aE Journal 2017/2018: aE/Intecture innovating architecture

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journal

aE studio / INTECTURE 2018/2019

news aE in action

Introduction aE/Intecture innovating architecture

by **Thijs Asselbergs**

Driven by the need to think differently about resources, energy, power generation, the choice of materials, and user involvement, we see the built environment in a new perspective. The program, Architectural Engineering, seeks for innovative and inspiring architectural solutions for social and environmental issues throughout all scales.

To achieve this, innovation of the architectural challenge is high on our agenda. Innovation is more than just a technical improvement. How do you implement new current issues in modern architecture? We anticipate new energy, materials, and circularity. We also use the current environment of the metropolis and the countryside. We add new buildings, strengthen existing stock, and work on new components of buildings. From high to low tech. From digital to traditional, looking carefully to the context.

We like to work together. Partners have been found in Landscape Architecture in the HARVEST-BK project for the Rotterdam Architecture Biennale in Rotterdam (IABR 2020) and Parkstad Zuid Limburg (IBA 2020). We work together with Heritage & Architecture and the department of Urbanism within the Shared Heritage Lab, in Bandung Indonesia. In Amsterdam, hundreds of international Master's students from different semesters are working on the renewal of AMC, the largest 40-year-old academic hospital in the Netherlands. It is a completely covered city, with half a million square meters of indoor space. Our ideas for creative solutions for the Marineterrein as a breeding ground for slow architecture have found their way to the Future of the City debate. TU Delft partner AMS (Amsterdam institute for Metropolitan Studies) will soon be established on this location.

In order to inspire the innovative strength and debate, we are hosting Paul Kalkhoven, partner at Norman Foster, as a guest professor until spring 2019. We are looking for 'the new architect', the role that the architect can play in the renewal of architectural issues. From large to small scale, from panorama to artefact. We like to train decisive specialists and broad generalists. We share projects and ideas with students, teachers and researchers. We are proud to present you this ninth journal.

photo:
Andy van den Dobbelsteen, Samsoe

Pavilions for Okana

Explore Lab

Alumni Laura Straehle and Ellen Rouwendal just came back from the second building phase of the community center in Kenya, with the Design-Build-Project 'From Landscape to Roofscape – Pavilions for Okana', a prototypical pavilion structure designed for public use in East Africa. Low-tech design solutions were important to realize the project successfully together with the local inhabitants, workers and international students in less than two years. The community center in Okana is in use by the villagers and has the aim to be self-sustaining at the end of 2019.

Student Steelprize

aE Intecture Winner

aE Alumna Frédérique Sanders has successfully realized two prototypes of her graduation project, 'PV as Art'. In June 2017 a first prototype was placed at a Van der Valk hotel in Germany and a second prototype can be seen at the Green Village in Delft.

The innovation concerns two vital trends in architecture: the increasing demand for solar cells and the increasing demand for natural light in buildings. By combining these two requirements, a new roofing system was developed.

Archiprix

aE Intecture Nominee

aE Alumna Freddie Koch recently presented her graduation project 'Crafting the disused' as part of the national Archiprix competition.

The project explores a proposal for a decentralised waste management system for a small village in Indonesia, with a strong focus on recycling and reusing of waste materials for the built environment. The exhibition of 27 projects can currently be seen at the TU Delft and will travel through the Netherlands beginning August 2018.

aE in action **news**

New aE/Intecture collaborations

Shared Heritage Lab

The transformation of cities and buildings is one of the main emergent themes in contemporary architecture. Finding an appropriate balance between the old and the new is of fundamental interest for contemporary architectural design. The Shared Heritage Lab aims to explore, design and test resilient future scenarios for the historic cores of Indonesian cities with a shared Dutch past.

The collaboration between aE Intecture, Heritage & Architecture and Urbanism of Delft University of Technology and the School of Architecture, Planning & Policy Development of Institut Teknologi Bandung (ITB, Indonesia) forms a 3-year programme, which is supported by the Royal Netherlands Embassy in Jakarta (Indonesia) and the Dutch Cultural Heritage Agency (RCE). In 2020 the collaboration is celebrated with an exhibition and publication of the results during the 100th year anniversary of ITB.

HARVES TBK

INTECTURE

LANDSCAPE ARCHITECTURE

TU Delft

IABR Harvest Lab

From September 2018, aE / Intecture and Landscape Architecture are starting a Cross Domain studio. At a time when technical innovation plays a major role in thinking about and designing the built and unbuilt environment, aE / Intecture and Landscape Architecture are looking for innovation through all scales. From the scale of the landscape to the building, from the scale of the object o the region. We work on inspiring examples that put the metabolic thinking on the map. How these fields of design will influence each other is part of the quest, but it will certainly lead to new types of space and materialization in both architecture and landscape architecture. This program has been selected for the International Architecture Biennale Rotterdam 2018-2020 'Missing Link' and is offered in the graduation labs of aE / Intecture (MSc track BK-Architecture) and Landscape Architecture (MSc track BK-Landscape Architecture).

aE Café

Rethinking current ways of building

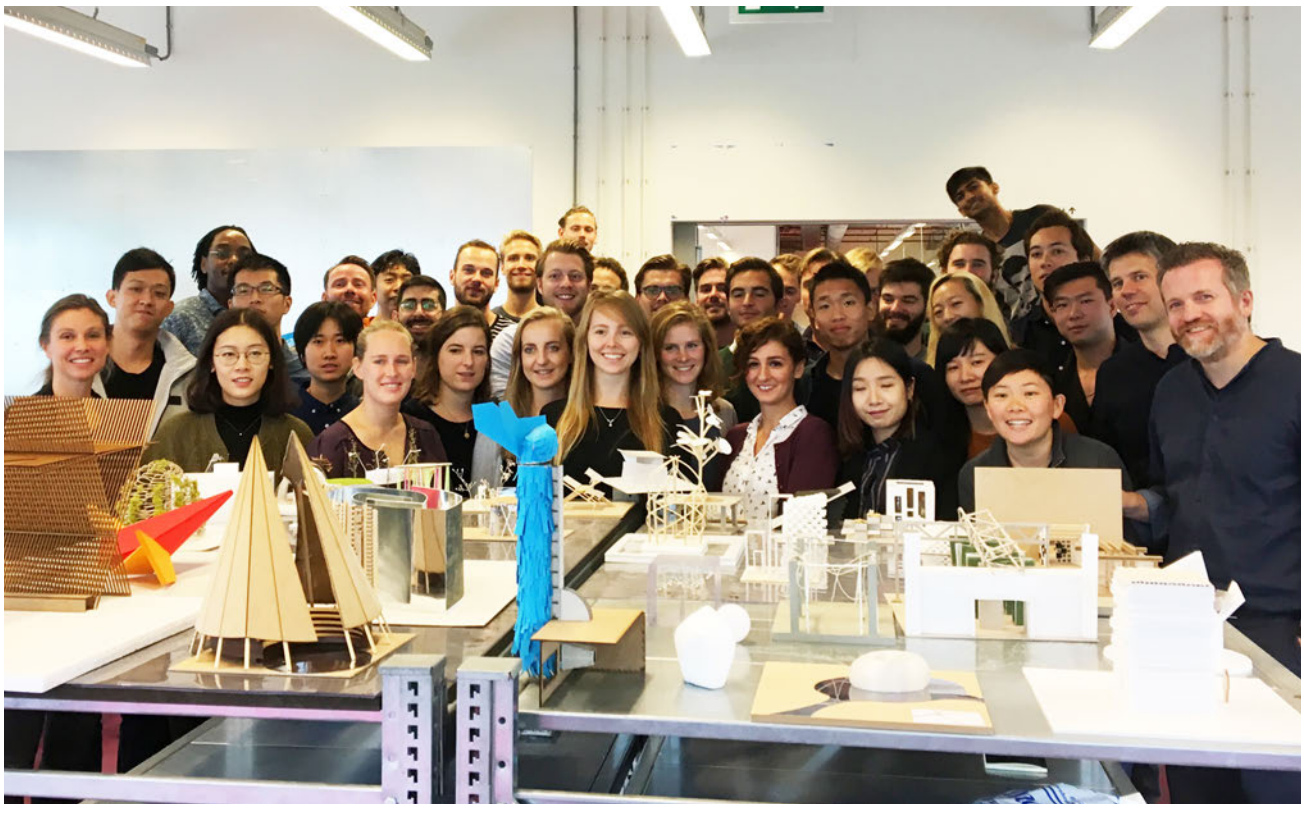
On 12th December 2017 aE Intecture organised a series of lectures and subsequent round of discussion about new ways of building in a world of resource scarcity and high energy demands.
In the first part of the event, five alumni, Fallon Walton, Frédérique Sanders, Floris Plink, Iris van den Brink and Thom Schreuder were invited to present their graduation projects and practical experience with regard to the change that an architectural design can/is supposed to bring.
In the second half of the event aE/Intecture student Max Verhoeven presented his graduation project about local materials in South Limburg. You can find out more about his research on page 14. His presentation was followed by a fascinating lecture by Clemens Quirin from Martin Rauch's office Lehm Ton Erde in Austria. He introduced the office's work with earth as a building material and gave interesting insights into rammed earth construction. An interview with Clemens Quirin is featured on page 15.

INTECTURE 17/18

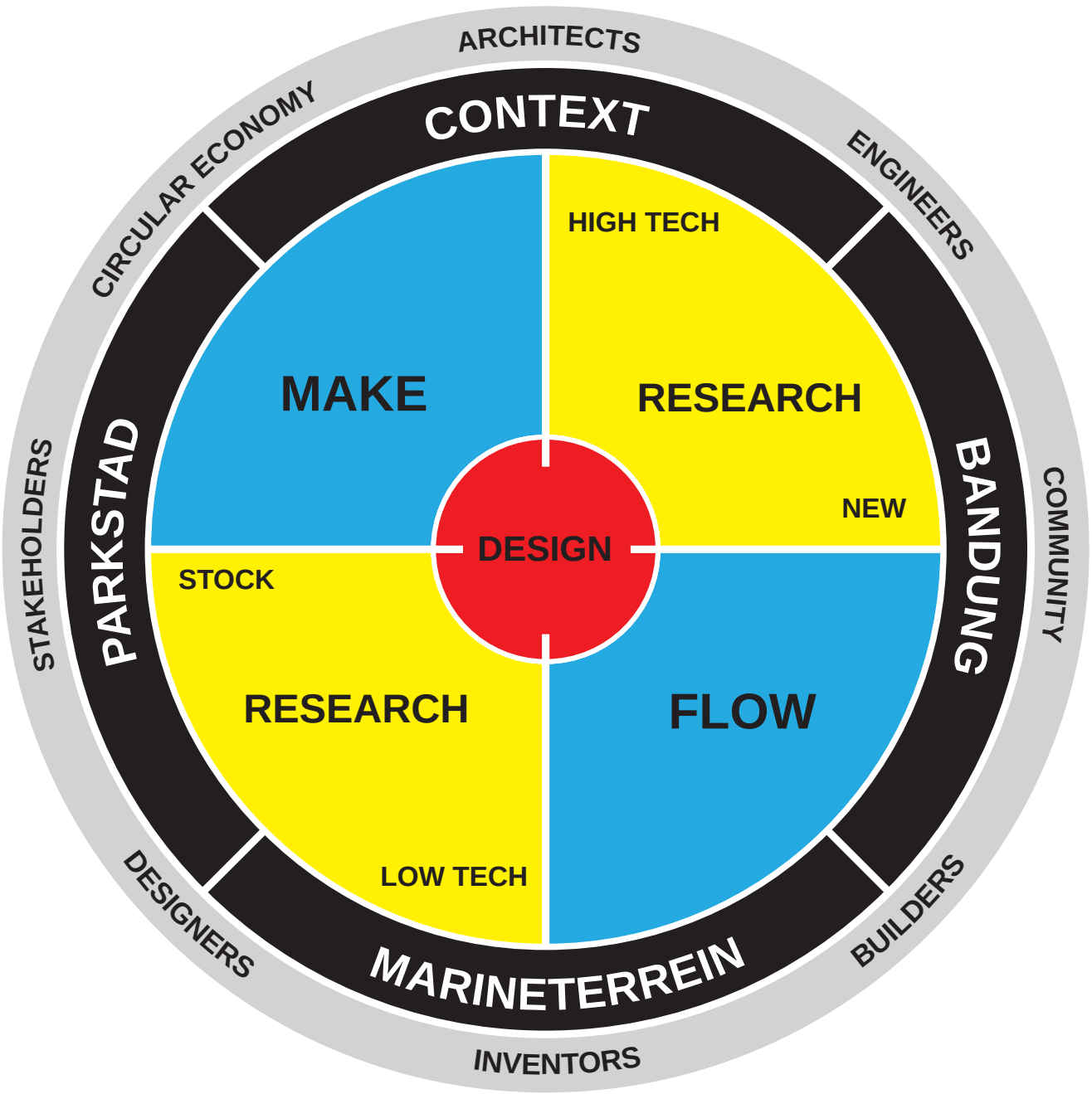
Students and alumni

This graduation year (2017/2018) two groups of aE INTECTURE students (studio 19 & 20) launched new research and design projects in the last two semesters. At the start of the two semesters they kicked off with the Intecture Pavillion Pitch, in which they introduced themselves and their technically inspired design fascinations.

On December 2018 aE Intecture will organise an aE Alumni Day during which the studio presents new developments in architecture and alumni share their work experiences. On the back of this aE journal you'll find an interview with alumni Frédérique Sanders who graduated in aE INTECTURE. She has been developing her graduation design and has already placed the first prototype at a Van der Valk hotel in Germany.



