMIT on history and design in the built environment, the Berlage Centre for Advanced Architectural Studies, and the Faculties of Technology, Policy and Management, Civil Engineering and Industrial Design.

Examples of strong collaboration in the Netherlands include:

- The alliance with Wageningen University through its Centre for Geo-information on the application of GIS in visual landscape research (Nijhuis), and its Landscape Architecture Group on design-related research methodology.
- Contributions to the alliance with Leiden University and Erasmus University Rotterdam, for example in association with the Leiden Institute of Environmental Sciences and Social Psychology on urban biodiversity; and the new Centre for Global Heritage and Development, established in 2013.
- The Urbanism programme is also deeply engaged with partners within TU Delft, particularly in the department of RMIT on history and design in the built environment, the Berlage Centre for Advanced Architectural Studies, and the faculties of Technology, Policy and Management, Civil Engineering and Industrial Design. India, Europe and the US and enables extensive research exchanges;

### 3.4 Guests

Among the many national and international guests hosted by Urbanism, special mention should be made of Juval Portugali, Professor of Human Geography at Tel Aviv University, who was recently selected to give a lecture in the prestigious 'Decade of Planning' series sponsored by IFHP-AESOP.



Urban Delta's:  
Mekong, Elbe, Mississippi & Rhine.



## Academic reputation

### Invitations to address major conferences

YEAR	CONFERENCE	WHO	WHERE
2010	International Conference on Sustainable Cities	van Timmeren	Wageningen NL
2010	International Conference Deltas in Times of Climate Change	Meyer, Nijhuis	Rotterdam NL
2010	Conference American Planning Association on Delta-Urbanism	Meyer	New Orleans US
2011	Osaka Seminar on Cultural Landscapes	Luiten	Osaka JP
2011	Scales of Nature, 49th IFLA World Congress	Sijmons	Zürich CH
2011	IASDR, 4th World Conference on Design Research	Nijhuis, Bobbink & Jauslin	Delft NL
2011	Landscape Infrastructure Symposium, Harvard Graduate School of Design	Sijmons	Cambridge US
2012	International Conference on Future Facades	van Timmeren	Bath UK
2012	Salzburg Conference on Planning and Development	Rocco	Prague CZ
2012	International Symposium on Spatial Planning, National Chengchi University	Nadin	Taipei TW
2012	3rd Congress Cities of People	Fernández Maldonado	Rio de Janeiro BR
2012	Int Forum on Use of Underground Space as a Public Policy Tool for Sustainable Urbanisation	van der Hoeven	St Petersburg RU

### Conference organisation activities

YEAR	CONFERENCE	ROLE	WHO	WHERE
2011	Diversity in Urbanism: AESOP Young Academics Conference	Organisation	PhD group	Delft NL
2012	Regional Studies Association Conference, Networked regions and cities in times of fragmentation	Joint organisation with OTB	Zonneveld, Fernandez Maldonado & Stead	Delft NL
2012	International Colloquium Exploring the Visual Landscape	Organisation	Nijhuis, van Lammeren	Delft NL
2012	Knowledge conference for the Delta Programme 2012	Joint organisation with other uni's	Hooimeijer	Delft NL
2012	International Colloquium Exploring the Visual Landscape	Organisation	Nijhuis, van Lammeren	Delft NL
2012	New Urban Configurations, International Seminar on Urban Form	Joint organisation with Architecture		Delft NL
2012	Urbanism on Track, 2012 : international workshop as part of 'Future Research Directions in MOVEMENT' conference	Organisation	van der Spek	Delft NL

### Involvement in scientific or professional events and exhibitions

YEAR	EVENT	ROLE	WHO	WHERE
2010	No Man's Land: The Island Maker, London Festival of Architecture	Exhibitor	Salij	London UK
2011	Vertical Village Exhibition	Curator	Why Factory	Taipei TW Soeul KR
2012	Porous City: Exhibition and Debate: Hong Kong Business of Design Week	Curator	Salij, Maas	Hong Kong HK Delft NL
2012	Venice Architecture Biennale	Exhibitor	Why Factory	Venice IT

## Prizes, awards, competitions

YEAR	PRIZES, AWARDS, COMPETITIONS	ISSUER	WHO	WHERE
2011	Cote Sauvage, construction and refurbishment of a public open bath at the lake, Sierre, 1st prize.		Jauslin & others	Cote Sauvage FR
2011	National Order of the Legion of Honour	The President of France	Maas	The Hague NL
2011	National Indonesian Institute of Architects Award	National Indonesian Institute of Architects	Suryawinata	Jakarta ID
2012	Highly recommended paper	AESOP Young Acad	Rongwiryaphanich	Reading UK
2012	Dissertation Fellowships	Chiang Ching-kuo Foundation for Int Scholarly Exchange	Lu & Huang	Taipei TW
2012	Sustainability and Humanity in the Built Environment	Zumtobel Group	Hackauf, Haikola & Rivas	Berlin DE
2012	Award for Marketing + Architektur	Raiffeisenbank	Jauslin & others	Zürich CH

## Evaluator of research programme

YEAR	PROGRAMME	ROLE	WHO	WHERE
2010	Architecture, Urbanism and Planning education programmes at the Universities of Leuven and Gent	Reviewer	Sijmons	Leuven BE
2010	NWO, Vidi Social Sciences (M&GW)	Member of committee	Zonneveld	The Hague NL
2011	Luxembourg National Research Funds	Panel member	Nadin	Luxembourg LU
2012	Foundation for Science and Technology, FCT evaluation of project proposals for national funding	External reviewer	Tisma	Lisbon PT

## Editorship academic serial

YEAR	JOURNAL	ROLE	WHO	WHERE
1984/>	Planning Practice and Research (Routledge)	Editor-in-Chief	Nadin	Oxford UK
2004	Design/Science/Planning (Techné Press) series	Editor	Klaasen	Amsterdam NL
2003/>	Journal of Design Research	Editor	Klaasen	Olney UK UK
2010/>	Research in Urbanism Series	Editor	Nijhuis, van der Hoeven	Amsterdam NL
2010	L'Architecture d'Aujourd'hui #378	Guest Editor & Author	MVRDV, The Why Factory	Paris FR
2003/>	OASE Foundation (Architecture Journal) (1992-now) bilingual Dutch-English	Chair	Sijmons	Rotterdam NL
2010/>	European Journal of Spatial Development,	Co-Editor-in-Chief	Zonneveld	Stockholm SE
2012	Built Environment	Guest Editor	Caliskan	Marcham UK
2012	SPOOL: Journal of Architecture and the Built Environment	Editor	van der Velde, Tisma, van der Hoeven	Delft NL

## Role in practice and policy making

YEAR	FIRM/ORGANISATION	ROLE	WHO	WHERE
2010	Beleidsregels voor ontwikkelingen met ruimtelijke kwaliteit, Provincie Noord-Holland	Advisor	Nijhuis	Haarlem NL
2010	Public open space provision in dispersed urban areas: case Rotterdam Stadsregio	Advisor	Velde, Wilbers	Rotterdam NL
2011-13	New Orleans Urban Water Plan	Advisor	Meyer	Woerden NL
2012/>	Raad voor de leefomgeving en infrastructuur	Member	Vanstiphout	The Hague NL
2012/>	College van Rijksadviseurs	National advisor	Luiten	The Hague NL

### 5.1 Societal/scientific quality and relevance of the research

The quality of the urban environment is a determining factor in the social, economic and environmental performance of societies, and the quality of life of their citizens. Practice in urbanism has a huge part to play in the quality of places, often allocating great advantages to some and costs to others. Our agenda for research in urbanism is strongly influenced by these concerns. We recognize that patterns of physical urban development are critical to the objectives of economic competitiveness, sustainability and social cohesion. Both basic and applied research will have implications for the knowledge that can contribute to more fair and sustainable development.

The design of the Urbanism programme, and particularly the content of the cross-cutting themes, has taken these questions into account whilst also seeking to align with current and potential future key scientific questions in the field. For example, the emerging urban metabolism theme is concerned with the performance of elements of the city-region infrastructure in relation to the environmental sustainability and social wellbeing of cities. It addresses questions that are both socially relevant and at the forefront of academic debate.

Other themes and research activities in the Urbanism programme seek to blend societal and scientific relevance in innovative ways, such as

projects on the impact of climate change on urban and rural development, urban containment and dispersal, the wellbeing of people in the built environment, accessibility to services, the quality of landscape and public places, and the effectiveness of tools for design and planning

International research is under way on urgent questions regarding the social and economic impacts of rapid urbanization, and the planning and design of cities that face more extreme environmental, economic and political shocks. For example, research on urbanizing deltas addresses critical questions of urbanization in vulnerable locations that affect the lives of millions of people (Meyer and others). The international comparative work on spatial planning, provides a starting point for regions to understand how methods of intervention in urbanism could be re-formed to favour more equitable and sustainable development (Nadin and others). Other examples include the way that advanced tracking technologies are being used to investigate urban designs in order to improve the pedestrian experience (Spek and others); space syntax methodology has been applied to understanding neighbourhood security and archaeological remains (Nes); and a combination of quantitative, qualitative and mapping methods is informing strategies to improve the resilience of cities to climate change (Ronwiryaphanich, Lu, Lin, Esch and others).

### 5.2 Key indicators

Strong evidence of the recognition of the social relevance of our research can be found in sponsors, funding bodies and project partners, such as success in winning projects under the EU and national programmes that involve civil society as partners, sponsors and funding bodies for staff, PhD candidates and projects. Income for client-led research has come from social actors who are prepared to pay for the work – evidence of the importance they assign to this research.

Central to the notion of 'social relevance' is communicating results to policymakers and lay audiences. We seek to continue to balance our research outputs so as to respect both scientific publication intended for the academic community, and publications and products that are intended to influence professional, policy and lay communities. Ensuring social relevance also means that staff are active in professional communities and the public domain.

The chair of Politics and Design and the Why Factory have specific roles in relation to the societal relevance of our research in raising awareness, investigating, providing information and challenging accepted wisdom and practices in urbanism. Public lectures and debates are central, for example participation in the Working Village debate at the Architectural Association (AA) in 2013 by Vanstiphout on the notion of a radical entrepreneurial village. The Why Factory publishes the Future Cities series of books envisioning alternative urban futures alongside popular public exhibitions and media that attract wide publicity at home and abroad.

Since well before the last assessment, the research programme has been emphasizing that the underpinning of all our research and teaching should be a core of high quality, rigorous peer-review outputs that have a significant effect in international academic communities.

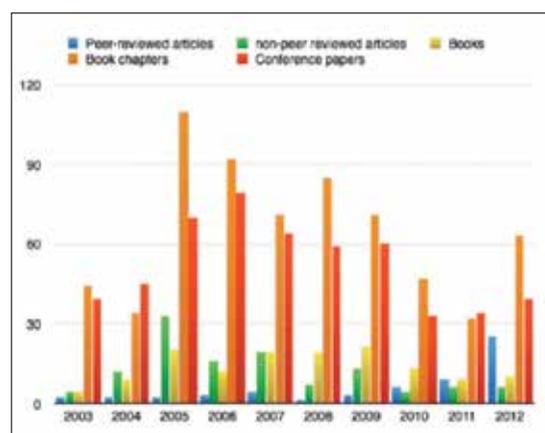


Figure 2 Publication outputs of the Urbanism Programme 2003-12

That policy, and the actions taken to deliver it, have produced a dramatic turnaround in outputs as shown in Fig. 2.

The list of publications since 2009 demonstrates a very significant increase in the number of higher quality publications. The Urbanism programme also has a very positive role in journal editorship, as listed in section 4. Guest editorships are being used to introduce more staff to high-level academic publishing. However, we recognize that there is still significant progress to be made before we have an average of one high quality academic journal article per year per member of research staff - and a proportion that achieve the highest international academic recognition as measured through citations and downloads.

Table a. Main categories of research output

	2010		2011		2012	
	STAFF	GUESTS	STAFF	GUESTS	STAFF	GUESTS
Refereed articles	6	0	9	0	24	1
Non-refereed articles	4	0	1	5	2	4
Books	12	1	9	0	9	1
Book chapters	36	11	31	1	57	6
PhD theses	1	0	6	0	3	4
Conference papers	22	11	26	8	37	2
Professional publications	27	1	20	3	33	2
Editorships journals/book	7	3	8	0	13	1
<b>TOTAL PUBLICATIONS</b>	<b>114</b>	<b>27</b>	<b>109</b>	<b>17</b>	<b>178</b>	<b>21</b>

## 5.3 Results and outputs

### KEY PROJECTS

#### NODES

##### Programme

##### *New tOols for Design and OpEration of Urban Transport InterchangeS*

###### EU FP7

Grant: € 145.764

Role: partner

Principal Researcher: Frank van der Hoeven

Coordinator: UITP International Association of Public Transport

Duration: 9/2012 to 9/2015

Interchanges play a key role in the integration of the urban mobility system and in enabling good intermodal solutions. Their efficiency and sustainability is therefore essential to achieve sustainable transport objectives in Europe. NODES will build a toolbox to support European cities in the design and operation of new or upgraded interchanges, as a way to provide greater support, services and satisfaction to the travelers and users, as

well as to interchange operators and those societal and economic actors depending on the efficiency of interchange operations. Five key areas are considered: Land use & Infrastructure, Design, Intermodality & ICT, Management and Business models, Energy & Environment. NODES brings together 17 partners representing local government administrations, public transport operators, research centres and consultants and European associations.

##### Programme

#### IPDD

##### *Integrated Planning and Design in the Delta*

###### NWO and FES funds

Grant: € 241.339

Role: coordinator

Principal Researcher: Han Meyer

Duration: 09/2011 to 09/2013

Delta regions are worldwide developing in high speed. There is a need to manage and balance values as safety, ecological quality, freshwater supply and the growing demands of cities such as the expansion of infrastructure and economic activities. The research focus of this project, called 'Integrated Planning and Design in the Delta' (IPDD), is the 'Zuidwestelijke Delta of

the Rijn, Maas and Schelde', located in The Netherlands. IPDD is part of a larger research program, called 'Urban Regions in the Delta' (URD). The main goal is to contribute to the state of knowledge about sustainable and integrated development of regions that are confronted with the complex challenge of intensively combining different land uses and functions.

##### Programme

#### BETTER AIRPORT REGIONS

##### *Models and Development Pathways for Sustainable Urban Transformation*

###### NWO - Urban Regions in the Delta

Grant: € 900.000

Role: coordinator

Principal Researcher: Arjan van Timmeren & Andy van den Dobbelen

Duration: 2012 to 2014

Airports are often situated near towns and cities and significantly stimulate further urbanisation in the surrounding region. 'Better Airport Regions' looks at the urban regions surrounding international airport hubs and examines how airports could contribute to more sustainability, resilience and flexibility in major urban regions. The

project aims to develop guidelines for the integration of airports and urbanised areas and for the transformation of current airport regions. 'Better Airport Regions' is specifically examining the cycles (energy, water, food and traffic), urban development and management of the airport regions of Schiphol and Zürich.

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## Programme

ESPON-European Observation Network for Territorial Development and Cohesion  
Grant: € 749.849  
Role: partner (for € 167.000)  
Principal researcher: Dominic Stead  
Coordinator: NORDREGIO, Stockholm  
Duration: 2011-2014

### TANGO

#### *Territorial Approaches for New Governance*

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The project focuses on how territorial development is organised and managed across Europe's member states. It provides an overview of recent trends as well as detailed examples of territorial governance from a multi-level, a multi-sector and a multi-actor approach. The research considers the potential role of spatial planning instruments and other instruments in supporting good

territorial governance. A typology of current territorial governance practices in Europe is also developed (coordinated by the TUDelft team). One of the outputs of the project is a handbook for policy officials which draws lessons from the in-depth case studies undertaken in the project..

## Programme

EU FP7  
Grant: € 30.000  
Role: partner  
Principal Researcher: Dominic Stead  
Coordinator: Austrian Institute for Regional Studies and Spatial Planning (ÖIR)  
Duration: 11/2008 to 11/2011

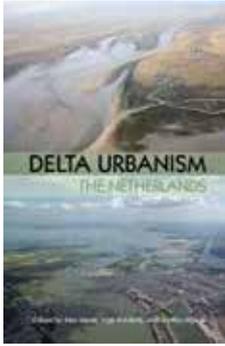
### SUME

#### *Sustainable Urban Metabolism for Europe*

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Urban development is running environmental risks, consuming huge amounts of resources and putting strains on the environmental system. Sustainable Urban Metabolism for Europe (SUME) is focusing on the way how future urban systems can be designed to be consistently less damaging to the environment than in the present. The concept of urban metabolism helps to understand and analyse the way how (urban) societies use resources of the environmental system such as energy and land for maintaining and reproducing themselves. Based on the urban metabolism approach, the flows of resources, energy and waste maintaining the urban

system are explored. The built environment as the stock of the urban system is using a substantial portion of flows being built. Moreover, the spatial qualities of built urban systems - the "urban forms" - have an impact on the qualities and quantities of resources needed to maintain them subsequently. The SUME project will analyse the impacts of existing urban forms on resource use and estimate the future potential to transform urban building and spatial structures in order to significantly reduce resource and energy consumption, thereby taking into account differences in urban development dynamics.



Year: 2010

Publisher: Technepress

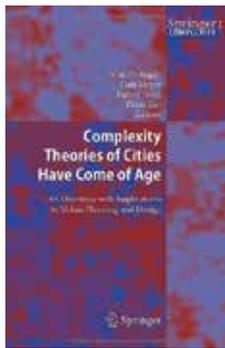
Pages: 208

### DELTA URBANISM: THE NETHERLANDS

*Han Meyer, Steffen Nijhuis & Inge Bobbink (eds.)*

Delta Urbanism gives an in-depth look to a country that has grappled for centuries with the crises that confront coastal cities worldwide. Delta Urbanism is published by the American Planning Association and imported and distributed in Europe by Techne Press. Delta Urbanism is part of the series Delta Urbanism, exploring the growth, development, and management of deltaic cities, toward

balancing various and often competing goals in a sustainable manner: urbanization, port commerce, industrial development, flood defense, public safety, ecology, tourism, and recreation. Delta Urbanism contemplates the policies, tools, technology, coordinated planning, public outreach, and international cooperation—both current and emerging—needed to save deltaic cities.



Year: 2012

Publisher: Springer

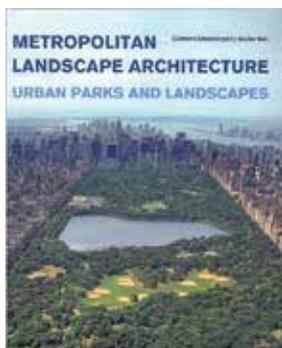
Pages: 433

### COMPLEXITY THEORIES OF CITIES HAVE COME OF AGE: AN OVERVIEW WITH IMPLICATIONS TO URBAN PLANNING AND DESIGN

*Juval Portugali, Han Meyer, Egbert Stolk & Ekim Tan (eds.)*

The city represents the accretion and accumulation of successive layers of collective activity, structuring and being structured by other, increasingly distant cities, reaching now right around the globe. This historical and structural development cannot therefore be understood or captured by any set of fixed quantitative relations. Structural changes imply that the patterns of growth, and their underlying reasons change over time, and therefore that any attempt

to control the morphology of cities and their patterns of flow by means of planning and design, must be dynamical, based on the mechanisms that drive the changes occurring at a given moment. This carefully edited post-proceedings volume gathers a snapshot view by leading researchers in field, of current complexity theories of cities. In it, the achievements, criticisms and potentials yet to be realized are reviewed and the implications to planning and urban design are assessed.



Year 2011

Publisher THOTH

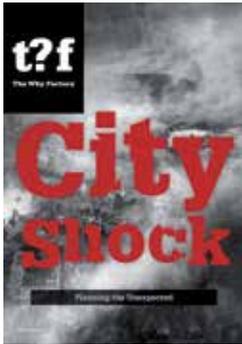
Pages 448

### METROPOLITAN LANDSCAPE ARCHITECTURE: URBAN PARKS AND LANDSCAPES

*Clemens Steenbergen, Wouter Reh*

The city does not exist without landscape, nor landscape without the city. The original landscape is always reflected in the form of the city. But how is architectonic coherence between the city and the landscape really achieved? This book sketches the development of the urban landscape from the Renaissance to the present. The examples include urban landscapes and parks in Rome,

Paris, London, Berlin, New York, Amsterdam, Barcelona, Boston, Hamburg, Frankfurt and Cologne. Here, for the first time, the architecture of the urban landscape is the subject of a systematic, visual study, with more than 450 drawings, maps and illustrations. This opens up a new, fascinating perspective on the role of landscape in shaping the metropolis today.



Year: 2012

Publisher: nai010 uitgevers

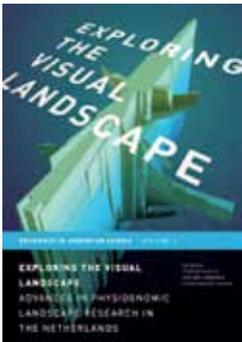
Pages: 296

## CITY SHOCK. PLANNING THE UNEXPECTED

*Winy Maas, Felix Madrazo Salazar, Pablo Roquero & Jeronimo Mejia*

In a world of seemingly ever-increasing instability, many urban planning decisions seem to be governed not by vision, but by fear--fear of disaster, of change, of the unknown. What can we learn from this state of affairs? Can such fear be made beneficial? Is it conceivable that 'fear' might even offer a kind of guide in matters of urban planning? Guided by fantasy and invention rather than science, *City Shock: Planning the Unexpected*

proposes ten 'what if' scenarios, imagining how each of these scenarios could play out in the Dutch landscape between 2018 and 2047. In a narrative composed of feasible but unlikely headlines, a series of newspaper-style spreads report on fictitious future catastrophic events, exposing possible causes and consequences.



Year: 2011

Publisher: IOS Press

Pages: 336

## EXPLORING THE VISUAL LANDSCAPE: ADVANCES IN PHYSIOGNOMIC LANDSCAPE RESEARCH IN THE NETHERLANDS

*Steffen Nijhuis, Ron van Lammeren & Frank van Der Hoeven*

*Exploring the Visual Landscape* is about the combination of landscape research and planning, visual perception and Geographic Information Science. It showcases possible ways of getting a grip on themes like: landscape openness, cluttering of the rural landscape, high-rise buildings in relation to cityscape, historic landscapes and motorway panoramas. It offers clues for visual landscape assessment of spaces in cities, parks and rural areas. In that respect, it extends the long tradition in the Netherlands on physiognomic landscape research and shows the state of the art at this moment.

*Exploring the Visual Landscape* offers important clues for theory, methodology and application in research and development of landscapes all over the world, from a specifically Dutch academic context. It provides a wide range of insights into the psychological background of landscape perception, the technical considerations of geomatics and methodology in landscape architecture, urban planning and design. Furthermore, there are some experiences worthwhile considering, which demonstrate how this research can be applied in the practice of landscape policy making.

### POLYCENTRIC STRUCTURES IN LATIN AMERICAN METROPOLITAN AREAS: IDENTIFYING EMPLOYMENT SUB-CENTRES

*Ana MarÍa Fernández-Maldonado, Arie Romein, Otto Verkoren & Renata Parente Paula Pessoa*

#### Publication Info

Year: 2013  
In: *Regional Studies*,  
Published online: 03 May 2013  
Cited by: unknown

The significant spatial transformations that have occurred within Latin American metropolitan areas since the 1990s have triggered many local studies claiming the formation of polycentric structures. This study explores the extent of that process, identifying sub-centres of employment using the double threshold methodology of job concentration and employment density in Mexico City (Mexico), Lima (Peru) and

Fortaleza (Brazil). The results, although partial due to an absence of data on informal employment, indicate that Latin American metropolises are moving towards polycentric structures. But the identified employment sub-centres are mostly located in or near the metropolitan core, which practically excludes the formation of polycentric nodes in the metropolitan periphery.

### URBAN DESIGN IN A DYNAMIC DELTA

*Han Meyer*

#### Publication Info

Year: 2012  
In: *Urban Design and Planning*,  
165 (2), 89 -101  
Cited by: 1

In the Dutch policy concerning flood control and water management, 'hard core' civil engineering approaches are substituted by approaches which emphasize resilience and working with nature. The 'working with nature' approach has been applied predominantly in rural areas while in the urbanised western part of the country a more traditional combination of 'hard core' hydraulic engineering and urban planning seems to be the best option. This is an obstacle for a

comprehensive vision of the future of complex urban delta regions. This paper describes the Rotterdam region as an urbanised delta region 'par excellence' and discusses the peaceful coexistence of two different approaches. A perspective to combine both approaches in one method which enables engineers, designers and politicians to balance different options for combinations of urban development and water management is shown.

### DEVELOPING ROTTERDAM'S SKYLINE

*Frank van der Hoeven, Steffen Nijhuis*

#### Publication Info

Year: 2012  
In: *CTBUH Journal*, 2, 32-37  
Cited by: unknown

The planning and construction of tall buildings is often controversial, polarizing the public debate on architecture and urban life. In many cases the emotional discourse focuses on aesthetics and view corridors, more than city planning or economics. This paper introduces a framework that analyzes the visual impact a developing skyline has on a city and its surrounding region, using Rotterdam as a case study. By studying the

height and completion year, identifying the tall building cluster as it is perceived visually and conducting a GISc-based visibility analysis, the framework provides context to tall building designs. The results make the assessment of individual projects more scientific and balanced, removing many of the emotional elements that often enter into the discussions.

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## OPENING UP THE COMPENDIUM: AN EVALUATION OF INTERNATIONAL COMPARATIVE PLANNING RESEARCH METHODOLOGIES

*Vincent Nadin, Dominic Stead*

### Publication Info

Year: 2012

In: *European Planning Studies*,

Published online: 26 Sep 2012

Cited by: unknown

It is two decades since the European Compendium of Spatial Planning Systems and Policies was conceived. Since its publication in 1997, it has become a widely cited reference in comparative planning literature, and remains one of the few comprehensive reviews of spatial planning policy and practice across western Europe. It also represents one of the few studies to develop a typology for distinguishing between national planning systems. A number of comparative research studies on spatial planning have since built on the methodological foundations laid by the Compendium although its typology of national planning systems is not always

used or interpreted as originally intended for a variety of reasons. In the context of extensive reform of planning approaches in Europe, the paper examines what can be learned about methodologies for international comparative research in planning based on the experience of the Compendium study and subsequent major comparative planning studies. We conclude that while broad typologies remain useful in explaining general trends, they may hide as much as they reveal. Future studies should widen the criteria used to build ideal types beyond formal characteristics in order to address planning in practice.

## ICT-ORIENTED URBAN PLANNING STRATEGIES: A CASE STUDY OF TAIPEI CITY, TAIWAN

*Wei-Ju Huang*

### Publication Info

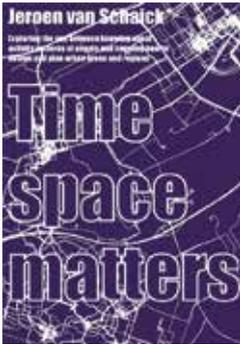
Year: 2012

In: *Journal of Urban Technology*,  
19(3), 41-61

Cited by: unknown

With the development of wireless technology and its infrastructure networks, information and communication technologies have become widely and deeply embedded in our daily lives. Technological and socioeconomic trends are gradually changing the concept of ICT-oriented urban planning strategies from the virtual city to the ubiquitous city. Many studies have tried to map the relationship between urban planning and ICT strategies, but how the means of implementation influence the outcomes of such strategies is lacking discussion. This study aims to establish

an analytical framework for exploring the relationship between the means of implementation and the outcomes of such strategies. The ICT-oriented urban planning experience of Taipei City is used to test the limitations and application of the framework. The study finds that technological trends, physical infrastructure, ICT content, interface design, and user characteristics are key factors that subtly interrelate with each other and should be considered integral when initiating such strategies.



*Year:* 2011  
*Publisher:* Eburon  
*Pages:* 280

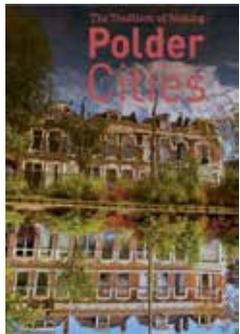
### TIMESPACE MATTERS: EXPLORING THE GAP BETWEEN KNOWING ABOUT ACTIVITY PATTERNS OF PEOPLE AND KNOWING HOW TO DESIGN AND PLAN URBAN AREAS AND REGIONS

*Jeroen van Schaick*

It is important to know about peoples' temporospatial activity patterns when making urban and regional designs and plans. Despite wide acknowledgment of this idea, knowledge about people's activity patterns does not get full attention in day-to-day practice of urban and regional design and planning. This book makes the case that, with activity patterns of people changing nowadays, this subject deserves full attention within the domain of urban and regional design and planning. Understanding how the societal organisation of time relates to the societal organisation of

space is key to answering the questions put to designers and planners about the future development of cities and urban regions.

'Timespace matters' contains a detailed analysis of two promising approaches of putting time in the picture of urban and regional design and planning: the use of tracking technologies such as GPS and the times-of-the-city approach developed in Italy, Germany and France. It explores the borders between the domains of social geography and of urban and regional design and planning..



