

journal

Architectural Engineering studio journal



p o w e r e d b y i n n o v a t i o n

INTECTURE



Architectural Engineering brings spatial, functional, social design and technical possibilities and developments together. Subjects like product design, material research, building physics, structural mechanics, computation and model and production techniques all play a major part in architecture. In fact architecture and engineering are irreversible connected with each other. Research in the field of technology leads to all kinds of improvements in architecture. This also works the other way around, for instance improvements in architecture help inspire research and innovation. If you choose for Architectural Engineering, you'll choose for architecture as a

complete design discipline in which technical possibilities are an inspiration and an important contribution to the architectural design.

This annual journal gives the faculty insight in our master programme and it shows recent work made by students of the architectural Engineering studio.

We hope you all like the work of INTECTURE, integration of technology in architecture! And please feel free to visit us in BK City at room BG.OOST.250!

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second edition

aE Day 2014

21 March 2014 – don't miss it!

The Future Is Architectural

Introduction

In the early 80s, I graduated at the department lead by Professor Jaap Bakema, the man that coined the term 'van stoel tot stad' (from chair to city). It offered me insights into the gradations of scale and different disciplines that characterize the building industry. These different levels of scale and disciplines are also at the foundation of my two-fold experience with building practice of the past decade: that of architect and that of booster of architectural policy. This experience proves useful now: since the beginning of the 21st century, a permanent shift of the role and position of the architect within building practice becomes apparent. Those who want to connect the culture of building with technological innovation must know how design and ingenuity are interconnected. The present is asking for new values. We must combine a strong dose of innovation with the urgency of renewing the building stock.

Let's face it: the Netherlands has an interesting tradition of distinct buildings that are renowned for their (functional) expression, while they, more often than not, have been realized with modest budgets. And this existing building stock is crying for our attention. Knowledge of our building traditions can make an important contribution to successfully transforming existing areas. Much inspiration can be taken from Dutch examples, not only here but also in other parts of the world. Attention and respect for this transformation asks for research on design, ordering and accessibility, certainly when it comes to building technology. Can we reinforce the traditional values of our rich building history and integrate it in our thinking and design? Too easily we keep looking for the new, while we don't even understand what's there. We're living in exceptionally special times, on the eve of a sustainable economy. How do we fit traditions within the new building assignment? How do we renew the city and what technical solutions are necessary for these grand assignments?

Balance in design

From my own experience in the profession of design, I have learned that design is about finding a balance between program requirements, space, architectural identity, technology, budget, sustainability and context. It's about clarity in structure, functionality and space. In transparent structures such as those made of glass and steel, but also in more massive, 'robust' structures of concrete and wood. It's about a responsible utilization of resources, about realizing an optimal climate inside and outside of a building. And not to lose track of liveability or the detail as well. Balance is found when appropriate knowledge with the right ideas is applied by the right advisors. Is it not time for buildings to stop consuming energy and start producing it?

Here, materialization is essential. In 1988 I coined the term 'zappi'. It's the material that can do anything: it's soft, strong, liquid, transparent, absorbing, fire resistant, maintenance free, easy to process, cheap,

“The studio of Architectural Engineering could become a laboratory for innovation and technical research”

sustainable and so on. Who is engaging in design is searching for the optimal, analyzes and combines, constructs and discards, influences his surroundings, determines space and use, is looking for the right balance.

It's the permanent search for the technical starting points and principles that make architecture optimal. Valid architecture is striving for precision, transparency and the right balance between form and material. Strip a building from its facade, decompose its load bearing structure, measure temperature and humidity inside with extreme weather outside and it becomes clear that in many cases, the logic of applied mechanics or building physics is completely absent. Clarity, honesty and ingenuity should be the basis of our design culture. Architecture should originate from our thoughts around the way it is to be constructed. *Design by thinking of the making.*

Balancing architecture and load bearing structure

A successful cooperation between architect and structural engineer is an important basis for architectural design. Architects should be able to design buildings together with structural engineers. Here, the load bearing structure is an optimized and well-balanced part of the object, as with a modern racing bike every part has its own calculated force.

We should realize that it's not about the calculations. It's about the ingenuity with which the architect integrates structural aspects in his thinking. 'Design originates from collaboration', I once wrote Professor Arie Krijgsman, one of the foremen of the famous ABT. I was referring to the way the British were doing it: architect Richard Rogers called in all consultants such as structural engineers, building physicists and installation consultants together with the architects, locked them together in a room for several days, forcing them to think interdisciplinary about how the building should be given form.

In architecture and building technology it's about finding the right balance between space, material and climate. This integration can be developed, you can learn to design and to research it. Architectural Engineering functions as a semi permeable wall that regulates and stimulates the technical and physical influences on an architectural design. Architectural Engineering searches and finds essential building components that are integrated optimally in a design.

In this way, the studio of Architectural Engineering, founded in 2008, could become a laboratory for innovation and technical research within the new department AE+T. Under the nickname INTECTURE®, what follows for designers is a search for integrating technology in architecture. The bud has been planted; the new assignment is being researched.

This aE Journal provides the reader with beautiful and inspiring examples, provided by our own students.

For us, it's about bringing together technical research in architectural education. It's about current assignments, where we are challenged to build in

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INTECT

Engineering!

places that are otherwise difficult because of for example environmental constraints, or on or alongside large infrastructural works. aE-Studio can contribute a great deal to these questions by innovation and integration of questions of energy and materials while designing new buildings or transforming existing ones. Designers then become design-engineers, asking new and challenging questions to scientists, providing a medium where research can be done cooperatively. Architects have to be capable to optimize form while minimizing material use and by logically integrating technology. A good design has a simple concept: as little design as possible.

Role and position of the architect

The profession of architect has developed greatly over the centuries. In the distant past, it was the all-knowing master builder that visualized the design by drawings. He guided his design by technical and administrative means: the architect was the master builder of the entire work. His relationship with the client was clear and the classical marriage between them was a given until far into the twentieth century. It was only after the previous economic crisis of the 80s that the position of the architect as master builder has been shifting. Building management and project development began to make their strong mark. Construction management and budget control are usually taken care of by consultants.

Nowadays, it happens more and more that the architect only draws up a design while hardly being involved with the rest of the building process. There exists a Dutch word for this: the VODO-architect, the architect that only makes a VO ('voorlopig ontwerp', preliminary design) and DO ('definitief ontwerp', final design). From this the conclusion can be drawn that the influence of the architect is eroding. If we're not careful, the profession narrows itself down even more to nothing more but an aesthetic consultant. A dark omen is the application of 'De Nieuwe Regeling' ('The New Arrangement'), implemented at the start of this century with consent of architects. The DNR is an agreement that records the legal relationships between architect and client. In this agreement the architect is not called architect, but: consultant!

In short, now that the master builder is losing his dominant and directive position, we will have to rethink the way we shape the building process. For how can 'the new architect' (DNA) anchor and guarantee the quality of his building?

When the architect has to stand his own within the large and complex building industry, he will benefit from schooling in not only the aesthetical side of the building assignment, but he will also have to commit himself to structural and climatic aspects. For if he has no understanding in the technical elaboration of a building, his aesthetically pleasing designs will be easily discarded as unrealistic. For architecture needs to be about building art and building engineering.

“we will have to rethink the way we shape the building process”

Of course, the architect can't do all this on his own. He has to ensure collaboration between different actors and that the right parties join the conversation. His directional role demands an overview. The generalist has to know when he needs to address which specialists in order to take responsibility for the entire building.

As an educational institution, we too cannot escape the shifting position of the architect. As an example: from 2011, the 'Wet op de Architectentitel' (Architect's Title Act) has been implemented. As of 2015, the WAT determines who is liable to subscribe to the architectural register and thus is legally justified to call himself architect. The WAT demands that the architect complies with certain requirements and that he – and this is new – has two years of practical experience up his sleeve. Interesting is, for our faculty as well, how our graduates are going to give shape to this test of practical experience.

How does this compare to our current educational system? Who graduates here has had extensive project education, but within both the Bachelor and Master there is hardly any time for any practical

subjects. Can an architect who is trained here only lay eggs in an incubator as a bald chicken, without knowing anything about the world outside? Let's ensure that new architects indeed will have clear insight in the complex elements of the building process.

What for are we educating our average architecture student? They are no longer liable to call themselves architect, for they have to show that they have two years of professional experience. It's not for nothing that the former Chief Government Architect and Professor Jo Coenen has implemented the 'Experiment' in 2003. This Experiment should strengthen the knowledge, insights and experience of the complete building process. Design is analysis, combination, cooperation, anticipation, financial management, juggling with differing circumstances. Who wants to build excellently has to know what's going on outside. So, how will the young graduate implement the practical component?

The essence of this story is captured with one simple question: is it about science or art, about theory or practice? The Dutch name for our Faculty is the Faculteit Bouwkunde, while internationally we are named Faculty of Architecture. Apparently for the Dutch speaking world, we're still engineers, while internationally our profile is that of an architectural school. Put this against the backdrop of European regulation that states that we're not even educating our students as architects in the literal words of the law. Our studio wants to make it clear what we stand for nationally and internationally: Architectural Engineering. This is the future.

Because it is about the balance between building art and building science. It is about the technical component that is integrated in architecture, optimizing functional use and beauty. This can only improve humanity and its surroundings, from chair to city!

Thijs Asselbergs



BSc5

Archineering

MATERIALIZATION AND THE DESIGN PROCESS ARE THE TWO MAIN THEMES IN THE MINOR ARCHINEERING.

Architecture and *materialisation* are inextricably intertwined. The idea or concept can be enriched and made more profound with the material development. Designing the climate, detail and structure can lead to new insights and unexpected perspectives on a design. In three short design exercises structure, detail and climate will be emphasised. All aspects will be covered in one longer exercise. In this design the fascination of the student for a material, a climate aspect, sustainability or another topic will be leading.

Just like an athlete can train to become a master, a designer can train the *design process* as well. By training designing in short exercises and explicitly studying the design process, more insight in the design process will be acquired. In short, designing is exploring and discovering the unknown by means of a guiding theme within a frame of reference and with a design language: sketching and models.

The minor, which starts every fall semester, consists of two quarters, each concluded with one grade. Designing, plan analysis and reflection on the design process are the subjects of assessment. Next to tutoring in the design studio, several seminars are held.

Archineering 1 (first quarter, 15 ects) can be followed separately, Archineering 2 (second quarter, 15 ects) only when combined with Archineering 1.

Tutors: Erik Hehenkamp, Roel van de Pas, Joep Manschot

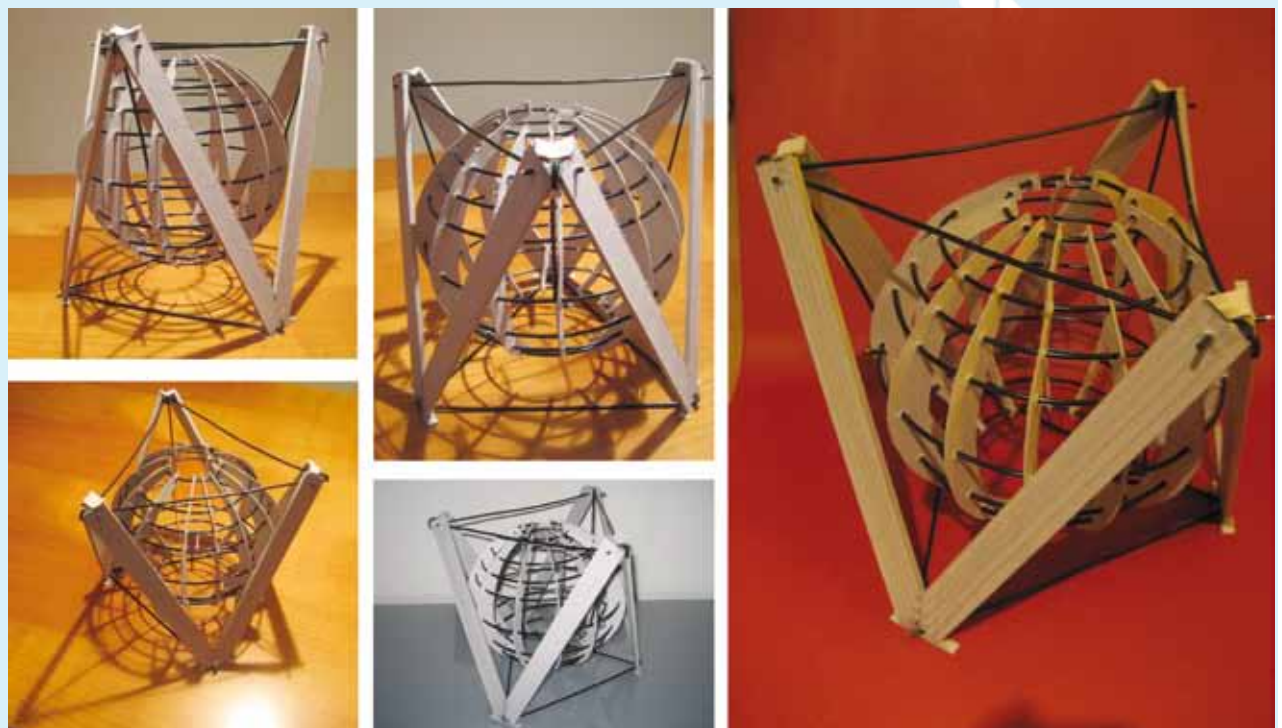
Consultants: Eric van der Ham, Hans Daane