Introduction Intecture



FLOW

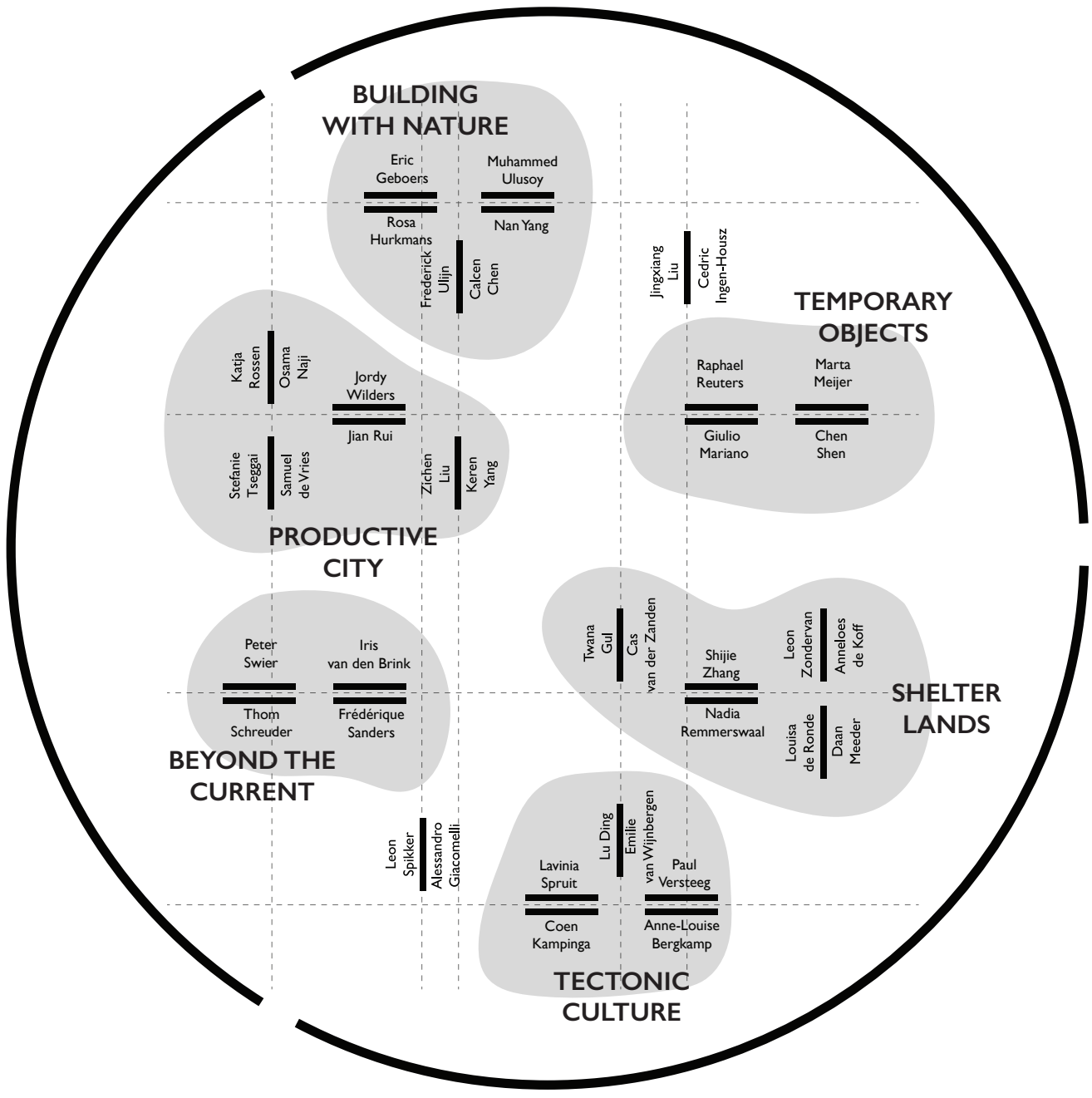
In Flow we see buildings as structures interwoven with their wider system. The sustainable performance of buildings has everything to do with flows. Well managed flows of people and resources contribute to valuable, comfortable and healthy spaces and cities.

STOCK

Stock is about the potential of the existing by looking differently to what is already there, by making use of a technical fascination, in relation to current or future needs. Ideas for intervention can vary: the upgrade of existing housing stock, office buildings or product development of interiors.

MAKE

Make is about new (digital) production methods, the (re)-use and development of materials and systems for existing and new applications. How do we change the future of our environment, our homes and our cities, using a bottom up approach towards a better and more sustainable future?



text **Annebregje Snijders**

THE NEWS OF PROGRESS

Fascinated by the social position the architect can take

And the ambition he or she can adress

We embrace the existing and combine this with hope

which innovation brings

Stressed out by existing systems, structures and habits in the building industry

We work on meaningfull examples

Which tickle curiosity again

We integrate questions of our time

Which could lead to strong social environments

There are three domains; flow, the stock and the make

Which make the renewal visible

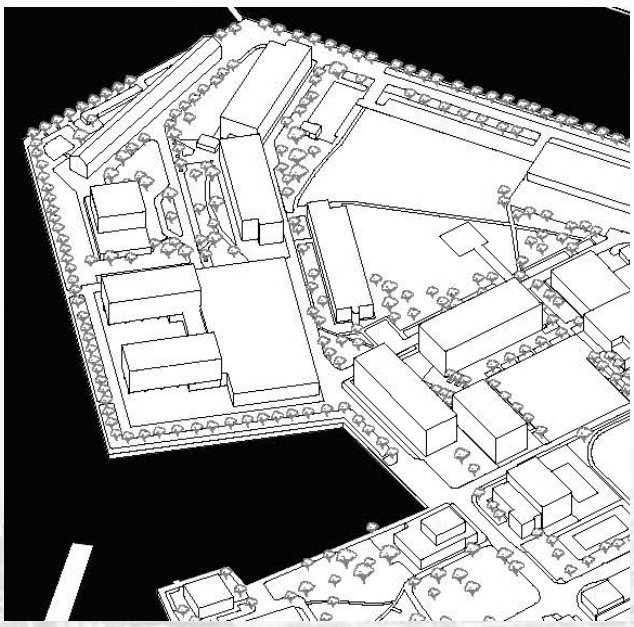
That's what the news of progress is about

So change needs experiment and prototyping

To seek for recognition, identity, and pride

Context Marineterrein | Amsterdam

Shared living and working environments



text **Thijs Asselbergs**

Marineterrein offers an oasis of tranquility in the bustling city of Amsterdam. Though a protected enclave, it has nevertheless traditionally been a hive of business activity. The municipality would like to preserve this character. Marineterrein is to become a meeting point for the residents of Amsterdam, a place where they can enjoy the peace and quiet, the water, and the panorama over the city. Besides this, it will become a place in which researchers and entrepreneurs from many nations can collaborate as they wish.

aE/Intecture is working together with the Bureau of the Marineterrein and is looking for a new experimental approach. Students are working on different subjects: from a complete new energy system to an innovative school, from a tiny housing project to temporary festival architecture. We like to discuss our proposals also with the local people who are working or living at the Marineterrein. Working on these types of experiments we like to contribute to an innovative way for new uses of the city and add value to such an enclave in the center of a metropolis in western Europe.

The development of the Marineterrein Amsterdam is not running the traditional course of progression. In contrast to traditional project developments, the projects have no final goal or plan of functionality. Instead, themes have been created within which developments will take place.

(article continues on the next page)

TIMBER TOP-UP

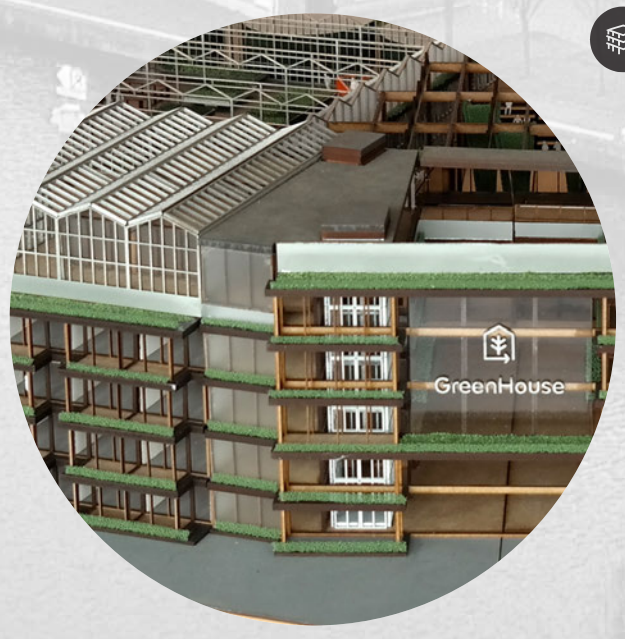
by **Bob Zwanink**

How can a vacant office building be transformed and "topped-up" for residential use in the Marineterrein of Amsterdam? The existing building consists of a concrete skeleton structure and an outdated façade with concrete sandwich panels. To improve its energy performance, climate comfort and to extend its lifetime, a deep retrofit of the building is necessary. Extra levels are added to make these interventions financially possible and to respond to Amsterdam's densification policy. Most additions are done in timber frame construction to minimize the embodied energy and its carbon foot-print.

ARCHITECTURE FOR EMERGENT CRAFTSMANSHIP

by **Paweł Kryński**

Designers of decentralized mass customisation and digital craftsmanship often collaborate and create co-workshops. Important requirements for such workshops are: re-configurability, adaptability, connection between home and living. This digitally fabricated building system works with wood and fiberglass composites, joined with CNC milled friction locks. The system has an open-source framework which can be easily modified and rebuild by the user.



SYMBIOTEL GREENHOUSE

by **Jasper Vos**

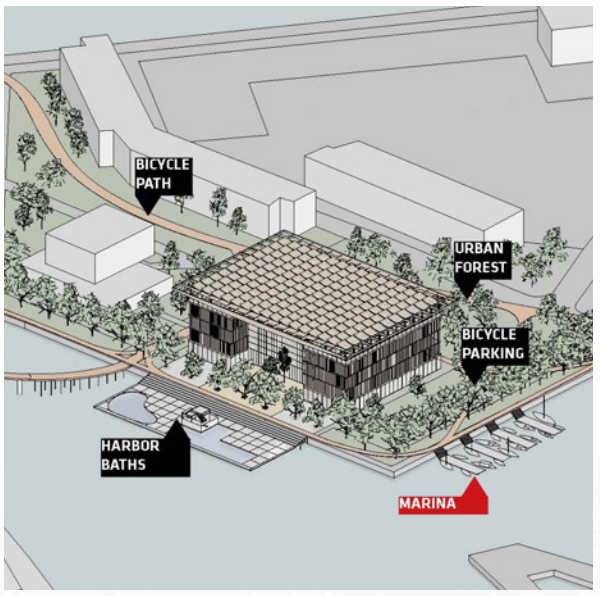
The industrial revolution and mass scale production has led to an enormous amount of waste. We are now aware of the environmental problems of linear production, and most believe that it is important to act right and strive towards a world without waste, a circular world.

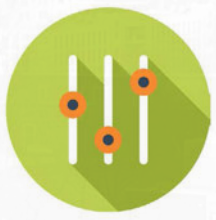
This project is to transforms an existing building in to a hotel and restaurant, creating a new incubator and a new identity of the "Marine Terrein" area in Amsterdam, focusing on re-used materials and optimized flows.

HOME IN THE DIGITAL AGE

by **Adam Busko**

The current building stock and the modern architectural discourse are out of sync with the lifestyle of young innovators and modern technology. The household structure and user description used to create architecture in the past is obsolete, especially for the young of today. Through the transformation of an existing 1960s building, this project aims to design a live-work environment in Amsterdam's Marineterrien, informed by detailed research on the lifestyle of young innovators of the millenial generation.



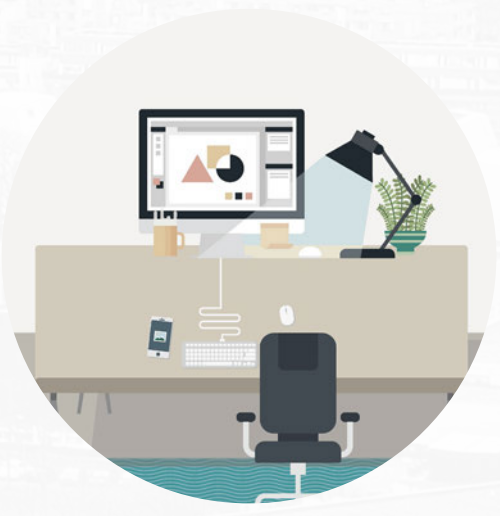

flexibility


downsizing


co-living


environmental awareness

old working style


new working style

Context Marineterrein | Amsterdam

Public production environments

text **Thijs Asselbergs**

The express wish of Amsterdam is to have a gradual trajectory of growth, on the basis of a gradually growing consensus. This innovative approach has been agreed upon in an administrative agreement and will be completed by Bureau Marineterrein Amsterdam. Furthermore, the prospect of cohesion and interaction is increased, as the owners and users will be working together on completing the character of the property instead of working towards the completion of a predetermined master plan.

The intention is to allow the area to grow in value. This includes economic value as well as societal values such as sustainability, integration with the city, and the improved profiling of the international identity of Amsterdam. Growth in terms of societal value is important to the owner, the Dutch government, who can then economically and socially distance itself from the property; as well as being important for the Municipality of Amsterdam, who can then decide in which direction they would like this new part of the city to develop.

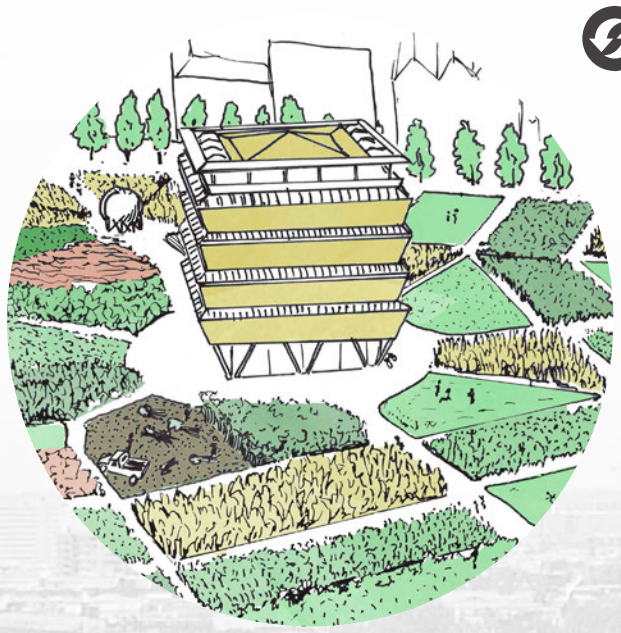
The development of Marineterrein Amsterdam is driven by three values:

Innovation
The curiosity to learn about new cultures, fields, techniques, and opinions. No fear for the unknown. Enterprising and resourceful. The desire to discover.

Connection
Actively combining knowledge, contacts, and resources. Innovative combinations of technology, science, and entrepreneurship. Aimed at mutual understanding and benefit. Cooperative and able to organize efficiently.

Focus
Focused on content. Concentrated and goal-oriented. Sustainable and serious. Unperturbed and undisturbed. Peace and concentration. No-nonsense attitude.

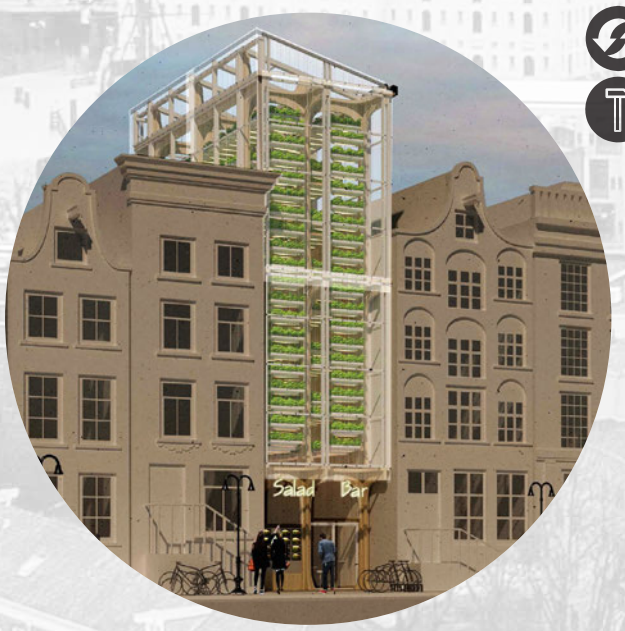
The Ministry of Defense is vacating the area step by step. In the buildings that become available, pioneers are working together on innovative ideas and projects that promote a sustainable society. In this way, the area is slowly transforming into a meaningful and innovative city district.