*Year:* 2011  
*Publisher:* TNO  
*Pages:* 371

### THE TRADITION OF MAKING: POLDER CITIES

*Fransje Hooimeijer*

Climate change brings larger and more frequent rainstorms and Dutch cities are confronted with water nuisance. The urban water systems are unable to deal with this change in the hydrological cycle in spite of the fact that the Dutch are dealing with this condition for centuries. The question is: What is the tradition of building in wet and soft soil conditions? There is a lack of systematic research into this matter and a base for future development is missing. This research fills this gap for the tasks in the polder. A framework of seven phases offers insight into the relation between

the landscape, the available technology and urbanization per phase. It becomes clear that until the Industrial Revolution the "making" was at the base for the city "shape". Since technology makes everything possible the "shape" is starting point made possible by technology and completely disconnected from the natural system of the landscape. The method of building-site preparation is crucial in the way the urban design is connected to the landscape as carrier of the hydrological system.



**Year:** 2011  
**Publisher:** IFOU  
**Pages:** 241

## CHANGING CENTRALITIES UNDER URBAN CONFIGURATIONAL SCALE STRUCTURE

*Qiang Sheng*

This thesis is a morphological research on Beijing's urban centers of different scales. Based on the rapid economical/social/spatial changes happened in last decades, this thesis aims to find how changes in movement patterns affect the location of shops, particularly food shops and markets in Beijing, contributing to the question of the quality of public space in urban areas by noting

down the changes in distribution of these basic amenities consequent on mobility and redevelopment in a rapidly changing urban context. It intended to illustrate the spatial logic for the evolution of the movement network as 'scale-structure' itself and how it affects the emergence of urban centres which is a crucial factor for the quality of public space and urban life.



**Year:** 2012  
**Publisher:** TU Delft  
**Pages:** 440

## CITYMAKER. DESIGNING GRAMMARS FOR URBAN DESIGN

*José Beirão*

This thesis is aimed at two different types of readers: those interested in shape grammars and those interested in urban design. The former will find extensive and detailed concepts that address (urban) design synthesis using shape grammars for design exploration. The latter will find the conceptual basis for the development of generative design tools for urban design. It encompasses a design method using design tools based

on shape and description grammars as the generative formalism. The research was developed within the framework of a research project called City Induction (Duarte et al., 2012). The goal of the project is the integration of design support tools to formulate, generate and evaluate urban designs.



**Year:** 2012  
**Publisher:** TU Delft  
**Pages:** 352

## THE ROOTS OF THE RANDSTAD (DE WORTELS VAN DE RANDSTAD)

*Nikki Brand*

The Roots of the Randstad concerns the origins of the polycentric nature of contemporary cities in the western area of the Netherlands, commonly known as 'the Randstad'. Within the disciplines of planning and urban design the Randstad is considered a textbook example of a polycentric urban hierarchy. Yet, very little is actually known about the driving forces that have given shape to existing urban

hierarchies throughout the world. Moreover, the Randstad has also been dubbed 'Holland's paradox' because of its assumed reversed evolution from a primate city hierarchy focused on Amsterdam in early modern times, to a polycentric hierarchy in the 19th century. Why do urban hierarchies change over time and which factors were decisive for the rise of the polycentric Randstad?

### THE 5TH AESOP YOUNG ACADEMICS MEETING

*Diversity in Urbanism: Learning Across Cultures and Disciplines*

#### Info

*Date:* 2011, February 16-18  
*Place:* Delft

The meeting is an annual event organised by the Association of European Schools of Planning (AESOP) Young Academics (YA) Network. It aims to bring together young planning scholars, who have just recently entered the academic world, and to provide a forum to debate and reflect upon their ideas with experienced researchers. Each year the meeting focuses on different issues

and challenges related to contemporary planning. This meeting focused on the issue of Diversity in Urbanism: Learning Across Cultures and Disciplines and consisted of three tracks: Cross-national Studies, Resilience Thinking and Climate Change, and Citizen and Community Engagement in Urban and Rural Development.

### URBANISM ON TRACK 2012 (MOVE)

*Application of Tracking technologies in Urban Design*

#### Info

*Date:* 2012, March 13-14  
*Place:* Delft

The aim of this workshop/seminar was to exchange knowledge on processing, visualisation and interpretation of GPS-tracking data. Central issue of the workshop is the preparation of the data for application in Urban Design: from raw spatio-temporal data to accessible and valuable information. A dataset consisting of spatio-temporal data

of households in the City of Rotterdam will be provided. In April/May 2011 about fifty people living in high-rise buildings in the Centre of Rotterdam were tracked for one week using GPS. Additionally, a questionnaire was taken. Participants of the workshop received this data package.

### COLLOQUIUM EXPLORING THE VISUAL LANDSCAPE

#### Info

*Date:* 2012, March 22  
*Place:* Delft

A colloquium about the combination of landscape research, planning and design, visual perception and Geographic Information Science. During the colloquium renowned scholars and young talented researchers will address theory, methodology and application of visual landscape research in the rural and urban realm. The various contributions

provide a wide range of insights into the psychological background of landscape perception, the technical considerations of geomatics, and methodology in landscape architecture, urban planning and design. Furthermore some speakers will discuss applications in the practice of landscape policy making.

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## REGIONAL STUDIES ASSOCIATION (RSA) EUROPEAN CONFERENCE

*Networked Regions and Cities in Times of Fragmentation: Developing Smart, Sustainable and Inclusive Places'*

### Info

Date: 2012, May 13-16

Place: Delft

Regions and cities are increasingly interdependent; economically, socially and environmentally. Patterns of interactions between regions are experiencing rapid changes as a result of dramatic shifts in production and consumption patterns, advances in communication technologies and the development of transport infrastructure. These changes pose many challenges for the analysis and management of regions. At the same time, regions are becoming increasingly fragmented in many ways. Classic forms of

government based on clear-cut arrangements between administrative levels, policy sectors and the public and private domain are no longer sufficient. The result is a complex pattern of overlapping governance and fuzzy boundaries, not just in a territorial sense but also in terms of the role of both public and private actors. The 2012 RSA conference provided a opportunity for participants to come together and reflect on networked cities and regions within different contexts of fragmentation.

## INTERNATIONAL SEMINAR ON URBAN FORM (ISUF)

*New Urban Configurations*

### Info

Date: 2012, October 16-19

Place: Delft

In the age of globalization, cities can no longer be understood as autonomous identities but have to be regarded as parts of larger networks. Since the second half of the 1980s, this process of transformation accelerated: e.g. globalization of the market, further delocalization of production, the endless flow of people, information and goods worldwide. As a consequence of this new 'nomadic culture' the city structure changed. Due to the overwhelming increase of logistics, locations closer to regional and/or international hubs are preferred. The priority given to the perspective of time tends to reduce the traditional importance of space. But despite the initial 'end of the millennium' catastrophic perspective, which forecasted the falling of the city itself, huge metropolitan areas have been progressively increasing their institutional role, economic power and cultural attractiveness. However, the success of the wealthier cities and metropolitan areas in the world

exists thanks to less prosperous centers of production elsewhere. The enormous growth in transport infrastructure has increased mobility, but not for all. Both, availability of physical infrastructure and social inequality in mobility, result in specific patterns of concentration and dispersal of economic activities and social groups. Further, increased mobility might be impacted by the Hydrocarbon Twins, climate change and peak oil. Solutions for complementary and multiple connections, including walking, cycling, water links, railways, highways and airlines, offer the opportunity of new mobility patterns prompting unexpected spatial configurations including new concepts combining living and working, food production within cities, etc.

The conference addresses the abovementioned framework to specifically understand which kind of new urban configurations can arise from it. International Seminar on Urban Form (ISUF).



# Earning capacity

As explained in section 10, PhD studies are sponsored by many national and international organizations.

We are also attracting interest from very capable researchers, for example the programme has secured funding for a three-year postdoc researcher from the prestigious Urban Studies Foundation, Glasgow (Stead, Dabrowski). A feature of some projects is the combination of funding from different sources. For example, the Kustkwaliteit 2.0 project involves funding from the Delta Programme, the Ministry of Infrastructure and the Environment, three provinces and various other sources.

## 6.1 Success and vision on how to obtain research projects

Since 2008, the Urbanism group has made great progress in its capacity and competences in securing external funding for research. This is demonstrated in the figures for 2010-12 and by the range of bodies now funding work in the programme, including:

- Netherlands Organisation for Scientific Research (NWO)
- EU 7th Framework Programme
- European Spatial Observation Network (ESPON)
- Joint European Programme Initiatives (JPIs) in Heritage and Urban Europe
- The international Climate-KIC programme
- Various foundations, national ministries, provinces, municipalities, etc.

Prospects for earning capacity in the future are therefore good. However, we are not complacent. Three factors will be particularly important in future success: (1) improving the competences and track record of staff; (2) consolidating the research programme and preparation in teams; and (3) the motivation of staff.

Re (1) Collaboration with the Urban and Regional Studies group in OTB and the TU Delft Valorisation Centre has been very important in helping to improve capability in external funding matters and

**Table a. Research funding**

FUNDING	2010		2011		2012	
	K€	%	K€	%	K€	%
Direct funding	1.459	64%	1.465	51%	1.493	47%
External funding	823	36%	1.409	49%	1.702	53%
<i>Coverage Contribution</i>	155	-	243	-	512	-
<i>Results finished projects</i>	144	-	88	-	49	-
<i>Acquired project funds</i>	524	-	1.078	-	1.141	-
<b>TOTAL FUNDING</b>	<b>2.282</b>	<b>100%</b>	<b>2.874</b>	<b>100%</b>	<b>3.195</b>	<b>100%</b>
EXPENDITURE	K€	%	K€	%	K€	%
Staff costs	1.541	91%	1.456	91%	1.325	92%
Other costs	144	9%	146	9%	110	8%
<b>TOTAL EXPENDITURE</b>	<b>1.685</b>	<b>100%</b>	<b>1.602</b>	<b>100%</b>	<b>1.435</b>	<b>100%</b>
CHAIRS EXTERNALLY FUNDED	K€	%	K€	%	K€	%
Ontwerp & Politiek (AUT)	€ 100		€ 100		€ 100	

to develop a 'bidding culture'. We have asked some staff to concentrate on improving their publication record in order to assist with bidding.

Re (2) The Urbanism research programme should provide a focus to bring together our resources around specific questions. There is more work to be done here, especially to incorporate new members of staff. Preparation has already begun on the Horizon 2020 programme as a priority. We expect to be making extensive use of our growing research networks to build multidisciplinary teams so that we can access funding to support our programme in related research areas, such as 'security' and 'efficient energy'.

Re (3) Most important for the future is that we have experienced a surge in enthusiasm and motivation for externally funded research among staff, and a wider recognition of the benefits it can bring in terms of research focus, collaboration in networks, social relevance and scientific quality.

## **6.2 Overview of top-5 projects**

*Implementing Transit-Oriented Development (iTOD)*, funded by NWO (Stead, Poljani, Balz)

The project iTOD is identifying lessons for successfully developing and implementing a Transit-Oriented Development (TOD) strategy in the Amsterdam metropolitan region. The project is led by the University of Amsterdam and involves Radboud Nijmegen and TU Delft .

*Planning for Energy Efficient Cities (PLEEC)*, funded by EU 7th Framework (Read, Rocco and others)

PLEEC brings together academic and European city partners to learn how to improve energy efficiency by combining scientific knowledge and innovative best practice in a number of small cities. PLEEC aims to develop a more general model for energy efficiency and sustainable city planning. The project is led by Eskilstuna Energy & Miljö (Sweden) and involves partners from nine countries.

*Urbanism, Complexity and Cognition*, funded by KNAW, International New Towns Institute, the municipality of Rotterdam and Climate KIC (Portugali, Stolk, Forgaci, Mashoodi Tan)

The project uses urban simulation models to investigate the dynamic relations between the urban morphology and socioeconomic performance, strategies for urban development through serious gaming, and the complexity-cognitive view on urban design

*Territorial Approaches for New Governance (Tango)*, funded by ESPON (Stead, Wandl, Zonneveld and OTB)

Tango investigates how multilevel and cross-sector territorial governance is organized throughout Europe and the role of spatial planning tools in supporting good governance. The project is led by Nordregio and involves partners in six countries.

*New Tools for Design and Operation of Urban Transport Interchanges (Nodes)*, funded by the EU 7th Framework Programme (Hoeven)

Nodes will build a toolbox to support European cities in the design and operation of new or upgraded interchanges, and provide strategies for integrated land use planning with urban passenger infrastructure planning. The project is led by the Union Internationale des Transports Publics (UITP) and involves partners from nine countries.



# Valorisation

## 7.1 Means used to transfer knowledge

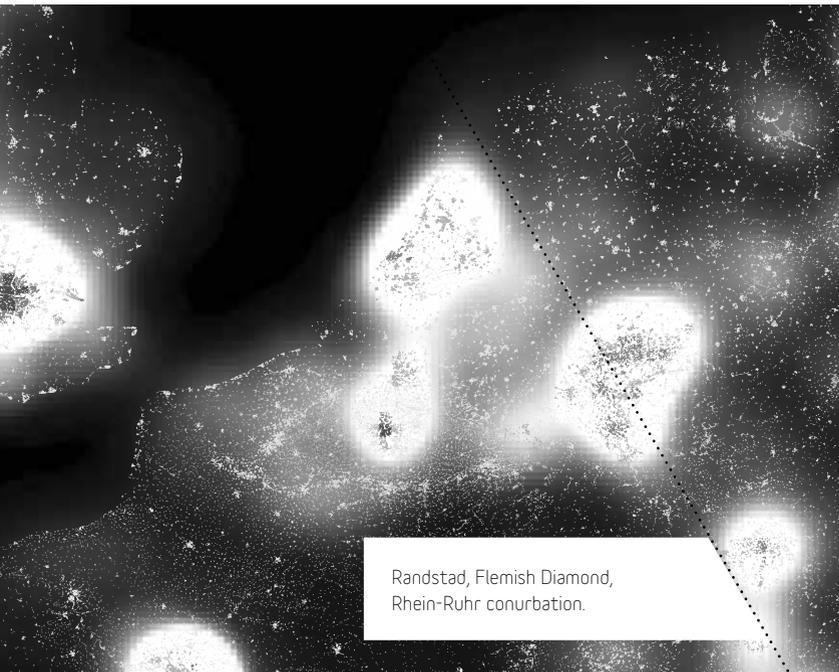
We valorize our research work (that is, add to its value) through publications, events, applied projects and education programmes. The group's publication approach was mentioned in section 5. The Urbanism programme has had a strong publication record for many years, but primarily this has been through books, book chapters and professional publications (with more than 100 books published in the seven years to 2009). We know that the majority of these publications have not contributed greatly to 'valorization' in academic circles.

Our policy to switch our attention to peer-review journals is having some success, in terms of both reaching the academic communities and the quality of outputs. We are also taking part in faculty initiatives to provide more open access publications, notably PhD dissertations, and this too has proved successful with a very large number of downloads; for example a recent PhD dissertation was downloaded more than 800 times in just a few weeks. Section 5 also gave a few examples of the events, advisory roles and other activities that we engage in to make use of, to widen access to, and to add value to our work.

## 7.2 Users of the knowledge

Section 5 gave some examples of how we connect with users, especially government and civil society. We are fortunate in having government institutions and civil society organizations that are keen to engage with the research agenda, to take part in discussions on research findings and to make use of them - and this applies to the minister downwards. Engagement with users is integrated into the way that research is conducted and thus adds value to our research.

The most important valorization activity is probably education, however, and the users are students and alumni. Many students come to TU Delft with a strong motivation to learn about the evaluation of practice and alternative approaches. Thus, Master's programmes in urbanism are 'research-led'. We ensure that the courses we provide are closely linked to the programme and to our track record. For example, the cross-cutting theme on urban deltas is reflected in a Master's studio on the same subject; the theme governance is central to the studio on 'complex cities'. We engage the students in our research work. This has the double effect of giving value to the research, which we know is then cascaded in many places by our alumni, and engaging students in the research enterprise.



Randstad, Flemish Diamond, Rhein-Ruhr conurbation.



## PhD research

### 8.1 Topics

During the previous review period, the Urbanism group expanded PhD research: it now has the largest group of PhD candidates and graduates in the faculty. However, in the context of poor completion rates, the accent since 2010 has been on consolidation, with a moratorium on additional recruitment and exceptions allowed only for new professors and where external funding has required a PhD candidate.

PhD candidates are organized within the cross-cutting research themes (as can be seen in the programme). A of the programme is improving through research theme activities. There is a good distribution of PhD candidates across the themes. Future PhD recruitment will be tied more closely to the programme and the priority topics and/or research questions it identifies.

### 8.2 Supervision

PhD candidates typically have a chief supervisor (promotor) and a day-to-day supervisor. In special cases, the school may assign a second supervisor. TU Delft provides training for supervisors and a number of our staff completed the training in the review period. The research leaders will discuss whether training should be mandatory for all supervisors.

Only a professor can supervise a PhD candidate and this is becoming a constraint on the number of candidates we can recruit. Some professors

already have a large number of candidates and much responsibility rests with the day-to-day supervisors. This issue has been brought to the attention of the university.

### 8.3 Success rates

The number of candidates increased from 12 in 2003 to 52 in 2009, and will increase to a projected 54 by the end of 2013. The current objective is to maintain PhD numbers at around this level but to widen the pool of supervisors. From 1999 to the end of 2013, 105 candidates will have started a PhD in Urbanism; 44 graduated and received their doctoral degrees; 21 withdrew from the programme and 54 will still be working towards their PhD.

Completion rates are poor – and this was a cause of concern for the 2010 research assessment panel. A comprehensive review of progress at the end of 2009 revealed that of the 52 candidates who were still doing research, 15 were having difficulties making progress. By the end of 2013, there will be a total of 54 candidates all but one of whom will have graduated by the end of 2016. Much effort has been applied to shifting the backlog of candidates, many of whom are members of staff. This has involved:

- More monitoring of performance by the executive committee and in meetings of all supervisors.
- Review of supervision arrangements for each candidate and changes made to ensure that they get adequate support.
- Bringing in Professor Eric de Jong from the University of Amsterdam to assist with completion of the landscape related PhD candidates.
- Taking a more definite line at the stage of the first-year review, requiring unambiguous evidence of good progress and a good likelihood of success.
- Providing targeted training in academic writing skills.

The Graduate School has introduced a new monitoring system for PhD candidates and a requirement for each PhD to earn 45 graduate school credits (equivalent to 8 hours of teaching, plus preparation and assessment) through competence development.

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#### **8.4 Resources**

The faculty has excellent study facilities in the university and faculty libraries, and special facilities such as computer hardware and software.

#### **8.5 Funding**

Since 2008, there has been a decline in the proportion of candidates on TU Delft salaries and a sharp increase in those funded by scholarships. Urbanism no longer funds PhD study from government funding. Many PhDs, almost wholly international, secure their funding in the form of grants from Nuffic, the China Scholarship Council, INTI, national governments and other sources. Other PhD candidates are recruited using funding from externally funded research projects,

particularly from NWO. Funding does not seem to be an issue but we do need to monitor the effect of the 'bench fee'.

#### **8.6 Attractiveness**

The Urbanism programme is very attractive to international PhD candidates and we receive many speculative enquiries each week from potential applicants, many of whom are well qualified and some of whom have already secured funding. As explained above, there are very limited opportunities. We propose that when recruitment resumes, we will be advertising the key topics and research questions on the web and inviting competitive applications. The European Post-master in Urbanism (EMU) provides a pre-PhD track for exceptional students who may graduate from EMU and move directly into PhD research; we will continue to make use of this track, which has less risk as we already know the candidates well. The Urbanism programme is also involved in the Urban Systems and Environment Research Centre proposal to develop PhD research with Chinese funding in collaboration with South China University of Technology.

Trends in funding have certainly made it more difficult to recruit Dutch PhD candidates and one issue of concern is the need to maintain a balance between international and Dutch candidates – and ensure that we have PhD candidates who are investigating the Dutch experience of urbanism.

The Urbanism programme also receives many applications for visiting PhD researchers who wish to spend 6-12 months at TU Delft. The department of Urbanism has adopted a protocol to ensure that all applications are scrutinized and that we accept a limited number where there is a strong relation with the research programme and proposed outputs that will contribute to it.



# SWOT-analysis

## STRENGTHS

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The distinctive mix of design, social science and engineering/technology disciplines is a major strength. This 'Delft approach' is blended effectively with a strong capability to collaborate internationally to link local practice with global networks. There is a critical mass in all areas, a willingness to collaborate, and excellent working relations with OTB. Our reputation for providing high quality education ensures a steady stream of highly qualified international students for the research-led Master's courses and applicants for PhD study. The programme has shown that it can attract a steady stream of major, externally funded research projects, which is testament to the commitment and flexibility of our staff.

## WEAKNESSES

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Skills in producing peer-reviewed publications and in bidding are developing slowly and are still concentrated among too few people. There is only limited awareness of the vision and aims of the research programme overall, and not all staff accept the importance of publication. We do not always use the programme effectively to guide management decisions and there is a large backlog of PhD candidates. Concerns have been raised about the quality of the supervision of PhD candidates and their expectations of the PhD programme. We have few women in senior positions, the organization of bidding is fragmented, and staff need development in research methods and methodology.

## OPPORTUNITIES

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The Amsterdam Institute for Advanced Metropolitan Solutions and the joint research centre on Urban Systems and Environment with South China University of Technology will provide a solid foundation for developing the programme in ways that are socially and internationally relevant. Research funding bodies are paying more attention to urban development and there are forthcoming research calls at national, EU and global levels. The merger of OTB into the faculty brings us into closer contact with staff who have complementary scientific expertise and experience in contract funded research and academic publishing, whilst the Why Factory brings more staff with practical experience.

## THREATS

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Can we shift to a 'research-led' culture whereby we make best use of external funding, work more collaboratively and produce higher quality research outputs? The 'hobby mentality' about research lingers and its replacement with a more professional approach is a considerable challenge. There is a threat of fragmentation as professors pursue their individual interests. The programme is ambitious and it is doubtful whether we could deliver high quality on all aspects. Funding constraints mean we lose younger capable researchers, and there is pressure to recruit teachers. The balanced critical mass of each discipline might be compromised.

### 10.1 Adjusting the strategy

In the 2010 research assessment self-evaluation, we stated that 'a reorientation of research activity in the Urbanism group has begun and will continue'. Our strategy then was to focus our resources on the disciplinary specialisms and a limited number of cross-cutting academic research topics. We agreed to build our track record around them, thus providing a more solid foundation for external research funding proposals.

In terms of our research topics, this has meant defining more clearly and building support for the cross-cutting research themes. These have mainly concentrated on the strengths of the urbanism discipline in the Netherlands and the existing strengths of research staff. We have also looked at new emerging topics that can be developed into successful themes over a longer period.

In terms of research management, it has meant taking a more proactive approach to the mainstream academic funding opportunities; building the academic publication record in order to demonstrate our capability; and directing staff and PhD research more vigorously towards the objectives of the programme. The implications for our staff vary: for some it means switching from personal research projects to team working in externally funding projects; for others it means more attention to developing academic and proposal writing skills.

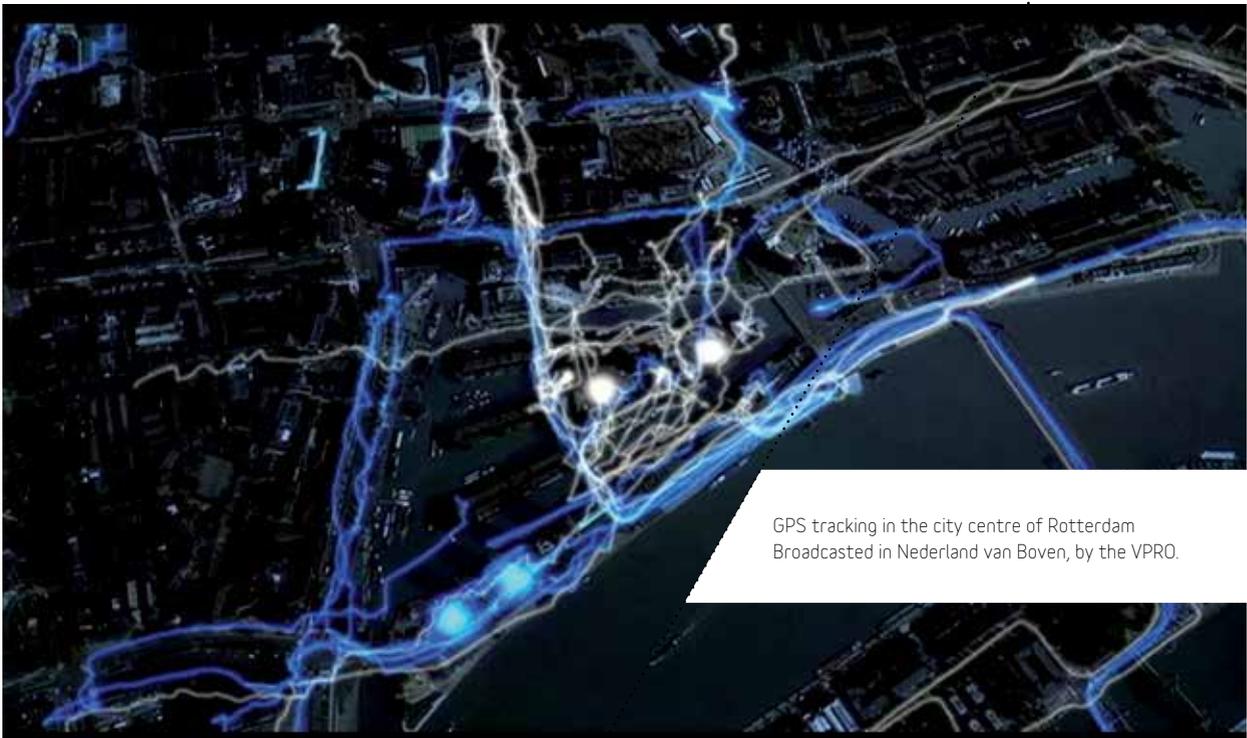
The integrated set of actions we have since taken have proved successful on most counts and so we propose to continue in similar vein, but with increased emphasis on PhD recruitment and supervision, and the management of staff who do not contribute to the objectives.

Thus, the main components of the strategy are:

- To review the cross-cutting research themes (with OTB) so as to simplify our objectives and concentrate on topics that can demonstrate true international excellence and have potential to win collaborative research projects, produce further high quality publications, and be at the forefront of theoretical, methodological and empirical work.
- To continue to rebalance publication efforts away from books and professional publications to academic peer-reviewed papers and to clarify the 1-1-1 campaign in relation to early stage PhD researchers, and taking into account the particular capabilities of each member of staff, especially inexperienced teachers. But to continue with the target of one good quality academic paper per year for each member of research active staff by 2016.
- To prepare an action plan for major 'blue chip' research bids, identifying potential funders within and beyond the Netherlands (including Horizon 2020), and to create interdisciplinary research teams with first rate partner institutions around our own research agenda.
- To strengthen the 'research culture' by continuing to develop staff competencies in academic publication, contract research funding and PhD supervision; and by managing staff workloads to direct them more actively either into or away from the research effort depending on demonstrated competences.
- To monitor the progress of PhD candidates and take early and decisive intervention as a department when progress is not being made,

or supervision is falling below acceptable standards, whilst improving the cohesion of the Urbanism PhD community, widening the pool of supervisors, and creating more structure in the process within the framework of the Graduate School.

- To enter into detailed discussion with the OTB Urban and Regional Studies Research Programme to develop consolidate further our collaboration into a combined and coordinated research group.



GPS tracking in the city centre of Rotterdam  
Broadcasted in Nederland van Boven, by the VPRO.

BU

# *Innovations in Management of the Built Environment*

RESEARCH LEADERS: Prof. Hans Wamelink PhD & Prof. Hans de Jonge

### 1.1 Scientific and societal aims

The Innovations in the Management of the Built Environment (IMBE) research programme promotes an integrated view of management processes in the built environment that covers:

- The stages of the lifecycle (initiative, development, realization and use), stressing continuity and adaptability;
- The different aspects and actors involved (clients, users, designers, engineers, policymakers, developers, contractors, etc.), towards the integration of actions, information and products;
- The relevant scale and abstraction levels (from urban planning and portfolio management to construction logistics and facilities management) in a coherent background to human actions and activities.

The aim of this programme is to develop scientific insights and new solutions on the basis of a wealth of knowledge and tools drawn from a wide spectrum of disciplines that includes public administration, strategic management, economics, law, mathematics, sociology and psychology, in addition to design and engineering. It also addresses a social necessity: the built environment is a major though diffuse area of large investment that has yet to achieve its potential in terms of spatial, functional and technical quality, cost effectiveness and sustainability, as indicated by current vacancy rates in real estate, failure rates in construction, high cost relative to performance, etc. This makes it necessary to incorporate the interests, ambitions and constraints of the various stakeholders, and to unite products and processes of development and redevelopment towards new multidisciplinary approaches that achieve the performance needed today.

In this framework, IMBE conducts thorough analyses of:

- Performance requirements, goals and constraints; the addition of value through real estate; and successful and sustainable real estate strategies (product-oriented research);
- The planning, briefing, design, construction, management and redevelopment of the built environment (process-oriented research).

