TITT

Review 2018 – 2019

Department of
Architecture

in Numbers

about

500.000
drawings at the archive of
the Architekturmuseum at TUM

1.800
applicants

160
doctoral candidates

8 study programs

over

1.200
student
work spaces

TOP 25 worldwide

in the QS World University Ranking
by Subject 2019

EUR **5.8** mio.

third-party funding (2017)

11.000
tools rented at the ar.toolbox

378
event announcements on the
Department's website in 2018

4.000

models per year made
at the design factory

86
partner
universities in

36
countries worldwide

visitors at the exhibition
"Palaces and Factories –
The Architecture under
King Ludwig II"

223
incoming
students

51.341

206
outgoing students

30
Liter

Forum every morning Of filter coffee poured at the Voerhoelzer

Image: Ulrike Myrzik
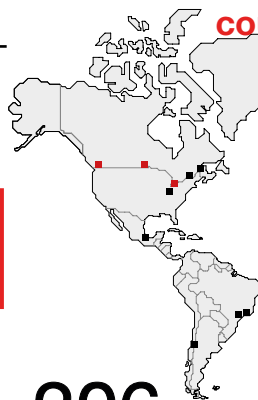
Preface

Dear Students, Alumni, Partners and Friends,

This magazine gives a selective overview of the activities of the last few months. As winter semester 18/19 culminates in an exciting range of final crits, I take the opportunity to look back and look ahead.

TUM Architecture is part of one of the most dynamic technical universities in Europe. Embedded in an excellent living and research environment, we are proactively taking advantage of the outstanding Munich ecosystem to strengthen our educational programs and research networks.

In the 150th anniversary year of TUM, which is just coming to an end, architecture was also a feature of numerous events. In the 'architects on architects' series, outstanding contemporary practitioners discussed architectural role models from previous generations. The exhibition ''Royal Castles and Factories. "Palaces and Factories – The Architecture under King Ludwig II" at the Architekturmuseum of TUM in the Pinakothek der Moderne received over 50,000 visitors. We were also able to welcome numerous visitors to the TUM-Wide Open Day in October 2018. Finally, we awarded honorary doctorates to our outstanding colleagues James Corner (University of Pennsylvania), as well as Jacques Herzog & Pierre de Meuron (ETH Zurich).

Our vision is to successfully integrate design practice into research. As part of our efforts to implement this,we have been operating the Architecture Research Incubator (ARI) since 2017. Additional activities have been similarly successful: these include ten applications to the ZukunftBAU programme, the development of several prototypes, eight DFG applications, three Horizon2020 applications, as well as several conference participations and publications.

With the retirement of Prof. Sophie Wolfrum (Urban Design), Prof. Dr-Ing. Manfred Schuller (Building History) and Prof. Erwin Emmerling (Restoration), we bid farewell to some highly esteemed colleagues. Their professionalism, creativity and commitment will be sorely missed and has greatly enriched our department.

Through the appointments of new staff, we will enhance our profile further. Prof. Dr. Thomas Danzl (Akademie der bildenden Künste Dresden) is actively engaged in bridging the disciplines of architecture and restoration. Prof. Dr. Andreas Putz (ETH Zurich) brings his expertise to bear on the development potential of post-war building stock. Prof. Dr. Benedict Boucsein (ETH Zurich) and the professorship of Urban Design are uncovering and investigating the complex interactions between social progress and urban development. Prof. Francis Kéré (Architectural Design and Participation / Accademia di Architettura di Mendrisio) has already enlivened and given new impetus to our DesignBuild projects and the TUM.Africa initiative.

The appointments in Digital Fabrication and Building History are about to be successfully completed. The new professorships of Construction Process Management and Real Estate Development will receive second memberships in our department in order to make cooperation even closer in the future.

Within the framework of the Excellence Strategy of the Federal and the State Governments, TUM has developed the Agenda 2030 - an important reform project. We look forward to strengthening and crosslinking our design expertise with other engineering disciplines.