Coordinator: Tjalling Homans

Lecturers: Elise van Dooren, Andrew Borgart, Eric van der Ham, Thijs Asselbergs



Coen Kampinga - mobile home



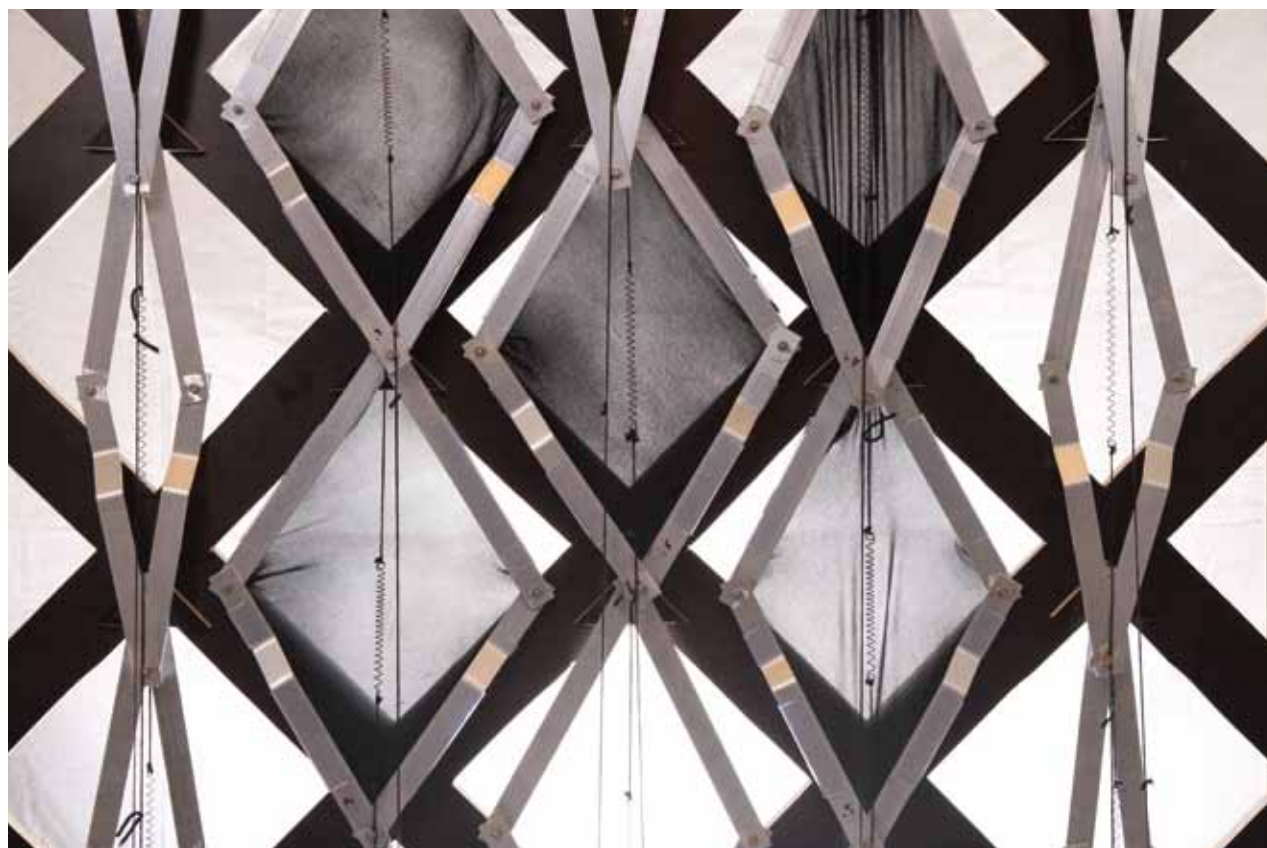
Jasper Gradussen - pavillion "push and pull"



A selection of Archineering models

LAB Bucky Lab

MSc1



As a Building Technology course – designing an innovative facade concept, working it out in detail and ultimately building a 1:1 prototype – Bucky Lab has been running at the Faculty of Architecture for quite some time. While much of the assignment has changed over the years, the emphasis has always been on detailing and prototyping, something that current assistant professor Marcel Bilow embodies with much passion. He is called Dr. Bucky Lab for a reason.

“We mostly draw students who are interested in construction and technology. An idea doesn’t have to be pretty on the first hand: it has to work,” Bilow says. “Our innovative, sometimes crazy projects then become interesting for architects as well.”

One thing that Bucky Lab has been famous for is its metal workshop. However after the fire of 2008 and after some time in the Faculty of Civil Engineering, this workshop now has been replaced by a mobile workshop. Bilow: “It made no sense running a workshop an entire year when it was only really needed for four weeks per year – two for each semester. Therefore we came up with the mobile workshop: a collection of cases containing all the tools and machines we need, able to be set up anywhere we want, whenever we want. The entire world then becomes our workshop.”

“Developing and building innovative facades remains our goal. What is very important to us as well is that experimenting and prototyping is done intelligently. Often the students start with a small model, they tinker around and in the end they know how the full scale prototype should be executed. Its that mixture of experimenting, sketching, engineering and creating a 3D model on the screen that increases the students skills and understanding of how things are done out there.

This semester, having a record number of 64 students, the course also has a new member. Casper van der Meer, graduated from the faculty of industrial design (IO) is supporting the students from his perspective as an industrial designer. Casper was involved with his graduation project in the development of a house made out of wrapped cardboard, developed the material library of IO and started the perpetual plastic project with some friends to illustrate how easy plastic recycling is, so a perfect fit as a guest tutor for the course.

This time we develop concepts for solar shading in cooperation with ROMAZO, the Dutch sunshading association to be handed in for the Bold and Beautiful student competition on the façade trade fair in Rotterdam. Being able to win all 3 prizes last year, the pressure is on, to get this semesters results on the same level.

And as always, these structures are to be built on a 1:1 scale at the end of the semester. So keep an eye out for a number of students dressed in safety clothes, building the facades of the future! Don’t miss the exhibition in the orange hall in January.

Also, make sure to visit the blog:
<http://buckylab.blogspot.nl>

Tutors: Dr.-Ing. Marcel Bilow, Ir. Casper van der Meer



MSc2 EXTREME

EXTREME is the new course at aE that is focused on integration of climate and load bearing structures in architecture. In the project students have to design a small research centre for Dutch universities on Antarctica.

The main idea of the course is to learn the students to deal with problems by thorough analysis rather than by using dogmatic solutions. The project is situated in an extreme environment which helps to quickly understand what the real problems are. In the Netherlands for example you would use a 30 or 60 minute fire resistant wall to make fire compartments in buildings so the building can safely be evacuated. On Antarctica though, the fire department takes 3 months to arrive. Therefore students need to think in strategies to deal with such problems.

Other typical problems are of course the cold climate, little sunlight, lack of space to do sports, but also the shortage of fresh food, the small cargo bay and limited weight capacity of the airplanes which will be used to get the building to Antarctica.

The project starts with some lectures on "Why innovate", "Earthquake resistant buildings", "Why Integrate" and on Halley VI:

Innovation is provoked by developments in technology, new demands and change in society. This project might have some relevant opportunities for innovation as Job Schroën will explain.

In designing earthquake resistant buildings there are, as in any extreme design task, different strategies. Mauricio Morales will go into some of them and will explain the importance of integral design in earthquake resistant buildings.

Integration of e.g. climate and load bearing structure is vital to make architecture. Ulrich Knaack will explain why and how it's done.

The British research centre Halley VI has just been finished. A video on the project reveals the unique problems of Antarctica and Halley VI's solutions to them.

During the second or third week there is a workshop on building physics, which should help students develop their concept, as building in a -50C environment is not an option without a clever building physics concept.

During the consults (twice a week), the team of architecture engineering teachers will be supported by incidental visits of climate and structural engineering teachers.

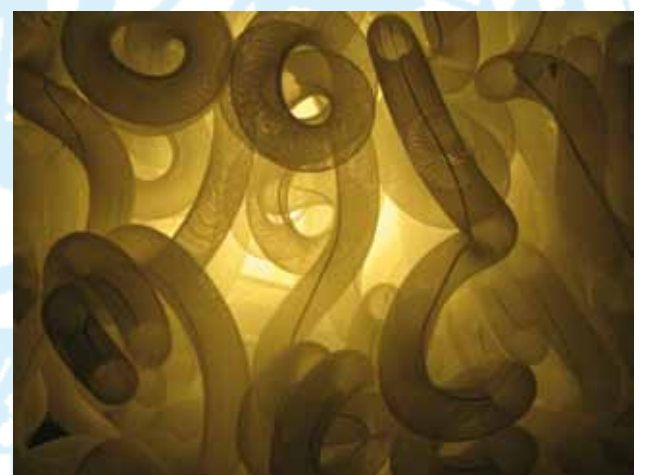
On the 19th of November there will be an excursion to a steel construction company, which is currently building a 250 meter bridge at it's yard. The excursion will show things like: why welding above your head is such an expensive thing, why sometimes you shouldn't use laser measurement tools and why -in bridge building- a level plane is a bad idea.

Architecture teachers: Job Schroën, Hans Kalkhoven, Annemiek Bleumink

Building physics and climate teachers: Martin Tempierik, Leo de Ruijsscher, Siebe Broersma

Structural engineering teachers: Andrew Borgart, Rob Nijse

Coordination and content: Ulrich Knaack, Job Schroën



Studio^{07/08}

MSc3/4

Studio 07/08: Westwards Scheveningen

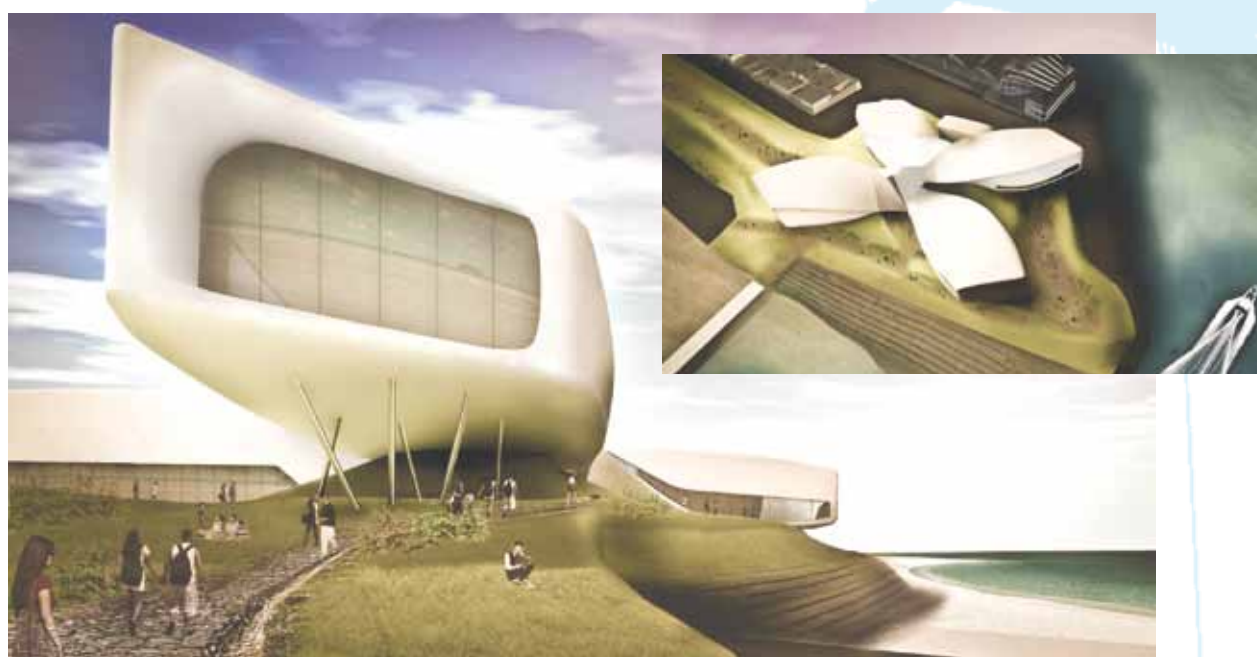
Scheveningen has a long history as a Dutch fisherman's village and as the seaside resort of The Hague. As the Norfolk terminal that connected Scheveningen to England, became redundant new wastelands appeared to be developed. The municipality of The Hague has published its future potential in the report Scheveningen Harbor, Pearl at Sea. The Scheveningen harbor and its surroundings will serve as the location for the Architectural Engineering MSc4 studios. The site contains all elements for exciting master plans with space for residential and commercial buildings and for cultural purposes. The buildings to be designed will be the vehicle for technology driven architecture, exploring ways to build for an unknown future with new technologies in the field of material science, structural and computational design, climate design, product development, green building and new management strategies. Fixing what can be fixed, with options left open for what we cannot foresee.