The research questions resulting from these analyses lead to the development of innovative decision-making solutions for the management of the built environment at any stage of the lifecycle that:

- Contribute to the best possible alignment of the supply of relatively static real estate and the dynamic market demand for up-to-date buildings, infrastructure and public space;
- Promote and facilitate cooperation, innovation and integration in planning, design and construction processes of buildings and urban areas.

## 1.2 Where do we stand?

One of the main priorities of IMBE is to identify emerging social, economic and technological issues. This leads to early recognition of new challenges that trigger both applied and fundamental research into the spatial impact of, for example, organizational change, workplace change, evolving activity patterns and workflows, and technological innovations in communication.

By addressing a number of distinct problems and developing approaches and tools for their resolution, the IMBE programme has reached its halfway point. The last three years were characterized by a search for the causes underlying many of the symptoms currently evident in the built environment, and a move towards fundamental theories and methods for coping with a growing need for spatial quality, sustainability, cost effectiveness, and the gaining of added value in real estate development, design and construction management.

The products include a number of PhD dissertations in key areas, such as urban area development, supply chain management and decision support. Scientific publications have been made on basic aspects of real estate management strategies, the adaptive reuse of buildings, sustainable development, and information and design management (see section 5.3 for key publications). We have paid particular attention to process-related matters, making explicit the dynamic aspects and the roles of different actors or stakeholders and outlining promising strategies and long-term solutions. These results conclude the early phases of several projects and form the foundations for further research both from the same viewpoint and in relation to other issues and approaches.

## 1.3 Where do we want to be next?

In the next stage of the IMBE research programme, we intend to build on what we have done so far by consolidating, integrating and expanding existing research products. This will take place both internally and externally:

- Internally within IMBE by creating a comprehensive structure from the various partial analyses and solutions. Integration and continuity have already been addressed in the context of specific issues (e.g. use requirements and preferences in office buildings and the adaptive reuse of existing stock). The next task is to bring together all abstraction levels, actors and aspects in a comprehensive structure that applies to most problems;
- Externally by intensifying relations with international research partners towards analyses of and solutions to wider European issues. IMBE's relationship with the Dutch market has been one of the strong points of our research.

The early results of this approach are visible in IMBE research in 2013. These include projects and publications that combine corporate real estate management with design and information management, building information modelling with supply chain management, briefing with decision support systems, etc. At the same time we are also working on refinements of the basic strategies and approaches on the basis of insights produced by new applications and combinations. External cooperation is also picking up pace, as evidenced by the successful FuturA NWO proposal, which was developed together with Radboud University Nijmegen. We intend to intensify such cooperation by actively seeking research partners from other institutions on the basis of the subjects and ideas produced by the internal consolidation and integration, towards meaningful long-term partnerships that allow us to utilize existing research results as well as stimulate new investigations and approaches through knowledge and technology transfer in both directions.

## 2

## Composition

Table a. Research staff at institutional and programme level

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	30	24.10	29	23.2	26	21.00
Non-tenured staff	7	5.31	6	4.11	6	4.00
PhD students	5	2	10	3	12	3
Guests	21	14.10	14	6.93	15	7.83
<b>TOTAL RESEARCH STAFF</b>	<b>63</b>	<b>45.51</b>	<b>59</b>	<b>37.24</b>	<b>59</b>	<b>35.83</b>

Table b. Research staff with position in practice

WHO	ROLE	FIRM/ORGANISATION	WHERE
Prof. Monica Chao-Duivis PhD	Managing director	Dutch Institute for Construction Law	The Hague NL
Prof. Hans Wamelink PhD	Partner	DHV b.v.	Amersfoort NL
Prof. Hans de Jonge	Managing director	Brink Groep b.v.	Leidschendam NL
Prof. Friso de Zeeuw	Director of new markets	Bouwfonds Ontwikkeling	
Alijd van Doorn	Owner	VanDoorn.management for architecture	Rotterdam NL
Louis Lousberg PhD	Owner	Lousberg Projectmanagement en advies	Amsterdam NL
Boukje van Reijn	Project manager	Objectum	Zoetermeer NL
Ronald van Warmerdam	Project manager	Municipality of Amsterdam	Amsterdam NL

# 3

## Research environment and embedding

IMBE is one of the two research programmes of the Department of Real Estate & Housing (RE&H). It covers three of the four sections of RE&H: Design & Construction Management (DCM), Real Estate Management (REM) and Urban Area Development (UAD). The third section – Housing – participates in a programme of the same name with the OTB. It follows that there are strong ties between the two programmes, the main difference being in the application areas. There are also ties with other departments of the faculty – notably Urbanism – and with other faculties of the university, including Civil Engineering and Geosciences, and Technology, Policy and Management.

Connections with practice, industry and government are strengthened by three knowledge centres founded by RE&H and external partners:

- The Centre for People & Buildings (CfPB), which focuses on the relationships between people, working processes and places of work;
- The Centre for Process Innovation in Building and Construction (CPI), which promotes innovation in the area of building processes throughout architecture, engineering and construction (AEC);
- The Knowledge Centre for Urban Area Development (Stichting Kennis Gebiedsontwikkeling; SKG), which focuses on the formation of partnerships between public and private partners in urban area development.

### 3.1 International and national positioning

IMBE researchers are active members of various international academic platforms that cover all aspects of our research spectrum. These allow the presentation of research results and the development of meaningful exchanges, leading to invitations to attend events and join consortia, and to other opportunities for cooperation. As a whole programme, IMBE was prominent at the MISBE 2011 conference, where various parts and aspects of our research as well as their interrelationships were reported in more detail.

### 3.2 Collaboration with stakeholders

IMBE has close working relationships with many real estate, development and government organizations, including:

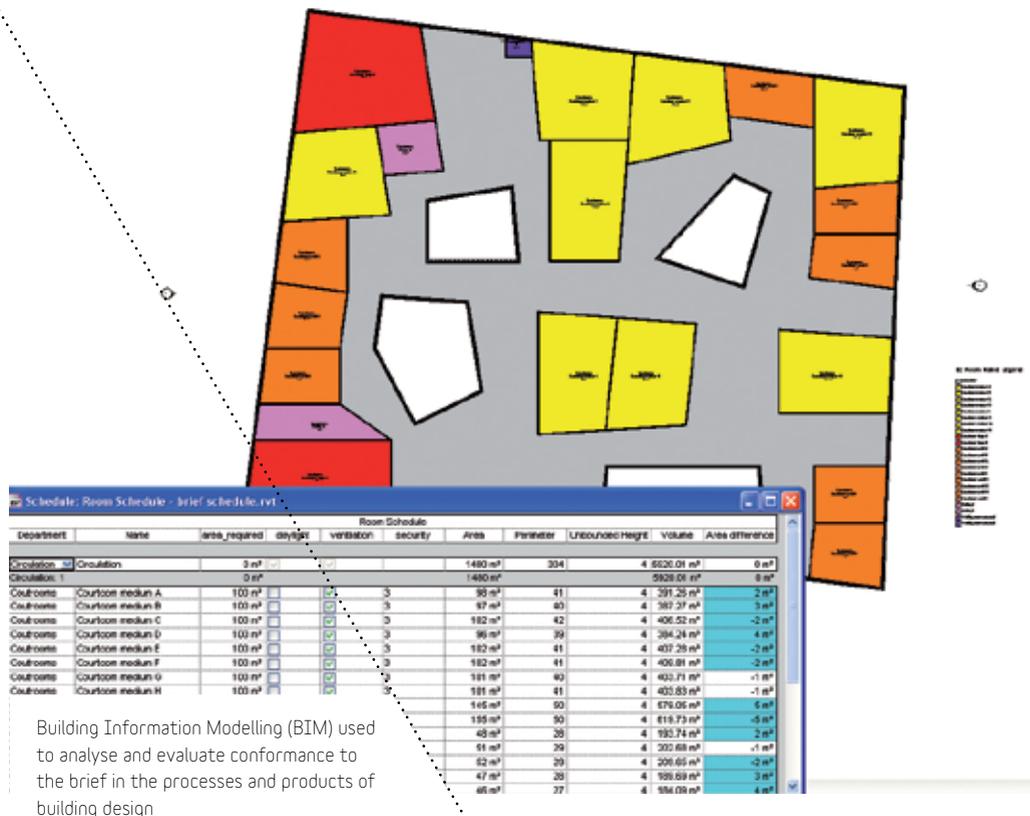
- Opdrachtgeversforum in de bouw (network organization of institutional clients in Dutch AEC): this organization represents major public organizations that are routinely and heavily involved in the development and management of buildings. IMBE was instrumental in the establishment of this forum, is leading the support organization and has gained substantial sponsoring for a new part-time chair (with staff) on this subject in the department of RE&H;
- Municipality of Rotterdam: Rotterdam has a long tradition in organized planning and development, and has a standing 10-year research agreement with IMBE on the subjects of decision support and value-driven urban area development;
- Dutch Government Buildings Agency (Rijksgebouwendienst; Rgd): IMBE has close ties with this agency, which manages and develops the large real estate portfolio of the Dutch state (7,000,000 m<sup>2</sup> gross floor area - GFA), including a considerable proportion of monumental structures (1,000,000 m<sup>2</sup> GFA) and a high percentage of sensitive governmental, correctional and cultural buildings. In addition to funding several research projects (the most recent being on integrated contracts and the

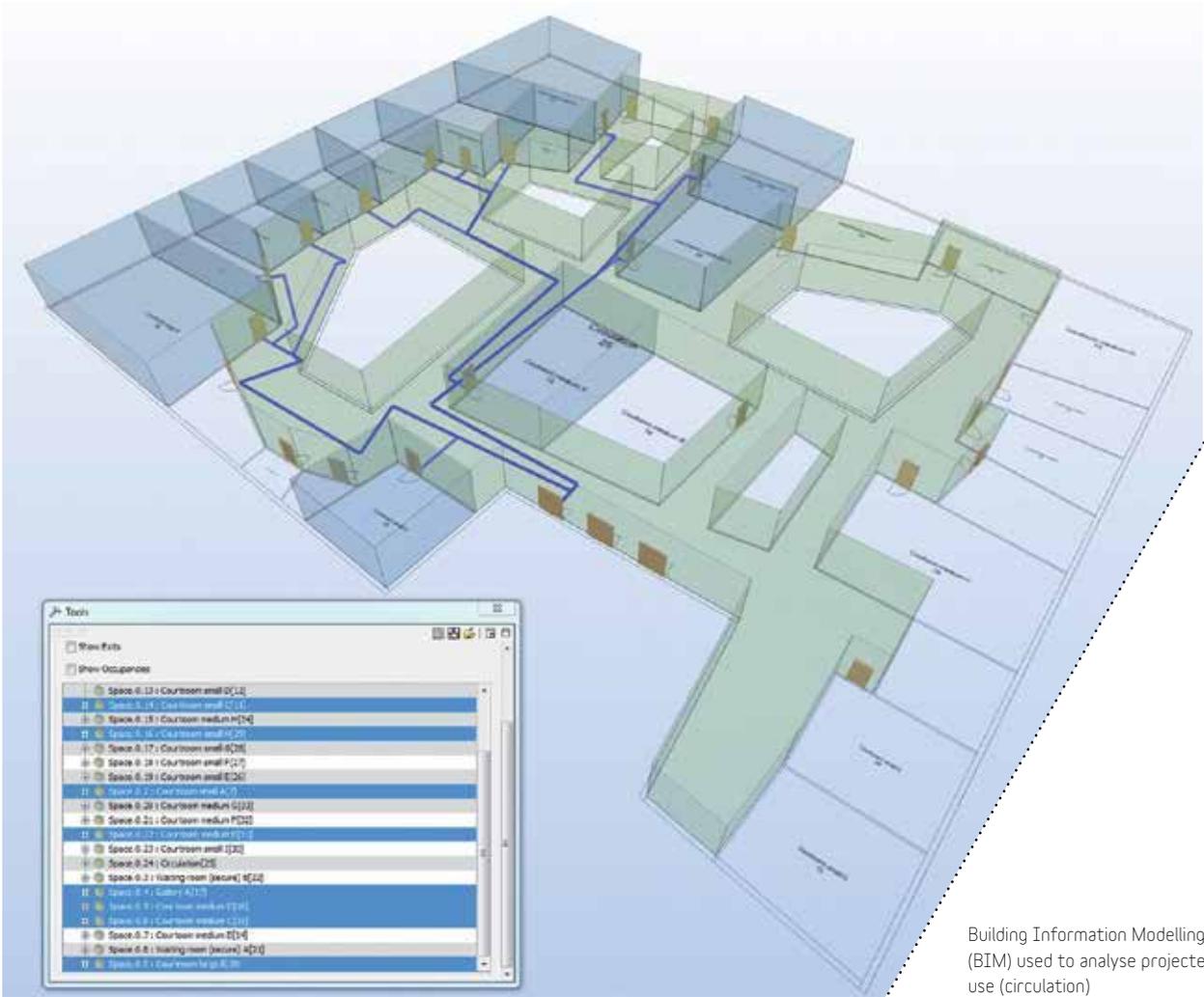
building information modelling (BIM) norm of the agency), Rgd has been a key partner in developing knowledge centres and the Opdrachtgeversforum mentioned above;

- BIR (Bouw Informatie Raad - Building Information Council): this organization represents clients, designers and engineers who are interested in applying BIM in AEC, and has worked with IMBE on the application and dissemination of research results, in particular the integration of BIM methods and techniques in design education;
- BouwvNederland (The Building Netherlands): this national association of construction companies is a major partner in supply chain-related research and valorization efforts;
- De Bouwcampus (The Building Campus): this is a physical and virtual knowledge and innovation centre, where a broad spectrum of parties in the building industry come together for workshops, training, knowledge exchange and collaboration.

### 3.3 Participation in consortia

- CBSA (2013): a consortium led by Prof. Arjan van Timmeren (Urbanism, Faculty of Architecture, TU Delft) and co-led by Prof. Hans Wamelink. Goal: to support the decision-making process for climate-proof area development by systematically analysing the monetary and non-monetary costs and benefits, and using the results of this analysis to formulate recommendations for improvement (Climate-KIC proposal; approved).
- COMPASS (2011): a consortium led by VTT, Finland, and including the architectural associations of Finland, Ireland and the Netherlands. Goal: the development of SME-oriented computerized support for sustainable building (FP7 proposal; rejected).
- HUBER (2011): a consortium led by SOLINTEL, Spain, and including VTT, Finland, and the University of Twente, the Netherlands. Goal: retrofitting SME business models for energy efficiency (PF7 proposal; rejected).





Building Information Modelling (BIM) used to analyse projected use (circulation)

# 4

## Academic reputation

### Invitations to address major conferences

YEAR	CONFERENCE	WHO	WHERE
2010	Keynote Lecture, Symposium on Construction Management	De Jonge	Aulanko FI
2010	Keynote Lecture, CIB Int Conf Open and Sust Building - Edificación Adaptable y Sostenible	Geraedts	Bilbao ES
2012	Keynote Lecture, AUDE (British Association of University Directors of Estate) Annual Conf	Den Heijer	Lough-Borough UK
2011	Keynote Lecture, NUAS (Nordic Association of University Administrators) Annual Conf	Den Heijer	Uppsala SE
2010	Special Session Roundtable 'Land Use Regulation and Compensation Rights', Fourth Conf of the International Academic Association on Planning, Law and Property Rights	Hobma	Dortmund DE
2012	Keynote Lecture, European Society of Construction Law conference	Chao-Duivis	Liege BE
2012	Chair, Design Build Upgrade, Hospital Build Europe Conference and Exhibition	Van der Voordt	Berlin DE

### Conference organisation activities

YEAR	CONFERENCE	ROLE	WHO	WHERE
2011	MISBE 2011 (Management and Innovation for a Sustainable Built Environment), organized under the auspices of the Int Council for Research and Innovation in Building and Construction (CIB), together with ENHR and AESOP	Organisation	IMBE	Amsterdam NL
2010>	Urban Area Development Annual Conferences	Organisation	IMBE	Utrecht NL
2011	Seminar on Urban China Development	Organisation	Chen	Delft NL
2011	Assoc of Eu Schools of Planning (AESOP) Young Academics Meeting	Organisation	Daamen	Delft NL
2012	European Infrastructure Procurement Symposium (EIPS)	Joint Coordinator	Volker	Copenhagen DK

### Evaluator of research programme

YEAR	PROGRAMME	ROLE	WHO	WHERE
2012	Midterm Review, Research Progr Techn, Hogeschool van Amsterdam	Auditor	Prins	Amsterdam NL
2013	Evaluation, Department of Architecture, Democritus University of Thrace	Auditor	Koutamanis	Xanthi GR

### Prizes, awards, competitions

YEAR	PRIZES, AWARDS, COMPETITIONS	ISSUER	WHO	WHERE
2012	Nominee, Boekman Dissertation Prize in the field of Arts, Culture and Related Policies	Boekman Foundation / NWO	Volker	Amsterdam NL
2012	Best Paper Finalist, 5th Engineering Project Organization Conference	EPOC 2012 Conf	Volker	Rheden NL
2012	Best PhD Paper Award, The Int Forum on Knowledge Asset Dynamics (IFKAD) and Knowledge Cities World Summit (KCWS) Joint Conf	IFKAD/KCWS	Magdaniel	Matera IT
2010	Officer in the Order of Oranje-Nassau	Kingdom of NL	De Jonge	Lansingerland NL
2012	2nd prize, open design competition for the redevelopment of the Eptapyrgio area	Municipality of Thessaloniki	Koutamanis	Thessaloniki GR
2012	Finalist, Green Arch Competition (Design & Development Category)	NAi/ Min Economic Affairs	Magdaniel	Rotterdam NL

### Election to academies or academic professional associations

YEAR	INSTITUTE	ROLE	WHO	WHERE
2010>	European Society of Construction Law	Chief Executive	Chao-Duivis	Willstaett DE
2010>	Network Org of Institutional Clients (Opdrachtgeversforum id Bouw)	Steering Group	De Jonge	Delft NL
2012>	Network Org of Institutional Clients (Opdrachtgeversforum id Bouw)	Secretary	Volker	Delft NL
2010>	Master City Developer, Postgraduate, Post-experience Programme of Erasmus University, TU Delft and City of Rotterdam	Academic Board	De Jonge	Delft / Rotterdam NL
2012>	Working Commission W065 on Org and Management of Construction, CIB	Joint Coordinator	Wamelink	Rotterdam NL
2012>	Board and Programme Committee, CIB	Member	Wamelink	Rotterdam NL
2010	Building Brains	Scientific Board	Wamelink	Delft NL
2012>	ClickNL Built Environment	Core Team	Wamelink	Eindhoven NL
2010>	NEPROM, Association of Dutch Developers	Board	De Zeeuw	Den Haag NL
2011>	CoreNet Global, Benelux Chapter	Chair	Arkesteijn	Brussel BE
2010>	ERES (European Real Estate Society)	Board	Arkesteijn/Remøy	Newtownabbey UK
1996>	Working Commission W096 on Architectural Management, CIB	Joint Coordinator	Prins	Rotterdam NL

### Editorship academic journal

YEAR	JOURNAL	ROLE	WHO	WHERE
2011	Special Issue of Journal Urban Planning International on 'Managing Urban Development Process: the Dutch Experience'	Guest Editor	Chen	Beijing CN
2010>	Real Estate Research Quarterly	Editorial Board	Daamen	Amsterdam NL
2010	Special Issue of Architecture, Engineering and Design Management	Guest Editor	Prins	Abingdon UK
2011	Special Issue of the Engineering Project Organization Journal on 'Establishing Collaboration in Public Engineering Projects'	Guest Editor	Volker	Colorado US
2010	Architectural Science	Editorial Board	Prins	Taipei TW
2010>	International Construction Law Review	Editorial Board	Chao-Duivis	London UK
2010>	Facilities	Editorial Board	Van der Voordt	Bingley UK

### Editorship professional journal

YEAR	JOURNAL	ROLE	WHO	WHERE
2010>	Tijdschrift voor Bouwrecht (Dutch Journal of Building Law)	Editorial Board	Chao-Duivis	The Hague NL
2010>	Building Business	Editorial Board	De Jonge	Zandvoort NL
2010>	Advisory Board: Real Estate Magazine	Chairman	De Jonge	Amsterdam NL
2010>	Duurzaam Gebouwd (Sustainability Programme)	Expert Team	De Jonge	Soesterberg NL
2010>	Real Estate Magazine	Editorial Board	Remøy	Amsterdam NL

### Role in practice and policy making

YEAR	FIRM/ORGANISATION	ROLE	WHO	WHERE
2012>	Actieagenda Bouw (Advisory Body to the Dutch Ministries of Home Affairs and Economic Affairs, Agriculture and Industry)	Core Team	De Jonge	The Hague NL
2012	Action Programme Office Vacancy, Dutch Min of Infra and Environment	Chairman	De Jonge	The Hague NL
2010>	Arbitration Board for the Building Industry in the Netherlands	Member	Chao-Duivis	Utrecht NL
2010>	Dutch Green Building Council	Board of Experts	Wamelink	Rotterdam NL
2010>	Architectuur Lokaal (National Centre of Expertise for Building Culture)	Board Member	Chao-Duivis	Amsterdam NL

### 5.1 Societal/scientific quality and relevance of the research

IMBE focuses on residential and non-residential stock, such as offices, educational buildings, retail and leisure facilities, and healthcare complexes. These are considered at all abstraction levels and throughout their lifecycles, but predominantly from the viewpoint of use and utility, that is, concerning their performance and contribution to the activities they accommodate.

Although such issues have always been of particular importance in the high-density, high-yield built environment of the Netherlands, they have been accentuated by the credit crunch and its effects. The degree of vacancy (estimated at 16% for offices in 2012), the substantial investment in ageing building stock and in currently less attractive locations, urban conflicts and decay, as well as underemployment among architects and engineers, are problems that require precise and accurate data, extensive analyses and reliable projections in order to develop transparent solutions that address all levels and aspects, and facilitate action by and cooperation between stakeholders.

To address these problems, IMBE considers the performance of building stock both in isolation and in its (usually urban) context, making explicit the roles, constraints and relationships of different actors and stressing the need for consistent, structural solutions that are based on policy and strategy, and are substantiated by scientific

means. This involves extensive knowledge and technology transfer from various disciplines, followed by adaptation to the conditions of AEC and integration into a coherent whole that applies continuously to the lifecycle of the built environment. The results are comprehensive methods and techniques that are usually geared towards specific issues, such as new business models for sustainability or post-credit crunch architectural practice, supply chain evaluation tools in construction and renovation, indicators of post-occupancy evaluation success and approaches to the adaptive reuse of existing building stock. Despite the apparent focus on such diverse issues, the backbone of IMBE research is formed by wider methodical concerns, as evidenced by the emphasis on problems of integration and cooperation in, for example, urban area development and supply chain management.

### 5.2 Key indicators

- **Description:** the ability to collect and organize data that express the existing situation in a precise, accurate and reliable manner. This has been a hallmark of IMBE research and has cemented our relationship with practice and industry.
- **Explanation:** the ability to correlate data and unambiguously identify underlying causes and relationships towards transparent models of the existing situation. Here, too, IMBE has been successful with respect to both clarifying societal questions and formulating hypotheses for further research.
- **Prediction:** building on the models that explain the existing situation, IMBE has been proposing mostly theoretical and prescriptive approaches that guide coordinated decision making and action by various stakeholders. The further development of these forms a scientific priority for the coming years, as they determine the ability to connect to wider European networks.

Table a. Main categories of research output

	2010		2011		2012	
	STAFF	GUESTS	STAFF	GUESTS	STAFF	GUESTS
Refereed articles	1	0	5	0	9	0
Non-refereed articles	6	0	11	0	2	1
Books	7	1	9	2	8	1
Book chapters	27	0	23	0	13	2
PhD theses	6	0	2	0	2	0
Conference papers	20	3	25	3	13	0
Professional publications	37	9	42	18	23	1
Editorships journals/book	0	0	6	0	5	0
<b>TOTAL PUBLICATIONS</b>	<b>104</b>	<b>13</b>	<b>123</b>	<b>23</b>	<b>75</b>	<b>5</b>



Prof. Friso de Zeeuw

## 5.3 Results and outputs

### KEY PROJECTS

#### Client

#### SUPPLY CHAIN MONITOR

Bouwend Nederland, Aedes and consortium of 11 large contractors and housing assoc.

*Grant: € 400.000*

*Role: initiator, partner, coordinator*

*Principal Researcher:*

*Hans Wamelink, Ruben Vrijhoef, Jelle Koolwijk*

*Duration: 2011 – present*

Despite but also probably due to the current financial condition the Dutch building sector is currently investing in the development of supply chains, through which significant increases in efficiency can be achieved. The project stream “Koplopers / ketenmonitor” brings together the Dutch market leaders in this area and facilitates knowledge exchange between them and mutual reinforcement in their explorations and activities. One of

the main instruments for doing so is the Supply Chain Monitor, an online system that compares similarities and differences between supply chain projects in industry so as to identify the effectiveness of each approach and the precise effects of supply chain integration. By the end of 2012 fourteen different projects had been registered and analysed in this system.

#### Client

#### NEW LIFE IN HIGH-VACANCY AREAS (NIEUW LEVEN IN LEEGSTANDSGEBIEDEN)

Dutch Government Buildings Agency

*Budget: € 100.000*

*Role: researcher, coordinator*

*Principal Researchers:*

*Hans de Jonge, Hilde Remøy*

*Duration: 2011 – 2013*

The study concerns the transformation of governmental real estate within the management of the governmental real estate portfolio and the impact of vacancy and transformation on urban areas. The result is twofold: the first part is a comprehensive map of government real estate in relation to office vacancy in The Netherlands; the second

part is a pilot study of the management of four government buildings (as representative of other vacant or soon-to-become vacant buildings) based on an area development perspective.

#### Programme

#### HIGHER EDUCATION REAL-ESTATE MANAGEMENT

Agentschap NL & Dutch assoc. of University Campus directors

*Grant: € 210.000*

*Role: coordinator*

*Principal Researchers*

*Alexandra den Heijer,*

*Hans de Jonge, Monique Arkesteijn*

*Duration: 2010 – present*

This stream integrates a wide spectrum of questions concerning portfolio, asset and property management in Dutch organizations of higher education. Starting with the particular problems of each organization, we work towards the correlation of different levels and aspects in the framework of

models and approaches developed in our fundamental research. In addition to direct solutions to particular problems, we assist organizations of higher education to develop an overall approach to their real-estate activities, with a focus on the issue of added value and decision support.

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## Programme

## URBAN AREA DEVELOPMENT

SKG Foundation  
Grant: € 900.000  
Role: initiator, partner, coordinator  
Principal Researchers:  
Friso de Zeeuw, Agnes Franzen  
Duration: 2006-present

A stream of research projects funded through SKG, a foundation supported by several government organizations and private institutions. The general aim of the stream is to improve the role and competences of public and private actors in urban development, with specific attention

to improvements in supporting laws and regulations, to devising strategies for integrated development and to translating changes in the economy to new value-creating opportunities and business models in Dutch urban development practice.

## Programme

## FUTURA

### *Future Value Chains of Architectural Services*

NWO-Creative Industry  
Grant: € 443.778  
Role: main applicant  
Principal Researchers:  
Hans Wamelink, Leentje Volker  
Duration: 2013 -2017

One of the only two successful proposals by a school of architecture at the latest call for the creative industries by NWO, The Netherlands Organization for Scientific Research (the Dutch national research council). The project aspires to outline new roles of architects and to develop governance models for architectural services in the value networks between architectural firms, their

clients and other stakeholders. The project finances one PhD position at IMBE and another at Radboud University Nijmegen, our major partner in Futura.

## Programme

## UKNA

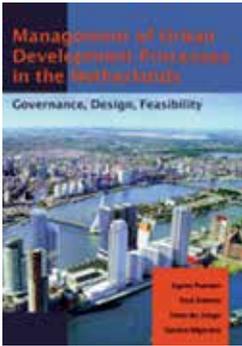
### *Urban Knowledge Asia Network*

Urban Knowledge Asia Network (UKNA)  
Grant: € 1.204.000 (total)  
Role: secondment partner  
Principal Researchers:  
Yawei Chen, Erwin Heurkens,  
Tom Daamen  
Duration: 2012-2016

An inclusive network that brings together concerned scholars and practitioners engaged in collaborative research on cities in Asia and consisting of over 100 researchers from 13 institutes in Europe, China, India and the United States, the UKNA represents the largest academic international network on Asian cities. It is funded by a grant awarded by the Marie Curie Actions 'International

Research Staff Exchange Scheme' (IRSES) of the European Union. The UKNA Objective is to nurture knowledge on Asian cities. This will be achieved via research staff exchanges and targeted case study based research, pursuing three avenues of inquiry: ideas of the city, cities by and for the people, and future of cities.