Best regards,

Andreas Hild, Dean

Table of Contents

Table of Contents

A bee patch provides food for thought

That a semester project can develop into a successful and publicly effective intervention in urban space was demonstrated by the exhibition on the design project URBEEN, which once again showcased all phases of the temporary installation realized in summer. Prof. Regine Keller's Chair of Landscape Architecture and Public Space, in cooperation with the Bavarian State Ministry of Food, Agriculture and Forestry, completed a project in which the ministry's historical garden frontage along Galeriestrasse became the setting for an experiment linking intervention and participation. The topics of nature conservation and public awareness raising, but above all the question to what extent temporary interventions are useful as a prelude and tool for planning discussions and building processes - also in a larger context - were at the forefront of our design considerations. The installation designed, planned and implemented by students in "Studio1zu1", which was opened in June on the green area, consists of linear plant boxes and a deadwood sculpture as a huge wild bee hotel. The dimensions and color are reminiscent of farmland structures. The various plantings served as an important source of food for the bee colonies which settled in the front garden. The prominent, but previously rather unattractive urban space was not only able to enhance its profile and design through the installation, but also created a particularly valuable experience for passers-by and citizens as a showcase and meeting point as well as a real-world project for the students.

The exhibition "URBEEN" showed the open space analysis of the environment around the Bavarian State Ministry of Food, Agriculture and Forestry. (Photo: Johann-Christian Hannemann)

Inspiring international landscape architecture

Udo Weilacher, Jonas Bellingrodt

On May 16, 2018 the Technical University of Munich (TUM) awarded an honorary doctorate degree (Dr.-Ing. e.h.) to James Corner, renowned New York landscape architect. With this award, the TUM recognizes the excellent achievements of James Corner in international teaching, research and practice in landscape architecture. At the same time, this exceptional honor, given for the first time at TUM to a landscape architect, signalizes the high recognition for landscape architecture in the international academic community. Dr. Udo Weilacher, Professor for Landscape Architecture and Industrial Landscape, emphasized in his laudation: "James Corner is doubtlessly one of the most influential theorists and brilliant practitioners of landscape architecture in our time. When his seminal book Taking Measures Across the American Landscape came out in 1996, his splendid collages in combination with the aerial photography of Alex MacLean revealed landscapes as richly layered entities engulfed in complex dynamics on different time scales. It was a clear statement, if not manifesto, that landscape architects are engaged in a subject that is so complex that its traditional means of description are not only utterly inadequate, but cripple our transformative potential." On the occasion of the award of the honorary doctorate degree, Prof. Dr. Udo Weilacher's Chair also published the booklet "Inspiration High Line", in which 27 renowned professors of landscape architecture from twelve different nations comment in short essays from their personal perspective on the popular conversion project in New York. In their insightful texts, the authors contribute to the professional discourse about the future transformation of urban infrastructure in general, and James Corner's approach in particular.

Part I of the lecture series "architects on architects": Arno Lederer on Sigurd Lewerentz, introduced by Philip Ursprung. (Photo: Daniel Reh)

architects on architects

Uta Graff, Dietrich Fink

In the summer semester of 2018, outstanding architects of our time talked about architects of previous generations under the title architects on architects. The lecture series which took place at our Department of Architecture focused on the cross-generational relevance of ideas and concepts from previous generations of architects and the question of their relevance and transfer to the present time. The diversity of the contributions corresponded with the diversity of the speakers and the architects discussed, and opened up a broader discussion on building culture. Dialogues between the architect speakers and renowned architectural theorists or artists further enriched the theme of the public lectures. These dialogues will be published in summer 2019 as the book architects on architects by Dietrich Fink, Chair of Urban Architecture, and Uta Graff, Chair of Architectural Design and Conception, together with Julian Wagner und Nils Rostek. With contributions by Mario Botta, Alberto Campo Baeza, Jasper Cepl, Pippo Ciorra, Tom Emerson, Donatella Fioretti, Lise Juel, Momoyo Kaijima, Christian Kerez, Hans Kollhoff, Arno Lederer, Mauro Marzo, Olaf Nicolai, Monika Sosnowska, Stephan Trüby and Philip Ursprung.