THE MARINEPLANTATION

by **Wessel de Jong**

The objective of this graduation project is to demonstrate how the Marineterrein in Amsterdam can gradually become a breeding ground for a circular economy and a place for people to enjoy life. To make this, all development will be made 'harvestable' and will produce well separated waste streams with minimal value reduction. The project transforms the area into a wetland park and a bio-based building materials factory. The wetlands filter sewage from the city, and provides a sustainable building material that is processed and sold by the factory.



CROP CHAIN BUILDING

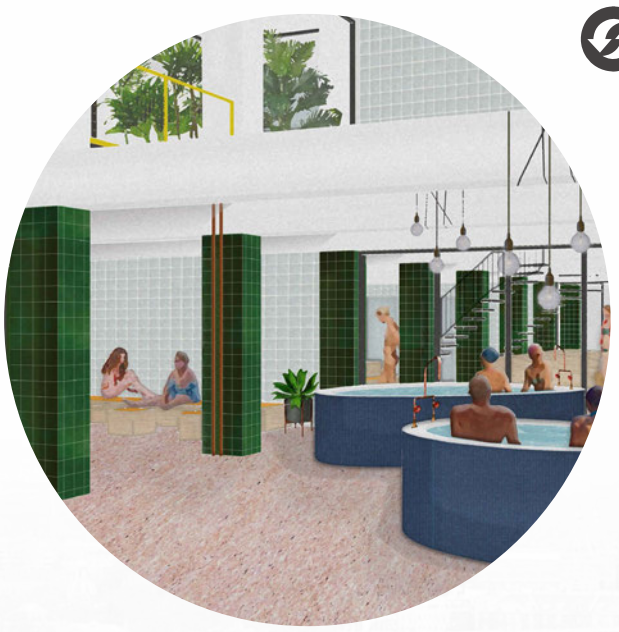
by **Daniele Tanzi**

This new building typology unites production, process and retail of food. When these phases of the "food supply chain" are combined, transportation is avoided - saving time, resources and costs while reducing waste and closing material cycles. Production, processes and retail are combined with culinary experiences and education in a public space. A new prefab building system enables extension, easy disassembly and reapplication.

DESIGNING FOR CLIMATE PHENOMENA

by **Bart Wolbert**

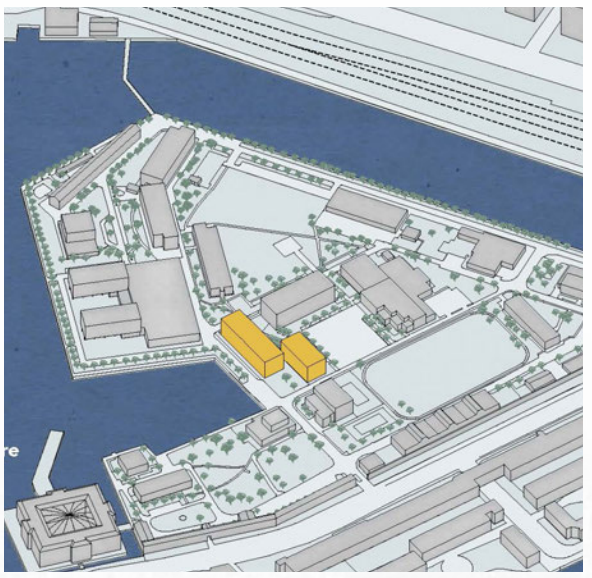
Because of the excessive use of fossil energy, climate considerations are no longer the peripheral factors for architecture. Architects should no longer be limited to operating in the visual realm, disregarding the invisible senses that make up climatic design. This city spa complex at the Marineterrein in Amsterdam celebrates the local climate and provides a place of relaxtion and retreat for the city's residents. The experience of climatic phenomena is used to reinforce the link between human and nature in an urban environment.

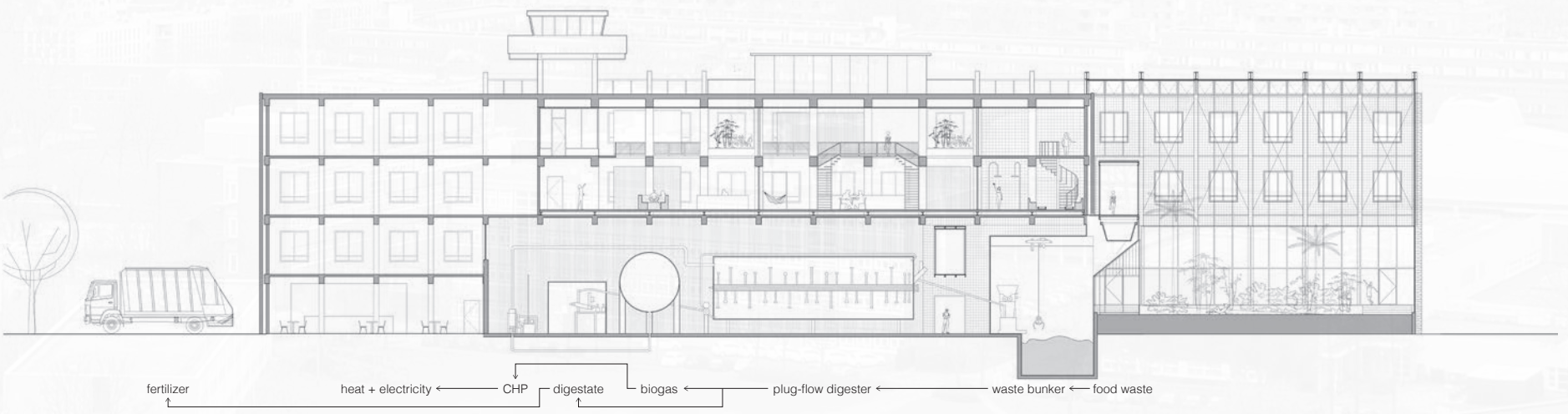


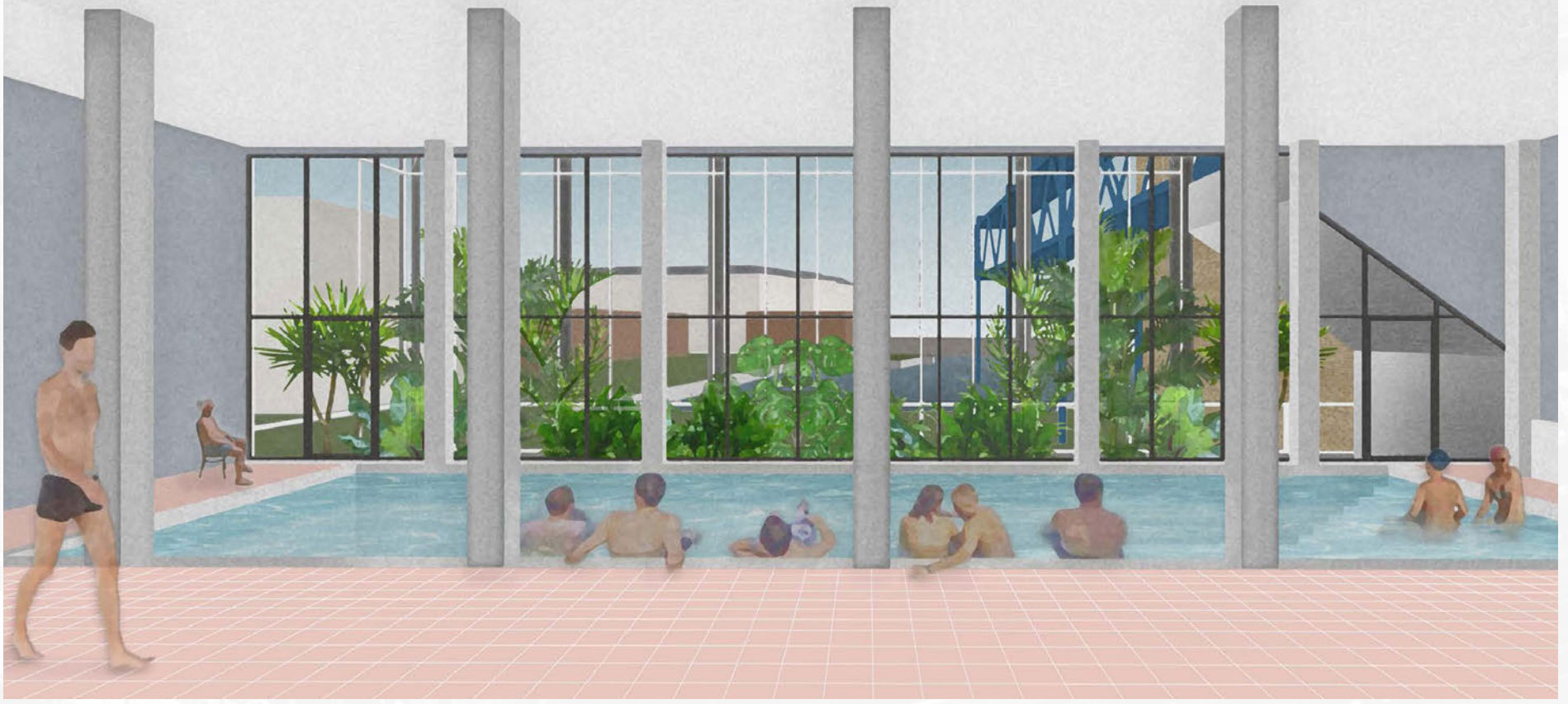
BADHUIS MARINETERREIN

by **Fallon Walton**

This graduation project involves the transformation of an existing 1960's building on Amsterdam's Marineterrein, the former site of the Dutch Royal Navy, into an integrated food waste-to-energy plant and public bathhouse. The intention of this unordinary combination is to create a self-sustaining water-related and socially amplified program that can support (both energetically & socially) the possibility for a variety of other future informal and formal public activities in and around the transformed former Navy building.





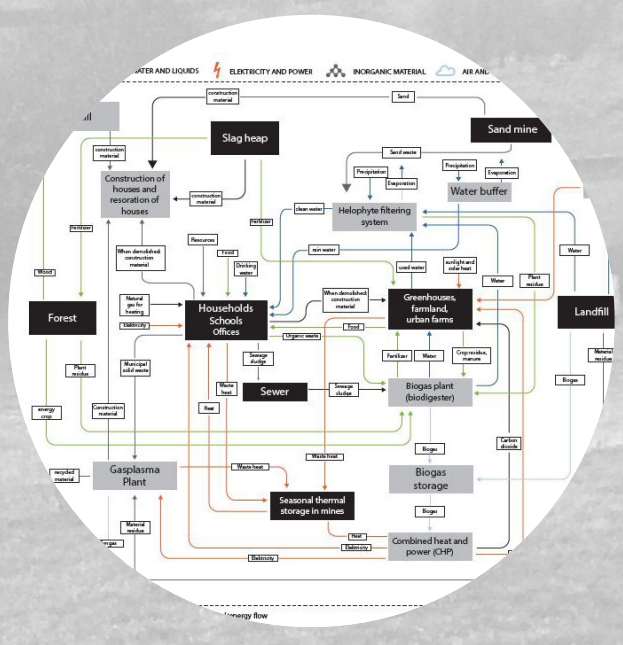


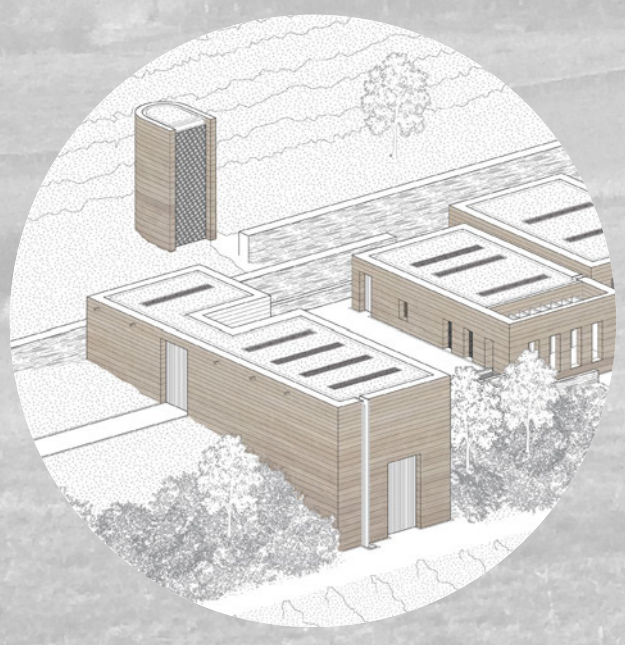
Context Parkstad Limburg | Gardencity 2.0

text **Annebregje Snijders**

After two periods of transformation, Parkstad Limburg is current working on its third - meeting our comfort needs, and looking for smart solutions. aE/ Intecture aims to develop challenging examples for improvement and transformation, by designing Parkstad potentials.

Gardencity 2.0 is a concept that, based on the uniqueness of the site, provides a coherent and renewed urban landscape. Made in response to IBA Parkstad, it offers a framework - as an opportunity - in which beauty, productivity and proximity to the landscape in and around the city is strengthened, based on existing characteristics and typologies. Forests, parks and heathlands as well as agricultural and industrial landscapes are again under scrutiny whereby the metabolistic flows, such as energy, water and food are mapped. It examines how the demand in relation to resources, nutrients and their cycle influences the architectural landscape. Together with new practices for recreation, housing and care, examples are being developed that can be an engine for a new economy, in which city and country, building and need, people and nature reinforce each other and live in symbiosis as an organism.





RETURN TO EDEN

by **Yannick Warmerdam**

Technology will not be enough to make our lifestyles sustainable, we have to change our lifestyle and learn to become content and not always strive for more comfort and technological progress. The school for contentment shows the beauty of sober architecture in the picturesque Dutch landscape, based on research about objects through the eyes of our old masters.

FROM THE FOREST

by **David Kooymans**

This research and design project explores new energy potentials for the region and specifically focuses on the Brunssummerheide. The focus of the graduation project will be the potential of wood and biomass from the forest and the utilization of the wood and energy that it produces. The program consists of local material and energy production in synergy with spa cabins as recreational space.

CONVIVAL CONSTRUCT

by **Max Verhoeven**

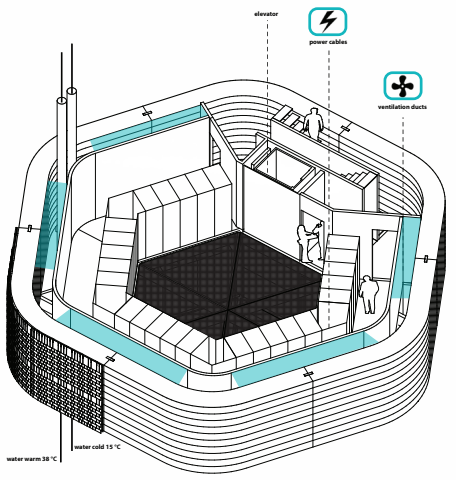
In architecture, as in food, local is an idea whose time has come. This means working with local resources in terms of materials, workforce, culture and history. This project, focused on the rapidly shrinking area of South Limburg, aims to design an organic winery from local natural materials in South Limburg to strengthens the identity, social engagement and self sufficiency in the region.