## KEY BOOKS



**Year:** 2011

**Publisher:** Techne Press

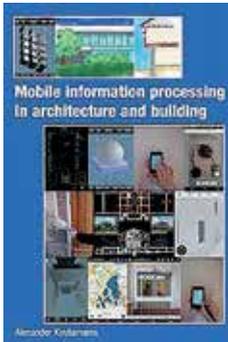
**Pages:** 248

### MANAGEMENT OF URBAN DEVELOPMENT PROCESSES IN THE NETHERLANDS

*Agnes Franzen, Fred Hobma, Hans de Jonge & Gerard Wigmans (eds.)*

This book provides a management view on urban area development. Urban area development has increasingly been influenced by the private sector, requiring the public sector to adapt. Network societies and global economies necessitate a more integrated approach to managing urban development. Management of Urban Development Processes in the Netherlands describes the changes taking place and the shared governance approach to urban development. It describes the process of managing urban development and covers the full life-cycle of urban areas, from the initiation and planning of development projects to realisation and

maintenance. It also provides an overview of current practice, acquired knowledge and instruments developed in the Netherlands. Process architecture, financial engineering, market influences and spatial quality are covered since they all affect the level (and perception) of success. The information presented results from many years of research and experience at Delft University of Technology and is the product of interdisciplinary discourse. This is appropriate to the field of urban area development since it is itself a discipline about interaction and skillful combination: 'the art of combining'.



**Year:** 2010

**Publisher:** Multi-Science Publishing

**Pages:** 158

### MOBILE INFORMATION PROCESSING IN ARCHITECTURE AND BUILDING

*Alexander Koutamanis*

This book outlines the applications of mobile devices such as smartphones and PDAs to architecture and building. It offers an invaluable guide to professionals and students as an overview of the possibilities and limitations of what is likely to become a major development in their field. The book addresses general use issues specifically architectural applications - sketching, CAD, and project management. There is a critical

overview of the reasons why one might use mobile devices for each specific purpose, of the possibilities and limitations of these devices; of the skills and facilities required for using them effectively and efficiently; and of the relation between mobile applications and general computerization in architectural practice (in terms of both technology and organisation).

## THE POWER OF PLURALISM FOR URBAN STRATEGIES

*Monique Arkesteijn, Leentje Volker*

### Publication Info

Year: 2012  
In: *Cities*, 31(4), 328-336

Although several strategy scholars have pleaded for a pluralistic approach, not many have empirically shown the actual implementation of pluralism in strategic real estate decisions. In this article we demonstrate the value of implementing pluralism for the design of a real estate strategy of a Dutch university campus. Three strategic projects – an Ideas Competition,

a Think Tank and a Campus Vision – made it possible to consider a wide range of options and to display the dynamic interrelations between the objects (buildings), the portfolio (the campus) and the urban context (the city). The results show that pluralism is a powerful approach to make decisions about real estate and urban planning strategies at a pragmatic as well as on a strategic level.

## THE UNIVERSITY CAMPUS AS A KNOWLEDGE CITY: EXPLORING MODELS AND STRATEGIC CHOICES

*Alexandra den Heijer, Flavia Curvelo Magdaniel*

### Publication Info

Year: 2012  
In: *Int. Journal of Knowledge-Based Development*, 3(3), 283 - 304

This paper seeks to understand the relationship between urban, corporate and university strategies required to develop knowledge cities and the relevance of the physical setting as an important resource to achieve mutual goals. This paper positions the university campus as a large-scale real estate object and reviews the literature on real estate management and campus development within the frame of the knowledge economy.

The methodology uses empirical data of existing comparative studies on university campuses and knowledge cities including the case study in Bogota, Colombia. The paper provides models to support policy makers with management information for their strategic choices. Moreover, it outlines the relevance of involving external stakeholders in campus strategies.

## OFFICE BUILDING CONVERSION AND SUSTAINABLE ADAPTATION: A COMPARATIVE STUDY

*Hilde Remøy, Sara J. Wilkinson*

### Publication Info

Year: 2012  
In: *Property Management*, 30( 3), 218 - 231

The City of Melbourne seeks to retrofit 1,200 CBD properties by 2020 as part of the strategy to become carbon neutral, whilst Amsterdam aims to cut CO<sub>2</sub> emissions 40 per cent by 2025. In examining converted buildings in Amsterdam and the Melbourne CBD typical attributes of converted stock can be identified to target retrofit measures. This paper seeks to focus on these initiatives. In Amsterdam five case studies were undertaken to reveal and

define building attributes that explain the viability of these conversions. On the other hand, the Melbourne study was based on a database assembled containing all Melbourne CBD office building adaptations carried out between 1998 and 2008. The research analysed the conversion of office buildings and the scope for sustainable retrofit evaluating a limited number of attributes known to be important in adaptation.

## PROCURING ARCHITECTURAL SERVICES: SENSEMAKING IN A LEGAL CONTEXT

*Leentje Volker*

### Publication Info

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Year: 2012

In: *Construction Management and Economics*, 30(9), 749-759

Decision makers involved in selecting an architect for a building project in the public domain have to comply with European procurement regulations. The blend of the legal requirements and the subjective elements of architectural design creates a situation in which the legal rationale often clashes with the organizational sensemaking process that decision makers experience. Hence, being aware of the origin of these conflicts could have important managerial implications for the design of a tender

process. A competition and a tender case were selected to collect data by observation, interviewing and document analysis. The incremental and iterative character of making sense of supply and demand and the implicit ways of aggregating value judgements in order to make a final procurement decision were found to be the main underlying decision processes in procuring architectural services. Being aware of these characteristics in the design of a tender process would significantly reduce the chance of conflictive situations.

## IN SEARCH FOR THE ADDED VALUE OF FACILITY MANAGEMENT: WHAT WE KNOW AND WHAT WE NEED TO LEARN

*Per Anker Jensen, Theo van der Voordt, Daniel von Felten, Anna-Liisa Lindholm, Susanne Balslev Nielsen, Chaiwat Riratanaphong & Mirjam Pfenninger*

### Publication Info

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Year: 2012

In: *Facilities*, 30 (5/6), 199 - 217

**Purpose** - This article aims to present and compare research perspectives and theoretical reflections from a variety of academic fields on the concept of added value of facilities management.

**Design/methodology/approach** - The starting point is the so-called FM Value Map, which was presented in a recent article in *Facilities* by Per Anker Jensen in 2010. The article is a first result of the work in the EuroFM

research collaboration group and is based on literature reviews of the most influential journals within the academic fields of facilities management (FM), corporate real estate management and business-to-business marketing.

**Findings** - Good relationship management and building on trust is shown to be equally important as delivering the agreed services.

## ADAPTABLE OFFICE BUILDINGS

*Hilde Remøy, Peter de Jong & Wiechert Schenk*

### Publication Info

Year: 2011

In: *Property Management*, 29 (5),  
443 - 453

Purpose - Across use, adaptation is a possible way of dealing with long term vacant office buildings, albeit previous research shows that there are many obstacles to be thrived. In the Netherlands several successful transformations of offices into housing were completed. Nevertheless, transformations do not take place on a large scale. High building costs are the main reason. Hence, new office developments should anticipate future programmatic transformation. This paper seeks answers to the questions: Is it possible to anticipate future programmatic change? To what extent will anticipation on future possibilities influence building costs?

Design/methodology/approach - The authors reviewed existing studies to gather information about transformation building costs and the critical success factors of transformations. The building design and costs for new office buildings were then studied, designed with enhanced transformation potential, focussing on two standard office building types, the central core tower and the single corridor slab, using the cost model PARAP.

Findings - The outcome of this research proposes an approach to office development that deals with adaptability as a means of realising enhanced future value.

## NETHERLANDS/NIEDERLANDE

*Fred Hobma*

### Publication Info

Year: 2010

In: MITSCHANG, S. (ed.) *Energy efficiency and renewable energies in town planning law /energieeffizienz und erneuerbare energien im stadtebaurecht.*  
Frankfurt am Main: Peter Lang,  
27-46

This book chapter discusses legislation in Dutch Planning Law regarding the use of renewable energies and energy efficiency. It also addresses the question whether municipalities can create their own (or higher) regulations compared to national regulations for these matters. The chapter concludes that Dutch legislation has very little attention for renewable energies. Furthermore, Dutch planning law has no connection with the use of renewable energies. On the other hand, it does have a strict regulation for energy efficiency of buildings. This regulation does

have a firm relation with planning law. The provisions for the energy efficiency of buildings, however, are restricted to new buildings.

Local authorities are not allowed to impose more strict levels concerning energy performance in a local bye law. It is not allowed for them to use a bye law to deviate from the level that has been set nationally in the Building Decree. Nor can private law agreements with developers be used to enforce new buildings that are more energy efficient than the Building Decree.

## AN ARCHITECTURAL VIEW OF THE CLASSROOM

*Alexander Koutamanis & Yolanda Majewski-Steijns*

### Publication Info

Year: 2012

In: BRASTER, S., GROSVENOR, I. & DEL MAR DEL POZO ANDRÉS, M. (eds.) *The black box of schooling : a cultural history of the classroom.* Bruxelles: Peter Lang, 203-222

Cited by: unknown

Similarly to most specialized buildings, schools as we know them today are a relatively late architectural development, dating back to the 19th century. The basic component of the 19th century school building was the classroom, a space specifically designed for a group of learners and a teacher working in the instructive manner, i.e. with the teacher as dispenser and controller of information and communication. Following a relatively short period of experimentation, the current stereotype of the classroom became firmly established: a rectangular space housing around thirty pupils, with fenestration on the one side and one or more entrances on the opposite side. The importance of the

classroom in school use and perception was such that school buildings often were little more than a collection of classrooms. Despite their emphasis on flowing, uninterrupted space (achieved through the removal of as many interior walls as possible), modernists largely accepted the cellular integrity and rectangular shape of the classroom and were only too eager to adopt its high, large windows. Later attempts at reform have focused on the classroom and its replacement with different prototypes derived from residential and leisure architecture to promote an informal sphere in learning but did not manage to dislodge its position in school architecture.

## AFTER THE FIRE: NEW WAYS OF WORKING IN AN ACADEMIC SETTING

*Marjan J. Gorgievski, Theo J.M. van der Voordt, Sanne G.A. van Herpen & Sophie van Akkeren*

### Publication Info

Year: 2010

In: *Facilities*, 28 (3/4), 206 - 224

Cited by: 5

**Purpose** - This purpose of this paper is to present the research findings of a Post-Occupancy Evaluation of new ways of working in the Faculty of Architecture of the Delft University of Technology and the lessons that can be learned from this particular case in connection with research findings from similar cases.

**Design/methodology/approach** - The paper is based on an internet survey among 266 daily users, additional interviews with decision makers and other participants involved in the implementation process, analyses of documents and personal observations.

**Findings** - The new office plan scores

highly on possibilities of meeting other people. Work spaces are considered to be functional, but employees also reported a lack of spaces suited for confidential (telephone) conversations and insufficient visual and auditory privacy. Employees are unable to control sufficiently the climate of their direct work environment and the way the environment looks. Security of the workplaces is rated below average. People want more rooms equipped with doors, and doors that can be locked. Another important complaint was lack of personal and collective filing and storage possibilities.

## KEY DISSERTATIONS



**Year:** 2012

**Publisher:** TU Delft

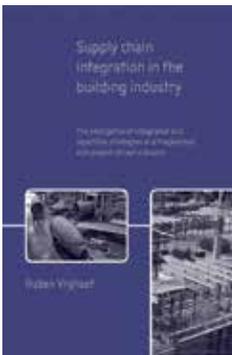
**Pages:** 484

### PRIVATE SECTOR-LED URBAN DEVELOPMENT PROJECTS: MANAGEMENT, PARTNERSHIPS & EFFECTS IN THE NETHERLANDS AND THE UK

*Erwin Heurkens*

Central to 'Private Sector-led Urban Development Projects' lays the concept of private sector-led urban development projects. Such projects involve project developers taking a leading role and local authorities adopting a facilitating role, in managing the development of an urban area, based on a clear public-private role division. Such a development strategy is quite common in Anglo-Saxon urban development practices, but is less known in Continental European practices. Nonetheless, since the beginning of the millennium such a development strategy also occurred in the Netherlands in the form of 'concessions'. However, remarkably little empirical knowledge is available about

how public and private actors collaborate on and manage private sector-led urban development projects. Moreover, it remains unclear what the effects of such projects are. This dissertation provides an understanding of the various characteristics of private sector-led urban development projects by conducting empirical case study research in the institutional contexts of the Netherlands and the UK. The book provides an answer to the following question: What can we learn from private sector-led urban development projects in the Netherlands and UK in terms of the collaborative and managerial roles of public and private actors, and the effects of their (inter)actions?



**Year:** 2011

**Publisher:** IOS Press

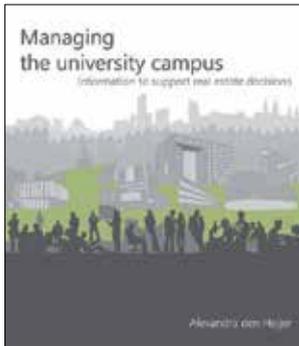
**Pages:** 336

### SUPPLY CHAIN INTEGRATION IN THE BUILDING INDUSTRY: THE EMERGENCE OF INTEGRATED AND REPETITIVE STRATEGIES IN A FRAGMENTED AND PROJECT-DRIVEN INDUSTRY

*Ruben Vrijhoef*

The building industry is a fragmented and project-driven industry with specific characteristics, which can sometimes result in negative effects. Reference has often been made to other industries, particularly manufacturing, that would function more effectively and efficiently. Major differences between building and manufacturing include the organization and coordination of the supply chain. Supply chain integration

has been suggested as a solution to the deficiencies experienced in the building industry. The premise is that the supply chain would function better if the building industry could aim for the standards of a more integrated and repetitively operating industry. This thesis aims to contribute to the theoretical and practical development of the concept of supply chain integration in the building industry.



Year: 2011

Publisher: Eburon

Pages: 432

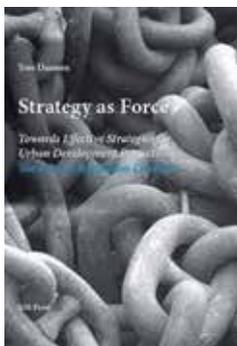
## MANAGING THE UNIVERSITY CAMPUS: INFORMATION TO SUPPORT REAL ESTATE DECISIONS

*Alexandra den Heijer*

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This book summarizes the results of ten years of research on a wide range of topics on campus management: from generating references for planning purposes – like current replacement costs and new space standards for the changing academic workplace – to strategies for the sustainable campus and new models that merge the campus and the knowledge city. The book includes profiles of fourteen Dutch campuses

and forty campus projects to illustrate trends. The content of this book combines insights from theory – adding to new real estate management theories and the required management information for real estate decisions – and lessons for practice. The book can support the decisions of policy makers, architects, campus and facility managers about the campus of the future.



Year: 2010

Publisher: IOS Press

Pages: 285

## STRATEGY AS FORCE: TOWARDS EFFECTIVE STRATEGIES FOR URBAN DEVELOPMENT PROJECTS: THE CASE OF ROTTERDAM CITYPORTS

*Tom Daamen*

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In European urban development practices, there is a recurring need for new perspectives that provide insight into the complexity involved in the realization of projects. This need exists particularly around prestigious projects, where the tension between planning ambitions on the one hand, and the reality of conflicting interests and tight budgets on the other reaches its highest point. In the Netherlands, it is also likely that this tension will not decrease in the coming years. Reason enough for an investigation into strategies for urban development projects. This thesis combines several existing scientific insights around the phenomenon 'strategy'. Here, strategy is recognized as force. The term force emphasizes that a strategy, as opposed to

a plan, provides those involved with the capacity to respond to the continuously changing reality of an urban development project. Thus, an effective strategy not only consists of making plans, but also includes three other strategic activities: venturing, learning, and visioning. These insights are then specified on the basis of the remarkable case of Rotterdam CityPorts – a project between city and port in which political and economic forces are especially amplified. This leads the thesis to develop a comprehensible theoretical model that reflects the complexity occurring in the realization of contemporary urban development projects. This strategy-as-force model is useful for both scientists and practitioners.

## KEY EVENTS

### MISBE 2011

#### Info

*Management and Innovation for a Sustainable Built Environment*

*Date: 2011, June 19-23*

*Place: Amsterdam, The Netherlands*

Organized by the Department of Real Estate & Housing, Faculty of Architecture, Delft University of Technology, under the auspices of Working Commissions W55, W65, W89 and W112 of the International Council for Research and Innovation in Building

and Construction (CIB), together with the European Network for Housing Research (ENHR) and the Association of European Schools of Planning (AESOP). Editors are Hans Wamelink, Rob Geraedts and Leentje Volker.

### ANNUAL CONFERENCES URBAN AREA DEVELOPMENT (PRAKTIJKCONGRESSEN GEBIEDSONTWIKKELING)

#### Info

*Editie 2012: 'Gebiedsontwikkeling Slim Vlottrekken'*

*Date: 2012, March 15*

*Place: Utrecht, The Netherlands*

Hoe krijgen we gebiedsontwikkeling slim vlotgetrokken? Maar ook: wat zijn mythes? Deze vragen stonden centraal tijdens het praktijkcongres 'Gebiedsontwikkeling slim vlottrekken'. We moeten meer naar coalities van belangen. Zo zouden zorg, wonen en pensioenen onderling een brug kunnen slaan. Waterveiligheid kan drager zijn van andere, nieuwe functies, zoals recreatie of energiewinning. En stedelijke

herverkaveling kan impasses in proces of financiering doorbreken. Nieuw vakmanschap in de gebiedsontwikkeling gaat over herkenbaarheid, voorkeuren en waarden van mensen. En wat mythes betreft: de bakken met geld van de pensioenfondsen worden niet op de Nederlandse vastgoedmarkt geleegd. Sinds 2011 vindt er jaarlijks een Praktijkcongres Gebiedsontwikkeling plaats.

### EUROPEAN INFRASTRUCTURE PROCUREMENT SYMPOSIUM (EIPS)

#### Info

*"Conflicts Between Institutional Frameworks and Managerial Practice: How to Operate, to Innovate and to Collaborate?"*

*Date: 2012, May 8*

*Place: Copenhagen, Denmark*

In procuring the public transport projects, clients are continuously experimenting with better ways of constructing, maintaining, operating and financing public transport systems. Design & Build DBFM, or Alliances are interesting examples of new ways of working. In case of public infrastructure, these contractual agreements have to fit within the regulations that have been agreed upon in the European Union. Yet, the construction industry still struggles with traditional failure issues such as poor

collaboration, time and cost overruns, lack of quality and political failure. Besides practical issues, there appears to be friction between the institutional frameworks (EU regulations) and managerial practice that somehow blocks the road to success. Several of the most important potential conflicts were addressed during this symposium. The symposium was the first in a row and jointly organized by NETLIPSE and NGInfra. Leentje Volker acted as joint coordinator.

## 6

## Earning capacity

### 6.1 Success and vision on how to obtain research projects

IMBE has attracted a steady flow of financing from industry and government, particularly concerning real estate issues and mostly for applied research that promotes testing, evaluation and feedback to fundamental research. Some funding spanned a number of years, allowing for long-term planning and commitment.

In other cases, short-term projects within the same theme were combined into streams that supported continuity in research. The credit crunch has affected this flow but we see continuing opportunities for the same aspects (e.g. with respect to vacancy and adaptive reuse), as well as an increasing demand for design and construction subjects (e.g. new roles for architectural practice and BIM). However, we believe that we can stimulate more demand by addressing integration and continuity throughout the lifecycle and at all abstraction levels. There are many partial solutions to isolated problems and IMBE should focus on the fundamental topic of how these relate to comprehensive, consistent and coherent approaches that augment the potential of partial solutions by expanding the utility of their effects. This also relates to funding acquisition through EU projects and national grants that facilitate long-term research planning and development.

Table a. Research funding

FUNDING	2010		2011		2012	
	K€	%	K€	%	K€	%
Direct funding	991	57%	1000	57%	888	64%
External funding (total)	737	43%	743	43%	495	36%
<i>Coverage Contribution</i>	239	-	285	-	220	-
<i>Results finished projects</i>	189	-	179	-	66	-
<i>Acquired project funds</i>	309	-	279	-	209	-
<b>TOTAL FUNDING</b>	<b>1.728</b>	<b>100%</b>	<b>1.743</b>	<b>100%</b>	<b>1.383</b>	<b>100%</b>
EXPENDITURE	K€	%	K€	%	K€	%
Staff costs	1047	91%	994	91%	788	92%
Other costs	98	9%	100	9%	65	8%
<b>TOTAL EXPENDITURE</b>	<b>1.145</b>	<b>100%</b>	<b>1.094</b>	<b>100%</b>	<b>853</b>	<b>100%</b>

CHAIRS EXTERNALLY FUNDED	2010		2011		2012	
	K€	%	K€	%	K€	%
St. Kennis en Gebiedsontwikkeling	€421		€170		€311	

## 6.2 Overview of top 5 projects

*FuturA - Future Value Chains of Architectural Services* (<http://www.nwo.nl/onderzoek-en-resultaten/onderzoeksprojecten/44/2300179344.html>): one of only two successful proposals by a school of architecture at the latest call for the creative industries by NWO, the Netherlands Organization for Scientific Research (the Dutch national research council). The project (budgetted at €443,778) aspires to outline new roles for architects and to develop governance models for architectural services in the value networks between architectural firms, their clients and other stakeholders. FuturA finances one PhD position at IMBE and one at Radboud University Nijmegen, our major partner in FuturA.

*Supply Chain Monitor*: despite but also probably due to the current financial situation, the Dutch building sector is investing in the development of supply chains through which significant increases in efficiency can be achieved. The project stream ‘Koplopers / ketenmonitor’ (Leaders / supply chain monitor) brings together Dutch market leaders in this area and facilitates knowledge exchange between them and mutual reinforcement in their explorations and activities. One of the main instruments for doing so is the Supply Chain Monitor, an online system that compares similarities and differences between supply chain projects in industry in order to identify the effectiveness of each approach and the precise effects of supply chain integration. By the end of 2012, fourteen projects had been registered and analysed in this system.

*New life in high-vacancy areas (Nieuw leven in leegstandsgebieden)*: this project was undertaken on behalf of the Rijksbouwmeester (the Netherlands’ chief government architect). The study concerned the transformation of governmental real estate within the management of the governmental real estate portfolio and the impact of vacancy and transformation on urban areas. The result is twofold: a comprehensive map of government real estate in relation to

office vacancy in the Netherlands, and a pilot study of the management of four government buildings that are representative of other vacant or soon-to-be vacant buildings, based on an area development perspective.

*Higher education real estate management*: this project integrates a wide spectrum of questions concerning portfolio, asset and property management in Dutch organizations of higher education. Starting with the particular problems of each organization, we work towards the correlation of different levels and aspects in the framework of models and approaches developed in our fundamental research. In addition to direct solutions to particular problems, we assist higher education organizations to develop an overall approach to their real estate activities, with a focus on the issue of added value and decision support.

*Urban Area Development*: a series of research programmes funded through SKG. The general aim is to improve the role and competencies of public and private actors in urban development, with specific attention to improvements in supporting laws and regulations, to devising strategies for integrated development and to translating changes in the economy to new value-creating opportunities and business models in Dutch urban development practice.

# 7

## Valorisation

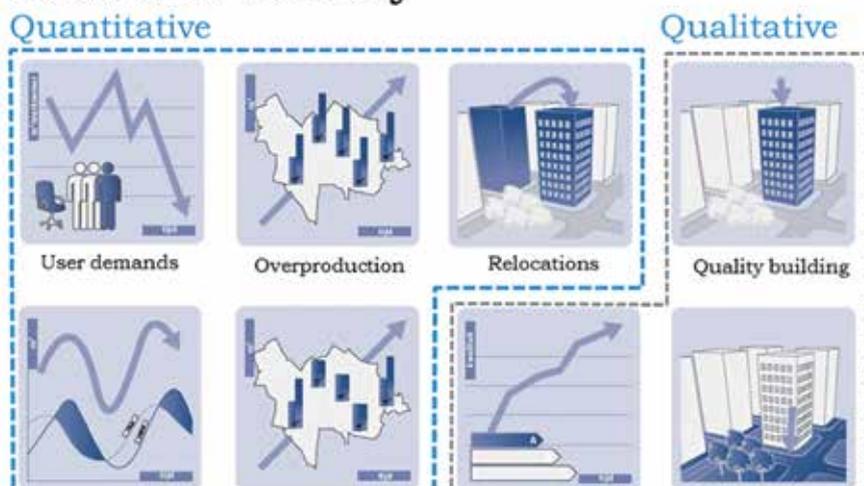
### 7.1 Means used to transfer knowledge

The knowledge centres and research funded by practice, industry and government have been instrumental in establishing networks that disseminate IMBE research results, provide feedback and offer opportunities for further research. Another channel for valorization is the MSc theses of students following the RE&H track, since our students are expected to graduate as interns in industry and to connect the subjects of their theses to both current issues in industry and RE&H research.

### 7.2 Users of the knowledge

The primary recipients of IMBE research products include policymakers, managers, engineers, designers and institutional clients active in AEC, in particular in the Netherlands.

## Causes of vacancy



# 8

## PhD research

### 8.1 Topics

Current PhD topics are clustered around three main themes:

- Integration: ranging from BIM and supply chain management to contract forms and business models for practice.
- Corporate real estate: with a particular emphasis on higher education and offices.
- Knowledge transfer: connections to allied sciences that underlie managerial decision making, in particular economics.

In relation to specializations and research priorities, this means that urban area development and the adaptive reuse of existing stock appear underrepresented.

### 8.2 Supervision

Long before the introduction of the current Graduate School regulations, RE&H had implemented very similar rules concerning day-to-day supervision by a key researcher in the same area in addition to the main supervision by a full professor, annual evaluations and performance indicators. Consequently, the transition to the new situation has been effortless and natural.

### 8.3 Funding

Prior to 2010, there was a surge in the number of PhD candidates thanks to impulse funding by the university. In addition, IMBE was reinvesting in research by financing new PhD positions from the surplus of externally funded projects. The latter form of funding continues to date, albeit in reduced quantities and destined primarily for internal integration subjects, such as the combination of supply chain management and BIM. In accordance with university policy, the main sources of PhD funding have become research grants (e.g. FuturA) and personal financing as stipulated by the Graduate School regulations. To stimulate personal financing, IMBE has been actively propagating its subjects in foreign grant organizations, such as the Brazilian SWB (Science Without Borders) programme.

### 8.4 Attractiveness

Judging by the number and the level of applicants for recent PhD positions, IMBE appears to address key issues in AEC in a way that promotes thorough understanding and excellent training, as well as promises opportunities in today's job market. However, our subjects and approaches seem to require some experience in practice: most of our PhD candidates do not come straight from university. This also applies to our own MSc graduates. A corollary is that a number of PhD candidates at IMBE do their research part time, next to jobs in industry or government. As such candidates represent a substantial source of empirical knowledge and a direct channel of valorization, we try to accommodate their circumstances without lowering the level expected of a PhD dissertation.



University Campus environment





# SWOT-analysis

## STRENGTHS

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- Multidisciplinary approach
- Emphasis on integration (wide scope that includes all aspects, actors and stakeholders)
- Lifecycle approach (emphasis on continuity)
- Managerial aspects closely related to domain aspects
- Connections with and relevance to society and industry
- Direct valorization
- Continuity in research themes and methods

## WEAKNESSES

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- Teaching workload
- Industry-oriented and practice-oriented subjects reduce level to that of consultancy (and create false image of competition with practice)
- Quantity of scientific publications
- International presence (including funding).

## OPPORTUNITIES

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- On-going changes in the built environment (including effects of credit crunch):
- Vacancy and reuse of existing building stock
- Rationalization and optimization of processes (supply chain integration, BIM, etc.)
- Resulting new roles and specializations in AEC
- Growth in demand for PhD positions.

## THREATS

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- Limited funding from industry (especially in comparison to before 2008)
- Relatively weak position of built environment in research grant funding programmes.

### 10.1 Strategic planning

The next stage of IMBE focuses on consolidating and integrating research internally and connecting to international partners externally, so as to improve the coherence of our approaches and the relevance and applicability of our results. This means that while existing themes and approaches are retained, emphasis is put on connections and correlations and therefore also on opportune subjects such as adaptive reuse, integration of processes and information, and societal requirements and needs. Addressing the last-mentioned also involves alliances with research partners from other areas, in particular the social sciences that study related phenomena. Such alliances could improve the accuracy and validity of our data and create opportunities for multidisciplinary research grants nationally and internationally.

Expanding our research to a European scale requires careful consideration of existing contacts and platforms, and probably the development of new ones that address current societal and scientific priorities, and can be effective and efficient in research development and funding. A prerequisite to such cooperation is an increase in the number of scientific publications through which we can profile our results and our ambitions, especially concerning consolidation and integration. Valorization also plays an important role with respect to consolidation, as it allows us to develop and test profiles relating to subjects and specializations.

In terms of capacity, it is critical to ensure continuity in research by the careful recruitment and training of new researchers. Despite the imminent retirement of a large number of key researchers, the current demographics of IMBE give us reasons for optimism with respect to capacity, provided we are able to retain the services of younger researchers who are not too distracted by teaching obligations and to prolong existing cooperation networks with external stakeholders.