Mallisavaranan Balraj: Museum as an Exhibit – A Composite Exploration

Researching on the urban scenario of Scheveningen, it demanded an urge for 'Museum for Temporary Exhibits'. 'Dykes' which forms the urban surface and character of the boulevard, was taken as the challenge by transforming them into an urban-scape to house the Museum in a raised level and allowing an uninterrupted public movement and activities beneath it. After a detailed research, Fiber reinforced composites was proven to be the most effective material to realise the museum. Moreover the plasticity and the light weightness offered by the material helped in blending, liquefying and unifying the private museum spaces and the outdoor publicspace in a strong architectural image.

Tutors: Jan Engels, Suzanne Groenewold, Arie Bergsma, Mauricio Morales Beltran



Gabriela Semeco: Seismic Refurbishment



This project is about community memory in post-disaster Port-au-Prince, through the historic preservation and retrofit of the Cathedral of Port-au-Prince. The project attempts historic preservation and seismic retrofit through the theme of memory. From a distance, the reinforcing structure on the ruins alludes to the old rosettas which were destroyed in the earthquake. The roofing detail, a shading device, casts a shadow on the floor reminiscent of the tile pattern that was once there. The temporary layer, made of scaffolding, invents a new shelter type.

By trying to preserve the historic seismicity of the site, I carry forward the building practices of the past as both a reminder of consequences and inspiration for future building practices.

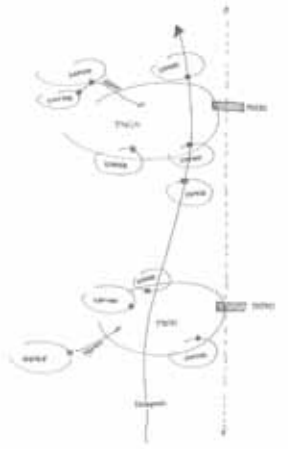
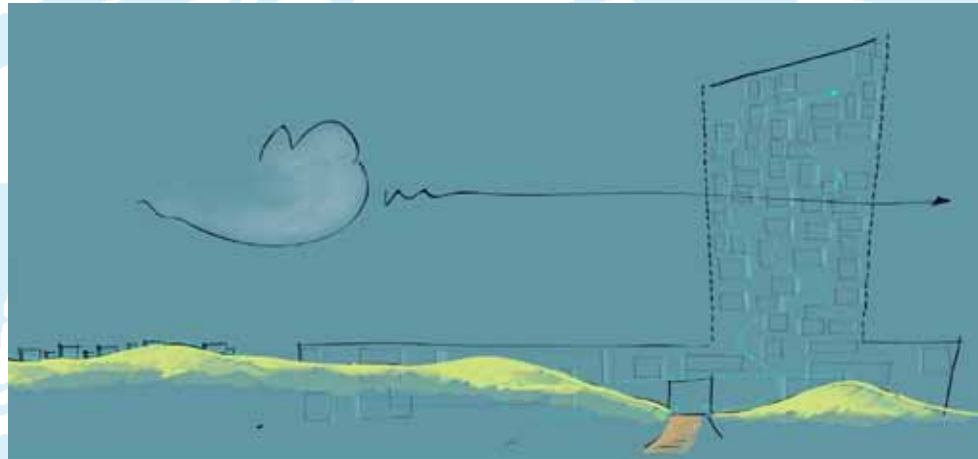
Tutors: Jan Engels, Suzanne Groenewold, Arjan van Timmeren

MSc3/4

Jettie Vernee: Winddriven Architecture

Design of a location specific hotel for the harbor of Scheveningen. The hotel uses wind experience to connect the user to the harbor of Scheveningen, where wind is the determining factor for the experience of the harbor and its surroundings. Research has been done on the interaction between buildings and airflows, the use of airflows in sustainable design, and the improvement of the use and experience of public spaces in hotels. The design is organized as a horizontal and vertical city in which rooms and public space are connected via a continuous (dune) path, on in which experience and connection are stimulated.

Tutors: Jan Engels, Suzanne Groenewold, Huib Plomp, Andy van den Dobbelsteen



Marieke Dijkstra: Finding rhythm at a psychiatric clinic

This project is dealing with movement, shadow and the border between personal and communal space. Embedded in the dunes of Scheveningen, it forms a refuge for psychiatric patients. These inhabitants stay in the clinic 24 hours a day, 7 days a week. Research shows that the environment influences the course of the psychiatric disease; a serene, clear and outspoken setting decreases the frequency of psychosis. Daylight was chosen as a main tool to create this setting.

During research, a system was created to quantify the effect of daylight within a space. This system was later used to guide design decisions.

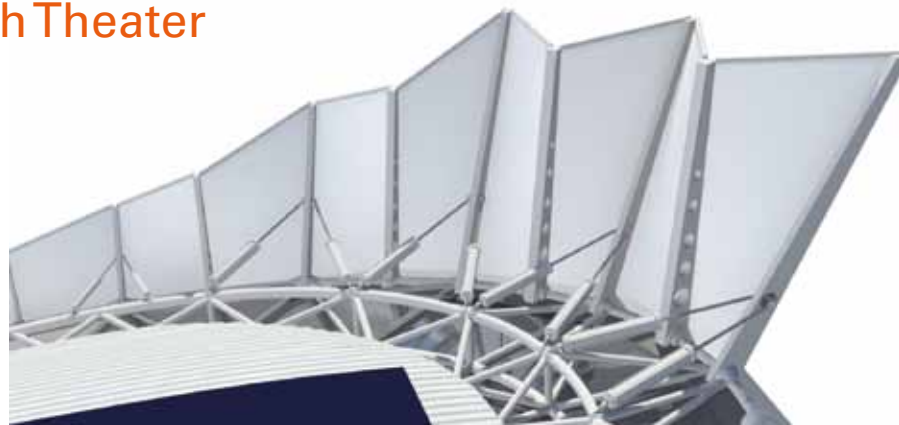
Tutors: Jan Engels, Suzanne Groenewold, Huib Plomp, Andy van den Dobbelsteen



Joris Heitkamp: Kinetic Beach Theater

The goal in designing the theater was to merge everyday mechanical engineering and adaptive architecture in a stunning environment, without allowing the kinetic aspect of the building just being a gimmick. Sunk symmetrically in the dunes in between WOII remains, the publicly accessible open air theatre and restaurant provide a year round attraction and reunites Scheveningen with the dunes and its war history. The heavy concrete base and auditorium gradually shifts to a elegant canopy construction with a PTFE curtain around the auditorium. The curtain on the canopy is able to open up in countless configurations, adapting to the environmental conditions or programmatic needs. See more at <https://vimeo.com/74150956>

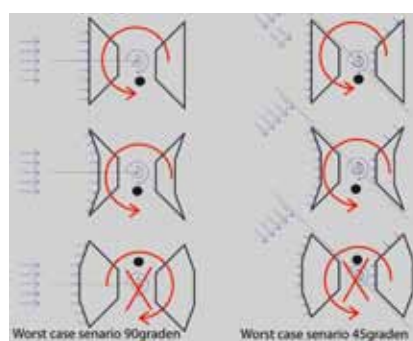
Tutors: Jan Engels, Tjalling Homans, Mauricio Morales Beltran



Reinhard Proffitius: Wind Driven Architecture

In this project the focus was on designing an energetic sustainable building. The design had to be made in Scheveningen where the wind has the most energy potential in all of Europe. This was the basis of a technical research to optimize the shape of a building for energy production. The result was a building which overproduces for 300 households beside the new hotel function. The implementation alongside of the harbor of Scheveningen resulted in an appropriate ending of the new boulevard of Morales, which combined all the functions and activities which come together at this part of Scheveningen. The technical research is published with ISBN 78-3-8454-7152-5

Tutors: Jan Engels, Tjalling Homans, Frank Schnater



Studio^{07/08}

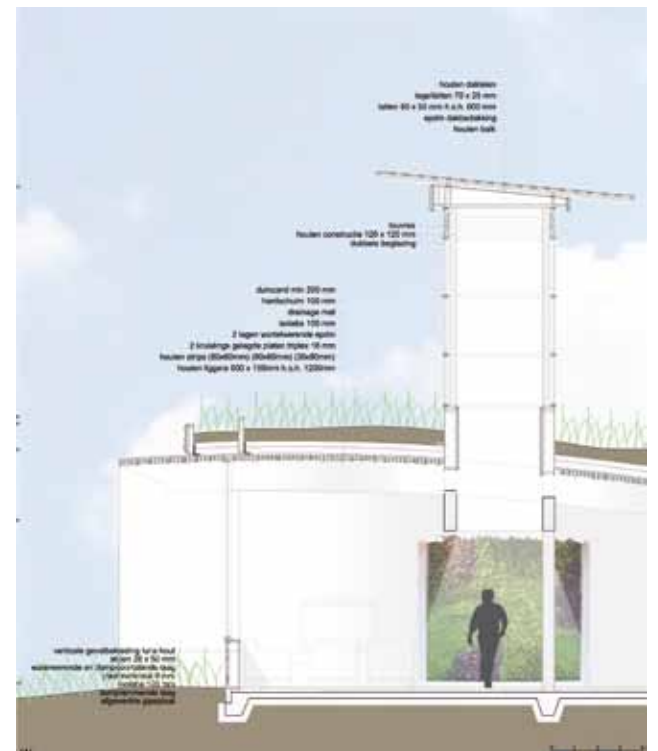
Eline Vermeulen: Architecture for Dementia

My proposal is a neighbourhood, in the dunes, for people suffering from dementia, where green places and ventilation through vegetation play an important role. The neighbourhood contains 8 small-scale residential complexes that are hidden underneath the dunes, and a public building where activities can take place and where shops are located.

The neighbourhood is divided by an axis: the boulevard where all elements of the neighbourhood are situated. On this axis, points of reference are placed. These points of reference are within so-called "dune-gardens", that are always connected to two living units. The neighbourhood also contains indoor gardens with a view to the sea.

Inhabitants can leave their house on their own. In the living units, solar chimneys bring light into the house while ventilating it. People will automatically walk towards light, which is why the solar chimneys are situated above the access halls to the living spaces and sleeping rooms.