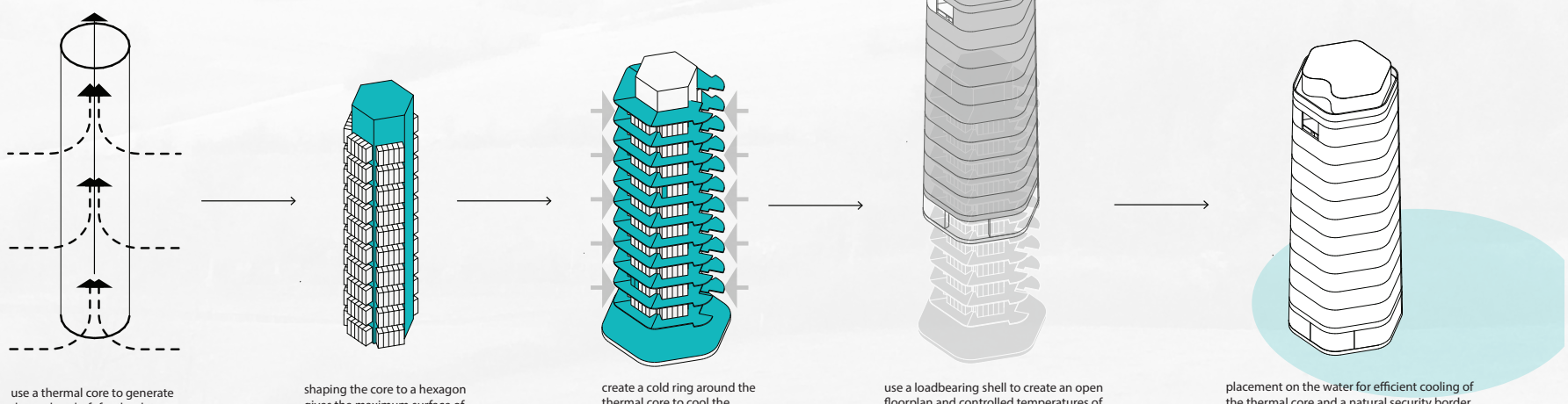
ARCHITECTURE OF THE CLOUD

by **Hugo Kooymans**

Data centers use massive amounts of energy which contributes to high CO2 emissions and also exerts pressure on local power grids. At the same time, much residual heat is being lost in the process to air, water or soil, providing an opportunity for energetic synergies.

The aim of this project is to explore how a data center can manifest its societal importance in the public realm and what opportunities does this offer for architectural, urban and energetic synergies in IBA-Parkstad.





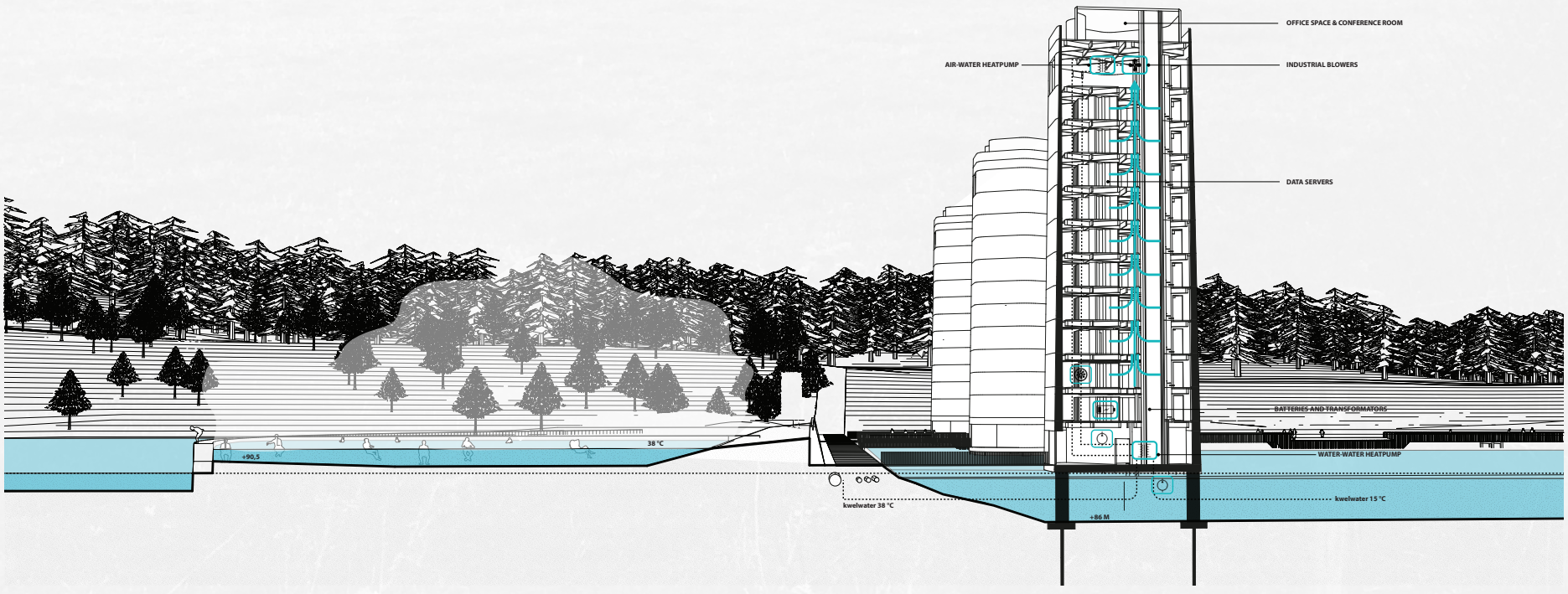
use a thermal core to generate thermal updraft for the data servers

shaping the core to a hexagon gives the maximum surface of the thermal core

create a cold ring around the thermal core to cool the servers

use a loadbearing shell to create an open floorplan and controlled temperatures of ventilation air and moisture levels.

placement on the water for efficient cooling of the thermal core and a natural security border



In Depth: Research by Design

Parkstad, Limburg

Materiaal Lokaal

text **Max Verhoeven**

Building with local resources is as old as human's first shelter. It has been the main principle in the development of numerous vernacular construction methods around the globe and it experiences a revival today in an era characterized by global warming and depleting finite resources. The way the use of local resources has evolved in the past few years in the hands of some of the world's most accomplished architects is defining a new movement.

'In architecture, as in food, local is an idea whose time has come' (Mackay-Lyons, 2014). This means working with local resources in terms of materials, workforce, culture and history, combined with global technological developments. This graduation research project aims to make a contribution to the development of an architecture constructed with local natural materials as an alternative for conventional building methods and as an reaction to the depletion of finite resources.

To do so, the research process started with collecting and mapping information specifically near the design location in the rural area of Domein Aldenborgh (Eys) in South Limburg and more generally in the wider region of the Meuse-Rhine Euroregion. This included interviews with craftsmen and visiting places of harvest, production and processing of natural materials that are potentially suitable for construction.

In the broader context of the Euro Region this resulted in an overview of four material categories: stone, wood, earth, fibre and crafts. These have been mapped and translated into an inspirational catalogue to show the local presence, historical use, present technological development and design potential of these resources as a basis for the design.

This catalogue is an inspiration for the possibilities for architecture with local resources in the region. It provides an overview of the availability of the different types of organic and abiotic materials as well as the practiced crafts that are related to the historic architecture of the half-timbered structure that is significant for the region. Together with short movies these are examples of communication that can contribute to a growing awareness for the use of natural materials, which is the underlying main goal.

Materiaal Lokaal
Samenvatting

Bas Vervuurt, Stone Craftman

Bas and his Father Marc Vervuurt run a small scale stone quarry of the only available hard limestone in the Netherlands in the village of Kunrade.

Chris Pelzer, Biologist

Concerned about the loss of fertility of the top soil layer, microbiologist Chris Pelzer advocates for plant resilience by natural occurring soil nutrients.

Production line of Lehm Ton Erde
photo: (c) Emmanuel Dorsaz

Prefab earth

Lehm Ton Erde in Austria

text **Clemens Quirin**

Building with clay and rammed earth is as old as the history of mankind, yet the material continues to be as modern and contemporary as hardly any other building material concerning its ecological properties and building physics.

Within the last 30 years, Martin Rauch and his company Lehm Ton Erde, have developed and implemented many techniques and projects relating to rammed earth. In order to decrease the drying time of the material on site, thereby accelerating the construction, Lehm Ton Erde has developed prefabricated wall elements out of rammed earth together with the necessary tools and machines.

A crucial pivot point in this development is not only the persistent elaboration of constructional details and enhancements of production possibilities, but also establishing the material with contemporary architecture and aesthetics.

chair

Education & Research Architectural Engineering

journal 2018/2019

education bachelor

Junior TU

Future Architectural Engineers

text **Bob van Vliet**

What if we ask high school students to do the same project that is put to third year's students? It turns out the result are highly motivated students and an impressive design collection. For three years in a row, a group of 25 highschool students from all over the country (and as far away as Brussels) has come to our faculty to spend five winter Fridays on the TU Junior project 'Digitally Designed Chairs' (DiDe Chairs). The event is part of the campus-wide Junior TU Delft programme, which offers a range of courses for ambitious, creative, technologically minded students.

The assignment is to design a chair for production in CNC milled plywood, a sister exercise to the assignment developed with Pieter Stoutjesdijk for the Archineering minor. The students learn and experience the basics of design, construction, and ergonomics. And we give them a crash course in CAD modelling. On day 4 of the program, they produce laser cut models of their designs. The goal of the DiDe Chairs project is not just to offer a group of high schoolers interested in design and technology a first look at Architectural Engineering, but also to further explore the possibilities of digital fabrication technologies.

Every year, these designers-to-be exceeded our expectations. Some delved into experimental connection details, others into new ways of sitting, still others pushed the CNC production technology as a basis for novel business models. And as a result every year, proud parents and high school teachers filled the Orange hall to come and see their achievements.

Minor

Archineering

text **Roel van de Pas**

The minor Archineering focuses on two main issues: technology as an essential part of any design product and making explicit the design process. Just like an athlete can train to become a master, a designer can train the design process as well. By training, designing, engineering and prototyping in a number of short exercises (like the design of a digitally fabricated chair) and explicitly studying and reflecting on the design process, more insight in the personal design process will be acquired. Some of the Archineering design projects focus on architectural design & engineering, involving construction, climate and materialization, other assignments are focussing on industrial design, digital manufacturing and aerospace engineering.

This very mixed programme results in new assignments, in which the relationship between design and technology is a key theme in the experiments of the students; do research and learn about the material aspects, construction and detailing of a design, get insight into climate design; translate a project very quickly and concisely in a physical and functional design that is well integrated into the urban and socio-cultural context; formulate a guiding theme and enrich and strengthen the concept through technical engineering; increase your 'frame of reference' and design language by using sketches, diagrams, drawings and (sketch-)models.

BSc2 |ON2-assignment

Design and Engineering

text **Frank Schnater**

This year 'Het Marineterein' in Amsterdam is just next to the Martime Museum, opposite Piano's 'Nemo' is the location for the final project of the first year. The students will design a pavilion for a rowing club. The assignment focuses on engineering a well-functioning construction and developing a comfortable indoor climate using a variety of passive climate approaches.
The 'Marineterrein' is the former location of the shipyards of the 'Admiraliteit of Amsterdam'. Here the ships were built to protect merchant's ships of the VOC. Since 2011 the area is developing into an exciting mix of innovative businesses, housing and leisure.
Aspects of structural engineering, climate design and building construction are represented by four experts per student group. Next to that students get education in Computer Aided Design (CAD) and construct different scale models by hand, ranging from 1:1000 models to 1:20 models, guaranteeing spatial, structural and material quality through all scales. In workshops various specialists help the students to connect their design to the urban context.

master **education**

Msc 1
Bucky Lab

text **Marcel Bilow**

For the first time, we run two different settings for the Bucky Lab: in autumn, we will have a Msc1 BT course, with all Building Technology courses integrated. For the spring period we also offer the Bucky Lab Studio Msc2 which will only contain Design, Production Technology and Computational Performance aspects. Within this shorter version we will design an innovative architectural product that has to be built within our mobile Bucky Lab workshop. In principle, it's a Bucky Lab without building physics, but you will get enough knowledge to build your prototype. We will develop innovative sun shades that can be rented or leased – so the solution will be flexible and rigid, to be used for many years in different locations.
More info on www.buckylab.nl

Projects were on display while the future of the Maldives and the project was discussed during the EXTREME symposium.

MSc 1 & 2
Extreme

text **Job Schroën**

The EXTREME course which started in September of 2017 was about the problems the Maldives face regarding waste and agriculture. The project was done in collaboration with the United Nations Development Program on the Maldives. During our visit to the Maldives it became apparent that architecture can be of great impact to make Maldives more circular.
maldivesmatter.com

The current EXTREME course is focused on the design of a Hyperloop station in the Netherlands. No Hyperloop stations have yet been built, which is why we will be focusing on some extreme configurations.

MSc 2
Gezel tot Meester

text **Elise van Dooren**

In the design project 'van Gezel tot Meester' two lines are followed: studying the design process and teaching design. By training the design process in a few short design assignments and reflecting on it, students learn about all kinds of aspects in the design process. By doing an internship in a first year design project as assistant-teacher, students learn about guiding students in the design process. The design project is based on research on design education by Elise van Dooren. In the course a vocabulary to talk about the design process is applied, explored and developed in different ways. In the end students have a short portfolio consisting of a few design results and a reflection on the process.

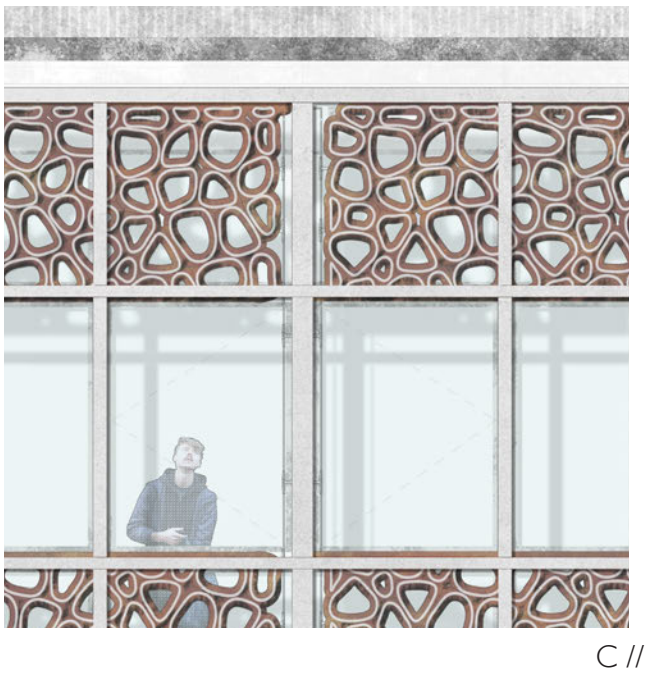
Delft Seminars on Building Technology

text **Bas Gremmen**

Imagine you have a beautiful facade design in mind or are fascinated by materials. Or you are convinced that we should realise energy neutral buildings or buildings that produce energy.

But now you have to design it. You need to have the knowledge and the skills to make your idea concrete, in the way you want it to be. We want you to experience what is needed to make your design feasible and buildable. This is what the course 'Delft Seminars on Building Technology' is about.

Design task
The design task of the 'Delft Seminars on Building Technology' is to make a re-design for an existing building, from the perspective of building technology design. How to integrate structural elements, facade construction and climate design in one design? Finally, the design should be '2030 proof', suitable to function in a changing socio-cultural context, making use of new technical possibilities, having a minimal ecological footprint on the environment.