In short, our research strategy concentrates on five actions:

- Internationalizing our research themes and activities
- Increasing the share of national and EU grants in research funding (long-term projects)
- Further improving our focus (consolidation and integration)
- Increasing the number of scientific publications
- Increasing the number of externally funded PhD candidates

### 10.2 New research topics and their prospects

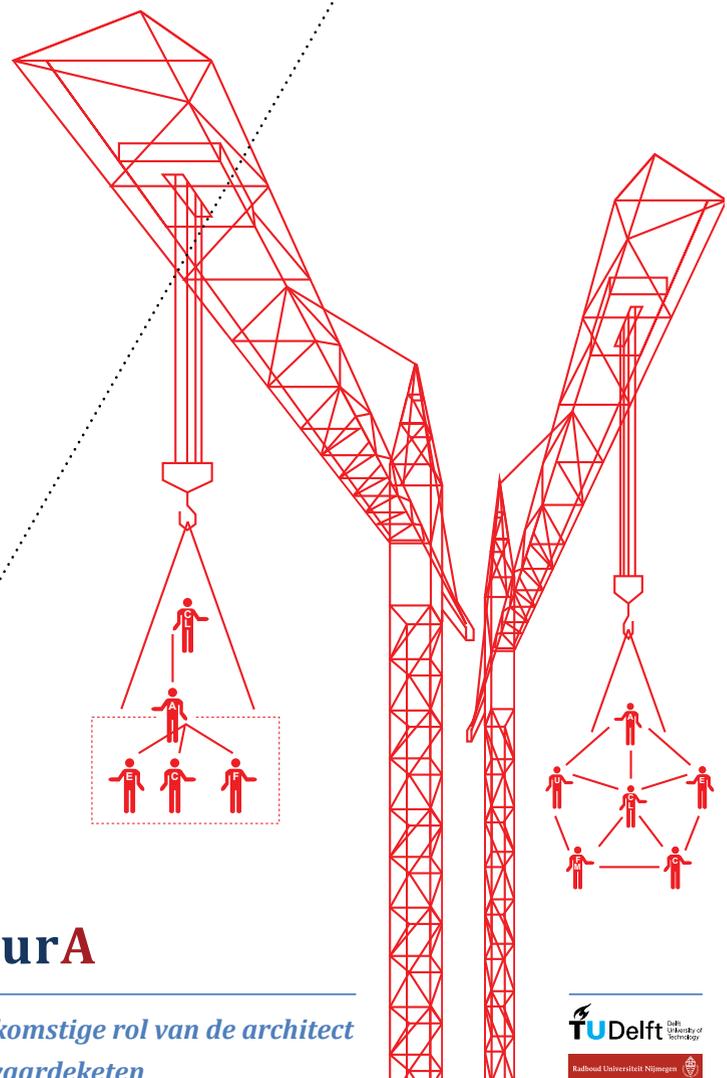
With consolidation and integration as our main research priorities, there is little need for expansion of our research topics, especially since we have been rather successful in the early identification and analysis of emerging problems and conditions. On the contrary, these priorities and our strategic considerations may involve reducing the number of topics actively pursued at any given moment, but without abandoning the broad spectrum of research knowledge and experience that makes integration meaningful and widely applicable.

In 2012, the department of RE&H launched an effort to realign its strategic goals in research and education. The following topics have been defined in order to draw together the department's existing lines of research:

- Adaptive reuse of the existing built environment.
- Integration of design and management processes through active connections between relevant actors, disciplines and spatial dimensions (object, stock, area, portfolio).
- Explanation and prescription by developing theoretical and methodical underpinnings of innovative design and management practices for the built environment.

### 10.3 Flexibility

On the basis of the above, IMBE is rather flexible in terms of short-term research subjects and comprehensive with respect to the coverage of our research. Researchers are expected both to develop specializations consistently and to contribute to other research topics, depending on strategic priorities.



**Futura**

*De toekomstige rol van de architect  
in de waardeketen*



How

# Housing

RESEARCH LEADERS: Prof. Marja Elsinga PhD & Prof. Henk Visscher PhD

# 1

## Scope

### 1.1 Scientific aims

#### Vision

A sustainable fit between the demand for and the supply of housing is of major importance for the quality of life of occupants, for the ecological footprint of urban areas and in terms of economic assets. Achieving such a sustainable fit requires innovative and multidisciplinary scientific research.

#### Mission

The aim of the programme is to develop scientific knowledge that is relevant to society; that is:

- knowledge of measuring energy efficiency, affordability and consumer preferences;
- knowledge of the effects of policies aimed at achieving sustainable and affordable housing, and;
- knowledge of the functioning of the housing market by developing price models and analysing the management and governance of actors in the housing markets.

The programme uses multidisciplinary approaches to provide new scientific insights through a combination of five perspectives, namely technology, policy sciences, management sciences, economy and sociology.

#### Objectives

The objectives include making fundamental contributions to the scientific fields that relate to achieving a sustainable fit between demand and supply in housing; making contributions to the innovation of the educational curricula; and providing insights that are beneficial for the societal debate on housing.

Figure 1. Four sub-programmes of Housing



The programme consists of four sub-programmes (Housing Market, Housing Governance, Housing Management, and Housing Quality) and aims to be a key player at the international level and a frontrunner at the national level. Therefore, the four following key objectives have been formulated:

- Housing Market sub-programme: to study the structure and functioning of the housing and house building market by focussing on demand, supply and price, and their interdependence;
- Housing Governance sub-programme: to focus on policies for sufficient, affordable and secure housing, and on the impact of these policies on welfare and economic growth;
- Housing Management sub-programme: to develop and evaluate approaches for the management and redevelopment of the housing stock in order to contribute to increasing the socioeconomic and environmental sustainability of housing provision;
- Housing Quality sub-programme: to study the physical performances of housing (such as energy efficiency, ecological sustainability and indoor climate) and policy instruments that guarantee or improve those performances.

### 1.2 Where do we stand?

The Housing research group is the result of a merger of the Housing Systems and the Housing Quality research programmes. All housing knowledge is now brought together in one research group and benefits from more cooperation at the meeting points of the two research programmes. For example, the Housing Quality group had thorough technical knowledge of energy efficiency and of the aims of policymakers. It appears again and again that the ambitions of policymakers are so far away from the energy efficiency improvements that take place in practice. This problem can benefit from knowledge of effective housing governance arrangements. Also, knowledge within the Housing Market group on consumer preferences can be fed into housing management strategies.

Figure 1 depicts the logic behind the division into the four sub-programmes. Challenges in housing are expressed in gaps between supply and changing demand (Market, formerly Housing Systems). To correct for these changes, various institutions intervene on the housing market (Governance, formerly Housing Systems). Individual actors (landlords, owners, developers, contractors) adapt housing within the market and institutional context (Management, formerly Housing Quality), resulting in the physical adaption of housing (Quality, formerly Housing Quality), to meet social, economic and environmental demands.

### 1.3 Where do we want to be next?

We want to benefit from the merger and combine our knowledge for joint applications and publications. We also want to further increase our recognition as an excellent housing research group by peer researchers and policymakers, and to:

- strengthen our position as being frequently invited to give keynote speeches, boards of journals, academic reviews and participate in consortia;
- be invited even more often to give keynote speeches;
- sit on the boards of journals;
- write academic reviews and participate in consortia.
- be attractive to international PhD candidates across the world.

# 2

## Composition

Table a. Research staff at institutional and programme level

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	29	17.98	28	16.54	26	15.25
Non-tenured staff	10	6.31	7	3.72	6	3.18
PhD students	12	8.7	16	11.7	23	11.7
Guests	17	0	19	0	7	0.00
<b>TOTAL RESEARCH STAFF</b>	<b>68</b>	<b>33.0</b>	<b>70</b>	<b>32.0</b>	<b>62</b>	<b>30.1</b>

Table b. Research staff with position in practice

WHO	ROLE	FIRM/ORGANISATION	WHERE
Prof. Anke van Hal PhD	Prof. Sustainable Building and Development	Nijenrode Business University	Breukelen NL
Vincent Gruis PhD	Prof. Innovation in Real Estate Management	Research Centre Technology & Innovation Hogeschool Utrecht	Utrecht NL
Laure Itard PhD	Prof. Energy and Built Environment	The Hague University of Applied Sciences	The Hague NL



For sale.

# 3

## Research environment and embedding

### 3.1 International and national positioning

The group is well known for its expertise, and its broad scope is unique in the field of housing. The group has a strong network and is often invited to give keynote speeches and to join consortia.

### 3.2 Collaboration with stakeholders

The research group cooperates with many other research groups in international scientific networks, such as the International Council for Building (CIB) and the European Network for Housing Research (ENHR). Moreover the group has special ties with the:

- Cambridge Centre for Housing and Planning Research (CCHPR)
- Centre for Comparative Housing Research of De Montfort University, Leicester, UK/Australian Housing and Urban Research Institute (AHURI)
- Eindhoven University of Technology
- Nyenrode
- Rural Institute, Seoul
- Reading University
- University of Glasgow
- University of Birmingham
- Uppsala University
- University of Aalborg
- Hong Kong Polytechnic University
- University of York
- University of Leuven
- Wageningen University

These ties include exchanging knowledge, providing facilities for visiting researchers and exploring possibilities for joint projects. Building supportive networks and continuing to be involved in proposals for the European Commission is also an important future strategy for the Housing group. Finally, the group has a long tradition in working with professional stakeholders in platforms:

- Platform31
- European Foundation for Living (EFL)
- Aedes Steunpunt Wonen
- Consortium of European Building Control and the expertise Centre on Housing Value
- Building for the Future? (EOS)
- COHERENO: Collaboration for Housing nearly zero-Energy RENOVation
- EPISCOPE consortium for optimization of the refurbish process.

### 3.3 Participation in consortia

- Steunpunt Wonen Vlaanderen
- Expertise Centre House value: professional stakeholders involved in the owner-occupied housing market
- Slim & Snel: network for the diffusion of smart and speedy approaches to sustainable housing refurbishment (with Platform31)
- BEEM-UP: Building Energy Efficiency for Massive market Uptake (FP7 - EeB-Energy)
- DEMHOW: Demographic Change and Housing Wealth (FP7-SSH)
- NEUJOB: Creating and adapting jobs in Europe in the context of a socio-ecological transition (FP7-SSH)
- SHELTER: Social Housing organizations and European professionals Linked and acting together for Testing and promoting professionals coordination in Energy Renovation. (IEE)
- SuslabNWE: Creation of a networked infrastructure for innovation on sustainability in the home environment that enables user-centred testing and development in a living laboratories and testing houses at five locations (Interreg IVB North West Europe)
- COHERENO: Collaboration for Housing nearly zero-Energy RENOVation (IEE)
- EPISCOPE: Energy Performance Indicator Tracking Schemes for the Continuous Optimization of Refurbishment Processes in European Housing Stocks (IEE).

## 4

## Academic reputation

## Invitations to address major conferences

YEAR	CONFERENCE	WHO	WHERE
2010	Keynote presentation FIEC Congress 2010 - "Sustainability is our business - Making the EU Market for Sustainable Construction a Reality"	van Hal	Limassol CY
2010	Building regulations in Europe. Keynote presentation at CEBC symposium	Visscher	Oslo NO
2011	Social housing in the Netherlands: where does it come from and where does it go? Keynote speech Conference on social and affordable housing, Tsinghua University	Elsinga	Beijing CN
2010	Housing affordability and housing policy in the Netherlands. Keynote speech at the 4th annual housing affordability congress	Hoekstra	Sydney AU
2012	History of the Dutch housing model and the role of the social rented sector, Keynote speech International Symposium on Eco-Friendly Community Design	Boelhouwer	Taipei TW

## Conference organisation activities

YEAR	CONFERENCE	ROLE	WHO	WHERE
2010-12	Wooncongres	Organisation	OTB & Platform 31	Den Haag NL
2010	International conference on Comparative Housing Research	Organisation	OTB	Delft NL
2011	Housing Quality 2020 conference	Organisation	OTB	Delft NL
2011	Workshop Researching Housing and the Built Environment	Organisation	OTB	Delft NL
2012	MOVE working conference social enterprise in housing	Organisation	OTB	Delft NL

## Involvement in scientific or professional event

YEAR	EVENT	ROLE	WHO	WHERE
2010	The new "Huisvestingswet". Commission for housing, neighbourhood and integration, Dutch Parliament	Member round table	Boelhouwer	The Hague NL
2010	DEMHOW-workshop with policy makers & members of EU Parliament	Speaker	Elsinga	Brussels BE
2010	OTB course: The market for owner occupied housing: recent developments and perspectives	Course leader	van der Heijden	Delft NL
2011>	Annual master class Nat Symposium for Housing Associations, SBO	Chair	Gruis	Netherlands NL
2011	Workshop 'social innovation & participation' CIB conference MISBE	Organisation	van Bortel & Kleinhans	Amsterdam NL
2011	Climatre Proof Cities, yearly event. Water in the neighbourhood	Session chair	Straub	Utrecht NL
2012	Reforming the housing market, Provada	Panel discussion	Boelhouwer	Amsterdam NL
2012	Meeting of Flemish policy makers and practitioners debating: Fundamentals of Flemish housing policy	Chair	Elsinga	Brussels BE

## Prizes, awards, competitions

YEAR	PRIZES, AWARDS, COMPETITIONS	ISSUER	WHO	WHERE
2012	Award best paper prize during 28th International PLEA Conference	PLEA	Joostens & Itard	Lima PE
2012	REHVA Professional award for sciences	REHVA	Itard	Scheveningen NL

## Honorary positions

YEAR	INSTITUTE	POSITION	WHO	WHERE
2010	RMIT University, AHURI Research Centre	Principal Honorary Research Fellow	Haffner	Melbourne AU
2012	Cambridge University Centre for Housing and Planning CCHPR	Visiting fellow	Haffner	Cambridge UK

## Election to academies or academic professional associations

YEAR	INSTITUTE	ROLE	WHO	WHERE
2008/>	European Network for Housing Research	Chair	Boelhouwer	Utrecht NL

## Editorship academic journal/book series

YEAR	JOURNAL	ROLE	WHO	WHERE
1997/>	Journal of Housing and the Built Environment	Editor-in-Chief	Boelhouwer	Dordrecht NL
2010/>	Journal of Housing and the Built Environment	Editor	Hoekstra	Dordrecht NL
2012/>	International Journal of Housing Policy / issue: Housing and Pensions	Guest editor	Elsinga	London UK
2012/>	Elsevier's Encyclopaedia of Housing and Home	Editor	Elsinga	Oxford NL
2013/>	Current Urban Studies	Editor	Elsinga	Delaware US
2005/>	International Journal of Law and the Built Environment	Editor	Visscher	Bingley UK
2005/>	Open House International	Editor	Visscher	Tyne & Wear UK
2012/>	Urban Studies Research	Editor	Hoekstra	Cairo EG
2007/>	Housing Studies	Mbr manag board	Haffner	London UK

## Editorship professional journal/book series

YEAR	JOURNAL	ROLE	WHO	WHERE
2009/>	Tijdschrift voor de Volkshuisvesting (Dutch Journal for Housing)	Editor-in-Chief	Elsinga	The Hague NL
2011/>	Real Estate Research Quarterly	Editor-in-Chief	Gruis	Amsterdam NL
2003/>	Tijdschrift voor de Volkshuisvesting (Dutch Journal for Housing)	Editor	Flier	The Hague NL
2011/>	Tijdschrift voor de Volkshuisvesting (Dutch Journal for Housing)	Editor	Haffner	The Hague NL
2005/>	TVVL-magazine	Editor	Itard	Leusden NL

## Role in practice and policy making

YEAR	FIRM/ORGANISATION	ROLE	WHO	WHERE
2003/>	Netherlands Graduate School of Urban and Regional Research	Chair board	Boelhouwer	Utrecht NL
2011/>	CBS, General advice cmte Central Bureau of Statistics Netherlands	Member	Boelhouwer	The Hague NL
2011/>	International advisory board of the Moscow city strategy 2025	Member	Boelhouwer	Moscow RU
2006/>	European Housing Forum	Member	Boelhouwer	Europe EU
2012	Taskforce Verzilveren (Task Force Mortgage Equity Withdrawal)	Member	Elsinga	The Hague NL
2006/>	Nederlandse Woonbond (Dutch National Tenants' Association)	Board member	Elsinga	Amsterdam NL
2013/>	Board of supervisors housing association Ymere	Member	Gruis	Amsterdam NL
2011	Aedes, Evaluation committee Assessments of Housing Associations	Member	Gruis	The Hague NL
2008/>	Dutch Green Building Council	Board member	van Hal	Rotterdam NL
2011/>	Parallel52, Dutch Canadian Sustainable Planning and Building Network	Founder/director	van Hal	Rotterdam NL
2009/>	Supervisory board housing association Vecht en Omstreken	Member	van der Heijden	Breukelen NL
2005/>	Housing valuation cmte 'Koopgarant', housing association Woonbron	Chair	van der Heijden	Rotterdam NL
2010-12	Board of experts "Woonkeur" certificate	Chair	Visscher	Houten NL

# 5

## Quality and relevance

### 5.1 Societal/scientific quality and relevance of the research

#### *Societal quality and relevance*

Housing is of crucial importance for the economy, for the ecological footprint and for the wellbeing of households. Since the global financial crisis, the role of the housing market in many countries has changed and housing is no longer one of the key drivers of the economy. On the contrary, investment in housing and the improvement of housing have stagnated. At the same time, international treaties and regulations at European and national levels have set very high CO2 emission reduction targets also for the housing stock. The building stock in the EU accounts for about 40 per cent of total EU energy consumption. In recent years, this energy consumption has increased dramatically, in both relative and absolute terms, due to the growing number of households and the resulting increased need for power for appliances, room heating and hot tap water.

Moreover, housing used to play an important role in welfare, and the provision of affordable dwellings was considered a wobbly pillar of the welfare state. This welfare function is under discussion

and more and more wealth in owner-occupied dwellings is considered an important source of welfare for individual households. A complete change occurred in the vision on the relation between housing and welfare. There is insecurity in the market: although there is a need to build more housing, there is reluctance to invest in housing. Investors in the market need insight into the future demand, house price developments and the expected rate of return on their investment in order to develop a sustainable portfolio strategy. Housing has a new role in society and adequate knowledge of this new role is lacking. More knowledge of new technologies, housing preferences, house prices, management strategies and policy instruments is necessary to achieve the ambition of a sustainable fit between demand and supply.

#### *Scientific quality and relevance*

Housing, as an area of scientific study and a societal activity, requires productive interactions among several disciplines. Furthermore, because housing is continuously influenced by developments in society and by scientific insights, research in this area has to both anticipate and respond to changing context and knowledge. Therefore, the programme researches this topic from many angles, combining several scientific disciplines.

- In the Market sub-programme, the economic and psychology disciplines dominate research into the functioning of the housing market in support of the aim to develop advanced models of the housing market.
- In the Governance group, the policy sciences, economics and sociology dominate the effort to understand the governance of housing and its effects.
- In the Management sub-programme, organization and innovation theories are dominant.
- In the Quality group, the technical discipline and policy sciences are dominant.

## 5.2 Key indicators

The Housing group considers the classic academic indicators relevant to the programme: journal articles, books, invitations to make keynote speeches, other academic presentations and panels, honorary positions, boards of journals, book series and encyclopaedias. Since the ambition of

the group is to contribute to societal challenges, we also attach high value to indicators of societal relevance: monitoring instruments, evaluations of new products/strategies/policies, invitations for housing debates at events and in such media as television, radio and the internet.

Table a. Main categories of research output

	2010		2011		2012	
	STAFF	GUESTS	STAFF	GUESTS	STAFF	GUESTS
Refereed articles	34	6	22	3	28	4
Non-refereed articles	3	0	3	0	1	0
Books	6	1	5	0	1	0
Book chapters	13	0	34	0	27	2
PhD theses	2	2	2	0	1	0
Conference papers	69	16	50	12	41	5
Professional publications	87	10	63	2	60	1
Editorships journals/book	16	0	11	0	13	0
<b>TOTAL PUBLICATIONS</b>	<b>230</b>	<b>35</b>	<b>190</b>	<b>17</b>	<b>170</b>	<b>12</b>



Peter Boelhouwer in Nieuwsuur.

## 5.3 Results and outputs

### KEY PROJECTS

#### Programme

FP7 - EeB-Energy

Grant: € 77.568

Role: partner

Principal Researcher:

Henk Visscher

Coordinator: Acciona

Duration: 12/2010 to 12/2014

#### BEEM-UP

*Building Energy Efficiency for Massive Market Uptake*

The BEEM-UP project (Building Energy Efficiency for Massive market UPtake) will demonstrate the economic, social and technical feasibility of retrofitting initiatives for drastically reducing the energy consumption in existing buildings, and lay the ground for massive market uptake.

BEEM-UP involves key expertise to implement and demonstrate innovative building and energy management approaches with the overall aim to improve energy efficiency in existing buildings and obtain better indoor comfort conditions.

#### Programme

FP7 - SHH

Grant: € 208.421

Role: partner

Principal Researcher: Marja Elsinga

Coordinator: University of

Birmingham

Duration: 1/2008 to 1/2012

#### DEMHOW

*Demographic Change and Housing Wealth*

Demographic change leads to an EU-wide shrinking and ageing of populations, accompanied by EU-wide changes to housing systems. The co-occurrence of these two macro processes suggests the intriguing question of the extent to which home ownership provides a potential cure for some of the consequences of ageing populations, as well as contributes to the causes. DEMHOW undertook research and

other activities in order to:

- Investigate how the composition of wealth has changed with respect, in particular, to changes in population, housing systems, state pension arrangements, and financial institutions
- Investigate how attitudes toward the acquisition of housing assets and their use in old age are changing, particularly given equity release products.

#### Programme

FP7 - SSH

Grant: € 123.466

Role: partner

Principal Researcher:

Marja Elsinga

Coordinator: Centre for European Policy Studies (CEPS)

Duration: 9/2011 to 9/2015

#### NEUJOBS

*Creating and Adapting Jobs in Europe in the Context of a Socio-Ecological Transition*

NEUJOBS' objective is to analyse likely future developments in the European labour market(s), in view of four major transitions that will impact employment and European societies in general. The first is the socio-ecological transition: a comprehensive change in the patterns of social organisation and culture, production and consumption that will drive humanity beyond the current industrial model towards a more sustainable future. The

second is the societal transition produced by the combination of population ageing, low fertility rates, changing family structures, urbanisation and growing female employment. The third transition concerns new territorial dynamics and the balance between agglomeration and dispersion forces. The fourth is a skills (upgrading) transition and the project is interested in its likely consequences for employment and (in)equality.

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## Programme

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Intelligent Energy Europe

Grant: € 206.678

Role: partner

Principal Researcher:

Henk Visscher

Coordinator: Logirep

Duration: 6/2010 to 6/2013

### SHELTER

*Social Housing Organisations and European Professionals Linked and Acting Together for Testing and Promoting Professionals Coordination in Energy Renovation.*

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The social housing sector faces a significant challenge. Housing operators have to implement energy renovations, but have difficulties in implementing them with the professionals on their portfolio. It is observed that without the necessary knowledge:

1) renovation to strict standards can take longer and be twice as expensive as normal, 2) professionals (architects, consultants, engineers, suppliers, installers, builders) don't have enough knowledge of energy aspects and 3) they are not used to working together in a co-ordinated manner. This leads to unnecessary difficulties during the construction, when it is too late to

easily make changes and many delivered buildings don't reach the expected energy performance. SHELTER starts from the current situation: the lack of coordination of professionals as the main obstacle to reach high efficiency in buildings and the ineffective use of information and tools available. The integrated design approach is applied, thus changing the way different professions work together along the supply chain. In SHELTER this approach is analysed in the frame of the renovation programmes of social housing operators in 5 countries and applied in practice.

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## Programme

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Interreg IVB

North West Europe

Grant: € 81.647 (50% of 163.295)

Role: partner

Principal Researcher: Ad Straub

Coordinator: TUDelft

(Faculty of Industrial Design Engineering)

Duration: 1/2012 to 3/2015

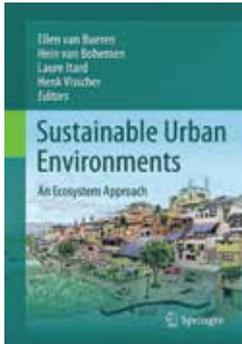
### SUSLABNWE

*Creation of a Networked Infrastructure for Innovation on Sustainability in the Home Environment that Enables User-Centered Testing and Development in a Living Laboratories and Testing Houses at 5 Locations.*

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SusLabNWE is an international infrastructure of living labs that enables innovation processes in which users and other actors actively participate. SusLabNWE provides the context in which they can interact with and

report on sustainable innovations in the home environment, while sharing practices with other households and stakeholders. These innovation processes are examined using observational techniques.



Year: 2011

Publisher: Springer

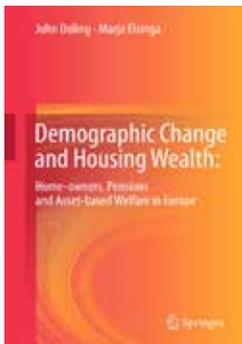
Pages: 429

### SUSTAINABLE URBAN ENVIRONMENTS: AN ECOSYSTEM APPROACH

*Ellen M. van Bueren, Hein van Bohemen, Laure Itard & Henk Visscher (eds.)*

'Sustainable Urban Environments: An Ecosystem Approach' presents fundamental knowledge of the built environment. Approaching the topic from an ecosystems perspective, it shows the reader how to combine diverse practical elements into sustainable solutions for future buildings and cities. You'll learn to connect problems and solutions at different spatial scales, from urban ecology to material, water and energy

use, from urban transport to livability and health. The authors introduce and explore a variety of governance tools that support the transformation process, and show how they can help overcome institutional barriers. The book concludes with an account of promising perspectives for achieving a sustainable built environment in industrialized countries.



Year: 2012

Publisher: Springer

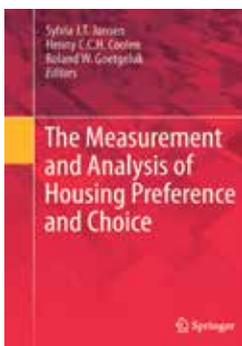
Pages: 161

### DEMOGRAPHIC CHANGE AND HOUSING WEALTH: HOMEOWNERS, PENSIONS AND ASSET-BASED WELFARE IN EUROPE

*John Doling, Marja Elsinga*

Across the EU, populations are shrinking and ageing. An increasing burden is being placed on a smaller working population to generate the taxes required for pensions and care costs. Welfare states are weakening in many countries and across Europe, households are being increasingly expected to plan for their retirement and future care needs within this risky environment. At the same time, the

proportion of people buying their own home in most countries has risen, so that some two-thirds of European households now own their homes. Housing equity now considerably exceeds total European GDP. This book discusses questions like: to what extent might home ownership provide a potential cure for some of the consequences of ageing populations by realizing housing



Year 2011

Publisher: Springer

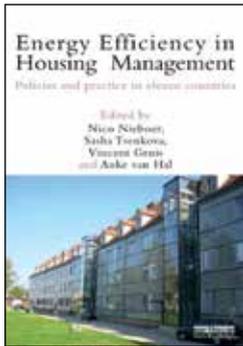
Pages 274

### THE MEASUREMENT AND ANALYSIS OF HOUSING PREFERENCES AND CHOICE

*Sylvia Jansen, Henny Coolen & Roland Goetgeluk (eds.)*

What are the current trends in housing? Is my planned project commercially viable? What should be my marketing and advertisement strategies? These are just some of the questions real estate agents, landlords and developers ask researchers to answer. But to find the answers, researchers are faced with a wide variety of methods that measure housing preferences and choices. To select and value a valid research method, one needs a well-

structured overview of the methods that are used in housing preference and housing choice research. This comprehensive introduction to this field offers just such an overview. It discusses and compares numerous methods, detailing the potential limitation of each one, and it reaches beyond methodology, illustrating how thoughtful consideration of methods and techniques in research can help researchers and other professionals



Year: 2012

Publisher: Routledge

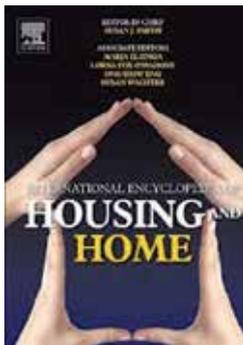
Pages: 256

## ENERGY EFFICIENCY IN HOUSING MANAGEMENT: POLICIES AND PRACTICE IN ELEVEN COUNTRIES

*Nico Nieboer, Sasha Tsenkova, Vincent Gruis & Anke van Hal (eds.)*

The embedding of energy efficiency in the management of individual housing organisations is crucial for the realization of current ambitious energy efficiency policies. This issue is examined for the first time in this book through an analysis of selected case studies in new 'green' buildings, as well as in the retrofitting of existing housing, maintenance and budgeting. The links between policy ambitions, practice and housing management institutions are given particular attention. Thus the book is primarily concerned with how ambitions about energy efficiency are carried forward in investment decisions at the housing estate level. Technical and financial issues relevant for this are also addressed.

The editors combine a wealth of experience in comparative research on housing policy and housing management with a strong academic background in housing studies and economics. The book aims to be internationally comparative including a range of countries. A chapter will be devoted to each of the following countries:- Sweden; Denmark; Germany; the Netherlands; England; France; Switzerland; Austria; Czech Republic; Slovenia; Canada. The book will appeal to a large audience of students and academics who are concerned with housing issues, urban policy and politics as well as to those engaged in research in energy efficiency policies in the built environment.