Young talent for urban research

First "TUM Junior Fellow" at the Department of Architecture: Dr.-Ing. Claudia Hemmerle was awarded the title by the Technical University of Munich and since the winter semester 2018/19 has successfully established the junior research group "Cleanvelope - energy-active building envelopes as a cornerstone of climate-oriented urban development". Over the next five years, the research group will investigate how the solar energy generation potential of urban building envelopes can be harnessed in resolving the competing demands of building culture and land use. Modelling of energy generation and use at neighbourhood level and of the influences on outdoor comfort should show how building envelopes contribute to a neighbourhood's energy supply and how residents, the urban climate and the electricity grid can benefit. Real-world case studies in Bavarian municipalities are also planned in order to develop implementation strategies and test integration into municipal planning processes.With its interdisciplinary orientation, the junior group has already found an inspiring home in the Architecture Research Incubator (ARI) of the Department of Architecture. The junior research team is financed by a 5-year grant from the Bavarian State Ministry of Science and the Arts within the framework of the Bavarian Climate Research Network (bayklif).

With subtlety to success

Max Otto Zitzelsberger, a research associate at the Chair of Architectural Design and Construction, had a successful year in 2018. He gained several honors for his architecture which combines highly industrialized methods with traditional craftsmanship. His constructions may seem to be ordinary, but that is part of what makes them special. The architecture catches attention with intricacies and nuances. In one of his first projects, he rebuilt a façade with curvy-trimmed cross-timbers for a historical barn in Kneiting. In his most recent project "Warte Haus", he constructed a bus shelter with a red flat-rolled steel roof in Landshut. While bus shelters are increasingly digitalized in urban spaces, Max decided to build a shelter free of modern technology. Max was awarded a distinction in the German Steel Construction competition for this project. He won also the AIT Award in the special category "Newcomer". Furthermore, his architectural design was recognized with the Weißenhof Architecture Award and was nominated for an award from the City of Munich. The TUM Department of Architecture congratulates on the success and looks forward to seeing what he does next.

Project "Black Rooms"
Chair of Architectural Design and Conception
Prof. Uta Graf

The Master's project "Refugium Lanzarote" reinterpreted and
expanded the concept of 'black space' by inverting it; the black space
is transformed from an interior space into a landscape space. In the
black space, the refugium is inserted like an intarsia.
The refugium itself, as a place of retreat with specific references to the
outside world, is independent in relation to the spatial and temporal
parameters of its surroundings. It is a place where "time is compressed
and suspended" and where one is "provided with an entropic
state" (Robert Smithson). The type and number of rooms, spatial
constellations and spatial references were articulated by the users in
writing. The concrete location for the refugium, on the other hand, was
to be individually defined by the respective designer on the basis of
the descriptions and taking into account the specific conditions in the
southern part of the island.

Image above: Photo by Katleen Nagel
and Felix Zeitler; below: Model by
Eva Hoffmann

Image above left: Model by Anna Opitz; Image right: Model by Laetizia Hackethal; below: Photo by Katleen Nagel and Felix Zeitler

Think big, Munich!

Munich is experiencing an acute housing shortage. Professor Sophie Wolfrum, former head of the Chair of Urban Design and Regional Planning (2003-2018), explains why small steps alone won't be enough to solve the problem and how urban areas have to be planned in order to enrich the lives of those who live and work in them.

Is urban growth more intense than it was in the past?