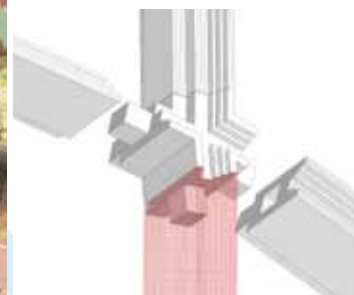
Tutors: Jan Engels, Tjalling Homans, Arjan van Timmeren



Ate Snijder: Solar Material (sun+sand=glass)

Many of the readers will probably have seen videos by Marcus Kaiser who invented a 3d printer that prints objects in the Sahara desert using only sand and sun. For the E part of the aE graduation studio I have done research into the structural potentials of this material which, in lieu of an existing term, I call 'solar material'. This is a type of low grade glass that is produced by fusing sand particles together using concentrated solar energy using a lens or series mirrors. The design featured a number of specific structural applications of the 'solar material'. Most notable is the meshed dome which sits within the ancient rammed earth walls of an existing ruin. Together they form an intriguing hybrid showcasing the contrasting structural and esthetic qualities of the two materials. The common trait of both materials however is that they are locally produced resulting in an extremely sustainable and site-specific architecture. The building's function is to be a hub for tourism with program of shops, food stalls and accommodation.

Tutors: Tjalling Homans, Annebregje Snijders, Rob Nijse



Robert Jan Kustermans: Form Follows Force

Inspired on the works of Calatrava, Candela and Saarinen, this research is about the interdependency of the shape of a building and the forces. As the name Form follows Force tells you, I didn't focus on optimizing the weight of the building, but on adapting the shape of the building in order to minimize the amount of hinge forces. Both the location and the building answer perfectly on the demand of a new cruise terminal in the Netherlands: the terminal shouldn't inferior the size of a cruise ship and the iconography gives the Pier a new boost.

Tutors: Jan Engels, Tjalling Homans, Wim Kamerling



MSc3/4

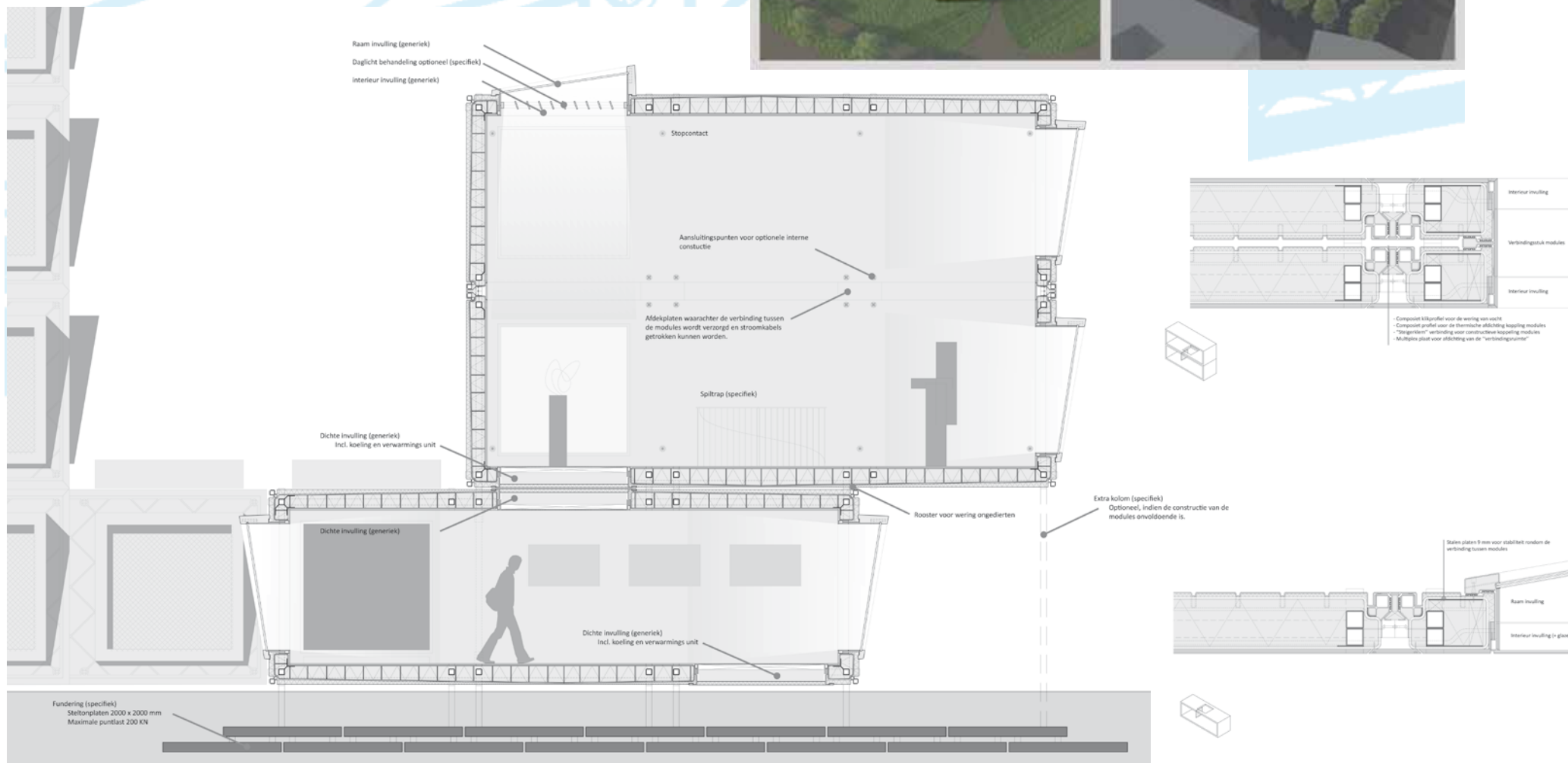
Edwin Jacobs: The Repositionable Art Podium (RAP)

In a globalizing world many events travel from city to city, providing a temporal economical and social boosts to the region (e.g. the Olympic Games and the World football championships). The goal for the RAP was to design an art podium that could travel like these events but instead of using 'disposable' buildings (if not designed for adaptation) take the building to the next event in another city.

The RAP uses modular components (the size and weight of the maximal transportable cargo by truck) to be easily disassembled, transported to a new location and assembled on the new site.

Instead of assembling the building in the same way on a different location the modular components can be rearranged to produce new layouts which can be used to adapt the design to a new context which changes as the building relocates.

Tutors: Jan Engels, Tjalling Homans, Frank Schnater



Bob van Rooijen: Dike / Building



This graduation project is a plan which defines opportunities for architecture in sea-defending structures in intensively urbanized coastal regions. The personal fascination with coastal defence structures turned out to be a great starting point due to the given location of Scheveningen. Research during the first semester lead to a more specific site: an old seadike on the edge of the harbour. The cohesion between dike and building characterizes the design of the building, both elements are strongly interlinked by the chosen spatial and constructional principles.

Tutors: Jan Engels, Tjalling Homans, Wim Kamerling



Studio⁰⁸

Johan Bogaart: Scheveningen Ready for the Future



Our cities are built full and become old unfortunately not always in a good way. Often there are areas that decay due to shifts in use and because of modernization in technology. Old buildings do not comply with new standards and are left to decompose until they are waiting to be demolished, or might there be a better alternative? By finding new use for characteristic buildings (such as the fish market) we can let the city age in a beautiful way while retaining the story of the area. By integrating modern technology at the same time we can save on construction costs (the skeleton is already there) we save on impact that we have on the environment. While we improve our living environment and save the most important parts of our heritage.

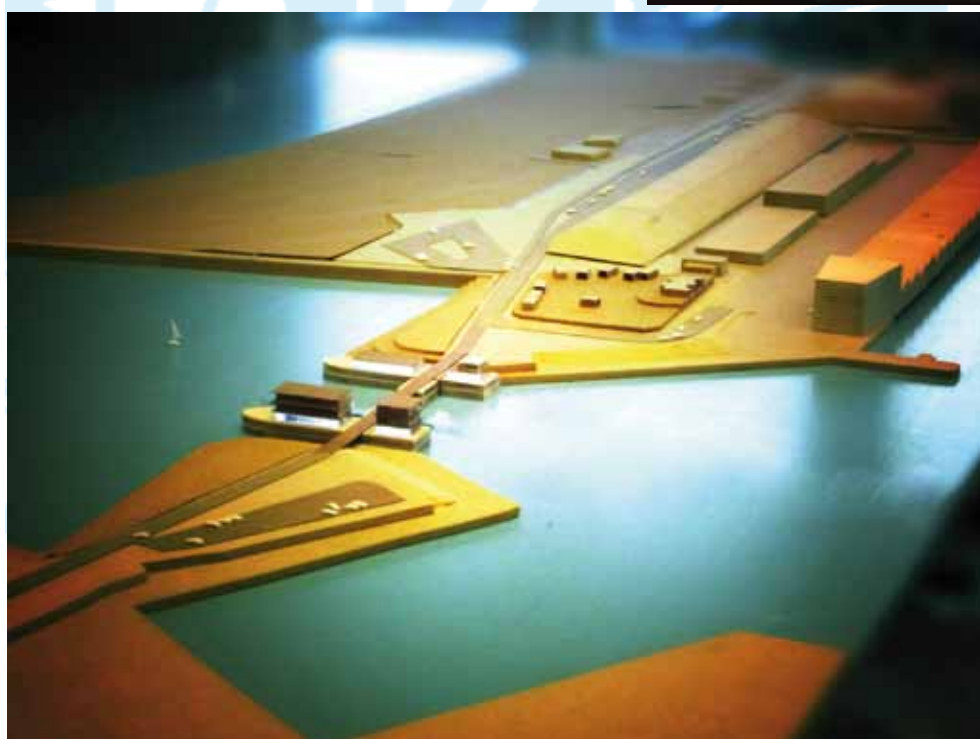
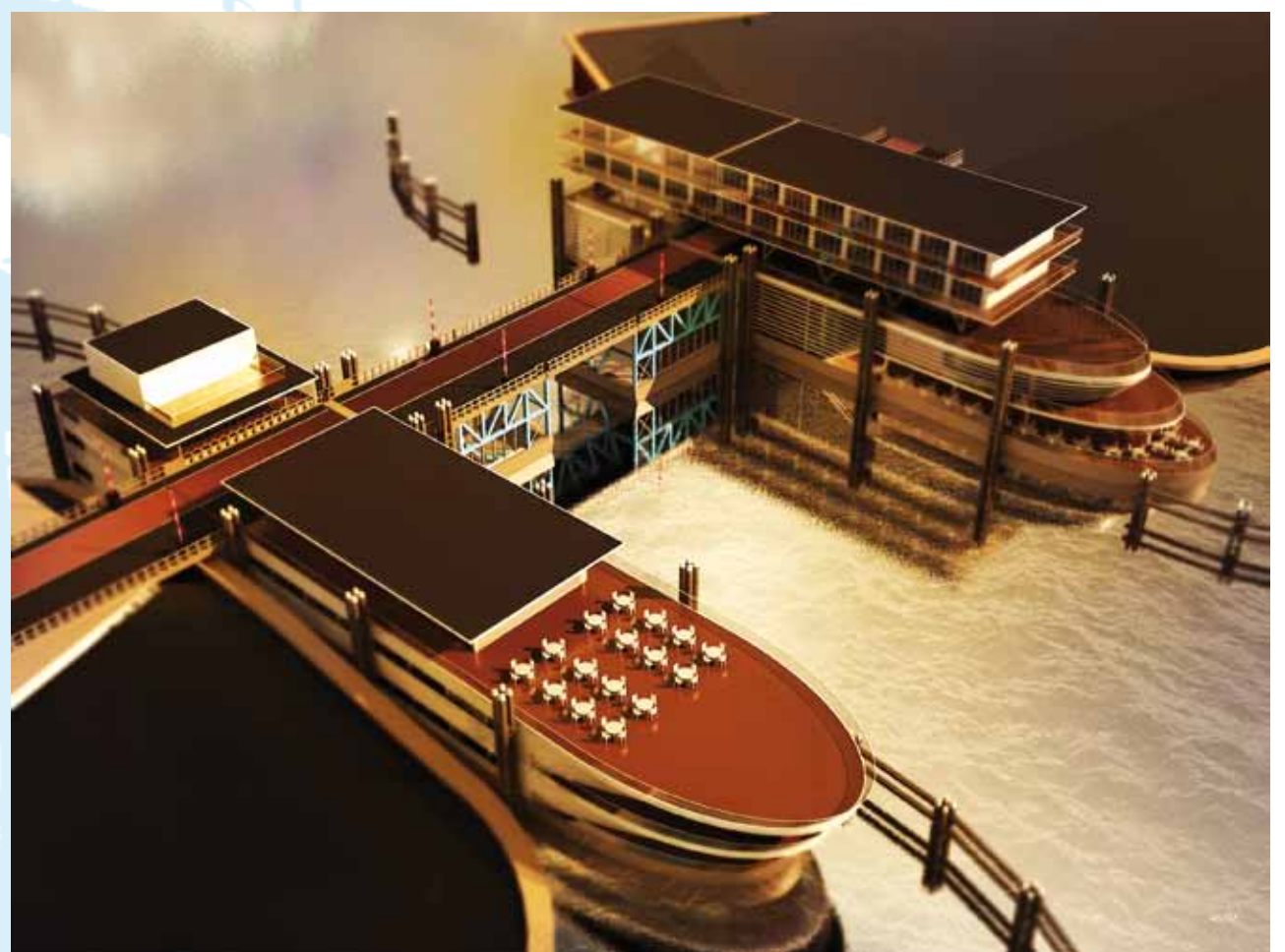
Tutors: Jan Engels, Tjalling Homans, Bob Geldermans



Tim van Beukering: Floating Connection for Scheveningen Harbour

The proposal for a floating structure in the harbour mouth connects both shores for cyclists and pedestrians at ground level, extending the brand-new boulevard to the southern area of Scheveningen-Harbour. The design features a unique hotel with a spectacular experience for its visitors. Pontoons start to shift into another configuration as vessels pass by; an event occurs that attracts tourists to the harbour area as counter reaction to the pier. Dimensions of approaching vessels influence the magnitude of the event. Only the bascule bridge will open when a sail yacht approaches, whilst an entire transformation is required for larger vessels.