Year: 2012

Publisher: Elsevier

Pages: 3862 (electronic)

## INTERNATIONAL ENCYCLOPEDIA OF HOUSING AND HOME

*Susan Smith, Marja Elsinga, Ong Seow Eng, Lorna Fox O'Mahony & Susan Wachter (eds.)*

Available online via SciVerse ScienceDirect, or in print for a limited time only, "The International Encyclopedia of Housing and Home" is the first international reference work for housing scholars and professionals, that uses studies in economics and finance, psychology, social policy, sociology, anthropology, geography, architecture, law, and other disciplines to create an international portrait of housing in all its facets: from meanings of home at the microscale, to impacts on macro-economy. The editors have worked for almost

five years to secure the quality, reach, relevance and coherence of this work. A broad and inclusive table of contents signals (or testifies to) detailed investigation of historical and theoretical material as well as in-depth analysis of current issues. This seven-volume set contains over 500 entries, listed alphabetically, but grouped into seven thematic sections including methods and approaches; economics and finance; environments; home and homelessness; institutions; policy; and welfare and well-being.

## LCA-BASED ENVIRONMENTAL ASSESSMENT OF THE USE AND MAINTENANCE OF HEATING AND VENTILATION SYSTEMS IN DUTCH DWELLINGS

*Inge Blom, Laure Itard & Arjen Meijer*

### Publication Info

*Year:* 2010

*In:* Building and Environment, 45(11), 2362-2372

*Cited by:* 15

Buildings contribute significantly to the human-induced environmental burden. This comes not only from construction and demolition but also from activities throughout the operational phase - building maintenance and energy use for climate control. This paper describes how life cycle assessment (LCA) methodology can be applied to quantitatively assess the environmental performance of the use and maintenance of heating and ventilation systems. The studied climate systems include individual non-condensing boilers, condensing boilers and heat pumps on exhaust air for heating and hot tap water combined with either collective mechanical exhaust ventilation or individual balanced ventilation with heat recovery. This study shows that a heat pump causes the highest environmental burden of all the assessed climate systems due to the electricity

needed for operation, high material content of the system and the refrigerant used. If the electricity used by the heat pump is generated fully by local photovoltaic cells, environmental performance will improve, but not for all environmental impact categories. Climate systems that reduce energy demand for heating, such as ventilation with heat recovery, will reduce the environmental impact related to energy use for space heating. However, if the electricity used to operate the system increases, along with the material content of the systems and distribution networks, other environmental impact categories than those related to space heating will also increase. Finally, maintenance frequency and related transportation of maintenance workers have a marginal effect on total environmental impact.

## CONCEPTUALISING SOCIAL ENTERPRISE IN HOUSING ORGANISATIONS

*Darinka Czischkea, Vincent Gruis & David Mullins*

### Publication Info

*Year:* 2012

*In:* Housing Studies, 27(4), 418-437

*Cited by:* 11

Recent changes in the provision, funding and management of social housing in Europe have led to the emergence of new types of providers. While some of them can be portrayed with traditional 'state', 'market' or 'civil society' labels, many correspond to hybrid organisational forms, encompassing characteristics of all three in varying combinations. Nonetheless, evidence suggests that there is a 'common thread' linking these organisations together, namely their core missions and values, which can be classified using

the term 'social enterprise'. Despite the growing body of literature on social enterprise, this concept has been poorly defined and applied to the housing sector. This paper aims to address this gap through a critical literature review encompassing Europe and the United States. Existing models of social enterprise are reviewed and a classification system for social enterprise is developed to reflect the specific features of the social housing association sector and as framework for future research.

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## HOME ENERGY MONITORS: IMPACT OVER THE MEDIUM-TERM

*Sonja van Dam, Conny Bakker & Anke van Hal*

### Publication Info

Year: 2010

In: Building Research and Information 38(5), 458 -469

Cited by: 43

Home Energy Management Systems (HEMS), e.g. energy monitors, are intermediary products that can visualize, manage, and/or monitor the energy use of other products or whole households. HEMS increasingly receive attention for their role in energy conservation in households. A literature review and a case study examine the mid-term effectiveness (more than 4 months) of HEMS. The case study presents the results of a 15-month pilot with a domestic energy monitor in the Netherlands. It explores the extent to which participants manage to sustain their initial electricity savings over time, with a special focus on the development of habitual energy-

saving behaviour. The results show that the initial savings in electricity consumption of 7.8% after 4 months could not be sustained in the medium- to long-term. A second finding is that certain groups of people seem more receptive to energy-saving interventions than others. These participants quickly develop new habits and exhibit larger savings than other participants. Obviously, a 'one-size-fits-all' approach for home energy monitors cannot be justified. For HEMS to be effective, a deeper understanding is needed that embraces social science, contextual factors, usability, and interaction design research.

## OCCUPANTS' BEHAVIOUR: DETERMINANTS AND EFFECTS ON RESIDENTIAL HEATING CONSUMPTION

*Olivia Guerra-Santina & Laure Itarda*

### Publication Info

Year: 2010

In: Building Research and Information, 38(3), 318-338

Cited by: 26

What are the key determinants and effects of occupants' behaviour on energy use for space heating? Statistical analyses were carried out on energy use and self-reported behaviour data from a household survey in the Netherlands. Results showed that the number of usage hours for the heating system have a stronger effect on energy consumption than temperature setting. Small correlations were found between energy use and the ventilation system, since most households barely use the ventilation system. The main building characteristic determining behaviour is the type of temperature control. Households

with a programmable thermostat were more likely to keep the radiators turned on for more hours than households with a manual thermostat or manual valves on radiators. In relation to household characteristics, the presence of elderly persons in the household proved to be a determining factor in the use of the heating system and ventilation. As a result of wide variations in preferences and lifestyle, occupant behaviour has emerged as an important contributor to energy use in dwellings. The results indicate that the type of heating and ventilation system has an influence on occupant behaviour.

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**THE AFFORDABILITY OF HOUSING IN THE NETHERLANDS:  
AN INCREASING INCOME GAP BETWEEN OWNING AND RENTING?**

*Marietta Haffner, Harry Boumeester*

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**Publication Info**

*Year:* 2010

*In:* *Housing Studies*, 25(6),  
799-820

*Cited by:* 13

Housing became more expensive in the Netherlands between 2002 and 2006, a trend which has been demonstrated using various measures of affordability. The expenditure-to-income ratios calculated for households confirm that the average cost of housing rose for tenants and homeowners, as well as for most income groups generally. This contribution analyses the development of various components of household expenditure, which contributed to these higher ratios. One of the most important considerations here is the fact that average household disposable incomes either fell

(tenants) or remained stable (homeowners) during the four-year period under review. This leads to the question of whether these increasing income differences between renting and owning can be attributed to the business cycle alone, or whether they are part of a longer-term trend that will eventually result in a rental sector that provides housing for those on lower incomes. The findings suggest that a longer-term or structural widening of the income gap between renting and owning may indeed be taking place.

## KEY DISSERTATIONS



Year: 2010

Publisher: IOS Press

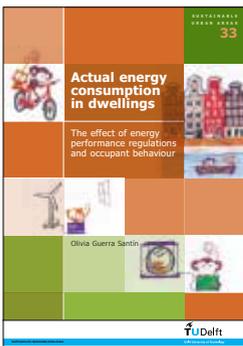
Pages: 204

### ENVIRONMENTAL IMPACTS DURING THE OPERATIONAL PHASE OF RESIDENTIAL BUILDINGS

*Inge Blom*

This publication analyses and compares these three causes of environmental burden and shows that material resources needed for replacements generally have a limited potential to reduce environmental impact. Reducing energy consumption for climate control and electrical appliances is much more effective. According to the author,

sustainable measures should be tested for shifts in the kind of environmental impact caused due to the use of alternative types of energy resources and altered material quantities. The sustainability of the electricity supply is essential to decrease the total environmental impact of the residential building stock.



Year: 2010

Publisher: IOS Press

Pages: 250

### ACTUAL ENERGY CONSUMPTION IN DWELLINGS: THE EFFECT OF ENERGY PERFORMANCE REGULATIONS AND OCCUPANT BEHAVIOUR

*Olivia Guerra Santin*

This research addresses the effect of energy performance regulations and occupant behavior on energy consumption for space and water heating in dwellings built after the introduction of the energy performance regulations in the Netherlands. The results of this research show that improving the energy efficiency of buildings alone is not

enough to decrease that energy consumption. The large differences found in the use of dwellings indicate that, especially in energy efficient houses, occupant behavior provides an opportunity for further reductions in the energy consumption for space heating which could boost the efforts to conserve energy worldwide.



Year: 2010

Publisher: IOS Press

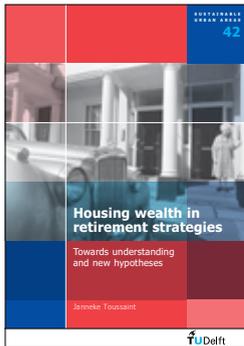
Pages: 232

### DIVERGENCE IN EUROPEAN WELFARE AND HOUSING SYSTEMS

*Joris Hoekstra*

The book explores the relationship between the characteristics of the welfare state and the characteristics of the housing system (housing policies, housing outcomes and housing market developments) in different European countries. It consists of a theoretical framework, six published articles and a concluding chapter. All six articles use the welfare state regime theory and typology of Esping-Andersen and/or the housing system typology of Kemeny, or at least some aspects of these, as an

explanatory framework. The results of the investigations indicate that there are considerable differences between the various European housing systems. As far as this is concerned, especially the Southern European countries occupy a rather distinct position. For this reason, two articles in the study specifically focus on the Southern European housing system of Spain. The book is relevant for both academics and policy-makers who are interested in international housing and housing policy developments.



Year: 2011

Publisher: IOS Press

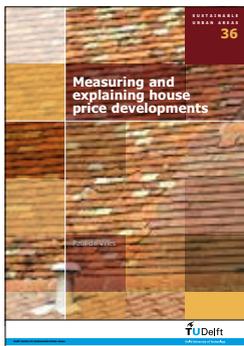
Pages: 250

## HOUSING WEALTH IN RETIREMENT STRATEGIES. TOWARDS UNDERSTANDING AND HYPOTHESES

*Janneke Toussaint*

What is the current role of housing wealth in household retirement strategies across the European Union member states, and could this role be extended? The existing theory shows that owning one's own home can be regarded as a form of pension: once the mortgage has been repaid, housing expenses are substantially lower and housing wealth can also be cashed in, either by selling or using equity release schemes. However, converting housing assets into cash is a

much less common strategy than expected. This book contributes to existing knowledge by relating household strategies to broader national contexts. The countries included in the study are Belgium, Finland, Germany, Hungary, Portugal, Slovenia, Sweden and United Kingdom, while the Netherlands is the subject of particular attention. The study suggests that owner-occupation is not the clear-cut solution that governments might have hoped for.



Year: 2010

Publisher: IOS Press

Pages: 226

## MEASURING AND EXPLAINING HOUSE PRICE DEVELOPMENTS

*Paul de Vries*

This study discusses ways of measuring and explaining the development of house prices. The goal of the research underpinning this dissertation was to develop a methodological framework for studying these developments. To explain and predict changes in prices, a house price model is presented. As suggested in literature on western housing markets, the Dutch house price developments can be

explained by demand-oriented short-run term variables and a long-run term variable. Using the house price model, this work identifies the fundamental factors in the development of house prices, a long-run equilibrium between interest payments and income, and the weak relationship on an aggregated level between house prices and newly built dwellings.



Year: 2011

Publisher: TU Delft

Pages: 312

## KLANTGESTUURD VOORRAADBELEID EN EMPOWERMENT: OVER TE WOON EN ANDERE INITIATIEVEN VAN WONINGCORPORATIES

*Sake Zijlstra*

Central to this dissertation are client driven housing management from housing associations in The Netherlands and the empowerment effects this management has on its tenants. The central issue includes what client driven housing management is (definition), in which ways this can be devised, what the envisioned effects are and

which effects this management successfully accomplishes. The provisions in the contracts, such as reduced price and shared risks, cater for more differentiated homes in the housing stock. The owner occupiers profit both directly considering authority and economical empowerment.

**COMPARATIVE HOUSING RESEARCH CONFERENCE, APPROACHES AND POLICY CHALLENGES IN A NEW INTERNATIONAL ERA**

**Info**

*Date:* 2010, March 24th-25th  
*Place:* Delft

A joint event between the European Network for Housing Research (ENHR) Working Group on Comparative Housing Policy and the Asia-Pacific Network for Housing Research (APNHR). Marking the re-launch of the European Journal of Housing Policy as the International Journal of Housing Policy. The conference addressed questions such as:

- What are the implications of the economic downturn for housing policy in different parts of the world?

- What are the benefits and dangers, of housing policy transfer between countries?
- What role can and should international agencies play in housing policy transfer?
- How can current developments in quantitative and qualitative techniques contribute to robust comparative housing research?
- What difference has comparative housing research made to policy development both within and across countries? What more could it contribute?

**CONGRESS HOUSING QUALITY 2020 (WK2020): ENERGY AND HOUSING QUALITY**

**Info**

*What Moves the People in the Non-profit Housing Associations Sector?*

*Date:* 2011, March 29th  
*Place:* Utrecht

Unlike many other events, this one is not just about one-way knowledge transfer. The basis for knowledge transfer is laid by individual positive experiences. This is why the focus of this event is on a joint approach: professionals from the field come together to jointly address the problems as outlined. A process-oriented approach and feedback in small groups provide useful solutions that can be

developed further during workshops. The final result of the event will be a collection of ideas coming from all participants. This will serve as an extra impulse to promote the participants' sense of involvement and commitment and to encourage them to take what they learn during the event back to their home organisations for use there.

**Info**

**START HOUSE VALUE EXPERTISE CENTRE**

*Date:* 2012  
*Place:* Delft

The aim of the housing value expertise centre is bundling and adding to existing scientific knowledge in the area of establishing a house's value, explaining and predicting price developments, and estimating risks in the housing market. State-of-the-art scientific insights are translated into solutions to societal and policy questions. These questions are determined in consultation with the other

participants in the expertise centre. The House Value Expertise Centre of OTB (The Faculty of Architecture and The Built Environment, TU Delft) and RTL Z jointly present the 'RTL Z Huizenindex' (house price index), an overall indicator which shows the current climate on housing market at a glance.



## Earning capacity

### b.1 Success and vision on how to obtain research projects

The Housing group has a long tradition in seeking opportunities to perform contract research. In recent years, the focus on large-scale projects has provided opportunities for tenured staff as well as PhD students. The group was successful in participating in many projects carried out for the European Commission (see 8.2). This success is due to our strong network and good reputation. The vision of the group is to maintain and extend the network and to focus on partners that have a good reputation and good cooperation skills. The group is actively seeking new opportunities and exploring possibilities, for example in Horizon 2020. The group also has a strong network in the Netherlands. This network is used for research

projects and to build consortia that enable more strategic research and also PhD projects. The recently launched Expertise Centre for House Value is an example of this.

To summarize, the group is maintaining and extending its network of researchers, possible funders and users of research results, and always has an open eye to combine research ambitions and funding opportunities.

### b.2 Overview of top-5 projects

- BEEM-UP: Building Energy Efficiency for Massive market Uptake (FP7 - EeB-Energy.2010.8.1-2 - 260039)
- DEMHOW: Demographic Change and Housing Wealth (FP7-SSH-2007-216865)
- NEUJOB: Creating and adapting jobs in Europe in the context of a socio-ecological transition (FP7-SSH-2010-266833)
- SHELTER: Social Housing organizations and European professionals Linked and acting together for Testing and promoting professionals coordination in Energy Renovation (IEE/09/707/SI 2.558240)
- SuslabNWE: Creation of a networked infrastructure for innovation on sustainability in the home environment that enables user-centred testing and development in a living laboratories and testing houses at 5 locations. (Interreg IVB North West Europe -2012).

Table a. Research funding

FUNDING	2010		2011		2012	
	K€	%	K€	%	K€	%
Direct funding	1.220	49%	1.385	52%	1.090	55%
External funding	1.286	58%	1.303	56%	946	54%
<b>TOTAL FUNDING</b>	<b>2.506</b>	<b>100%</b>	<b>2.688</b>	<b>100%</b>	<b>2.036</b>	<b>100%</b>
EXPENDITURE	K€	%	K€	%	K€	%
	Staff costs	1.755	63%	1.625	65%	1.409
Other costs	1.042	37%	888	35%	654	32%
<b>TOTAL EXPENDITURE</b>	<b>2.797</b>	<b>100%</b>	<b>2.513</b>	<b>100%</b>	<b>2.063</b>	<b>100%</b>



Renovation to passive house level.  
Kroeven, Roosendaal.

# 7

## Valorisation

### 7.1 Means used to transfer knowledge

The TU Delft website is the first platform on which research outcomes are announced and presented. Once research projects are completed, the main results are presented in a press release, which is sent to a long list of press agencies. This leads to many reports being published in journals and newspapers, invitations for interviews and presentations, and the commissioning of new research. We also present our results at national conferences and courses for professionals.

Moreover, researchers are invited:

- to participate in debates [on conference in journals for practitioners, television and radio.
- to attend conferences
- to contribute to journals for practitioners
- to be interviewed for television and radio programmes.

We also provide several four-day courses for practitioners on, for example, strategic portfolio management, recent developments in the housing market, the professional maintenance of housing stocks, and developments and risks of the owner-occupied market. Finally, we recently developed the NRP Academy, a one-year course for professionals who want to educate themselves to be able to effectively act in contemporary refurbishment practice (in cooperation with the National Refurbishment Platform).

### 7.2 Users of the knowledge

Our conferences and courses always attract a large number of participants. Professional books and reports are distributed widely. Commissioners – such as umbrella organizations for housing associations, municipalities, the building industry and the ministry of the interior – keep coming back to us with requests to join consortia and to initiate new projects.



Renovation to passive house level.  
Kroeven, Roosendaal.

### 8.1 Topics

All PhD candidates focus on a particular topic within the field of housing and have a place in one of the four sub-programmes (Housing Market, Housing Governance, Housing Maintenance, and Housing Quality). Current and recently completed PhD projects are:

- Samson Aziabah, Housing management strategies for Ghana
- Gerard van Bortel, Understanding neighbourhood generation governance: the role of housing associations in UK and the Netherlands
- Henk Brinksma, Future-proof housing refurbishment
- KyungHo Choe, Housing regime change in South Korea: an institutional approach
- Darinka Czischke, Social housing enterprise in Europe
- Sonja van Dam, Smart energy management for households
- Wenjing Deng, The impact of Public Rental Housing to the life strategy of tenants: A Case Study of Chongqing, China
- Faidra Fillipidou, Realising energy efficiency in the housing stock
- Rosa Donoso Gomez, Low income home owners in condominium tenure, Latin American Case studies
- Yunlong Gong, Evolution and equilibrium of spatial structure of intercity house prices in urban agglomerations in China
- Mariette Heemskerk, Leadership in Dutch housing associations (defence October 2013)
- Harry van de Heijden, West European Housing Systems in Comparative perspective
- Tasos Ioannou, Comfort related behaviour for predicting heating and electricity use
- Reinier van der Kuij, Organisation of real estate development within housing associations
- Christian Lennartz, Competition between social and private rental housing (finished February 2013)
- Dasa Majcen, Actual energy use in dwellings
- Erwin Mlechnik, Innovation development for highly energy-efficient housing (finished March 2013)
- Lorraine Murphy, Energy use in existing housing, exploring regulations and incentives for improved performance
- Arne Overmeeren, Area-based asset management strategies for housing associations
- Martin Roders, Implementation of climate change adaption in social housing through an innovated building process
- Tadeo Baldiri Salcedo Rahola, Integrated energy renovations in social housing
- Milly Tambach, Policies to improve the private housing stock
- Qi Tu, Improving house prices models
- Marieke Venselaar, Bottom-up implementation of supply chain partnering within Dutch housing associations
- Eefje van der Werf, Stimulation of sustainable housing refurbishment through innovative tendering models and system adaptations
- Winston Wilgo Wirth, The mortgage market in Suriname
- Zack Zairul, A model for flexible and affordable housing production in Malaysia
- Vacancy, The risks of home ownership; measurement and analysis

## 8.2 Supervision

PhD students always have at least one supervisor and one day-to-day supervisor/mentor. Policies on the supervision and mentoring of PhDs have been formulated at the Graduate School of Architecture and the Built Environment and in greater detail at research group level. All senior staff members have followed a course on supervising and mentoring, which is now subject to peer-review sessions several times a year.

## 8.3 Success rates

Our PhD students used to work part time and take a lot more than four years to complete their projects. Since 2008, we offer only full-time PhD positions. The success rate of this new generation is rather satisfactory, and most PhD students finish in about 4.5 years.

## 8.4 Resources

The objective is to have at least four PhDs per year completing a dissertation and to recruit four new PhDs. Candidates for our groups are members of the Graduate School for Architecture and the Built Environment (GS A+BE) and can also be members of the national research school NETHUR. They follow an education plan to develop the skills and tools necessary for carrying out PhD research. Since 2011, they are members of GS A+BE, which is part of the Delft Graduate School.

## 8.5 Funding

The PhD projects are funded in various ways: scholarships from other countries, from the Dutch organization providing scholarships to international students (NUFFIC), EU projects or other funders such as the Netherlands Bureau for Statistics. The Housing group is always active in exploring opportunities for larger research projects in which there is room for PhD projects. See also 8.1 and 5.3.

## 8.6 Attractiveness

The number of applications from candidate PhD students with a scholarship is evidence that the Housing group is attractive to prospective students. Particularly housing sustainability and housing affordability are popular topics. We aim to increase the visibility of the group and our research ambitions by actively promoting them through our website, contact persons in various parts of the world and the Institute for Housing Studies, which provides Master's courses for scholarship students from Latin America and Africa.

# 9

## SWOT-analysis

### STRENGTHS

The multidisciplinary approach and the broad scope of the field housing make the Housing programme unique. The group is able to lead or join projects that address a range of complex societal problems and challenges in the field of housing. At the same time, the group manages to combine practice-orientated research very well with the production of scientific output in highly ranked journals. The group is well known for its expertise, and several members of the group are on the boards of scientific journals. The group has a strong network and is often invited to join consortia.

### WEAKNESSES

The choice for the multidisciplinary approach results in a focus on multidisciplinary teams working on strategic and applied research, unavoidably implying not to focus on fundamental mono-disciplinary projects and outputs. This implies little chance on success for application for grants from scientific research councils such Netherlands Organisation for Scientific Research (NWO) and the European Research Council (ERC). Another weakness of the funding model is the high pressure on the staff to combine scientific publication with attracting and executing contract research. A final weakness is the label 'Housing'.

### OPPORTUNITIES

The merger of the Housing Systems and the Housing Quality group makes the group more complete and provides new opportunities to address societal challenges and to apply for funding. The graduate school and the attractiveness of the research programme for PhD students with a scholarship, create opportunities to attract PhD candidates with projects that match our research ambitions. Knowledge of housing is of key relevance to the sustainability and the economic and social agenda of governments both in and outside Europe. So there will be need for knowledge of housing in the coming decades, which will be addressed in such programmes as Horizon 2020.

### THREATS

Despite the many opportunities, the lack of funding of research is a continuous threat to the group. The budget of the university is under pressure, as are major research budgets; moreover, the competition for funding is becoming harder and harder. Another threat is the new situation at TU Delft, which has streamlined processes of, for example, finance and human resource management. This streamlined processes leaves less room for tailor-made decisions that are required to reach our research aims. Finally, there is an age gap between the senior researchers and the new generation of PhD students, and this uneven age distribution threatens the continuity of the research group.

### 10.1 Strategic planning

In January 2013, we started the Housing research programme as a joint endeavour in the Faculty of Architecture and the Built Environment to continue our collaborative research. We have a well-defined research area and (at the moment) a healthy financial situation. Moreover, the group is considered attractive to PhD students with a scholarship. If the university continues to reward scientific performances as it did during the previous period, we will have a very good chance of achieving our ambitions. These are:

- to continue to hire at least four PhDs a year,
- to further improve the quantitative and qualitative production of articles in peer-reviewed journals,
- to improve our visibility in the international scientific arena.

This will require substantial resources from national and EU subsidy programmes and contract research, but this is a challenge we are rather confident we can handle. However, if the university's direct funding were to be reduced, we would have to decrease the size of the group, reduce our research area and downscale our ambitions.

### 10.2 New research topics and their prospects

The groups have so far been mainly oriented towards Europe and Australia. The new challenge arising from the graduate school and the scholarship PhD students implies research projects based in countries outside Europe. We will extend our knowledge to housing problems and solutions in Asian, African and Latin American contexts. We will put effort into attracting PhD projects that closely match our research aims and into creating an inspiring research environment.

### 10.3 Flexibility

The majority of the staff is non-tenured and therefore the group is flexible. If necessary for financial reasons, we will need to reduce the size of the group and downscale our research ambitions. The group has proven to be flexible by building in existing knowledge and keeping the main track, while moving with the policy agenda in order to qualify for the necessary funding.



Renovation to passive house level.  
Kroeven, Roosendaal.

# URBAN STUDIES &



# URBAN & REGIONAL STUDIES

RESEARCH LEADERS: Prof. Maarten van Ham PhD, Prof. Willem Korthals Altes PhD, Kees Maat PhD & Prof. Wil Zonneveld PhD

### 1.1 Scientific aims

Urban and Regional Studies is about the interrelationships between everyday social and spatial patterns, growing complexities, and the governance of neighbourhoods, cities and regions. The programme has four sub-programmes:

- Governance of land development is about the interaction between planning, property rights and property markets, and the governance of the relationship between the private interests of landowners and common societal goals;
- Territorial governance studies the policy, politics and administration of territory and how cooperation and collaboration both between different parts and levels of government and between governmental and non-governmental actors are being shaped;
- Urban and neighbourhood change investigates neighbourhoods and cities as changing social sites and as sites of governance and civic action, including the effects of neighbourhoods on residents and how residents affect neighbourhood stratification;
- Urban systems and transport studies how the built environment interacts with spatial and transport behaviour, how this influences urban performance, and how these interactions can contribute to more competitive, sustainable and liveable cities.

### 1.2 Where do you stand?

The new Urban and Regional Studies research programme was formed out of three previous programmes that operated independently until 2013:

*Neighbourhood Change and Housing* (which in the period 2003–06 was called Urban Renewal and Housing) concerned the ways in which residential districts are ordered, organized and lived as everyday realities in a changing urban world. This programme has been transformed into the Urban and neighbourhood change sub-programme.

*Urban and Regional Development* dealt with the interrelationships between the ever growing complexity of urban systems and the extent to which the development of these systems can be influenced through policies and governance. Its two research themes have been remodelled to form two separate sub-programmes. Firstly, spatial development – which focused on how the functioning of the spatial system affects the basic aims of spatial policy, social wellbeing, economic competitiveness and environmental sustainability – has been reconceptualized to the *Urban systems and transport* sub-programme. Second, spatial governance – which focused on the evolution of spatial planning systems and practice, the spatial implications of European policies and comparative planning methods – has been developed into the Territorial governance sub-programme.

*The Governance of Geoinformation and Land Development* – which had the mission to improve the knowledge available for effective land management – has been divided between the Urban and Regional Studies programme and the Geoinformation Technology and Governance programme. Research in the former theme Land Development and part of research in the former theme Land Tenure and Property rights have been consolidated in the Land Development sub-programme.

### **1.3 Where do we want to be next?**

We aim to contribute to fundamental discussions about current and future changes in the politics and practices of territorial governance, urban and neighbourhood change, governance of land development and urban systems and transport, as well as their implications on various scale levels. We intend to become an international centre of excellence in these fields. We will consolidate and extend our international academic reputation, continue to focus on the publication of our work in international peer-reviewed journals, and increase our presence in international consortia. We want to contribute to solving some of the contemporary issues in our cities and regions. We aim to generate knowledge about the preconditions, supporting contexts and barriers to urban regeneration and transformation. We want to contribute to the development of competitive, sustainable and liveable cities. Based on this, we also want to contribute to policy discourses in these fields. As neoliberal approaches tend to dominate, we especially focus on the issue of the inclusiveness of spatial strategies and interventions, both in terms of actors and in terms of sustainability and competitiveness effects.

More operational ambitions are to:

- Publish influential papers in international peer-reviewed academic journals
- Combine research with a direct application in a practical context with scientific reflection on the issues involved
- Maintain a proper balance between our position as an important national player and involvement in international networks
- Deliver several PhDs a year within the programme
- Participate in international research networks
- Stimulate more scientific debate and joint projects between sub-programmes
- Build further relationships within the Faculty of Architecture and the Built Environment.