Emile Spek
Onno Valk
Donald Huygen
Ed Plug
Thijs Asselbergs
Tillmann Klein
Anne Snijders
Thaleia Konstantinou
Andy van den Dobbelsteen
Peter Luscuere
Bob Geldermans
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Martijn Dalinghuis
Danny Cheng
Bas Gremmen
Florian Eckardt
Roel van der Pas
Mo Smit
Paddy Tomesen
Luc Willekens

architectural engineering presents:

AMC REVISITED
BK TU DELFT

RESEARCH THEMES INCLUDE

Healthy hospital architecture
Rediscovery of structuralism
The New Making: circular building
Flexibility and campus
The relationship between façade, indoor climate, ar

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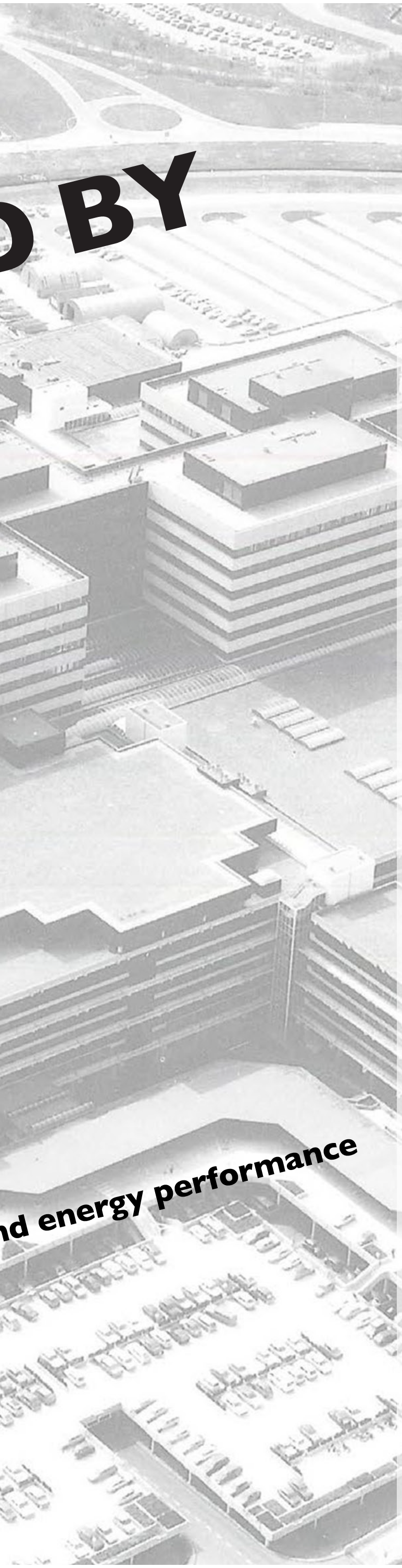


nd energy performance

text **Thijs Asselbergs**

The AMC in Amsterdam is the largest academic hospital in the Netherlands and comprises of about half a million square meters of floor space. The design dates back to the end of the seventies and is from the Dutch architects of Mourik and Duintjer. In addition to buildings, covered streets and squares, the complex also includes the medical faculty of the University of Amsterdam.

The facades of the 40-year-old AMC are due for renovation. A lot of preliminary research has been done in recent years. AMC is faced with a historical choice about what to do. The renovation project, with all its possibilities and dilemmas, is a unique opportunity to explore different possible solutions. Another factor that plays a role here is that the AMC is and remains in full use during the renovation.

How to deal with a lifetime of thirty years, for example? How to deal with circularity and how do energy requirements, indoor climate and façade renewal influence each other? What are the lines of thought now that political thinking about energy and material use has been put on the agenda? Which variants are possible and how is this in balance with the sizeable investments aimed at achieving energy neutrality? Which requirements are fixed in 2050? What can we anticipate? At the same time, AMC also has an architectural value and will become a monument. How do you deal with that?

Students, lecturers and researchers from BK TU Delft have been asked by AMC to develop design ideas and visions. These ideas and visions can be a unique and inspiring breeding ground for feeding the agenda of innovation.

An inventory of topics:

- Good architectural analysis of what is valuable;
- Organize and visualize design visions of different solution directions;
- Develop a vision on how to integrate new energy and material diversity;
- Make visible new architectural insights and use;
- A symposium and exhibition will be organized in the autumn of 2018.

The innovation issue is broad, it is not only about giving a design solution but it brings together many aspects such as: the history of the building, the place in the city, hospital architecture, the life cycle of buildings, management for planning, investing and organizing, flexibility in use, and so on. It is a challenging and topical subject that demands creativity, inventiveness and visionary thinking from a broad spectrum of generalists and specialists.

BK TU Delft works together on the vision with AMC, AMS, the municipality of Amsterdam and Atelier Rijksbouwmeester.

Within BK TU Delft it is a collaboration between the departments AE + T and MBE. Programs will be offered by Delft seminars on building technology, Bucky Lab, aE studio / intecture and the Building Technology track.

The architectural engineering chair coordinates the various program components.

More information? Send an email to Barbara Vliet-Van der Haas <B.T.vanVliet-vanderHaas@tudelft.nl>

amc

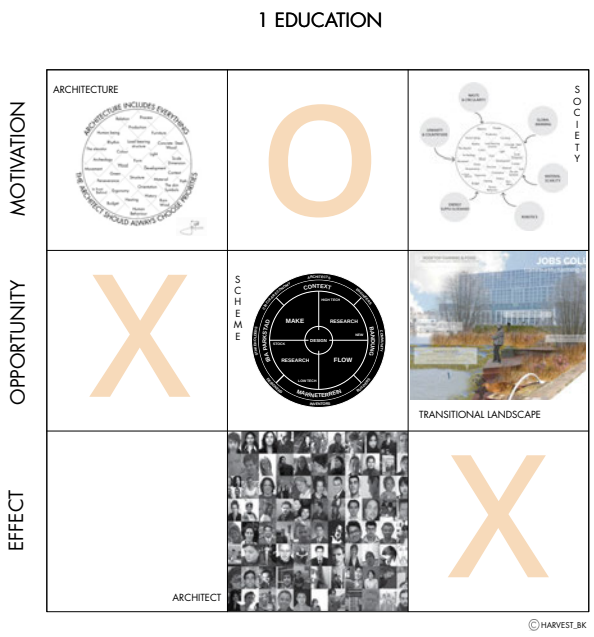
TU Delft

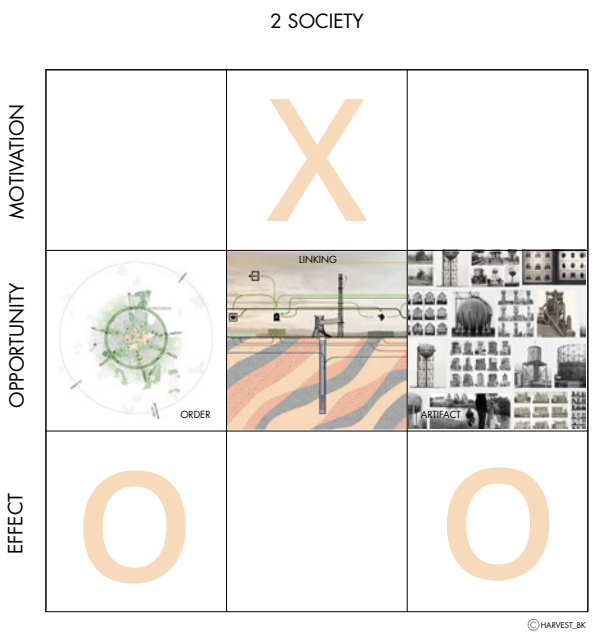
AMS
AMSTERDAM INSTITUTE FOR
ADVANCED METROPOLITAN SOLUTIONS

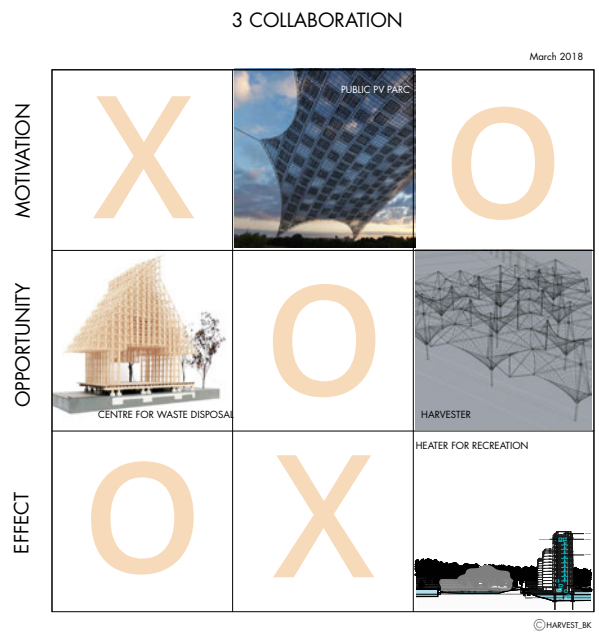
atelier RIJKSBOUWMEESTER

research featured

HARVEST_BK Designing energylandscapes and artifacts







text **Annebregje Snijders**

At a time when technical innovation plays a major role in designing the built and unbuilt environment, aE / Intecture and Landscape Architecture are looking for innovation through all scales. We aim to put the metabolic thinking on the map, leading to new types of space and materialization in both architecture and landscape architecture.

Harvest_BK Vocabulary

***Architecture**: The art and science behind objects such as buildings, landscapes, furniture and interiors. The fundamental organization of a system; emphasized by its components, mutual relationships, environment and guiding design principles.*

***Society**: The concept that coincides with the notion of community, but places more emphasis on its institutional and organizational aspects, such as the government and all of its devices.*
***Transitional landscape**: Urban area where the border between city and country is blurred.*

***Scheme**: the whole of appointments of a system*
***Infrastructure**: Array of facilities that are necessary for a city or landscape, or the organization of said facilities in order to function properly.*
***Order**: Logical arrangement according to set rules.*

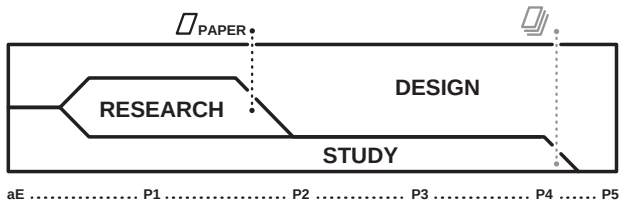
***Artifact**: Manmade object, tool or artwork*
***Panorama**: A view (usually) of a landscape.*
***Typology**: A designation for objects and environments that pertain to certain characteristic properties by which they can be classified and distinguished.*

INTECTURE

Research & design topics

text **Marcel Bilow**

Research is a vital part of the Intecture graduation studio. By doing research about a specific topic our students are fascinated by, they are able to become a little expert into this topic. While everything seems to be new or important to know when starting, we try to focus the research activities into one 8 page research paper. This paper will contain the essence of the literature studies and research activities done in the Msc3 period and should contain something new. A couple of semesters ago we had research reports about 80 pages and more with just a summary of a couple of books, nowadays with the new approach of the 8 page paper we see highly condensed, very sharp papers that include insights and knowledge about the topic and we see that the students are able to include these knowledge into their design. By the way… if you don't like to read books you can also research by design and test materials, configurations or connections and get your hands dirty.



Flow approach

text **Jan Jongert**

Sustainability in architecture can't exist by itself. Architecture is undeniably part of a bigger ecosystem and chain of processes that continuously need to be challenged to create the highest value possible, with both the environment and the people benefiting. The design can be approached as a (by)product of an ever changing metabolism. Buildings have a relatively big impact on the environment, which requires that their designers find different solutions for a dynamic environment.
The Flow approach of Jan Jongert is called systemic design: understanding the flows in an environment and defining the system they are part of. This approach helps to communicate processes and helps to choose and prove which physical intervention creates the biggest positive impact. Systemic design includes visual communication and imagination of the mutual benefits in programme, space and materialisation. The added value of this approach for the future architect is that he/she no longer is stuck to the position of 'just' materialising other stakeholders dreams, but is enabled to take part in and even initiate processes that will create their future commissions.

Make approach

text **Marcel Bilow & Pieter Stoutjesdijk**

We love to make things, of course as architects we build houses, but if you are into production technologies, new materials or a revival of traditional materials in a new application or even want to lay your hand on recycling towards a circular economy this direction will be your topic to follow. Our two expert makers Pieter Stoutjesdijk from The New Makers and our Dr. Bucky Lab Marcel Bilow will guide you for this hands on approach. They will encourage you to deepen your knowledge in digital as also analog production technologies first hand, they will help you to make the right decisions on how to choose the best combination of material and technology. Its up to you if you decide to explore the possibilities of creating a new material, a building system or a clever improvement on an existing technology as long as it helps to solve the problem you like to tackle. Both our experts are known for their ' no nonsense' attitude and hands on approach, they welcome you to get your hands dirty.

featured **research**

A circular building industry for self-build housing

text **Mo Smit & Johanna Wörner**

Every other year the HabiTechno International Conference is organized by Institut Teknologi Bandung in Indonesia. This event focuses on innovation in the field of housing development and construction and brings together researchers, design professionals and government officials from all over the world.

The paper, The Potential of a Decentralised Circular Building Industry for Self-Build Housing in Indonesia, which Mo Smit, Johanna Wörner, Thijs Asselbergs and Dibja Ku have written and submitted for the Habitechno conference, has been peer reviewed and got selected for a presentation. During the paper session programme on Saturday 11 November 2017 Mo Smit gave a summary of the paper, which was discussed with the audience afterwards.

Due to lack of housing in Indonesia, most dwellers self-build their homes while relying on the informal building industry. Therefore, it has been investigated how the current informal building industry in Indonesia could be transformed to fulfil the needs for affordable and ecologically sustainable housing construction. The research further evolves around the roles of planning professionals (e.g. architects, NGOs, universities etc.) and bottom-up approaches within self-build practices.

There is an abundance of local resources (materials, skills, crafts) in Indonesia, which can be enhanced for (re-) integration into the informal building industry. By taking up new roles, for example as self-build facilitators or product designers, architects could stimulate the transition towards a circular building economy by spreading environmentally responsible solutions for self-build housing.

The research shows that the decentralised character of the informal building industry in Indonesia has great potential to give self-builders access to ecologically sustainable building materials and new business opportunities. With only a few additions to the current informal building industry and a reorganisation of local material shops, an environmentally responsible and affordable development of self-build housing could be triggered while empowering communities to be healthy and resilient.

PD Lab

text **Marcel Bilow**

Its already a year ago that we erected the PD Lab, our fully digitally designed, engineered and produced house. Based on the ideas and activities around friction fit connections made possible by the use of a CNC milling machine Pieter Stoutjesdijk formed a team together with Tillmann Klein, Thijs Asselbergs and Marcel Bilow to give his ideas a proper test. Back then the building activities were quite a success and the first year already showed that the house is quite capable. We had to fix one leak but up to now we are fine. We did this to learn as much as possible, under real circumstances and of course outside. The last year we had a lot of activities already in the little house that serves as a testing lab for all different kinds of research investigations. We had acoustic tests, daylight measurements, two new graduate students involved in the improvement of the system and a very interesting workshop in the house to get our hands on a new interior shading fabric called squid, but have a look by yourself and see what we did outside.