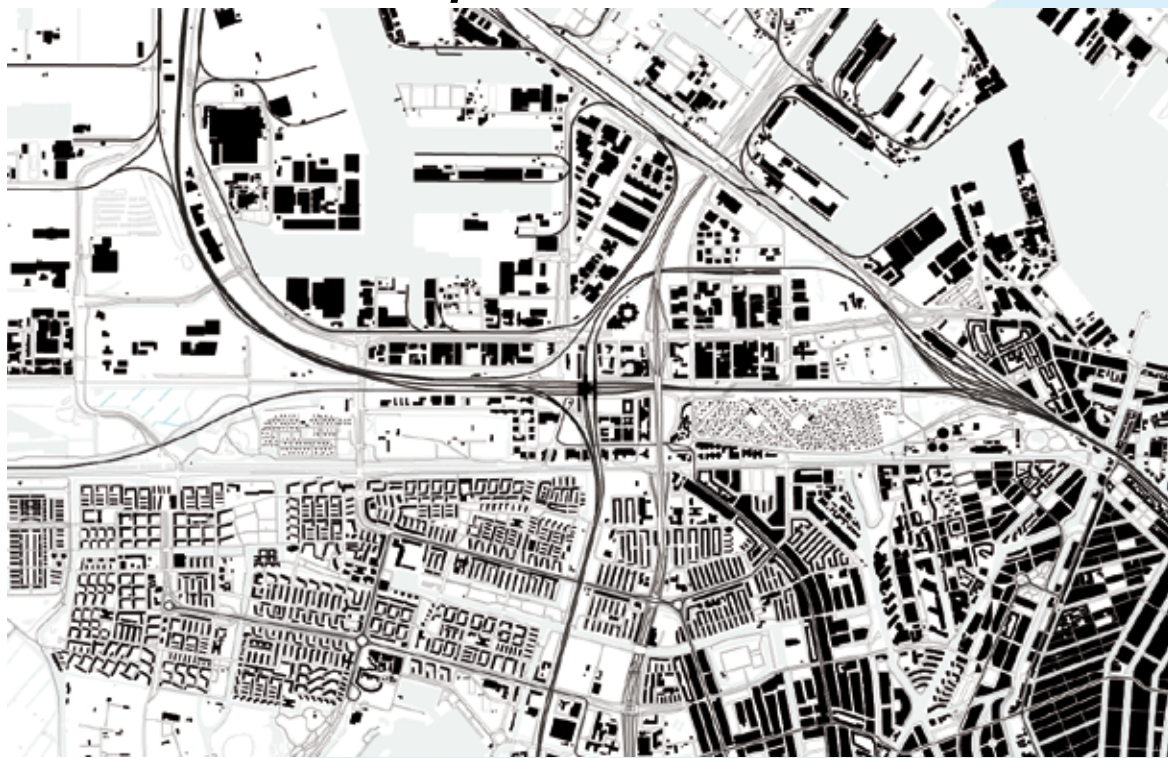
Tutors: Jan Engels, Tjalling Homans, Wim Kamerling



Check an animation of the building by following this QR-code!

MSc3/4

Studio 09/10: Amsterdam at Sea



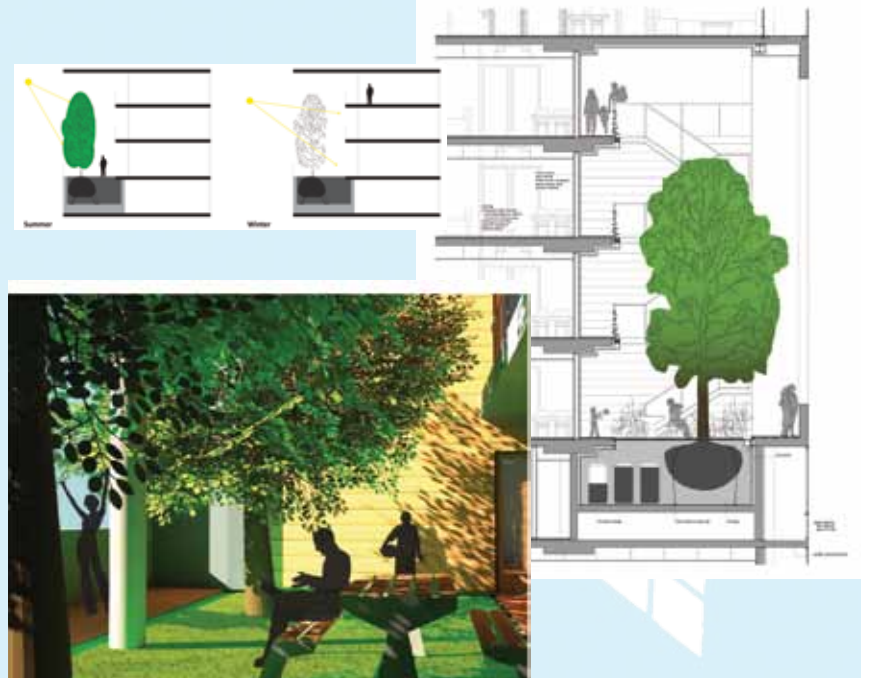
The Brettenzone is a testing ground for all kinds of projects: it is an area full of cultural heritage, textured with many layers of development. Bordered on the urban side by the Haarlemmerpoort (Haarlemmer gate), the area stretches westward towards the sea. In the past, the area has been partially submerged by rising sea water; this period however has left few marks nowadays. Only some pieces of the Spaarndammerdijk (Spaarndammer dike) remind us of those times. Many layers have taken its place: reclaimed land, long infrastructural lines as railroads, highways and water; living areas in the Westelijke Tuinsteden (Western Garden Cities), harbour areas and the office area Sloterdijk; yet also places for recreation like the Westergasterrein, or on a smaller scale the many allotments and residences. Relations between this high programmatic diversity are often invisible or non-existent. Many interpretations can be made of this in-between land.

The Brettenzone is a testing ground for the assignments of the future. Just some of these are pollution, energy use, our dwelling needs, rising sea levels, uncertainties in food supply and infrastructural barriers.

Jan de Ruiter: Transformation with the Sun

In a monofunctional area, what resulted in vacancy of many buildings, and a place without nature, my project started. I wanted to change the monofunctionality and to bring in nature. This resulted in the transformation of an office building into a hotel with a green route in the building, consisting of trees! The hotel rooms and the green route are based on the path of the sun. In the redesign of the hotel, passive solar solutions are combined together, to create energy efficient sunspaces at the hotel rooms at the south facades. For the green route, trees are used to offer visitors a better environment, the trees provide shadow and wind protection, and by that the experience of nature in the building is reached!

Tutors: Tjalling Homans, Annebregje Snijders, Bob Geldermans



Robin (Chao) Wang: A Double Life of Hyper-Openness



Vacancies in Brettenzone as an opportunity for a new type of commissioning. Fascinated by mass production and mass customization, I formulated my graduation project as a transformation of an existing vacant office building into a 'vertical autonomous', stacked dwellings and office units, designed by individuals tailor made to their wishes within a set of rules and principles.

Metaphorically I used the 'self made sneaker' and projected its various design options onto a building design: what in this case is the shoe, and what are the embroideries?

I translated the complexities of this seemingly simple projection and made a distinction between the hardware – components linked to the building structure – and software - components linked to the individual units. This analysis resulted in a conceptual design, in which accessibility, public space and piles are guaranteed. Within this structure I designed a set of possible plans for the units. I treated the façade double sided and created a multi useable facade element - as well for dwellings as for offices – on site and a set of rules about the use of public space on the other. This all resulted in a 'double life of hyper openness'.

Tutors: Tjalling Homans, Annebregje Snijders, Tillmann Klein

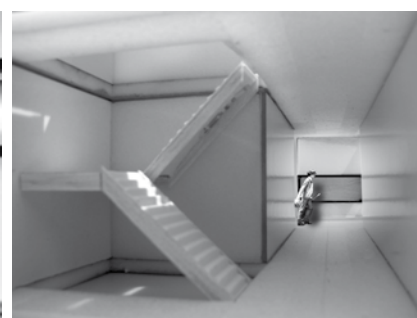
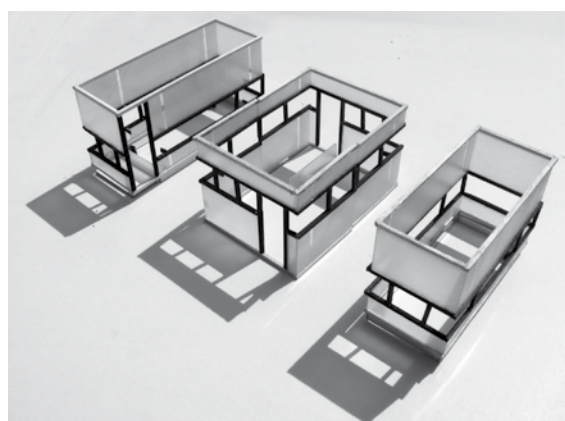
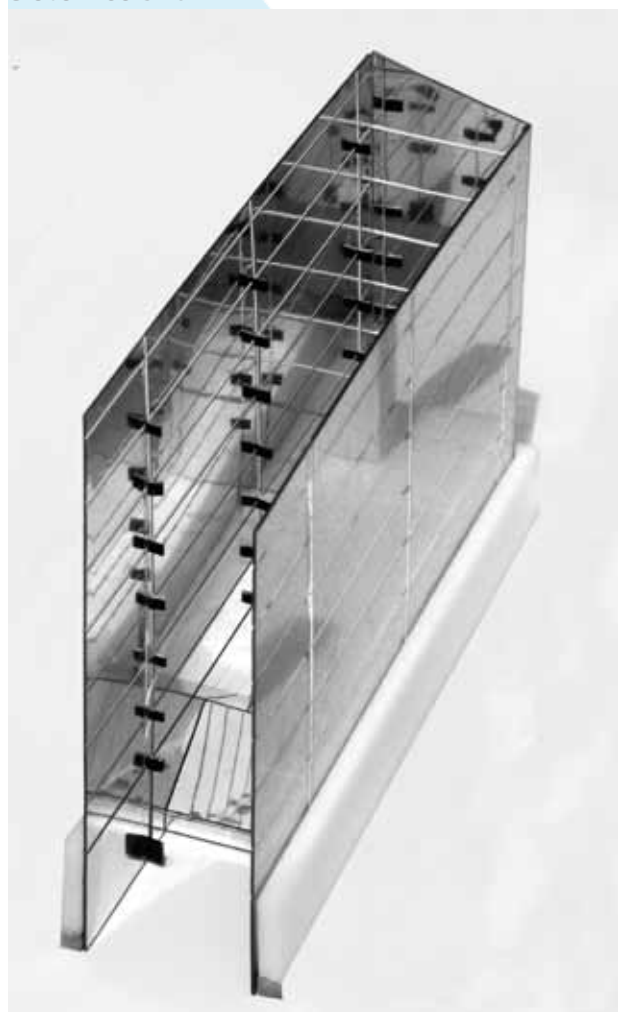