## 2

## Composition

Table a. Research staff at institutional and programme level

	2010		2011		2012	
	NR	FTE	NR	FTE	NR	FTE
Tenured staff	19	11	22	11.67	21	12.96
Non-tenured staff	9	3.32	4	2.14	6	2.83
PhD students	3	2.05	6	3.3	6	3.12
Guests	7	0	12	0	15	0
<b>TOTAL RESEARCH STAFF</b>	<b>37</b>	<b>16.27</b>	<b>40</b>	<b>15.41</b>	<b>44</b>	<b>17.21</b>

# 3

## Research environment and embedding

### 3.1 International and national positioning

In the areas of our sub-programmes – that is, governance of land development, territorial governance, urban and neighbourhood change, and urban systems and transport studies – we have a strong international position and reputation. This is evidenced by:

- a large number of invited talks in Europe and beyond;
- a large number of invitations to participate in international or European research proposals;
- invited and financed stays of scientists as guest at other universities;
- a substantial and increasing number of citations of our work in scientific journals;
- a recent series of edited books with established scientific editors and the editing of theme issues in established scientific journals;
- successful bidding to host or co-host international scientific conferences and seminars.

The programme contributes to a variety of networks and collaborations. International networks in which researchers of the programme participate, and execute coordination tasks, are the:

- Association of European Schools of Planning (AESOP);
- European Network of Housing Research (ENHR);
- International Academic Association on Planning Law and Property Rights (PLPR);
- Regional Studies Association (RSA);
- Network on European Communications and Transport Activity Research (NECTAR);
- World Society for Transport and Land Use Research (WSTLUR).

The research group also contributes to collaboration networks facilitated by European institutions, such as the Seventh Framework Programme. The group is currently preparing to participate in networks for Horizon 2020.

### 3.2 Collaboration with stakeholders

Most of our research projects involve, or are in collaboration with policy and practice stakeholders in the field of urban and regional studies, including Platform 31, housing associations, local, provincial and national authorities, consultants, rail operators, civic organizations and environmental groups. We give advice to all levels of government, including the cabinet minister responsible for housing in the Netherlands, and through our work in European research projects we also advise governments in other countries as well as the European Commission. We carry out a number of applied research projects that have the objective to support transnational learning and decision-making by both central and local governments on issues ranging from strategic investment projects to strategies to EU policies with clear or potential territorial impact. We also carry out fundamental research and discuss the results with potential end users.

Examples of collaboration are joint projects with the ministries of the Interior and Kingdom Relations (BZK), infrastructure and the environment (I&M), with civic organizations (e.g. the national organization of residents of deprived neighbourhoods, Landelijk Samenwerkingsverband Aandachtswijken), local authorities and housing associations. We regularly organize knowledge exchange courses and seminars aimed at a mixed audience of policymakers, practitioners and academics.

### 3.3 Participation in consortia

In recent years, we have built up an extensive international academic network on the basis of both fundamental and applied research projects. We participate as partner, work package leader or lead beneficiary in Framework 7, Joint Programming Initiative, ESPON and INTERREG projects. We have built up an extensive international academic network and participate in various national and international consortia. The following are some examples

- The Sustainable Urban Metabolism in Europe (SUME) network and FP7 programme coordinated by the Österreichisches Institut für Raumplanung (ÖIR) in Vienna.
- The TENLAW network and FP7 programme (coordinated by the University of Bremen, Professor Christoph Schmid) of legal scientists researching tenure law in the European Union, including relationships with the organization of the welfare state in which we also cooperate with OTB's Housing programme.
- The DIVERCITIES network and FP7 programme (which we co-coordinate, but for which the University of Utrecht, Professor Ronald van Kempen, is the principle coordinator) on the governance of urban diversity.
- A large programme with nearly 30 participants, funded by the Social Sciences and Humanities Research Council of Canada (SSHRC), on Neighbourhood Inequality, Diversity, and Change: Trends, Processes, Consequences, and Policy Options for Canada's Large Metropolitan Areas, coordinated by the University of Toronto (Professor David Hulchanski).
- The NWO CONTEXT project together with the University of Amsterdam (lead partner) and Utrecht University, Université Paris-Est Marne-la-Vallée, and University of Liverpool.
- We have also participated in a consortium on a Creative City Challenge within the INTERREG IVB programme North Sea Region. The research programme has participated in a large variety of programmes funded by Platform 31 (and its predecessor NICIS) for which many consortia were established with other universities (including the University of Glasgow) and policy and practice partners (such as housing associations). Topics studied in this context are "waterbed" effects (the extent to which urban regeneration in one neighbourhood leads to moving problems to other areas), social mobility, best persons in urban regeneration, and the role of the middle class in urban regeneration. The programme participates in an international consortium organizing a funded seminar series in the UK and the Netherlands.
- The programme has cooperated with other university institutions (including Professor Bert van Wee's group at the Faculty of TPM) in several NWO-funded projects on the relationships between transport and land use. Topics addressed by these projects include transit-oriented development, effects of time on travel behaviour, the Randstad area, and electric mobility. In this field we will organize the 2014 symposium of the World Society on Transport and Land Use Research.
- We participate in networks around ESPON (currently known as the European Observation Network for Territorial Development and Cohesion) and have so far contributed to nine research projects within this network. We have, for example, good relationships with Nordregio, the Nordic Centre for Spatial Development, with which we also cooperate in editing the European Journal of Spatial Development. These networks also fuel the making of consortia for the Joint Programming Initiative Urban Europe.
- We have also cooperated in URBANET networks, such as a network focussing on Sustainable Land Use Policies for Resilient Cities (with Middle East Technical University, Ankara, Universidade do Porto, Technical University of Lisbon and Nordregio, Stockholm).
- Outside the mentioned consortia, we actively collaborate with a range of individual academics from the USA, Canada, Turkey, Belgium, Denmark, Norway, Poland, Sweden, Finland, Germany, Portugal, Spain, Greece, the UK, Estonia and Lithuania. In various of the projects mentioned above, we have worked together with colleagues from other departments of the faculty, Urbanism in most cases.



Modern transport

### Invitations to address major conferences

YEAR	CONFERENCE	WHO	WHERE
2012	IFHP-AESOP Lecture, 20th Century Foundations of European Planning at the Sorbonne	Faludi	Paris FR
2011	Neighbourhood Effects Research, Dép Questions Sociales, Centre d'Analyse Stratégique & French General Secretariat of the Inter-ministerial Committee for Cities (SG CIV)	Ham	Paris FR
2012	Addressing Urban Injustice – Lessons from Europe, Cities Centre, University of Toronto	Ham	Toronto CA
2011	Pre-advise on Energy and Ownership for the Dutch Association for Energy Law	Ploeger	Zoetermeer NL

### Conference organisation activities

YEAR	CONFERENCE	ROLE	WHO	WHERE
2010	Two-day Conf on Neighbourhood Restructuring and Resident Relocation	Organisation	Kleinhans, Doff, Swarttouw-Hofmeij	Delft NL
2010>	Two Workshops on 'Soft Spatial Planning' and 'Territorial Governance in Europe', at HafenCity Universität Hamburg	Organisation	Waterhout, Stead	Hamburg DE
2010>	Sessions at the European Network for Housing Research (ENHR) Conferences in Lillehammer (2012), Toulouse (2011) and Istanbul (2010)	Organisation	Van Ham, Groetelaers, Korthals Altes	Istanbul TR Toulouse FR Lillehammer NO
2012	Conf Regional Studies Assoc, "Networked Regions and Cities in Times of Fragmentation: Developing Smart, Sustainable and Inclusive Places"	Organisation	Zonneveld, Meijers, Stead	Delft NL

### Involvement in scientific or professional event

YEAR	EVENT	ROLE	WHO	WHERE
2010/11	Plandag [Annual Dutch-Flemish Meeting of Academics and Professionals in the Field of Spatial Planning]	Organisation	Waterhout	Brussels BE
2010>	Meetings and Seminars by the Werkgroep Ruimte [Territory Working Group] of the BNSP, the Org of Dutch Planners and Urban Designers	Organisation	Waterhout	Amsterdam NL
2012	Presentation (in Dutch) on the Dutch Municipalities Act, Colloquium 'Voorkooprechten - Koop of onteigening?' [Pre-emptive purchase rights - amicable or compulsory purchase?],	Speaker	De Wolff	Bilzen BE
2012	Presentation at the Inaugural Conf of the Assoc of Notary "Drijvend Bouwen na 15 januari 2010" (Floating Building after 15/01/2010)	Speaker	Ploeger	Utrecht NL
2012	Conf on Housing and Care together with BOB advies, Aedes and Actiz	Organisation	Van Ham	Delft NL

### Prizes, awards, competitions

YEAR	PRIZES, AWARDS, COMPETITIONS	ISSUER	WHO	WHERE
2010	Regional Studies Association Award for Best International Paper	Reg Studies Assoc	Faludi	Pécs HU
2011	'Bene Merenti' awarded by the Univ Senate of Bucharest	'Ion Mincu' Univ	Faludi	Bucharest RO
2010	Hudig Penning for his Contrib to Housing and Spatial Development	Nirov	Priemus	The Hague NL

### Honorary positions

YEAR	INSTITUTE	POSITION	WHO	WHERE
2010-12	Foundation for the Advancement of Notary Science (Stichting tot Bevordering der Notariële Wetenschap)	Member Board of Supervision	Ploeger	Amsterdam NL
2010-12	Faculty of Law, VU University	Honorary Professor	Ploeger	Amsterdam NL

### Evaluator of research programme

YEAR	PROGRAMME	ROLE	WHO	WHERE
2012	Social Sciences and Humanities Research Council of Canada (SSHRC)	Evaluator	Van Ham	Ottawa CA
2012	NWO, Veni as well as Vidi Committees Social Sciences (MaGW)	Evaluator	Zonneveld	The Hague NL
2011	Vienna Science and Technology Fund (WWTF)	Evaluator	Van Ham	Vienna AT
2011	Research Foundation Flanders (FWO), Expert panel 'Science and Technology of Constructions and the Built Environment' (W&T9)	Evaluator	Zonneveld	Brussel BE
2010-12	Peer Review College Economic and Social Research Council (ESRC)	Evaluator	Van Ham	Swindon UK

### Editorship academic journal

YEAR	JOURNAL	ROLE	WHO	WHERE
2010-12	European Journal of Spatial Development	Co-editor-in-Chief	Zonneveld	Stockholm SE
2010-12	Journal of Housing and the Built Environment	Editor	Tasan-Kok	Delft NL
2010-12	International Journal of Law in the Built Environment	Editor	Ploeger	Bingley UK
2012	European Journal of Transport and Infrastructure Research	Advisory board	Stead	Delft NL
2012	Journal of Planning Education and Research	Advisory board	Stead	Thousand Oaks US
2012	Planning Practice and Research	Advisory board	Stead	Abingdon UK
2010-12	European Planning Studies, International Planning Studies, Journal of European Spatial Development, DISP, Planning Theory	Advisory board	Faludi	[Various]

### Editorship professional journal

YEAR	JOURNAL	ROLE	WHO	WHERE
2010-12	Vastgoedrecht	Editor	Groetelaers	Zutphen NL
2010-12	Rooilijn	Editor	Heinen	Amsterdam NL
2010-12	Real Estate Research Quarterly	Editor	Louw	Amsterdam NL
2010-12	Ruimte & Maatschappij	Editor	Waterhout	Apeldoorn NL
2012	Tijdschrift Vervoerswetenschap	Editor	Priemus	Amsterdam NL

### 5.1 Societal/scientific quality and relevance of the research

#### *Societal relevance and quality*

The research programme is positioned in the context of TU Delft, involving that “it seeks to answer utility-driven questions in a fundamental way” (TU Delft, 2012, Roadmap 2020, p. 47). So by default, most of our research is driven by its societal relevance. Increased understanding of competitive, sustainable and liveable cities and regions, territories and neighbourhoods is highly relevant, especially as this programme addresses these aspects in relation to governance and planning. It provides insights in the interactions between authorities and market players and also between institutions and people in a day-to-day living environment.

#### *Scientific relevance and quality*

The scientific relevance of the field of urban and regional studies is illustrated by the quantity and quality of research outlets in this thriving interdisciplinary field of research. For example, Thomson Reuters’ Web of Science defines a subcategory Urban Studies with 37 journals publishing 1621 articles in 2011. Planning and Development (54 journals, 2359 articles), Environmental Studies (89 journals, 5115 articles) and Transportation (24 journals, 1505 articles) are also interdisciplinary, partly overlapping subcategories addressed by this programme. Apart from these interdisciplinary subcategories, there are also mono-disciplinary subcategories, such as Geography or Sociology, that are addressed by this programme. Moreover, only part of the lively scientific debate in this research programme is discussed in journals covered by Thomson Reuters’ Web of Science. Many relevant journals are traditionally not covered by the Web of Knowledge database, but there are also other means of publication in the field of urban and regional studies, such as contributions to books.

The scientific relevance of our programme can also be illustrated by some of the lively academic debates that take place in areas covered by this research programme and to which we contribute.

**Table a. Main categories of research output**

	2010		2011		2012	
	STAFF	GUESTS	STAFF	GUESTS	STAFF	GUESTS
Refereed articles	29	6	29	1	36	0
Non-refereed articles	1	0	3	0	0	0
Books	11	1	7	0	6	0
Book chapters	24	2	20	4	34	2
PhD theses	3	0	2	0	0	0
Conference papers	32	4	41	4	64	3
Professional publications	25	1	24	2	30	2
Editorships journals/book	10	0	9	0	15	0
<b>TOTAL PUBLICATIONS</b>	<b>136</b>	<b>14</b>	<b>135</b>	<b>11</b>	<b>185</b>	<b>7</b>

## 5.2 Key indicators

The programme published 101 refereed articles in 2010-12, of which 62 were published in the following Web of Science database of Thomson Reuters listed peer-reviewed academic journals:

- Building Research and Information;
- Cities;
- DISP;
- Environment and Planning A;
- Environment and Planning B: Planning and Design;
- European Journal of Population;
- European Planning Studies;
- Habitat International;
- Housing Policy Debate;
- International Journal of Urban and Regional Research;
- Journal of Cleaner Production;
- Journal of Housing and the Built Environment;
- Journal of Transport Geography;
- Journal of Urban Affairs;
- Journal of Urban Planning and Development;
- Land Use Policy;
- Maritime Economics & Logistics;
- Open House International;
- Population, Space and Place;
- Regional Studies;
- Research Policy;
- Sociological Review;
- Technological Forecasting and Social Change;
- Technology Analysis & Strategic Management;
- Tijdschrift voor Economische en Sociale Geografie;
- Transport Policy;
- Transport Reviews;
- Transportation Research, Part D: Transport & Environment;
- Transportation Research, Part E: Logistics and Transportation Review;
- Transportation Research Record;
- Urban Studies;

Thirty-eight more papers were published in the following other peer-reviewed academic journals:

- B en M: tijdschrift voor beleid, politiek en maatschappij;
- Built Environment;
- Cityscape;
- Environmental Innovation and Societal Transitions;
- Etudes Foncières
- European Journal of Spatial Development;
- Housing, Theory and Society;
- International Journal of Housing Policy;
- International Journal of Knowledge-Based Development;
- International Planning Studies;
- Journal of Ethnic and Migration Studies;
- Journal of Legal Affairs and Dispute Resolution in Engineering and Construction;
- Journal of Urban Design;
- Journal of Urban Regeneration and Renewal;
- Planning Practice and Research;
- Planning Theory & Practice;
- PropertyNL Research Quarterly;
- Ruimte & Maatschappij;
- Stadsgeschiedenis;
- Studia i Materialy Towarzystwa Naukowego; Nieruchomosci;
- Territorium;
- Tijdschrift Vervoerswetenschap;
- Tijdschrift voor Bouwrecht;
- Town Planning Review;
- Urban Design and Planning;
- Urban Planning International (Guoji Chengshi);
- Urban Research & Practice;
- Urban Studies Research;
- Urban Transport of China (Chengshi Jiatong);
- WPNR.

The programme has also resulted in numerous books, edited volumes and book chapters with publishers like Edward Elgar, Elsevier, IOS-Press, Routledge, SAGE, Springer and Techne Press.

## 5.3 Results and outputs

### KEY PROJECTS

#### TANGO

##### *Territorial Approaches for New Governance*

#### Programme

ESPON-European Observation Network for Territorial Development and Cohesion

Grant: € 749.849

Role: partner (for € 167.000)

Principal researcher: Dominic Stead

Coordinator: NORDREGIO, Stockholm

Duration: 2011-2014

The project focuses on how territorial development is organised and managed across Europe's member states. It provides an overview of recent trends as well as detailed examples of territorial governance from a multi-level, a multi-sector and a multi-actor approach. The research considers the potential role of spatial planning instruments

and other instruments in supporting good territorial governance. A typology of current territorial governance practices in Europe is also developed (coordinated by the TUDelft team). One of the outputs of the project is a handbook for policy officials which draws lessons from the in-depth case studies undertaken in the project.

#### Programme

#### TWIN HUB

Interreg IVB

Grant: € 5.704.756

Role: coordinator

Principal Researcher: Ekki Kreutzberger en Rob Konings

Duration: 2011- 09/2015

The Twin hub network project aims to make intermodal rail transport within, to and from North West Europe more competitive, in particular between the Dutch and the Belgian seaports and European inland terminals. In this way the conditions are created to shift flows from the road to the rail sector, providing a more sustainable and robust

transport network and increasing the network connectivity and territorial cohesion within North West Europe. The central configuration in achieving this aim is the Twin hub network, a transnational rail service network. Its implementation to improve intermodal performances is the main objective of this project.

#### Programme

#### TENLAW

##### *Tenancy Law and Housing Policy in Multi-Level Europe*

FP7-SSH

Grant: € 2.692.526

Role: partner (for € 385.000)

Principal Researcher: Hendrik Ploeger

Coordinator: University of Bremen

Duration: 04/2012-10/2015

Private tenancy law is existentially affecting the daily lives of European citizens, as about one third of them depend on rental housing. This project sets out to provide the first large-scale comparative and European law survey of tenancy law. In a first step, it analyses national tenancy laws and their embeddedness in, and effects on, national housing policies and markets. In a second step, the effect of EU legislation on national housing policy in general and national tenancy law in particular will be analysed

in a comparative perspective. In a third step, a proposal for a better co-ordinating role of the EU in tenancy law and housing policy, in particular through an OMC process developing common principles of good "tenancy regulation", will be designed. This research matches well several priorities of the Stockholm programme given tenancy law's intimate relation to social human rights and a system of law and justice working for the benefit of European citizens, in particular vulnerable groups.

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## PLEASE DO IT YOURSELF... ON SOCIAL SUPPORT, PROFESSIONAL COUNSELLING AND LONG-TERM UPWARD SOCIAL MOBILITY IN A NEIGHBOURHOOD-BASED APPROACH

### Programme

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NWO - Platform 31 (Nicias)  
'Knowledge For Strong Cities'  
Grant: € 280.000  
Role: coordinator  
Principal Researcher: Reinout Kleinhans and Maarten van Ham  
Duration: 03/2012- 05/2014

Social mobility is a key concept in area-based policies aimed at deprived neighbourhoods in Europe and the US. Such policies often aim to improve the living conditions in deprived neighbourhoods and at the same time stimulate the social mobility of residents. The main objective of the project is to assess social mobility patterns and effectiveness of social mobility interventions, especially for

individuals needing long-term support. The backdrop of this project is the economic crisis and serious cutbacks in government funding of area based policies, which raises questions on the effectiveness of social interventions. The study creates a longitudinal quasi-experimental design through a second wave survey in our research area (Hoogvliet, a Rotterdam borough) and a control area.

## CITIES 'BORROWING' SIZE: AGGLOMERATION ADVANTAGES IN POLYCENTRIC URBAN REGIONS

*Dr. E.J. (Evert) Meijers*

### Programme

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NWO-VENI  
Personal Grant: € 140.608  
Researcher: Evert Meijers  
Duration: 02/2008-01/2011

The key question of this NWO project is: Can proximally-located cities borrow size from each other, so that agglomeration advantages, which increase with city size, develop to the extent of their combined size? Generally, the larger the city, the greater the extent to which agglomeration advantages have developed. But: agglomeration disadvantages also increase with the size of cities. Empirical studies into these issues traditionally focus on single cities. However, this is becoming less relevant as in many countries formerly self-contained cities are increasingly interconnected with neighbouring

cities to form 'polycentric urban regions' or 'urban networks'. It has been suggested that in such areas the agglomeration advantages correspond to their combined size, while the agglomeration disadvantages would remain limited to the local city size. This, however, lacks empirical validation. Through combining various data and using methods which include regression analysis, correspondence analysis, GIS-analysis, benchmarking and policy analysis this project seeks to address this empirical gap.



Year: 2011

Publisher: Routledge

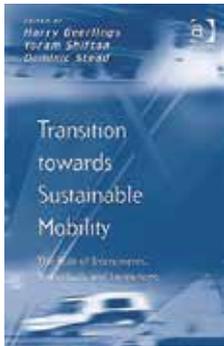
Pages: 208

### COHESION, COHERENCE, COOPERATION: EUROPEAN SPATIAL PLANNING COMING OF AGE?

*Andreas Faludi*

Since its foundation the European Union has developed policies, aimed at achieving increased economic and social cohesion. This book examines the most recent of these, the concept of territorial cohesion. Territorial cohesion is the pursuit of balanced development, competitiveness, sustainable development, and good governance. These concerns are most readily addressed by

the formulation of spatial strategies under the umbrella of spatial planning, that brings together a multitude of public and private actors in a process that requires cohesion, coherence and co-operation. This book traces the development of spatial planning at European level and argues that spatial planning can become a vehicle, not only for territorial cohesion, but for EU policy generally.



Year: 2012

Publisher: Ashgate

Pages: 430

### TRANSITION TOWARDS SUSTAINABLE MOBILITY: THE ROLE OF INSTRUMENTS, INDIVIDUALS AND INSTITUTIONS

*Harry Geerlings, Yoram Shiftan & Dominic Stead*

Focusing on making transition happen, this volume looks at various aspects and factors that are involved in the transition process and their implications for transport policy-making. The concept of Transition Management and how it can be applied to the transport sector is considered in detail, and forms the focus of the first part of the volume. The rest of the book is organised according to the three themes of transport energy use and

emissions, the role of information in policy-making, and the evaluation of transport policy. This volume brings together scholars involved in research from various disciplines and countries to discuss the relationships between policy instruments, individual behaviour, institutional practices and the transition towards more sustainable transport systems.



Year 2012

Publisher: Springer

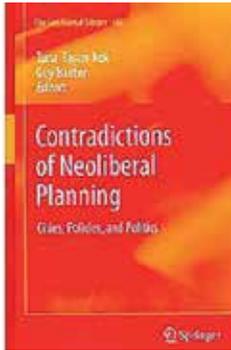
Pages 297

### NEIGHBOURHOOD EFFECTS RESEARCH: NEW PERSPECTIVES

*Maarten van Ham, David Manley, Nick Bailey, Ludi Simpson & Duncan Maclennan (Eds.)*

This volume of work reflects the fact that we are still no closer to answering the question of how important neighbourhood effects actually are. There is little doubt that these effects exist, but we do not know enough about the causal mechanisms which produce them, their relative importance in shaping individual's life chances, the circumstances or conditions under which they are most important, or the

most effective policy responses. Collectively, the chapters in this book offer new perspectives on these questions, and refocus the academic debate on neighbourhood effects. The book enriches the neighbourhood effects literature with insights from a wide range of disciplines and countries.



Year: 2012

Publisher: Springer

Pages: 217

## CONTRADICTIONS OF NEOLIBERAL PLANNING: CITIES, POLICIES, AND POLITICS

*Tuna Taşan-Kok, Guy Baeten (eds.)*

This book argues that the concepts of 'neoliberalism' and 'neoliberalisation,' while in common use across the whole range of social sciences, have thus far been generally overlooked in planning theory and the analysis of planning practice. Planning, if anything, may be seen as being in direct contrast to neoliberalism. It is this contradiction between the serving of private profit-seeking interests while actually seeking the public betterment of cities that this volume has sought to describe, explore, analyze and make sense of

through a set of case studies covering a wide range of planning issues in various countries. This book lays bare just how spatial planning functions in an age of market triumphalism, how planners respond to the overruling profit principle in land allocation and what is left of non-profit driven developments in comparative research on housing policy and housing management with a strong academic background in housing studies and economics.



Year: 2012

Publisher: IOS Press

Pages: 356

## EUROPEAN TERRITORIAL GOVERNANCE

*Wil Zonneveld, Jochem de Vries & Leonie Janssen-Jansen (eds.)*

The 1990s ended with the birth of the concept of European spatial planning, which became a unique catalyst of change in Europe and in EU member states and regions. This book examines both the evolution of territorial governance at a European and transnational level and how this new type of governance affects planning at the local and regional level. It not only brings together a number of papers written by academic scholars but also several reflective contributions by practitioners. As such, this book seeks to contribute to various

theoretical and empirical discussions: the institutionalization of European policy and integration; the Europeanisation of policy and planning; multi-level and multi-actor policy making; the contested nature of the knowledge base of European territorial governance and the role of visualization in politics and planning.

This volume has wide-ranging appeal for academics, practitioners and students in the field of urban and regional planning, geography and European studies.

## RESIDENTIAL OUTCOMES OF FORCED RELOCATION: LIFTING A CORNER OF THE VEIL ON NEIGHBOURHOOD SELECTION

*Wenda Doff, Reinout Kleinhans*

### Publication Info

Year: 2011

In: *Urban Studies*, 48(4), 661-680

Cited by: 10

Fear of the detrimental effects of ethnic segregation has pervaded the debate on the population composition of cities and neighbourhoods. However, little is known about mechanisms underlying the spatial sorting of ethnic minorities. Hence, policies aimed at desegregation may result in exactly the opposite—that is, new ethnic concentrations and segregation. This paper studies the residential outcomes of 658 forced movers from urban restructuring areas in The Hague. Compared with ‘native’

Dutch (those with both parents born in the Netherlands), ethnic minorities report neighbourhood improvement less often and are more likely to stay within or move into other ethnically concentrated neighbourhoods. These differences are not fully explained by differences in individual characteristics, resources, institutional factors, pre-relocation preferences or other relocation outcomes. Ethnic specificities in neighbourhood choices thus remain a pressing issue for further research.

## NEIGHBOURHOOD CHOICE AND NEIGHBOURHOOD REPRODUCTION

*Lina Hedman, Maarten van Ham & David Manley*

### Publication Info

Year: 2011

In: *Environment and Planning A*, 43(6), 1381 - 1399

Cited by: 14

Although we know a lot about why households choose certain dwellings, we know relatively little about the mechanisms behind their choice of neighbourhood. Most studies of neighbourhood choice focus only on one or two dimensions of neighbourhoods: typically poverty and ethnicity. In this paper we argue that neighbourhoods have multiple dimensions and that models of neighbourhood choice should take these dimensions into account. We propose the use of a conditional logit model. From this approach we can gain insight into the interaction between individual and neighbourhood characteristics which lead to the choice of a particular

neighbourhood over alternative destinations. We use Swedish register data to model neighbourhood choice for all households which moved in the city of Uppsala between 1997 and 2006. Our results show that neighbourhood sorting is a highly structured process where households are very likely to choose neighbourhoods where the neighbourhood population matches their own characteristics. We find that income is the most important driver of the sorting process, although ethnicity and other demographic and socioeconomic characteristics play important roles as well.

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## OPENING UP THE COMPENDIUM: AN EVALUATION OF INTERNATIONAL COMPARATIVE PLANNING RESEARCH METHODOLOGIES

*Vincent Nadin, Dominic Stead*

### Publication Info

Year: 2012

In: *European Planning Studies*,  
published online: 26 Sep 2012

Cited by: unknown

It is two decades since the European Compendium of Spatial Planning Systems and Policies was conceived. Since its publication in 1997, the Compendium has become a widely cited reference in comparative planning literature.

It remains one of the few comprehensive reviews of spatial planning policy and practice across western Europe. The Compendium also represents one of the few studies to develop a typology for distinguishing between national planning systems. A number of comparative research studies on spatial planning have since built on the methodological foundations laid by the Compendium although its typology of national planning systems is not always

used or interpreted as originally intended for a variety of reasons. In the context of extensive reform of planning approaches in Europe, the paper examines what can be learned about methodologies for international comparative research in planning based on the experience of the Compendium study and subsequent major comparative planning studies. We conclude that while broad typologies remain useful in explaining general trends, they may hide as much as they reveal. Future studies should widen the criteria used to build ideal types beyond formal characteristics in order to address planning in practice.

## THE IMPACT OF EUROPEAN PUBLIC CONTRACT LAW ON NETWORKS OF GOVERNANCE: A RELATIONAL APPROACH

*Willem K. Korthals Altes, Tuna Taşan-Kok*

### Publication Info

Year: 2010

In: *European Planning Studies*,  
18 (6), 971-988

Cited by: 8

Scholars increasingly stress the importance of relations rather than locations in planning. Consequently, planning research might not only focus on land use and land-use regulations, but also on the way relations between urban and regional actors are regulated. This paper reflects critically on the European directive on public contracts, which regulates specific relationships between

contracting authorities and economic operators, and its potential impact on urban and regional planning. The paper concludes that further juridification of these relations by procurement directive may result in the relative isolation of the actors involved in governance, both private and public, and may decrease the significance of these relational networks.