Design Education

text **Elise van Dooren**

Learning to design is the key point of education in every design studio. At the same time it often is opaque. Observing teachers and students at work in the design studio, they mostly talk about all kinds of aspects of a design product, such as composition, details and the way designs (have to) fit in their environment. In addition, teachers should question the design process as well. For example, how to experiment by making a lot of sketches and models, how to reflect, how to come up with ideas, and how to use common known principles, patterns and guiding themes?

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chair Architectural Engineering

From left to right: Mo Smit, Marcel Bilow, Pieter Stoutjesdijk, Roel van de Pas, Ype Cuperus, Tanya Tsui, Thijs Asselbergs, Bas Gremmen, Annebregje Snijders, Mauro Parravicini. Missing on this photo: Elise van Dooren, Barbara van Vliet, Job Schroën, Jan van de Voort, Emiel Lamers

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COLOPHON

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aE Alumni Day
December 2018

TU Delft

Material Circularity

The future of earth

Interview with **Clemens Quirin, Lehm Ton Erde**

What inspired you to work with earth?
Earth is a very direct material. It has excellent building physical properties and a warm appearance, which can be combined in beautiful ways with contemporary architecture.

Could you explain the process of your work?
In most cases, architects approach us during the design phase, when they have questions about construction techniques. If it is a small project, we often use the materials that we have in our surroundings, prefabricate the wall elements in our factory, and bring them to the building site. If it is a large project, such as the Ricola Kräuterzentrum in Switzerland or the Alnatura Office in Germany, we look for local production sites that are as close as possible to the building site. After a production site and suitable material have been found, a production facility is built and our production is shifted to this facility.

What are the main challenges in working with earth in our current building industry?
There are a lot of challenges. Firstly, there are generally no building regulations for earth. This is a great advantage, but also a great disadvantage. On one hand, it is possible to do whatever you want with the material; no building regulation restricts you. On the other hand, however, in some countries, materials without building regulations need individual authorization procedures, which comes with a lot of effort and paper work.

Another challenge is to restore trust into the material. We are working with unstabilized earth, without additional lime or cement. If lime or cement is combined with earth, the material looses a lot of important characteristics such as its 100% recyclability. If it is not stabilized, the material is water-soluble, which worries contractors. So, it is important to create trust into the structural safety and weather resistance of this material, to show that it is possible to build very durable buildings.

Also, craftsman are and have been lacking. In contrast to many other building material professions, no guild was developed around loam. Loam was a material that has always been used by self-builders in times when money was short. Today, specialized craftsmen are needed to refine and promote the material.

Home at Work

CRAFTING THE DISUSED

by **Frederice Koch**

This research investigates the potential of waste material as building material to support local waste management in Cigondewah, Bandung, Indonesia, but also to find a suitable, cost efficient, and safe alternative building material. The research consists of two parts. The first part investigates the local context and in particular current waste flows and occurrences, as a basis for the second part, in which a variety of waste building materials and their processes are analysed with respect to their potential suitability for a kampung environment such as Cigondewah.

Marineterrein

MATERIAL PRODUCTION PARK

by **Wessel de Jong**

The objective of this research project is to demonstrate how the Marineterrein in Amsterdam can gradually become a material production park for a circular economy and a place for people to enjoy life. The research explores how crops can be stored after harvest season and be processed into useful building materials. As there is a variety of crops, with each of these having a variety of applications, this means that the building has to be able to house a big diversity of production processes and their relevant tools. Therefore it has to be both flexible and practical.

Beyond the Current

RECYCLED BRICK HOUSING

by **Ruben Wessels**

This research investigates measures and strategies for achieving a zero-energy status in the renovation of existing 1960's portico-flats. An important aspect of the research was to develop a method for the re-materialization of the façade. Finally a façade system is designed which consists of a structure of re-used steel, allowing for an infill of sufficient insulation and an outer skin of recycled bricks. The customizable facade system enables single homes to have their own identity while being part of a collective energy-neutral structure.

Context Groningen | Seismic

Tools for earthquake proof buildings

text **Job Schroën**

The Seismic Studio focuses on the changing environment in the province of Groningen, where earthquakes caused by the extraction of natural gas are a new reality. The main challenge of this studio is to use architectural tools in order to return confidence to the inhabitants in the built environment.

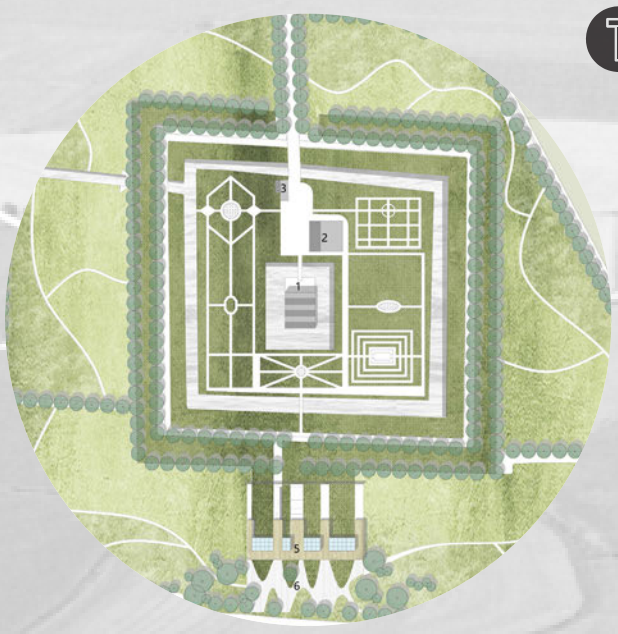
Architectural innovation is a result of the development of new materials and tools, new requirements and new environments, combined with the insights of a good architect. Because of the earthquakes in Groningen, the environment has changed and the technical quality of the existing architecture is no longer an answer to present day circumstances and threaths. The studio is thus looking for a new architecture for Groningen.

This can be done in many ways, for example by re-inventing traditional materials in such a way that they can deal with earthquakes. Or maybe we need to build with new and different materials? Another strategic approach is to make temporary structures, as it is expected that the earthquakes will not last for more than 50 years.

EXTENSION AND REINFORCEMENT

by **Kas de Valk**

In Groningen, an area prone to earthquakes, buildings are reinforced with clumsily placed beams and structures, making the places unlivable. The objective of this project is to create a more permanent reinforcement and protection for earthquake-threatened heritage buildings in the seismic region in Groningen. This project provides an external structural support for the buildings, which can also function as an programmatic expansion. Using contemporary materials and style, the expansion will be an own addition and not a continuation of the old style.



DESIGN FOLLOWS NATURE

by **Yonghui Huang**

This project focuses on the three different aspects which are seismic principles, biomimetic structure and biomimic climate for the historical garden of Uithuizen in Groningen. The final design responds to the environmental, historical, social and seismic context. The program of the design is a botanical education center for young children in Uithuizen. Solar-tracking panels and intelligent light diffusion glass were chosen to achieve a communication with nature in the ways of architecture and human experience.

SEISMIC RETROFIT

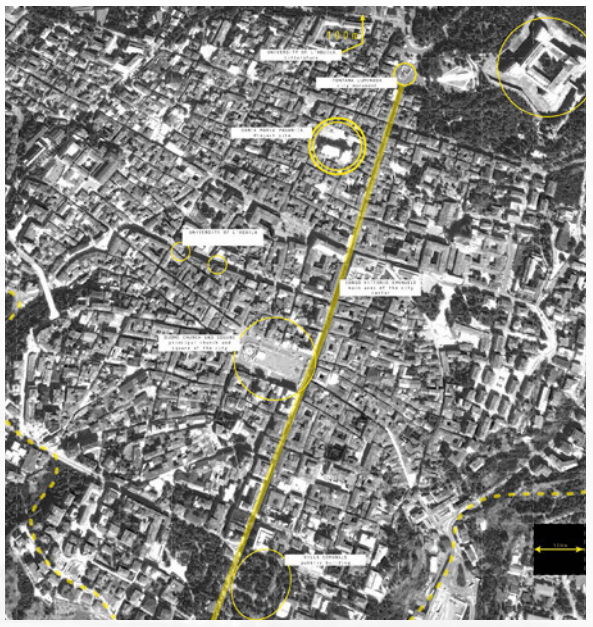
by **Zhenkun Zhang**

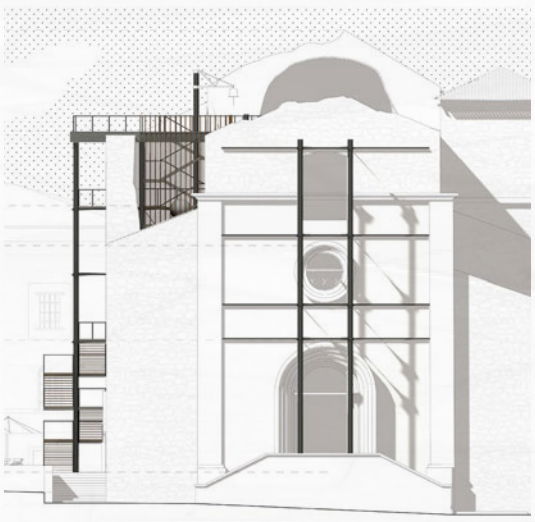
This project is the transformation of earthquake damaged buildings into a new public complex. Through adding an extra construction system, the design integrates separate buildings, provides more public space, and improves the existing architectural quality and structural performance. Through design and research, a more architectural solution to retrofit seismically damaged of brick buildings has been provided. The solution not only focuses on the structural challenge, but also aims to improve the architectural performance of existing buildings.

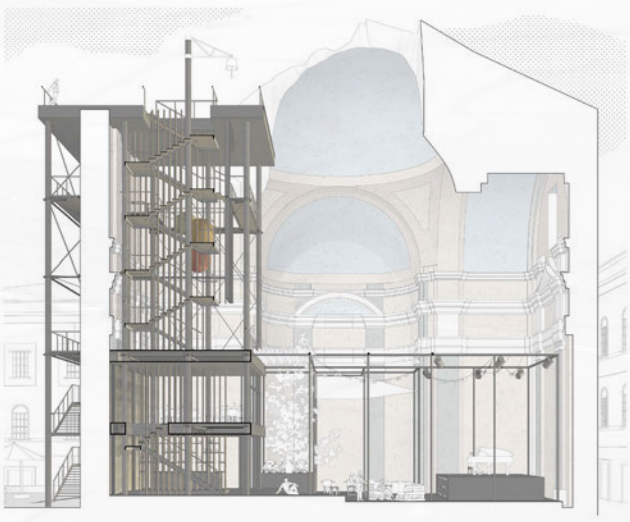
FROM THE RUIN TO THE REBIRTH

by **Andrea Gentilini**

The project consists of the design of a parasite structure inside the former church of Santa Maria Paganica in L'Aquila in Italy. After an earthquake in 2009 the city has been experiencing a series of difficulties with reconstruction. The project aims to create an alternative to the traditional reconstruction through the design of a parasite intervention, which stabilizes the remaining parts of the church to protect it against future earth quakes.







Context Beyond the Current

Increasing the energy efficiency of the existing stock

text **Thijs Asselbergs**

From 2020 on, all newly built buildings in the Netherlands need to be energy neutral. However, every year, only about 1% of the building stock in the Netherlands is being refreshed. Therefore Beyond the Current focuses on this big challenge: the sustainable transformation of the existing housing stock.

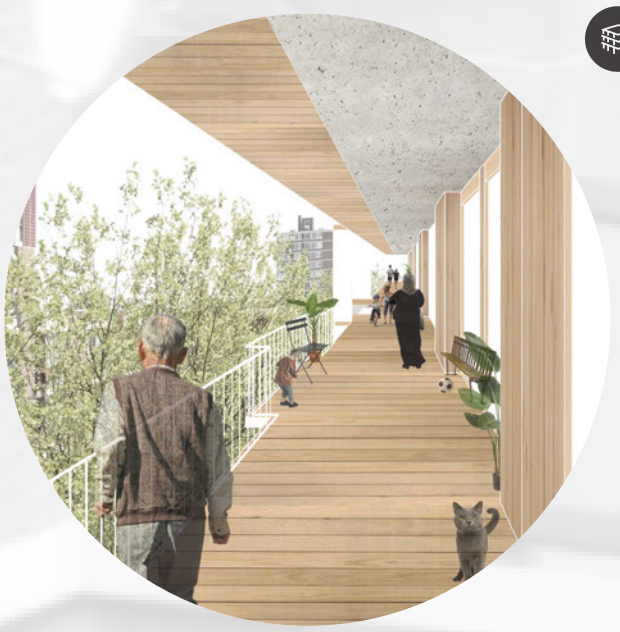
Most deep renovation designs of dwellings focus on the housing stock that is relatively easy to transform: (early) post-war row housing. A major challenge remains how to generate designs for more complicated housing estates such as pre-war housing and apartment blocks, particularly those concentrated in the larger cities.

In our graduation studio, we aim to generate design solutions for deep renovation of representative parts of the more complicated housing stock to increase its energy efficiency as well as architectural quality. The progress and results of the studio are reviewed by a group of postdocs working on the same topic.

USER FLEXIBILITY

by **Ruben van den Boom**

The project evolves around the refurbishment of post-war housing in Utrecht. The focus lies on the housing block Camera Obscura. The proposed plan is based upon three major aspects: the technical parameters for energy neutrality, the problems specified by the building analysis, and four types of flexibility to enable inhabitants to appropriate and influence their living environment.



MICRO LIVING

by **Anouk Geutjes**

This graduation project involves the transformation of a post-war galerijflat in Amsterdam Nieuw-West. The combination of the housing shortage in the city of Amsterdam and the problems of the Galerijflat itself were the starting point of this design. The idea is to embrace the Galerijflat in its appearance, while considering the changed needs of the residents and the social problems in the neighbourhood. The design creates small living units (micro-units) with a modular system to solve the social problems and increases the number of dwellings by 200%.

INCLUSIVE GARDEN LIVING

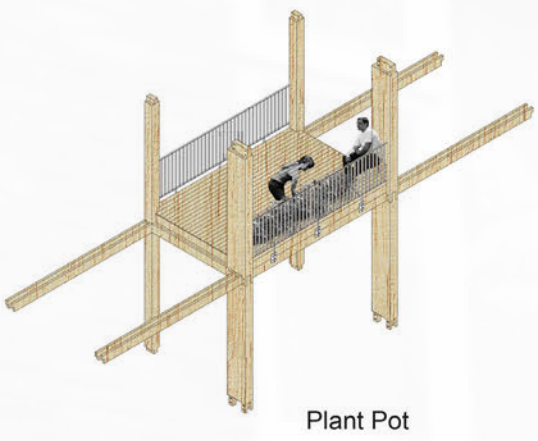
by **Dincer Ercel**

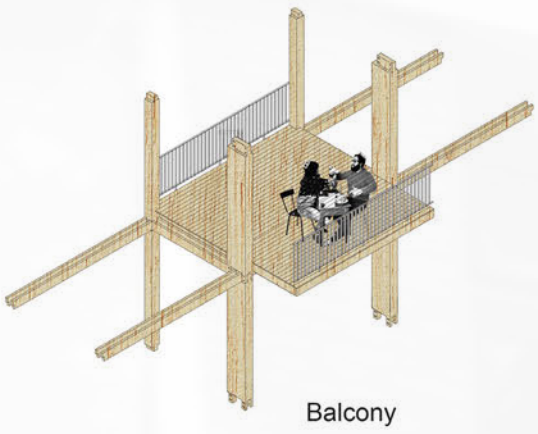
The refugee crisis is putting greater pressure on the social housing market. Also due to this there is a negative sentiment against the inclusion of refugees. Working on different scales and acting in the common interest, this negative sentiment can be carefully turned into an awareness of the added value for a new way of living together. The result of this research is an area improvement strategy for post-war neighborhoods. Elements of this strategy are offering different housing types, modular building, public green spaces, and the addition of functional collective spaces.