Studio⁰⁹

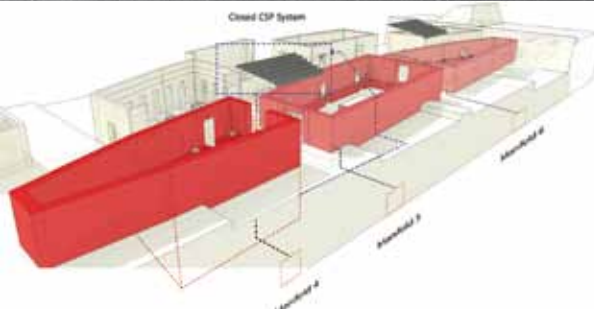
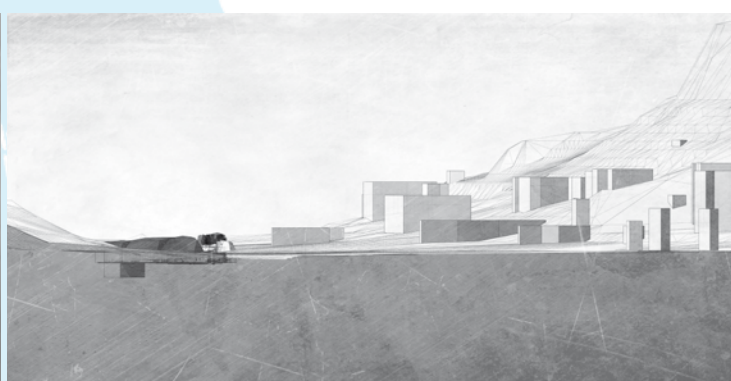
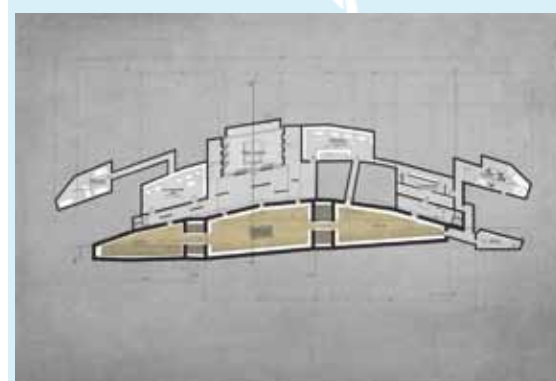
Bram van Hemmen: House of Mirrors

To cease the cycle of "vacancy attracting vacancy" in office landscapes like the Amsterdam teleport area. Large quantities of office buildings call for a rebirth into residential buildings. The typical office floor, however, is not instantly reinterpreted as a living space. Large quantities of TL lighting should be replaced by day lighting serving the living spaces and the outdated buildings do not meet today's energy standards. 120 computer controlled (heliostatic) mirrors, placed in a tilted construction frame overvaulting the roof, send their light via a curved mirror into translucent shafts drilled through the building volume. The shafts, supported by a construction hanging from the tilted construction frame, form the centre of an apartment. The shafts more than double the buildings daylight penetration and directly diminish the days with a heating load from 213 to 170. Excessive heat from the mirrors during summer days is stored in the ground, so that the system fully covers the building's heat demand in the winters.

Tutors: Tjalling Homans, Annebregje Snijders, Siebe Broersma



Frederich Steenkamp: Public Hammam, Ait Benhaddou, Morocco



The site for the Thesis project is located on the foothills of the Atlas Mountains in Morocco. As an UNESCO site and popular tourist attraction it has sustained popularity for its exotic location as a deserted Ancient fortress and has become a common film destination for Western film industries, including movies such as Lawrence of Arabia, Gladiator and James bond. The thesis project is a critical response to the separation of the old and new town, owing to globalization and de-urbanization of the area. The project uses the public sphere as the mediator between the two sides of the city. The function of the project is a public bathhouse. Natural rhythms of sun and water are used to draw a relationship between daily Islamic bathing rituals and the rhythms of the site. High and low tides express changes of seasons and access to the baths, whereas natural lighting is used as directional light for movement through the bathhouse.

Tutors: Tjalling Homans, Annebregje Snijders, Siebe Broersma

MSc3/4

Studio^{11/12}

Coastal area, Brettenzone & A12-zone

coördinator: Tjalling Homans, main tutors: Annebregje Snijders, Monique Smit, Tjalling Homans
research tutors: Marcel Bilow - Regina Bokel - Andrew Borgart - Siebe Broersma - Suzanne van Dijk - Andy van den Dobbelsteen
Bob Geldermans - Eric van den Ham - Tillmann Klein - Giancarlo Mangone - Rob Nijse - Martijn Stellingwerff - Peter Teeuw - Martin Tenpierik a.o.

If technique is the answer, what is the question?

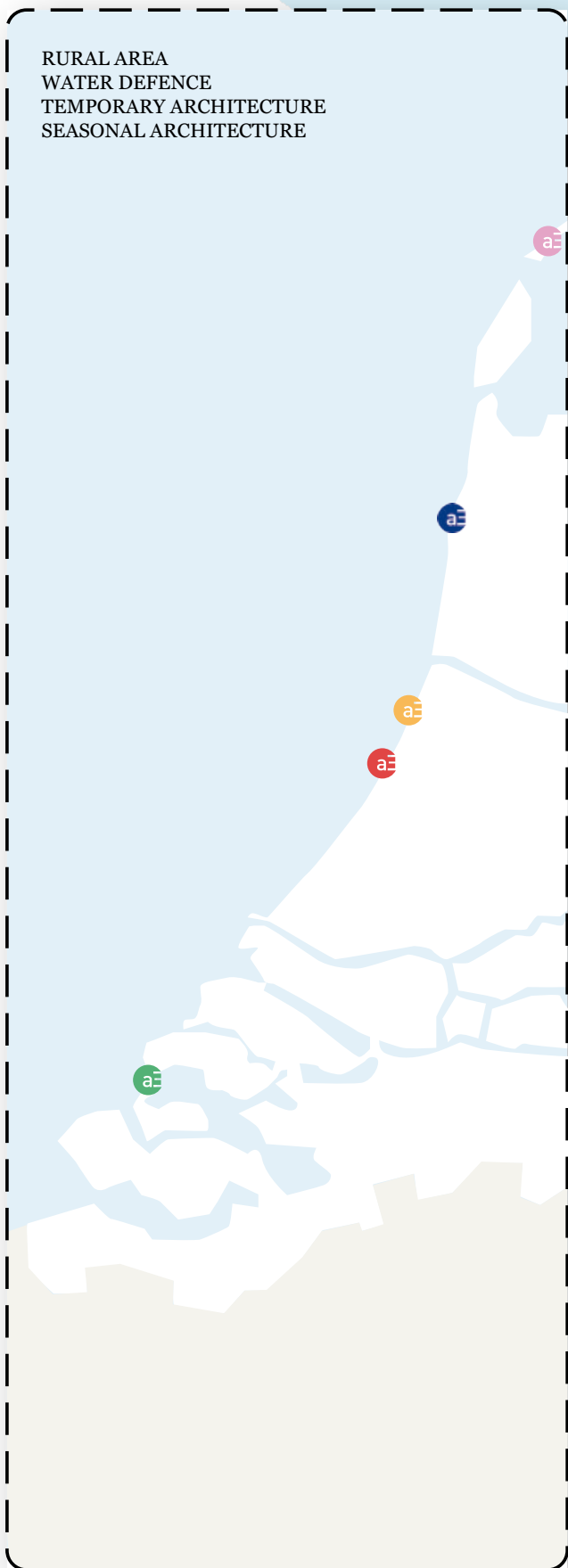
We're living in a time full of changes: there's a vast amount of office vacancy; a large percentage of the existing housing stock is not measuring up to our comfort needs; but also our new buildings have to deal with changing requirements. Changing requirements that are often motivated by a lack of space: we need to find solutions for building at unconventional places. But we also need to find answers for integrating other aspects in our built environment, such as: mobility, energy and food production, water treatment, etc.

How do these changes influence the way we have to think about our use of space and how can we anticipate on these changes?

AE Studio selected three contexts in which you can find all kinds of questions deriving from these changes: an urban extension-zone along the A12 in Utrecht, 'Land-in-between' in the Brettenzone in Amsterdam and a more rural area along the Dutch coastline.

Coastal area

RURAL AREA
WATER DEFENCE
TEMPORARY ARCHITECTURE
SEASONAL ARCHITECTURE



sarah roberts ^{ae}

Parametric frameworks for the design of deployable shelters

How can parametric frameworks and computational simulations be used to design lightweight deployable shelters customized for the Dutch coastal region?

susanna hofer ^{ae}

Designing a seafarm using natural materials

How to built a seafarm with a minimum impact on nature using natural materials?

leon spikker ^{ae}

Semi permanent beachresort and additional dune pavilions

How can a digital design tool assist in the design of an ultra-high performance concrete pavilion using robotic hot-wire cut EPS moulds.

wessel van beerendonk ^{ae}

Distinguished dunes

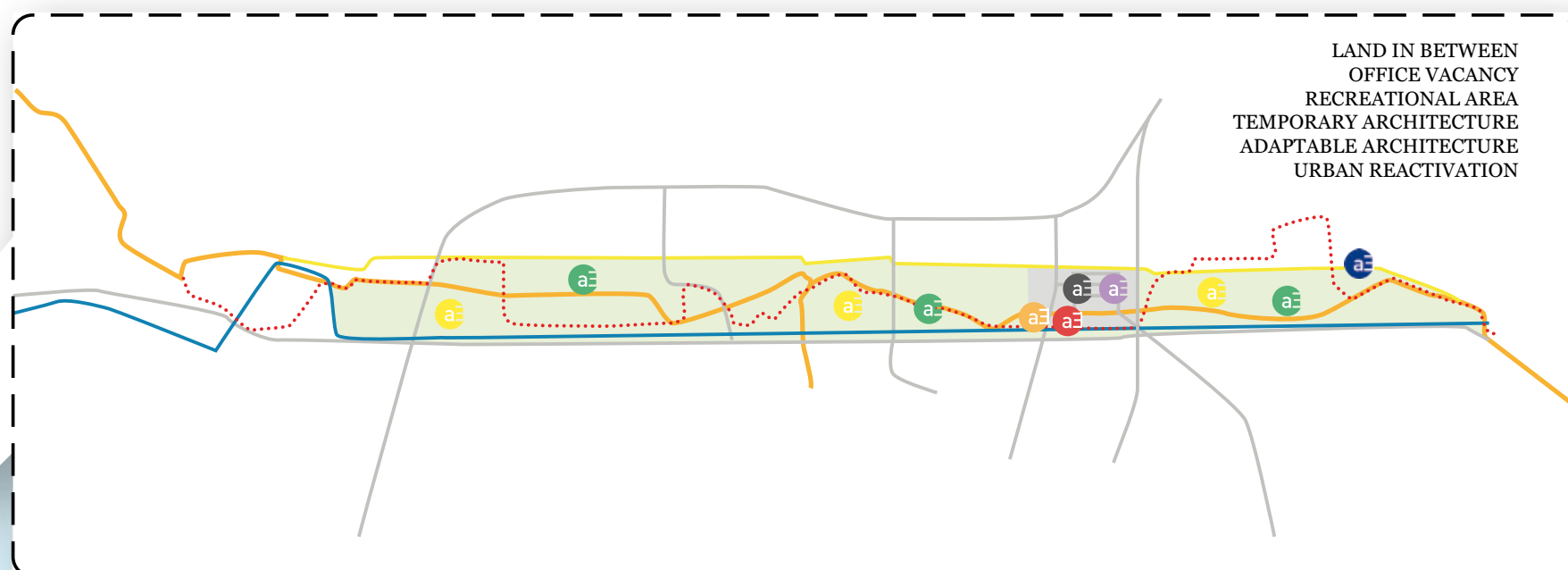
How can we design a building as a motor for new life creating new ecosystems in the Dutch coastal area, which imbeds itself in its direct environment, while on the other hand supports the process of grief and loss?

patricia knaap ^{ae}

Climate responsive architecture

How can I design a dwelling in the coastal area of the Netherlands in the most energy effective way by using the characteristics of the location and its climate and integrating modern sustainable technologies?