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## SPATIAL STRUCTURE AND PRODUCTIVITY IN U.S. METROPOLITAN AREAS

*Evert J Meijers, Martijn J Burger*

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### Publication Info

Year: 2010

In: *Environment and Planning A*,  
42(6), 1383 - 1402

Cited by: 35

Recent concepts such as 'megaregions' and 'polycentric urban regions' emphasize that external economies are not confined to a single urban core, but are shared among a collection of nearby and linked cities. However, empirical analyses of agglomeration and agglomeration externalities have so far neglected the multicentric spatial organization of agglomeration and the possibility of the 'sharing' or 'borrowing' of size between cities. The authors take up this empirical challenge by analyzing how different spatial structures, in particular the monocentricity - polycentricity dimension, affect the economic performance of US

metropolitan areas. Ordinary least squares and two-stage least-squares models explaining labor productivity show that spatial structure matters: polycentricity is associated with higher labor productivity. This appears to justify suggestions that, compared with more monocentric metropolitan areas, agglomeration diseconomies remain relatively limited in the more polycentric metropolitan areas, whereas agglomeration externalities are to some extent shared among the cities in such an area. However, it was also found that a network of geographically proximate smaller cities cannot substitute for the urbanization externalities of a single large city.

## THE ROLE OF ATTITUDES TOWARD CHARACTERISTICS OF BICYCLE COMMUTING ON THE CHOICE TO CYCLE TO WORK OVER VARIOUS DISTANCES.

*Heinen, E., Maat, K. and Van Wee, B.*

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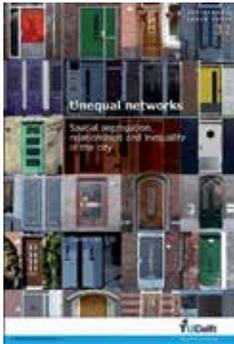
### Publication Info

Year: 2011

In: *Transportation Research part  
D: Transport and Environment*  
16(2): 102-109.2

This paper analyses the influence of commuters' attitudes toward the benefits of travel by bicycle (e.g. convenience, low cost, health benefits) on the mode choice decision for commutes to work. We assume that when the commute journey intensifies, either in terms of distance or frequency, attitudes toward cycling become more positive. Factor analysis reveals three underlying attitudinal factors toward cycling to work: awareness, direct trip-based benefits and safety. The decision to cycle is influenced by the factor "direct trip-based benefit" at all distances, whereas the "awareness" is influential only

over long distances. The decision to cycle every day is again affected by the "direct benefit" factor. The factors "safety" and "awareness" are important over shorter distances. Having a cycling habit increases the likelihood of cycling and a higher frequency of cycling. The perceived opinion of others only affects the mode choice over short distances suggesting indicates mode choice on longer commutes is based on one's own attitudes. These findings indicate that attitudes and other psychological factors have a relatively strong impact on the choice to commute by bicycle.



*Year:* 2010

*Publisher:* IOS Press

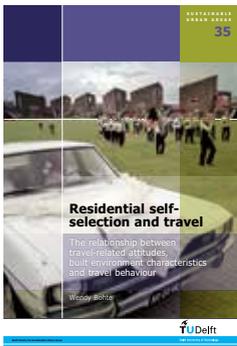
*Pages:* 368

## UNEQUAL NETWORKS: SPATIAL SEGREGATION, RELATIONSHIPS AND INEQUALITY IN THE CITY

*Gwen van Eijk*

Does the neighbourhood in which people live matter for the resourcefulness of their personal network and thus for their opportunities in life? Do residents of a multi-ethnic 'problem' area maintain fewer relationships with fellow-residents compared to residents of a homogeneous problem-free neighbourhood? And do 'diversity-seekers' who choose to live in a mixed neighbourhood translate their liking for diversity into more mixed networks and more bridging ties?

This book brings together key insights from urban studies and network studies in order to understand whether and how spatial segregation matters for personal networks and inequality. By approaching these questions through different urban sociological perspectives, the book engages with current debates on poverty concentration as well as ethnic diversity, gentrification and social capital.



*Year:* 2010

*Publisher:* IOS Press

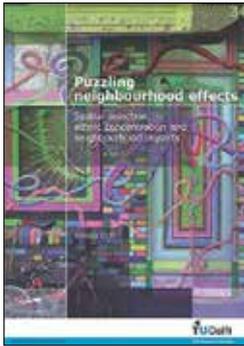
*Pages:* 214

## RESIDENTIAL SELF-SELECTION AND TRAVEL: THE RELATIONSHIP BETWEEN TRAVEL-RELATED ATTITUDES, BUILT ENVIRONMENT CHARACTERISTICS AND TRAVEL BEHAVIOUR

*Wendy Bohte*

The extent to which the characteristics of the built environment influence travel behaviour remains the subject of some debate among travel behaviour researchers. This thesis addresses the role of residential-self-selection, an important issue within this debate. Households may not only adjust their travel behaviour to the built environment where they live, but they may also choose a residential location that corresponds to their travel-related attitudes. The empirical analysis in this thesis is based on data collected through an internet survey and a GPS-based

survey, both of which were conducted among homeowners in three municipalities in the central Netherlands. The study showed that residential self-selection has some limited effect on the relationship between distances to activity locations and travel mode use and daily kilometres travelled. The results also indicate that the inclusion of attitudes can help to detecting residential self-selection, provided that studies comply with several preconditions, such as the inclusion of the 'reversed' influence of behaviour on attitudes.



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*Publisher:* IOS Press

*Pages:* 191

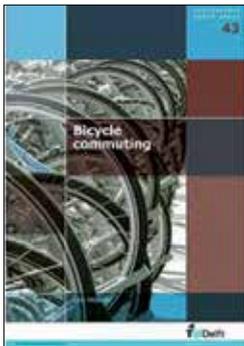
## PUZZLING NEIGHBOURHOOD EFFECTS. SPATIAL SELECTION, ETHNIC CONCENTRATION AND NEIGHBOURHOOD IMPACTS

*Wenda Doff*

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Like other West European countries, the Netherlands are facing a growing uneasiness about its changing demographics. It is within this context that animated discussions concerning immigrant neighbourhoods dominate. The general opinion is that living in such neighbourhoods hinders the 'integration' of immigrants into Dutch society. This book contributes to the academic and policy

debate by not only examining the effects of ethnic concentration, but also by finding out how people are sorted into neighbourhoods. Bringing together different bodies of literature, this book offers a more holistic view of the creation of ethnic residential segregation and its potential significance for individual life chances.



*Year:* 2011

*Publisher:* IOS Press

*Pages:* 266

## BICYCLE COMMUTING

*Eva Heinen*

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Cycling is cheaper, healthier and in urban environments often faster than other transport modes. Nevertheless, even at short distances, many individuals do not cycle. This thesis aims to explain why commuters vary in their decision to bicycle. Results indicate that the individual (day-to-day) choice to commute by bicycle is affected by personal attitudes towards cycling to work, social norms, work situation, weather conditions and trip characteristics. Additionally, this thesis provides evidence that different groups of bicycle commuters exist: non-cyclists, part-time cyclists and full-time cyclists. The mode choice of individuals within these groups (partly) depends on a number of different

factors. Non-cyclists seem not to cycle because they consider it impossible, either due to the distance involved, their need to transport goods, the need for a car during office hours, or a negative subjective norm. The decision to cycle among part-time or full-time cyclists is also affected by these factors, but additional factors can be identified. Finally, the day-to-day choice to cycle is based on work characteristics, weather conditions and trip characteristics. Part-time cyclists who cycle only occasionally are encouraged by pleasant weather conditions, while frequent cyclists are found to be discouraged by more practical barriers, such as where they need to work on that day.



*Year:* 2010

*Issue:* 25(4)

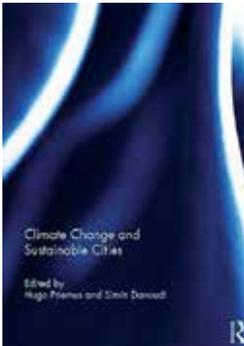
*Editors:* Reinout Kleinhans,  
Marco Van der Land &  
Wenda Doff

### SPECIAL ISSUE: JOURNAL OF HOUSING AND THE BUILT ENVIRONMENT

#### *Dealing with living in poor neighbourhoods*

Current debates on living in concentrated poverty neighbourhoods concern two broad categories of residents: poor households that are assisted to move from concentrations of poverty to lower-poverty areas (movers); and households (not exclusively the poor) that cannot move out of poor neighbourhoods or are not willing to do so, for various reasons (stayers). For the first category, the main issue is whether housing vouchers provide movers only with better housing or also with other social, psychological and economic benefits. A wealth of (partly contradictory) evidence justifies exploring a fundamental question: What should housing vouchers do?

With regard to those unwilling or unable to move out of poor neighbourhoods, we focus on how residents cope with the recurrent problems and stressful circumstances in poor neighbourhoods. Here, four interrelated concepts are central to our discussion: place attachment, coping tactics, territoriality, and social network formation. The aim of this special issue is to provide new evidence that underpins or questions the current debates on living in or leaving neighbourhoods with concentrated poverty. The research reported here was done in the United States, Great Britain and the Netherlands.



*Year:* 2012

*Issue:* 20(1)

*Editors:* Hugo Priemus, Simin Davoudi

### SPECIAL ISSUE: EUROPEAN PLANNING STUDIES

#### *Climate Change and Sustainable Cities*

The focus of this special issue is on the relationships between climate change, energy transition, flood risk, and spatial planning in urban areas. The diversity of the papers in this special issue is itself an indication of the multitude of climate change concerns that preoccupy researchers and practitioners. The special issue brings together seven

contributions ranging from broad overviews to sector-specific analysis. They deal with climate change mitigation and adaptation and cover different scales of analysis ranging from international and European to national and city perspectives. The sector-specific papers focus on housing and transport, drawing on Dutch and UK case studies.



Year: 2011

Issue: 186(3)

Editors: Dominic Stead,  
Giancarlo Cotella

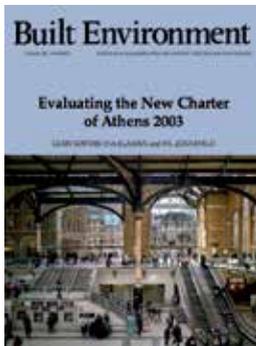
### SPECIAL ISSUE: DISP - THE PLANNING REVIEW

*Differential Europe: domestic actors and their role in shaping spatial planning systems*

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Spatial planning systems across Europe are very diverse and reflect local policymaking styles and cultures as well as specific territorial conditions and priorities. In fact, various studies of the Europeanization show that many impacts are often felt in different ways and at different times. Within these change processes, a crucial role increasingly

seems to be played by various communities of actors. This special issue focuses closely on the role of these communities of actors at the domestic level in shaping spatial planning policy in various action arenas across five very diverse national contexts: Finland, Greece, Italy, Latvia and Portugal.



Year: 2012

Issue: 38(4)

Editors: Wil Zonneveld,  
Ina Klaasen

### SPECIAL ISSUE: BUILT ENVIRONMENT

*Evaluating the New Charter of Athens 2003*

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'The European Council of Town Planners (ECTP) is confident that in the 21st century Europe will advance decisively towards the goal of integration. Within this developing framework, the ECTP presents a common and widely shared Vision of the future of European cities', so reads the introduction to the New Charter of Athens. The editors and contributors to this issue of Built Environment set out to evaluate the ECTP Charter, looking specifically at the underlying

assumptions about how European society is developing and how according to the Charter spatial planning and spatial planners should respond.



Northern IJ-banks Amsterdam: revitalization of industrial areas through mixed use

### 6.1 Success and vision on how to obtain research projects

The programme has had considerable success in acquiring research funds from a variety of sources (see also section 9). Our income traditionally originates largely from the Netherlands, including the national science funding organization NWO, local, regional and national governments, housing associations, and specific innovation and research programmes. The programme conducts, for example, research for local and provincial authorities such as local auditing committees, and other council research on the governance of land development, local urban regeneration projects and local mobility (like cycling).

Nationally, we have also acquired a range of projects from NICIS (Netherlands Institute for City Innovation Studies) on aspects related to neighbourhood regeneration. We have received research funding from the National Science

Foundation (NWO), ranging from personal grants for our most talented researchers (e.g. Evert Meijers won a prestigious VENI grant), general PhD grants and special programmes, such as Sustainable Accessibility of the Randstad, Urban Regions in the Delta, and Energy Transitions.

We are increasingly successful in acquiring funding from the European level. We have been successful in getting funding from high-profile FP7 coordination projects, a prestigious Marie Curie Career Integration grant, specific INTERREG programmes (TWINHUB, Creative City Challenges, InCompass: Regional policy improvement for financially sustainable creative incubator units; Electric Mobility), ESPON (European Observation Network for Territorial Development and Cohesion) and the Joint Programming Initiative Urban Europe. The economic crisis that started in 2008 is reducing our earning capacity as local, regional and national government departments have had big budget cuts and are facing new rounds of cuts. Also housing associations and other organization for which we traditionally do research have cut their research budgets. Moreover, TU Delft's general funding (Eerste geldstroom) has been decreased substantially, resulting in reduced funding for most parts of the university.

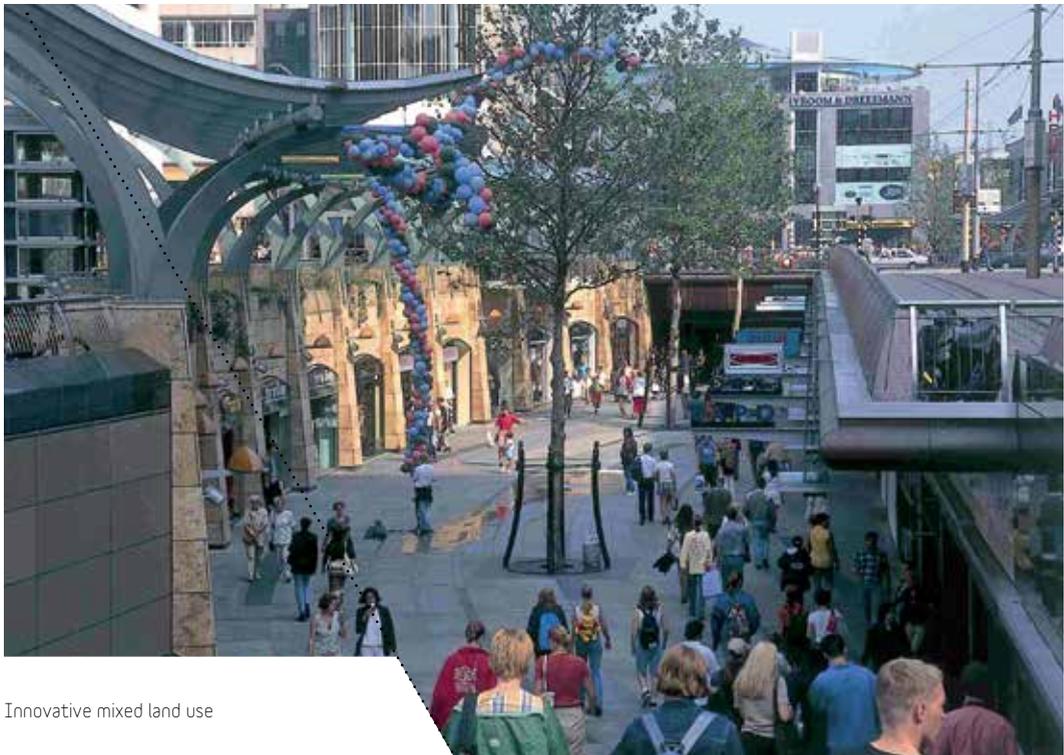
Despite the crisis, we still manage to get funding, for example in relation to the evaluation of national urban policies, but the overall opportunities have diminished, showing the importance of acquiring funding from a variety of sources.

Table a. Research funding

FUNDING	2010		2011		2012	
	K€	%	K€	%	K€	%
Direct funding	1,255	62%	1,058	60%	1,147	61%
External funding	755	38%	691	40%	746	39%
<b>TOTAL FUNDING</b>	<b>2,010</b>	<b>100%</b>	<b>1,749</b>	<b>100%</b>	<b>1,893</b>	<b>100%</b>
EXPENDITURE	K€	%	K€	%	K€	%
Staff costs	1,381	65%	1,141	60%	1,369	60%
Other costs	739	35%	758	40%	915	40%
<b>TOTAL EXPENDITURE</b>	<b>2,120</b>	<b>100%</b>	<b>1,899</b>	<b>100%</b>	<b>2,284</b>	<b>100%</b>

## 6.2 Overview of top-5 projects

- ESPON: participation in a range of projects of the European Observation Network for Territorial Development and Cohesion;
- FP7: Partner in Sustainable Urban Metabolism in Europe (coordinated by Österreichisches Institut für Raumplanung) about conceptualization of sustainable urban development as a metabolism, partner in TENLAW (coordinated by University of Bremen) into rental law (and the relationship with social systems for which cooperation with the Housing programme is established) and partner in the successfully acquired project of DIVERCITIES which starts in 2013;
- INTERREG. Coordinator of TWINHUB - a programme on testing new train routings using Rotterdam and Antwerp as a dual hub, and partnering in such projects as Creative City Challenge.
- NICIS programme: participation in a range of projects (both as coordinator and as partner) on neighbourhood change and housing as well as the importance of networks for the competitiveness of Dutch cities (the NAPOLEON project);
- NWO: VENI project and several projects on the relationship between transport and land use, including electric mobility and the sustainable accessibility of the Randstad, plus a project focussing on the possibilities and barriers to contextualize general judicial frameworks (the CONTEXT project).



Innovative mixed land use

### 7.1 Means used to transfer knowledge

OTB organizes knowledge exchange events such as courses for professionals, as well as conferences and seminars for policymakers and practitioners. We also contribute to such activities organized by other organizations.

Within our research group we encourage researchers to publish their results not only in academic journals, but also in policy and practice journals. We consider knowledge exchange an important element of our work and we always aim to link scientific research with practices in urban and regional areas. During the 2010–12 period, we published 200 professional publications, including papers in professional journals (84), chapters in professional books (26) and professional books (17).

### 7.2 Users of the knowledge

Thanks to our broad dissemination strategy that is explicitly aimed at policymakers, professionals and practitioners, the outcomes of our research are widely available and widely used. A significant proportion of our research is funded directly by the users of our research. Examples of valorization during the 2010–12 period are the following.

- Research for the province of Zeeland into the spatial effects of the new Westerschelde tunnel;
- A workshop with players in the knowledge region Rotterdam–Delft–Leiden relating to the INTERREG project Creative City Challenge;
- An invited presentation on community enterprise for Minister Spies. Utrecht, 19 September 2012;

- Membership of the Wijnthjes commission on land policy (the working of the vereveningsfonds) of the City of Amsterdam, involving ways how Amsterdam's land policy could adjust to the current crisis;
- Research for the city council of Enschede for their in-depth research (a raadsenquete) into land development policies of the previous decade;
- The establishment of a 'barometer' of the urban renewal activities in The Hague for the local authority;
- The organization of conference with 300 professionals into neighbourhood renewal with the Platform Corpoenista (a platform of housing associations);
- The making, by researchers from various sub-programmes, of a handbook of neighbourhood economics (together with the consultants of Seinpost), commissioned by the ministry of economic affairs;
- Research into examples of the potential use of the instrument of urban land readjustment in the Netherlands in cooperation with local authorities and the relevant ministries;
- Research into the parking of bicycles in relation to the new railway tunnel and development zone in the city of Delft;
- Interaction and dialogue with stakeholders and end-users of as part of international research projects such as ESPON RISE (focussing on integrated spatial strategies at regional level in four European regions including the Dutch Randstad), ESPON STAR (sustainable energy projects within the North Sea Region INTERREG programme) and ESPON EATIA (developing and improving methods to assess the territorial impacts of European policies in three EU countries), all three 'targeted analyses on user demand'. Another example is the NWO CONTEXT project in which end users directly participate.

# 8

## PhD research

### 8.1 Topics

All four sub-programmes take PhD students. The PhD students present some of their topics separately at the mid-term review programme. Current topics include:

- Causes and effects of segregation;
- Co-designing scenarios: success factors for strategic decision-making in a complex reality;
- Everyday encounters in urban public space;
- Family conditions and travel behaviour;
- Flexibility, accountability and financial results in land development;
- Relationships between urbanization, public transport structure and travel behaviour;
- Strategies of persons seeking housing;
- The image of the new city: social production and construction of a post-World War 2 urban area.

### 8.2 Supervision

We follow the guidelines of the graduate school of Architecture and the Built Environment for the supervision of postgraduate students. Our research group includes a team of experienced PhD supervisors. In addition, there is a PhD mentor who can be consulted if there are any issues in relation to supervision. We also contribute to the Urbanism research programme of by supervising a number of PhD students at the faculty's Urbanism department.

The research group participates in two interuniversity graduate schools. Central is the participation in the Netherlands Graduate School of Urban and Regional Research (NETHUR); Willem Korthals Altes was member of the NETHUR

board throughout the assessment period. Of a more auxiliary nature is the participation in Ius Commune, especially in its Property Law programme, of legal researchers in the Governance of Land Development sub-programme.

### 8.3 Resources

PhD students are provided with their own desk and desktop computer in an office in which we expect that no more than two researchers work at the same time. They can make use of a landline phone and have their own private storage facilities and book shelves. Each PhD student has personal funding for visiting (international) conferences, publishing their PhD thesis in the form of a book (many PhDs are published in the Sustainable Urban Areas series of IOS press) and for English language proofing by a native speaker.

### 8.4 Funding

Most PhD positions (employed) are externally funded by NWO or FP7. Other PhD students (contract PhD candidates) have their own funding in the form of scholarships. We also have several professionals working on PhDs to round out their professional careers.

### 8.5 Attractiveness

Our research programme and our experienced team of supervisors continue to attract PhD students. Our programme is especially attractive because of the combination of basic and applied research, which means that the work PhD students are doing often has direct relevance for society. Also working within larger national or international projects is attractive to students as it allows them to extend their network. Most PhD students in our programme prepare their PhD thesis based on refereed journal articles. The supervisors are experienced researchers who have published ample papers in peer-reviewed journals. In some cases, especially in relation the professionals working on a PhD, a PhD is prepared as monograph.



Demolition of flats in Urban Renewal project

# 9

## SWOT-analysis

### STRENGTHS

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The group is positioned within OTB, which has an excellent research infrastructure, including its own dedicated building and tailor-made office space. Also the multidisciplinary nature of the OTB and collaboration with other sub-programmes is a strength that results in joint projects and publications, also with the Urbanism department. Thanks to its high quality research staff, many of whom have an international reputation, the programme participates in many national and international research consortia and projects, and has a consistently high level of research income and research output with publications in international peer-reviewed journals and publications. The group is highly experienced in knowledge exchange activities.

### OPPORTUNITIES

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The organizational merger of OTB and the Faculty of Architecture offers many new opportunities for collaboration, sharing and disseminating knowledge, acquiring new talented PhD students and new opportunities for collecting research data. The present economic crisis has raised the societal awareness of the need for new ways of governance in the field of urban and regional studies, which might result in new funding opportunities. Also the increasing availability of large (longitudinal) datasets offers new research opportunities.

### WEAKNESSES

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A limited amount of university funding is available, which limits the possibilities for more fundamental research as much of our funding is dependent on external sources. Also a relatively large proportion of permanent staff are funded by short-term projects. The common core of the research programme needs to be further developed as the new programme has recently been developed from four separate programmes. Relative to the number of permanent staff, the programme has few PhD students.

### THREATS

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Acquiring external funding is getting more difficult at a time that also the university is cutting budgets. There is less and less research funding available from government and policy and practice partners. As other universities in the Netherlands and abroad are facing similar conditions, there is increasing competition for funds. Many funding programmes from the national science funding organization fund only PhD students and postdocs, not permanent research staff.

### 10.1 Strategic planning

The Urban and Regional Studies programme has employed an active internationalisation strategy before 2010, resulting in a group with extensive international contacts, participating in many international consortia and projects. Many of our research activities have an international nature and use data and case studies from abroad. Our internationalisation strategy includes the encouragement of existing staff to participate in international networks and recruiting new staff with such networks. The programme also hosts a range of international guests who actively participate in the programme. It is a continuous challenge to link our international orientation with a national grounding in practices that are relevant for urban and regional studies. We actively work with both professionals as the popular media to disseminate our research to a wider audience. We also disseminate our work to those involved in the fieldwork of our research. People are more than subjects of our research and we aim to present the outcomes to the communities we investigate.

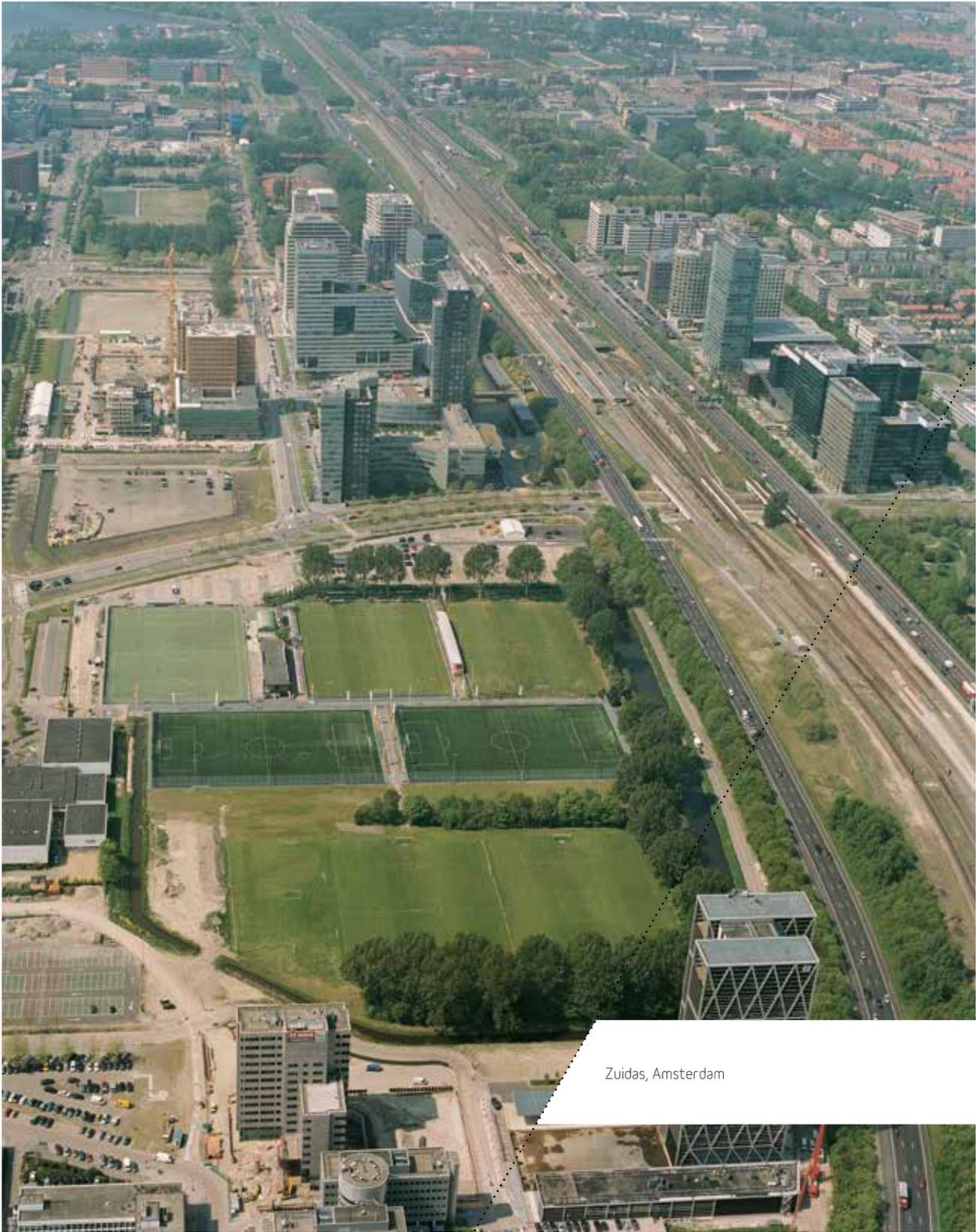
### 10.2 New research topics and their prospects

A new research programme has been drafted. In which the following new research topics are formulated.

- The authorities as land developers, new land development legislation, the Europeanization of the governance of land development, the legal complexities of modern land use, innovative and participatory land policy instruments and bridging internal and external effectiveness towards a legitimate governance of land development.
- Metagovernance, devolution, regionalization and soft space planning, Europeanization and territorial impact assessment, policy integration of areas and projects, developing and testing cross-national methods to compare, assess and understand territorial governance and the transferability of policies, concepts, procedures and instruments.
- Neighbourhoods as sites of governance and civic action, neighbourhood change and stratification, based on socioeconomic position, ethnic concentration and neighbourhood reputation and the relationship between socioeconomic inequality, poverty and neighbourhoods.
- The relationship between the built environment and travel behaviour within the greater framework of time, linking academic research and planning practice through real-world experiments, dynamics in the field of transport modes, such as, the transition to electric cars, and the accommodation of urban freight transport

### 10.3 Flexibility

The programme has a staff capable of moving towards new research questions that are topping the agenda. We aim to acquire new talented PhD students in order to improve the balance between tenured and non-tenured staff.



Zuidas, Amsterdam

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