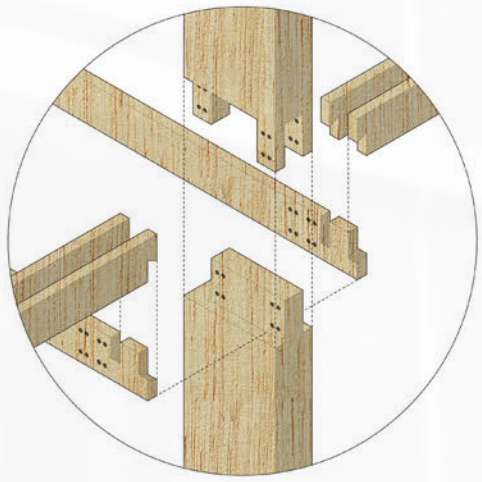
ENERGETIC ELDERLY HOUSING

by **Xiaoyi Yao**

This design for the post-war housing block Intervam in Utrecht focuses on energy-efficient refurbishment with housing adaption for elderly. Existing walk-up flats were transformed into energy neutral elderly apartments. An atrium was designed to regulate the indoor climate and embed mixed functions into the neighborhood as a new type of public space. The atrium is framed by a multi-functional timber structure that is designed specifically for elderly. The elevator-connected corridor is also used to improve the accessibility and social interaction for the elderly.







Context Bandung | Home at work

The industrial kampung as a healthy production environment

text **Mo Smit**

Home at Work, one of the aE Intecture design labs, focuses on the development of healthy and flourishing live-work environments within the context of the Indonesian city of Bandung. The last semesters students made plans for the heavily polluted industrial kampung of Cigondewah, a former rural settlement of farmers and fishermen at the south eastern periphery of the city which strongly urbanized under influence of the arrival of the global fashion industry in the region.

Cigondewah is also a first case-study of the Fashion Village Lab, an inititiative of research, design and development collective COCOCAN which aims to develop the region of Bandung into a sustainable and innovative region for fashion production using a community-based approach. Student projects, such as the design of healthy housing for factory workers, safe factories & workshops or community-based waste, energy or watermanagement facilities contribute to the overall ambition of this initiative.

Because of its rural past and agricultural remnants, its creative entrepreneurs and its intrinsic connection with the global economy, the industrial kampung of Cigondewah has a great potential to be a healthy and flourishing live-work environment for future generations. The off-the-grid character is a quality that can be embraced to make the industrial kampung not only economically self-sufficient, but also ecologically regenerative.

The main challenge of Home at Work is to develop circular design strategies which empower the local (business) community to transform their environment in a sustainable and equitable way. Instead of wasting resources they can be brought into a closed cycle on the scale of the industrial kampung. Instead of importing materials for clothing or building construction from other areas they can be locally produced within the region. The reconnection of economy and ecology enables industrial kampung communities to step out of poverty and realise a healthy and resilient live-work environment together.

BAMBOOTOPIA

by **Yuchen Li**

Polluted water and soil due to industrial waste makes traditional food crop farming in Cigondewah difficult, while industrial land is biting up the last precious green and farmland. This design of a bamboo plantation and factory seeks to solve these problems by facillitating a self-sustained bamboo agriculture-industry that can be run by villagers, producing textile fiber as well as bio-based water purification materials. The building is made of bio-based materials and the construction requires only low building skills while still providing functional and pleasant working and visiting spaces.

CNC BANDUNG

by **FLORIS PLINK**

In Bandung, Indonesia, "Kampungs" are informal settlements, usually situated in poor areas. In the past, these villages were built with traditional methods. However, since industrialization and the introduction of western building methods, buildings have been constructed in an unsafe manner. This project aims to use CNC milled wood to improve the building methods used in Kampungs, providing an alternative that is safe, easy, cheap, sustainable, and flexible.

BACK TO BAMBOO

by **Jaap Sybenga**

We live in a world where the use of depleting materials, like concrete and steel, has become the standard in the built environment, while bio-based building materials like bamboo are often ignored. Due to lack of skill and knowledge, bamboo is often used in a way that it is not durable or aesthetically pleasing, and as a result, concrete is often chosen over bamboo. The objective of this project is to increase the use of bamboo as a replacement for the extensive use of concrete in highly demanded low-rise buildings in suburban areas like Cigondewah, Indonesia.

ARCHIPRIX NOMINEE

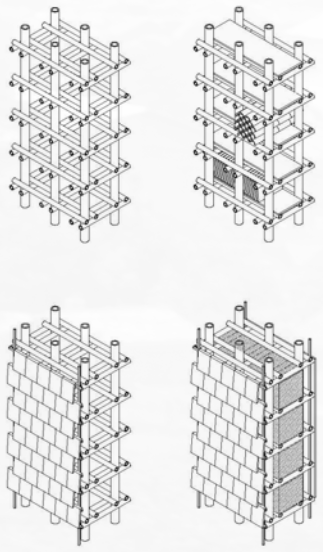
CRAFTING THE DISUSED

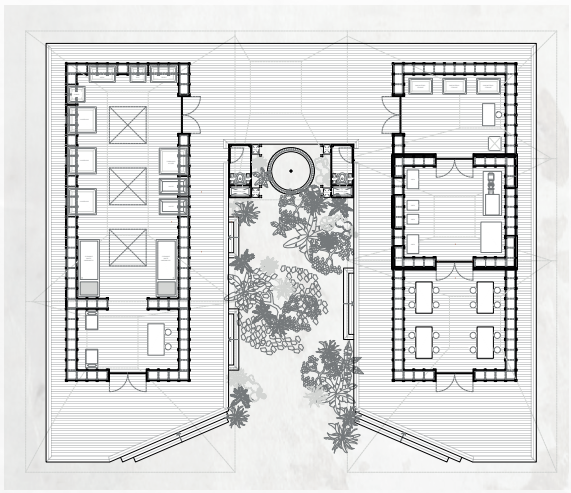
by **Frederice Koch**

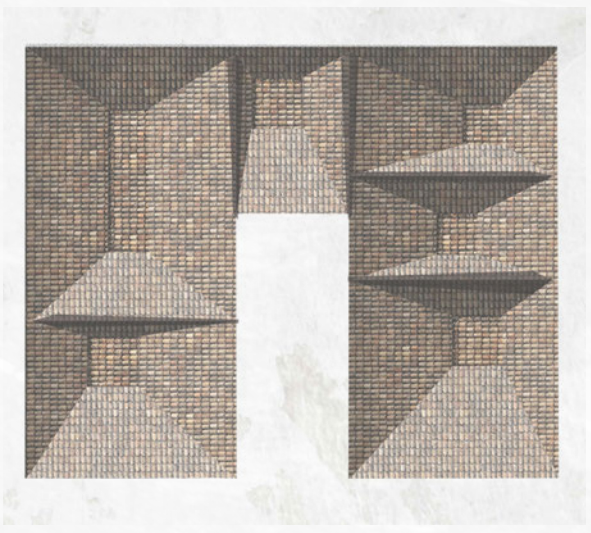
Waste pollution is becoming an ever increasing challenge in Indonesia. A combination of over-flowing landfills and little spatial opportunity for appropriate local waste storage and separation, as well as a lack of knowledge, is leading to large amounts of waste being disposed off on road sides and rivers or burned openly.

'Crafting the disused' focuses on local waste flows in Cigondewah, Bandung and offers a proposal to support recycling and reuse on a decentralised scale with a sequence of spatial facilities. Split into a recycling facility and a production facility, local inhabitants are encouraged to consider their approach to waste and furthermore to use this in a creative way, to recycle their waste into new materials for the built environment. In the meantime the addition of a waste bank (sampah bank) generates income for the neighbourhood.Using only local materials such as bamboo and the locally produced waste as construction material, the design is organised around the community with a self-built approach.

Key of the project is to clear the current waste pollution and to change the image of waste from 'unwanted' to a material that can be shaped to desire and to enable the community to organise their own waste management.







Context Bandung | Home at work

Collective self-build housing development

text **Mo Smit**

Large scale and rapid unplanned urbanisation takes place in many developing countries. In Indonesia there is a huge backlog (11.4 million in 2015) of affordable homes to house migrating villagers who flock to cities in search for work and a better life. Considering climate change and increasing CO2 emissions by the building industry, this is not just a quantitative and spatial challenge, but also a challenge in terms of building materials and the environment.

Although many housing projects are being developed by the Indonesian government, a lot of people still don't have access to formal housing. For low income communities, self build housing in kampungs often is the only alternative. In Indonesia around 80% of low income dwellings are self build housing and 70% of the total housing construction is performed by informal builders. Because self-build housing within kampungs provides the bulk of Indonesian dwellings for low-income households, the biggest environmental impact regarding the use of building materials is also made here.

To tackle the challenges above, the Home at Work design lab develops collective self-build housing typologies that enable the qualitative and sustainable densification of kampung environments, providing decent homes to urban newcomers. Besides the concept of the housing typology and the building construction method also the business model of the proposed developments is important, since the homes need to be affordable for low-income dwellers.

The design and development approach should allow communities to invest in sustainable neighbourhood improvements while incorporating circular economy principles. Communities' health and happiness will improve with reliable access to clean water for drinking and washing, to clean energy for cooking and lighting, to better facilities for waste disposal and to more quality open space. Circularity creates value and revenues by re-using waste, energy, water and other materials, by closing the loop on a local scale.

COMFORTABLY RISING

by **Bojie Chen**

An urban 'Kampung' is a kind of informal settlement in Indonesian cities. It is characterized by its high density, uncontrolled development, and poor living conditions. This design intervention is located in the peri-urban kampung Cigondewah, in the Indonesian city of Bandung.

The design aims to create better living conditions for kampung residents by creating a modular residential unit system that incorporates local passive design strategies, creating a living condition that is both comfortable and sustainable.

SAME SAME BUT DIFFERENT

by **JOHANNA WÖRNER**

To trigger a long-term development in Cigondewah different strategies are applied from bottom up: a change of the informal building industry, low-tech building innovation with local materials, urban riverside improvement and collective housing. The focus lies on the (re-) integration of local renewable building materials and the simultaneous improvement of living conditions and empowerment of the community. For this purpose the project seeks to enhance local potential such as natural resources, communal engagement, local entrepreneurship and the tradition of self-building.

LOCAL WASTE POTENTIAL

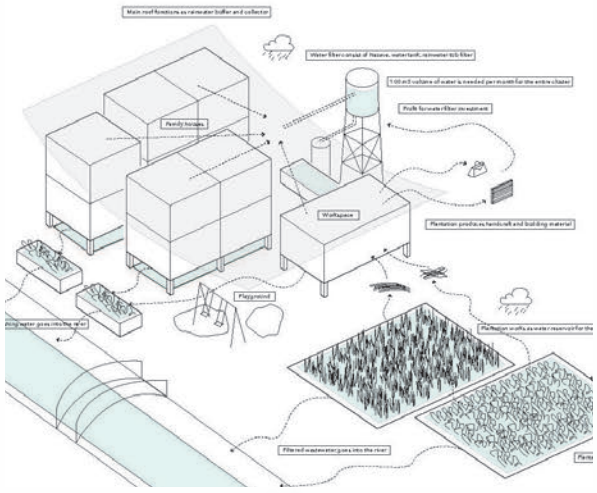
by **Martin van Splunter**

This housing project presents a new way of self-building in Indonesian peri-urban neighborhoods. A building system was developed that allows people in poor communities to build co-housing dwellings by themselves. The technical focus lies on the local transformation of stone waste material into new bricks. The traditional brick was redesigned and combined with concrete slabs and bamboo culms in an innovative but simple dry stacking system, which can easily be assembled and disassembled.

PRAY FOR RAIN

by **Sae Adipurnomo**

This project integrates economical, social, and environmental aspects into designing housing for Cigondewah. The project addresses two main problems in the area - the lack of housing, and the lack of water infrastructure. A new water system is designed, providing plant-filtered rainwater as a cleaner water source for the residents. The construction system is flexible and bio-based, using local materials like bamboo and engeng gondok (water hyacinth), and can be built on different plots.



Circularity and the role of the architect

Interview with Professor David Peck

Interview with **David Peck**
Interviewed by **Tanya Tsui**

What are the big challenges we need to address by 2030, or 2050?
I will stick to what we need to address by 2030, because that year is when the United Nations Sustainable Development Goals need to be delivered. The Sustainable Development Goals are also directly linked to another big global target - the Paris Climate Agreement. I mentioned these two targets, because they are the only agreements that have been signed by (most of) the world.

Personally, I'm focusing on the sustainable consumption of resources; in other words, researching how we can balance the natural capital we are taking out of the planet, with the activities we need to do with a world that is approaching a population of 10 billion. With the world we do here, we try to see everything on a global rather than a regional scale, and to talk in systems.

What is the role of the architect when it comes to addressing these global challenges? What attitude should the architect take?
I think architects are really well placed when it comes to tackling these issues, and here are some reasons: Architects engage in systems thinking. An architect doesn't just say, "I'm designing this piece of mechanical equipment, it has this function, here's all the analysis, and that's where my job ends." An architect needs to interface with society and the wider environment. Besides, I think the traditional idea of the architect as a building designer has moved on anyway. This doesn't bother me at all, because I see great young people coming out of this faculty who are holistic system thinkers, and the world needs these integrators - people who can bring different players around a table and use creativity and imagination to find solutions. And these are not obvious solutions, these are wicked challenges that we are facing. That's what I think is the role of the architect - a connector, and an integrator.

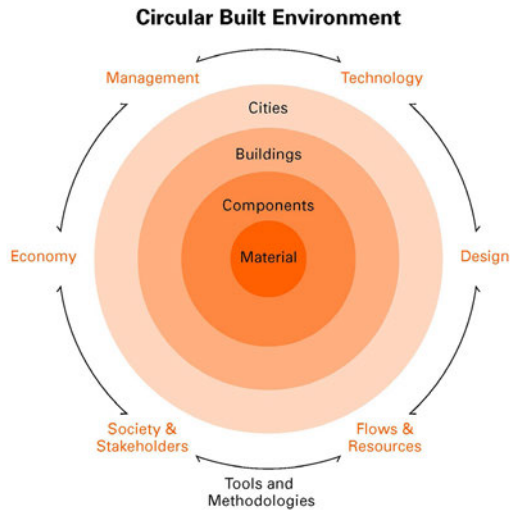
How can our education system be changed to facilitate this new role of the architect?
When I first meet my Masters graduation thesis students and they say they want to do a project related to the circular economy, I always ask them, "have you had any education on this in your previous Bachelors or Masters program?" and the answer is, "no"! Then, we need to build the students' knowledge from the bottom up, which I'm happy to do, but that is time that the student could have spent doing their own project, rather than learning to get ready for the project. The general consensus with TU Delft is that the circular economy should to introduced at the Masters level, but the Faculty of Industrial Engineering in Delft already has a compulsory course in the Bachelor, and it's working pretty well from what I hear.