Amsterdam - Brettenzone



yuxiao he

Paramatic designed extension of Westerpark

How can I design a cultural complex situated in an extension of Westergasfabriek Culture Park using digital design and workflow ?

nienke verhaar

Closed-cycle redevelopment of vacant offices

How can a vacant office building, in the Brettenzone Amsterdam, be transformed into a building with multiple other functions, with the Circular Economy concept for already used materials and added materials?

qiushi wu

Architectural structures in a national cycling park

How can I introduce new public facilities in the Brettenzone by designing complex geometry architecture with a digital workflow?

sevan markerink

Integrating urban farming into the redevelopment of vacant office buildings

How can a vacant office building be redeveloped into a multifunctional complex, where urban farming facilities have a significant functional, social and architectural value?

sam van til

Low-cost paper structures stimulating the redevelopment of Sloterdijk-area

How to design a (set of) temporal building(s) that can be produced with minimal costs, energy, effort and environmental impact consisting of paper construction elements that are and can be locally recycled and produced?

daan van gool

Using vacant office space for autonomous housing units

What kind of architecture emerges when future inhabitants redevelop vacant building complexes in an evolutionary way?

léon zondervan

Adaptable housing units for vacant offices

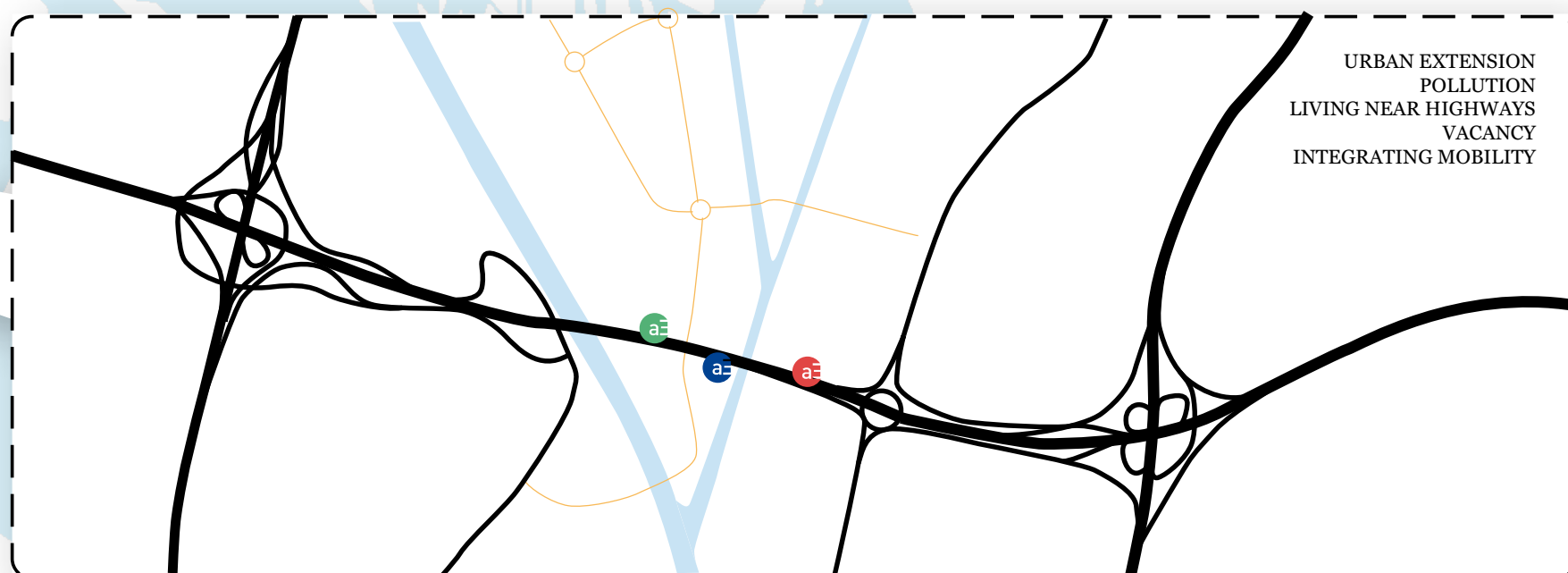
How can we design a cheap portable living unit that facilitates a comfortable micro-climate and -environment in vacant buildings that are in poor condition?

chen shen

Temporary stadium of bamboo

How can a temporary bamboo structure, which can be dismantled for reconfiguration and relocation, augment the recreational value with various activities in the built environment?

Utrecht - A12 zone



arez ali

The highway, our future healthy living environment!

How can the highway be integrated in our built environment, where it is no longer a barrier but part of a healthy and pleasant living environment?

cederick ingen-housz

highway as urban centre

How can I design a habitual building in the direct vicinity of the highway that reduces the soundpollution and increases the spatial qualities?

bao ngoc le

Converting the disadvantages of the highway while reconnecting the city as a whole

How can we transform the highway environment into a healthy and useable environment where we benefit the disadvantages of the highway and connect the city as whole again?

- this is an arbitrary selection of topics our students are working on -
Interested in AE Studio? See us @work every Tuesday and Friday in BG Oost 250!

PhD

aE Research

Learning to design is the key point of education in the design studio. At the same time it is opaque. Teachers are expert designers. Being a professional, performing a skill is for a large part an implicit activity. Observing teachers and students at work in the design studio, they mostly talk about the design product.

However, learning a complex skill like designing is a matter of doing and *becoming aware how to do it*. For students and teachers therefore, it will be helpful to make the *design process* explicit.

For making the design process more explicit, a conceptual framework with five elements is proposed. These elements are generic in the sense that they are main aspects and always present in the complex, personal, creative and open-ended design process. Personal and cultural differences in approaches are like kaleidoscope figures in respect to these elements.

The framework will be developed and tested in practice.

Elise van Dooren: Design Education

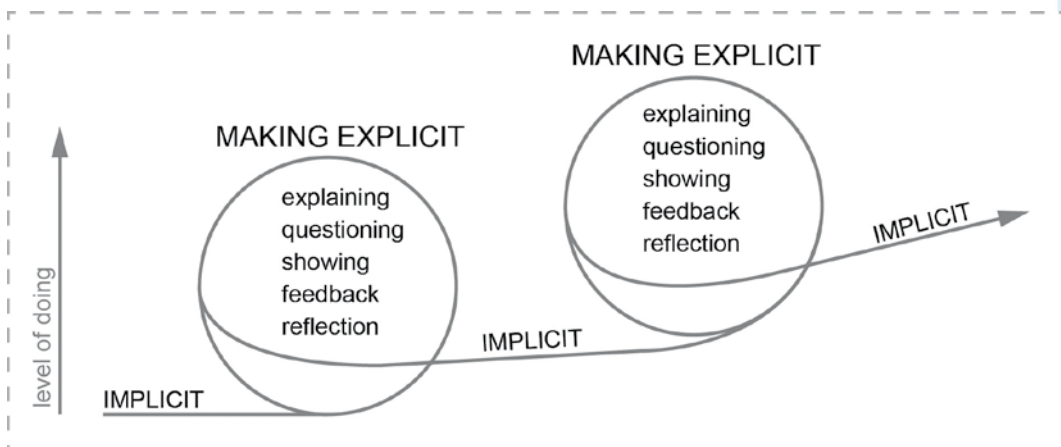


Fig. 1 making the implicit explicit in learning

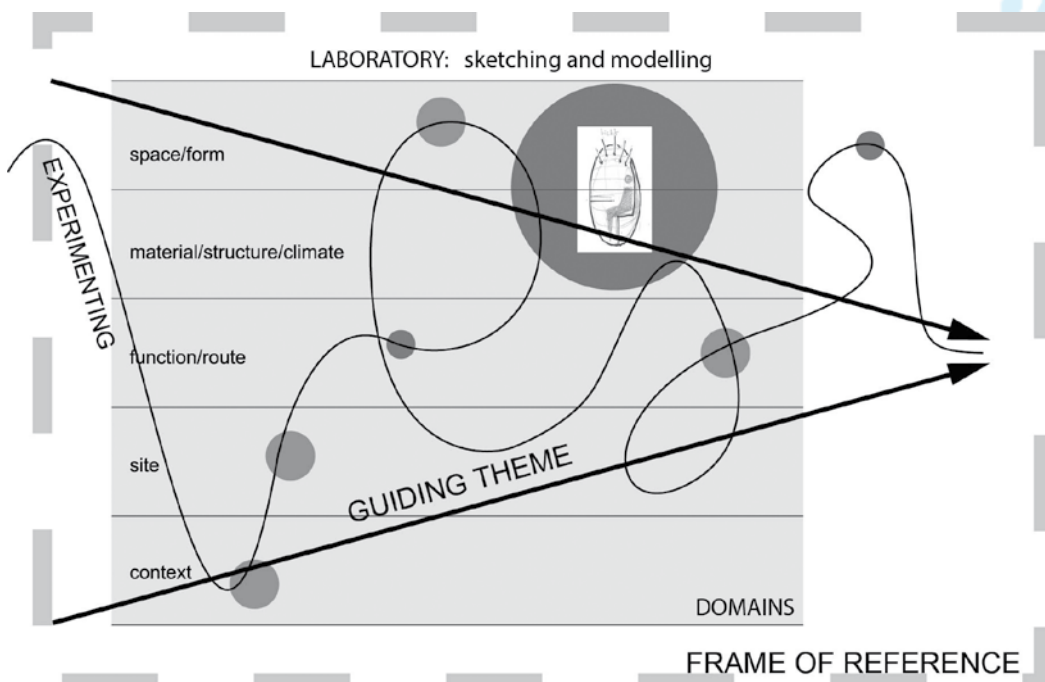


Fig. 2 The five generic elements in the design process: experimenting, guiding theme, domains, frame of reference and laboratory.



BEST STUDENT OF THE FACULTY

Pieter Stoutjesdijk: 100% CNC-cut Building Systems

With digital fabrication, our hardware is starting to bear greater resemblance to software. This research project explores the potential of processes used in the development of open-source software for the field of architecture. The design process will be connected to a building system that provides new insights on constructing with CNC-cut 2,5D elements and friction fit connections.

The design process uses digital technologies to allow broadly defined building performance to become the main guiding design principle. The system of adjustment and advice does more than merely optimizing quantitative parameters. Moreover, it fully supports the designer in creatively and effectively balancing the many - sometimes conflicting - performance related aspects. Both the building system itself and the intelligence behind the online information- and simulation driven design context have great potential to be developed collectively, similar to the development of software or other open-source hardware projects.

The proven technology of CNC milling will be used in innovative ways and applied to full scale building. The principle of CNC cut elements with integrated friction fit connections will be developed to reach new levels of adaptability, simplicity, material efficiency, aesthetics and structural performance. Combined with locally produced sheet materials from organic waste, this building system sets new standards of sustainability in building construction.

aE Day 2013 Alumni

This year, the first edition of the Architectural Engineering Alumni Day was held at the Berlage Rooms at the Faculty of Architecture. On this special celebratory occasion, we saw how some of our alumni are doing in the workfield, while we also said goodbye to our long-time tutor, Jan Engels, who is retiring. You can read a report of this day on this page.



With more than 50 guests the event that took place in the Berlagezaal we can call it a success and the program was inspiring as informative as we had hoped. Prof. Thijs Asselbergs gave a short intro about the studio and the current change and the new tasks of our profession and gave the word over to Jan Engels who invited 5 students of the earlier studios to let them talk about their time within the studio but most important, what they are doing now.

Karin Hoekstra now working for Royal Haskoning is busy with sustainable aspects within the public transport and mainly busy with central stations. Steven Goeman found a place in the office of Cepezed and is now busy with big projects just around the city of Delft, while Despoina Papadopoulou is now working for a Belgium office (Buro II) and her graduation project of a prison led her career also into an office that is now busy with one of the biggest prisons that are actually built.

Bernhard Aukema, who developed a Hydrogen related Architecture found its place in the mechanical installations office of Deerns and is now busy with the most complex installations that are engineered totally in 3D...it's a pity that most of his work will be hidden afterwards.

As the youngest grad student, Tim van Beukering who just finished with his bridge project in Scheveningen is still on job search, but took the time to support his girlfriend to finish her graduation project.