(Thijs:) We do need to speed up the system; we can't wait anymore, if you wait for two years, then you're too late!

We do now have online courses on edX, one is already up, and there will be two new ones start in May, which is lead by Bouwkunde, on circular engineering and design. It takes years to build new courses, but this is a first start - at least we now have open online learning for the world, for free.

Why did you choose to research on the circular economy?
I'm interested in the idea of global resource constraint. In other words, what are we doing in the world, how much materials do we need, and how those materials are connected to energy. What I rapidly realized was that the demands we have outstrip the planet's ability to provide. So what I want to find in my research is a solution - what can we do to stand a chance of running a 10 billion world, in some kind of harmony of what the planet can do? That's how I ended up engaging with looking at a transition to a circular economy. That's the simple answer anyway!

Is circular economy the only way to go? Are there any alternatives?
Circular economy isn't one way, nor is it one thing; that's the beauty of it. It combines lots of schools of thought, some of which have been around for decades, lots of it is nothing new. It can be done in all kinds of different ways, with concepts like cradle to cradle, blue economy, and many others. It can all come together in different ways, and you need creative people to do this. Coming back to my previous point, architects and architecture students are great creative people,



who can adapt and adopt ideas to suit whichever context they're working on. So we should get hung up about the circular economy being one thing, it's context based, and can be lots of things. Ultimately, it's about thinking in systems, thinking of how we can reduce or eliminate waste, and of how we can make better use of what we've got, rather than using the "take, make, waste" way of doing things.

What is your research about?
I focus on the resource constraint of critical materials, which are materials that are economically high important, but also have a high risk of supply insecurity. So we badly need them, but we might not get them. Those materials are also connected with energy - we need lots of energy to get them, but they're also essential for technologies for generating renewable energy. It's really a catch 22! I got interested in how, in the past, normally in wars, we faced emergency situations where we needed to use 50% less materials. If we understand what people did in the past, it might help us find solutions today within the context of the circular economy.

Useful links:
UN Sustainable Development Goals:
http://www.un.org/sustainabledevelopment/sustainable-development-goals/

The Paris Agreement:
http://unfccc.int/paris_agreement/items/9485.php

Online Circular Economy Course:
https://www.edx.org/course/circular-economy-an-introduction

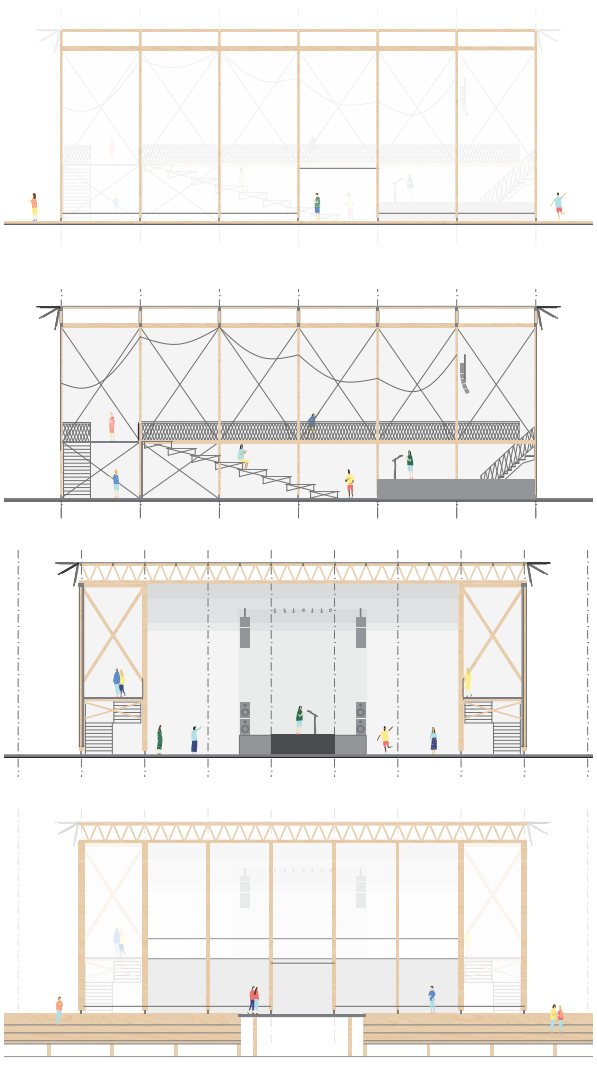
Context Temporary festival architecture

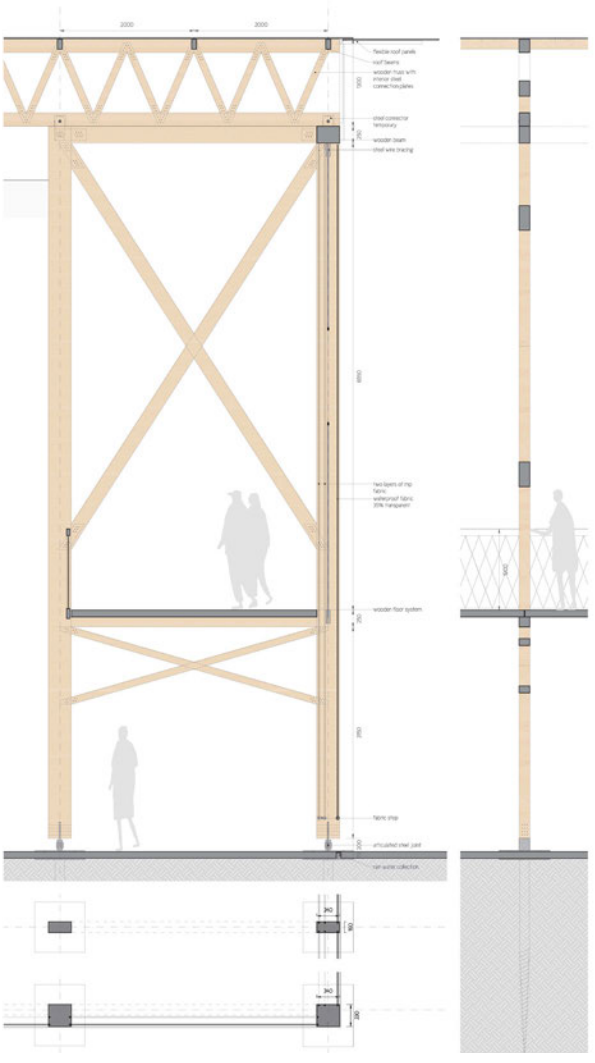
Festival Architecture

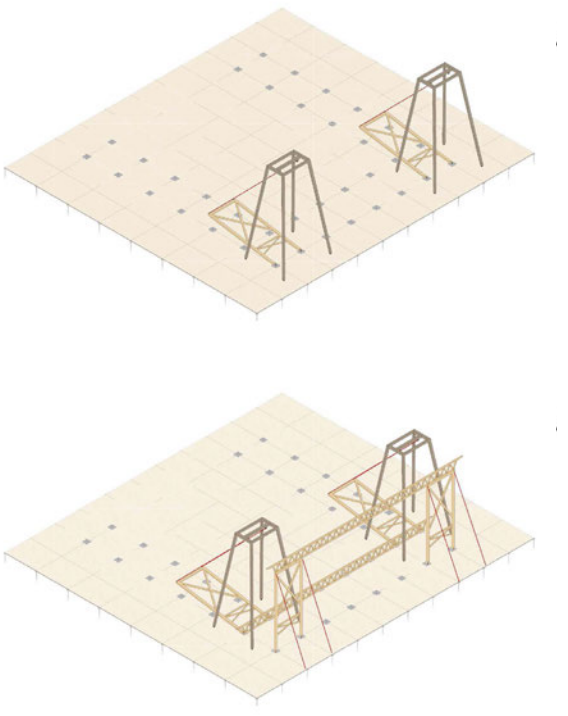
MUSIC MEETS ARCHITECTURE

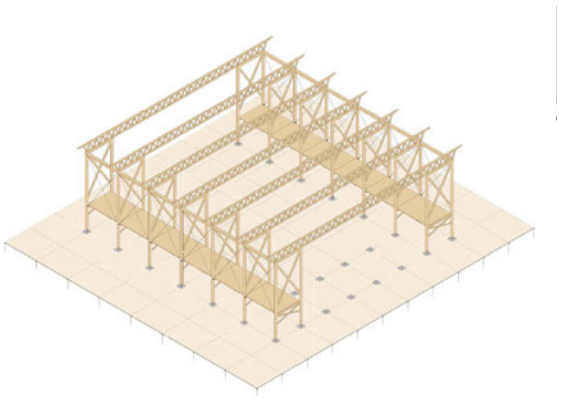
by **Dieke Luursema**

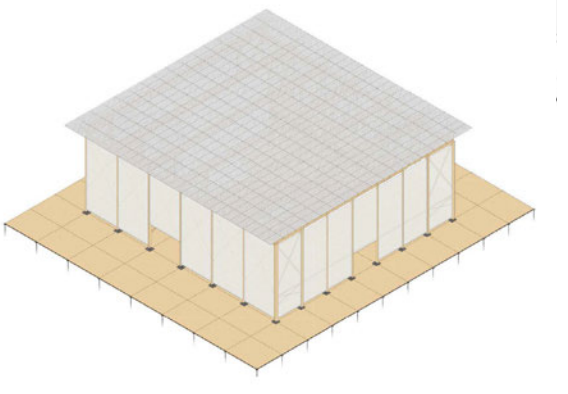
The increase in number of festivals in the Netherlands and the importance of live performances for musicians leads to the question of designing new performance places for festivals. Today, most tents do not provide sufficient acoustic qualities for the performance of music and do not add to the experience of the visitor. This leads to the main research question: What aspects of a performance place contribute to the experience of the performance at a pop music festival? To answer this question, visitors, musicians and sound engineers have been interviewed. From these interviews a collection of wishes has been drawn which have been compared and analysed to form a set of elements. The perfect festival performance place is a place with good atmosphere which can be created by the four elements: participation, sound quality, uniqueness and carefreeness. A design was made for Lowlands Festival. The wooden construction adapts these four elements and creates a new innovative concept for a temporary performance place.

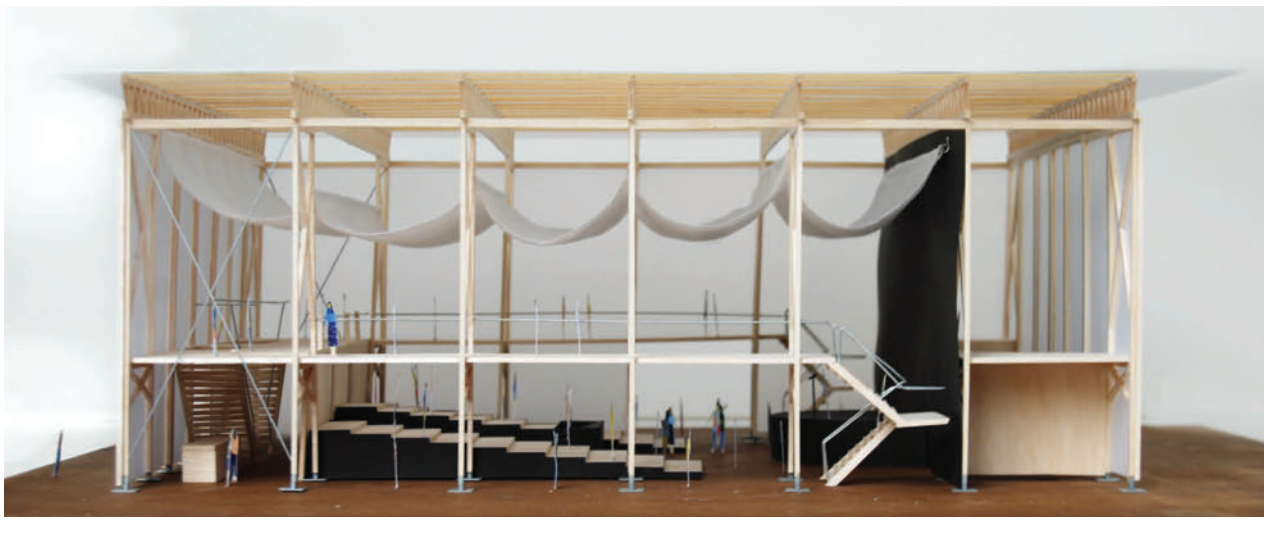












Alumni

aE/Intecture interview with alumni Frédérique Sanders

When did you graduate @aE/Intecture?
In February 2017 I graduated with the thesis "PV as Art - Heros Daylight School" in the direction Architectural Engineering, under guidance of Marcel Bilow and Annebregje Snijders. I was inspired by the fact that from 2020 all new buildings constructed in Europe has to be nearly carbon-neutral; in that way it is generally expected that in this century photovoltaics will become a substantial contribution to the power production of buildings. This increasing number of solar panels mounted on roofs all over the world is a good development, but not fed by an architectural approach. Instead of adding mono-functional solar panels, I thought it could be a solution to integrate solar cells in an existing building element: my example was a sunshading system. Important for the best formation of a sunshading system is to avoid direct sunlight and allow diffuse daylight; in contrast solar cells require direct sunlight. In this way a multifunction system was found. With the design for the Heros Daylight School on the Marineterrein in Amsterdam I gave an example how this integration of sunshading and solar energy can be done in an aesthetic and eco-efficient way.

Realizing your graduation thesis as real-life prototypes, how was that?
After my graduation I got the opportunity to develop my idea further at YesDelft, in a three months program called "LaunchLab". The first step was to do good market validation, before going further with the idea. This is a very important step; sometimes I was already thinking 10 steps forward, but then the YesDelft coaches put you on hold, and explained that you first have to find your market. Otherwise you are developing something, what nobody needs in the end. Together with my coach, Leon de Looff, we discovered that to begin, the sunshading/ solar energy system would fit the best in the market of terrace canopies. This was a bit difficult for me; I asked myself, if I go further, that means that I will design fancy pergola's, not my exact dream when I started my study haha. But in the other hand, I thought it is a very good and basic way to start.

What is the biggest difference between working on a graduation thesis and a real-life prototype?
In June 2017 I found my 'launching customer': a Van der Valk Hotel in Germany needed a sunshading system, so they gave me a budget to make it. Together with my brother I placed the system, it was very nice to see something you have so long in your mind, now in real. I started the SunMotion B.V. and in September I received a 'Start-up voucher' from the TU Delft. With that budget I had the chance to make a second prototype of the system for the
Green Village of the TU. Building the system was a very learn full proces; the metal worker doesn't want fancy drawings in pastel colors, he just want a simple and clear drawing. To conclude I can say that I learned the last year a lot of new things, not only building skills, but also business / presenting / marketing skills, a new area for me.

How do you see 'PV as Art' in the future?
At the moment I'm making the technical drawings for the first clients: a private client in Delft and a sustainable food concept in Amsterdam. Next to that I work since a few months also at an architecture office to get more practical experience. Together with the RVO (a Dutch government institution) I'm making a possible subsidy / research plan how to develop the SunMotion system further. A key point will be to divide the system in standardized parts, in such a way that the system will still be special for every client. I think this system is just an example, it will be the most interesting and challenging to keep being innovative and learn every year new things!