All in all it was a wide mixture of jobs the former students are now working in and the whole event showed that the studio provided them with the right set of skills to succeed in the real world.

Last but not least we also used the day to say thank you and goodbye to Jan Engels who will retire after 35 years at the faculty. We wish him all the best! And the beer at the end of the event was to celebrate his great support for all the students he supported the last years.

Also, make sure to visit the blog: <http://intecture.blogspot.nl>

We asked some of the alumni the following question:

"What is according to you the value of the ideology of Architectural Engineering for building practice?"

Carlo Maria Morsiani

The preparation of architectural engineering gives the necessary independence to the students in order to adapt in all the different constraints of every building practice. The ideology of the academic program furthermore runs along with the values of a new rising economy based on a "do it your self" attitude which allows new graduates to freely explore work opportunities as freelancers or even as self employed architect. Finally the dichotomy of a studio where two or more different aspects of a building process are forced to cooperate together determine that ambiguity necessary to float in the contemporary scenario.

Bernard Aukema

During the Architectural Engineering graduation studio you are challenged to deal with several technological aspects that can shape and organize architecture. Research is essential to discover the technological possibilities, but particularly parallel creative thinking about the appearance of the researched technology in the design can lead to unusual but suddenly viable ideas.

Personally, during my graduation in 2011 it became clear for me that "organizing your design like a machine" could lead to extraordinary architectural expressions. Architectural Engineering cuts both ways; an inspiring technological fascination arouses your imagination and the output of multidisciplinary research drives you further to harmonize the design and its experience. Especially the ability of translating technological research into architecture is valuable in building practice because it is an added value to come to a well-organized and convincing design.

second edition

aE Alumni Day 2014
21 March 2014 – don't miss it!

Architectural Engineering Associates

Solar Decathlon 2014

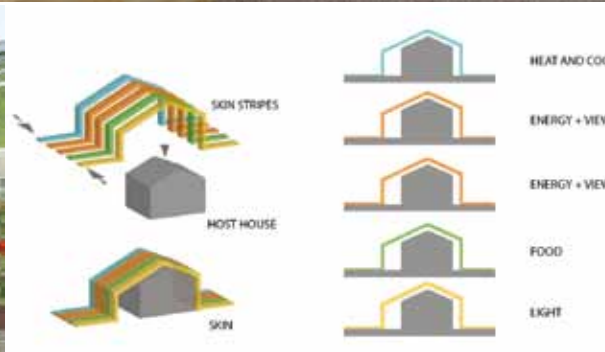


The Solar Decathlon Europe 2014 will take place in Versailles, France. Twenty Universities will be setting up their 'pavilions', each with its characteristic features and appearance. One of these structures appears to be aligned slightly different to the regular North-South alignment of the others. There is evidence of a street, a pavement and hints of a family home: pictures on the wall, the fresh scent of flowers from the garden. In fact, it IS a REAL family home from a REAL Dutch neighbourhood – in Paris!

We strongly believe that what's going to win next year's competition isn't another flashy concept house, but the genuine story of an authentic Dutch community and how it was improved by design. Whatever it is that we bring to France next year needs to be more than a house, it needs to be a piece of Holland.

Osama Naji
Prêt à Loger's Architecture Design Team

www.pretaloger.nl



BouT Student Association

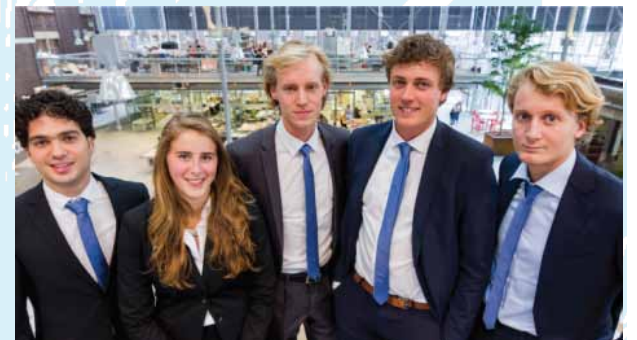
BouT is the student and practice association for Building Technology. We are a platform for students and alumni, PhD students, researchers and other academic staff and commercial enterprises. Within our network we aim to exchange building technology related knowledge and experience. Our board consists of Msc students who commit to the association for at least a year, next to their study activities.

Throughout the year we organize events that complement the Msc curriculum. Excursions to companies within the field of building technology offer insights in what to expect after graduation and give you the opportunity to gain knowledge. In collaboration with other associations or companies we organize symposia.

To keep our members up to date about everything happening in and around the Building Technology world, we publish the magazine RUMOER. This periodical revolves around a different BT-topic each time. Next to our own publication, we also have a small library of building technology related magazines like Detail and Bouwwereld. These are available for you to read at our office.

We hope to see you around!

Website: www.praktijkverenigingbout.nl
Mail: info@praktijkverenigingbout.nl
Office: BK 02.west.090



The BouT board (ltr): Muhammad Ulusoy, Tyrza Lighthart, Dwayne van Halewijn, Freek van Zeist and Joost van de Ven.



On 27 November, BouT will go on an excursion to the Octatube factory, where lectures will be given about some of the projects Octatube has been involved in: the Markthal in Rotterdam by MVRDV (on the left) and the Botin Art Centre by Renzo Piano (right). The excursion is members only, go to the website to subscribe!

Architectural Engineering Master Programme

MSc-1 aE – Bucky Lab

In the Bucky Lab and Bucky Lab Seminars the combination between architecture and building technology is brought to a higher level. The assignment is to design an innovative building façade prototype.

Research is done by virtual simulation and physical testing of the design's material and structural performance. The results are used as feedback to optimize the design.

The final test is the realization of a full scale prototype of a part of the façade. This means that the design will be translated into shop drawings, material quantities and a production strategy as a preparation for the actual building.

Bucky Lab (AR1AE015) - 12 ects
Bucky Lab Seminars (AR1AE025) - 6 ects
Compulsory courses - 12 ects



MSc-2 aE – EXTREME

The project is about building in an extreme situation, in respect to climate, location and function. Essence is the interaction between the extreme circumstances, the technical solutions, and the architecture.

Extreme circumstances require technical solutions that will be the starting point for the design development.

The designer has to direct the 'engineer questions and answers', towards the articulation of the form which is based on integration of aesthetic and technology.

This course can be a part of the TU graduation specialization 'Technology in Sustainable Development' (TIDO).

EXTREME (AR2AE010) - 12 ects
Compulsory & elective courses - total of 18 ects



MSc-3/4 aE – Architectural Engineering Graduation

The MSc-3 consists of extensive thematic research. Research focuses on a certain materialization, climate or structural fascination. Previous projects explored the possibilities of building with straw, floating buildings and parametric design.

Graduation Preparation (AR3AE015) - 15 ects
Research (AR3AE012) - 11 ects
Thesis Plan (AR3U012) - 4 ects

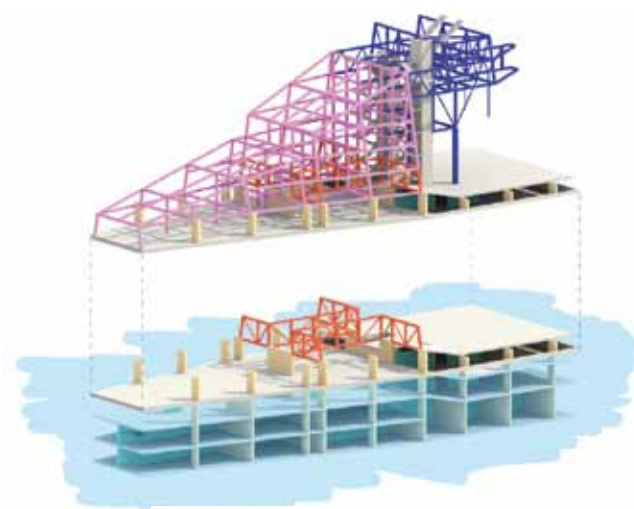
In the MSc 4, the emphasis lies on the integration of architectonic aspects and building technology within the design, guided by technical research (material, structural, climate & parametrical design).

The MSc 4 project deals with various building types and programs, situated in different interesting and challenging surroundings. You'll be supported and examined by architecture instructors, specialized in the materialization of buildings, and a building technology specialist dependant of the focus of the research and design.

This graduation lab can be a part of the TU graduation specialization 'Technology in Sustainable Development' (TIDO).



Dong Eung Lee - Energy City



Steven Goeman - Olympic Stadium Fleet

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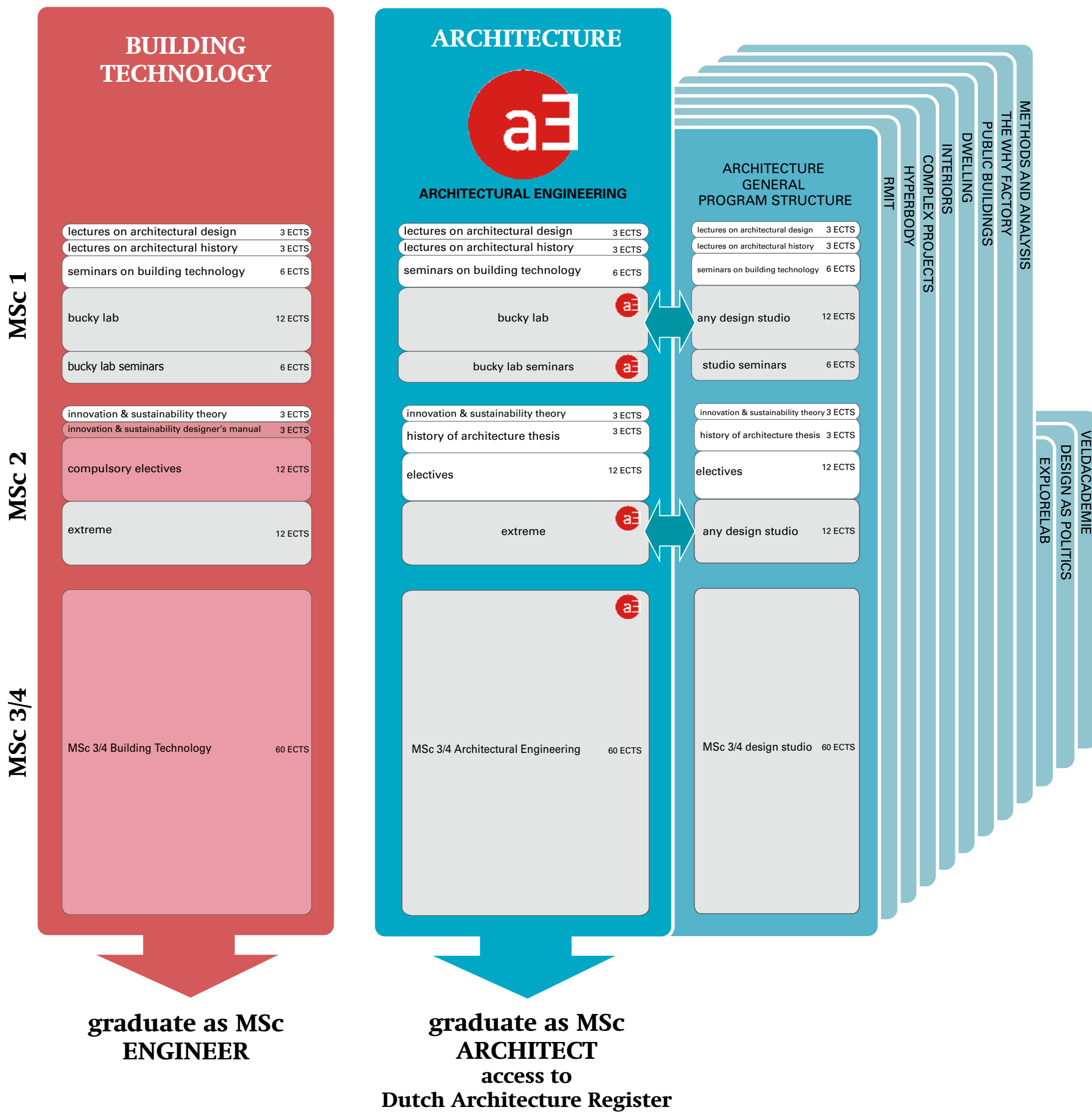
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Programme Scheme



COLOPHON

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Elise van Dooren
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