You can't really say that. Cities have always had growth phases, depending on the region, economy and the times. Thus for example a lot of money flowed into Germany in the form of reparations after the Franco-Prussian War in 1871. Together with industrialization and modernization, the result was very rapid growth of the cities in Germany during this period. Then we had strong growth after World War II: Ten million refugees came to the West. And cities are currently growing again. But the reasons can vary around the world. Thus for example in developing countries there is a shift from agrarian to industrial societies. In the developed countries on the other hand we see a shift from economies based on the production of goods to service and knowledge-based economies. The universities are growing, as can be seen for example at the TU Munich, where the number of students has doubled over the last ten years. The students then bring knowledge and economic activities to the city.

The housing shortage in Munich is particularly visible in the case of students who have difficulties finding an apartment. Was there a lack of proper advance planning in the past?

It's impossible to plan too far into the future, it makes much more sense to orient planning to requirements. But in past years reactions have been too slow. The plans for expanding the city which were formulated in the post-war years are today still characteristic for major urban areas in Munich. You could say an oversized coat was tailored which the city could grow into over the course of decades. In the 1950s and 1960s we saw the large new housing developments, for example in Neuperlach, Hasenbergl and Lerchenau. And the major single family home developments appeared in this period as well. There was a mixture of gradual development and large housing projects; Neuperlach was for example conceived as an overflow city, for 80,000 residents all at once. Measures on this scale were then unthinkable for a long time. But today we should really start talking once again about the fact that small measures will no longer be enough to satisfy demand. And it's beyond all doubt that the demands in this city are very large.

Should there be more construction?

I really think what we need in Munich is construction, construction, construction. However, this generates a lot of conflicts which the responsible Munich urban planners will have to master. Nevertheless, we have to start building more densely. Highly popular urban areas such as Schwabing, Sendling and Maxvorstadt are also very dense and their quality has to be achieved once again. Here we're not only talking about residential construction: social and technical infrastructure, like schools and public transportation, also has to grow at the same time. I see it as my duty to keep providing urban planning and urban design at such a high level of quality that the new urban districts will be just as popular as the old ones. This may take some time, but it is fundamentally a question of urban design proposals, a profession which we teach here at TUM.

What will urban planners have to bear in mind in order to create popular and lively urban districts?

There has to be a good balance between the buildings constructed and the intermediate spaces which actually make up the urban space. All these spaces, the urban public and private spaces in the buildings should intermesh well with one another. The districts have to be more than just functional, they also have to have the strongest, most lively mixture possible. One big problem whose consequences are hardly foreseeable is retail commerce, which is changing at a very rapid pace. Of course we want new urban districts to have a balance between living and working, a lively city with opportunities for a variety of activities. This certainly has to do with density, but it also has to do with the quality of the density.

"What we need in Munich is construction, construction, construction."

Sophie Wolfrum

Where could new urban districts be created in Munich?

For one thing there are areas in the Northeast along the suburban rail stations Daglfing, Englschalking and Johanneskirchen. It would be possible to expand the city here. However, the land is already in use, primarily as farmland and for equestrian sports. The second area in which the city of Munich is preparing an "urban planning development measure" is in the northwest near Feldmoching, right on the city limits. But here too there are strong conflicts of interest, several farmers have already organized a citizens' action group against the "urban planning development measure", which is first to ascertain the potential for construction space there.

Do you think the tense situation will be improving soon?

I think it will take time for the dust to clear and for things to settle down. Urban planning accelerates residential construction, and the municipal building societies have drastically increased their construction activities. But it will take several years before this improves the supply situation. With things the way they are now it's hardly conceivable that there could be over-production which would result in apartments standing vacant. There have certainly been some unwise investments. Right now many small apartments are being constructed, and it may well be that in 20 years hardly anyone is interested in this kind of apartment, because new forms of living together will be developing more strongly.

What forms of living together are you thinking about?

Right now we can see that fewer and fewer people are living in conventional families; more than half of the households in Munich are single-person households. New forms of living will develop in this area. In my generation the shared apartment always had the appearance of being a compromise solution where the residents had to argue about doing the dishes. But such new joint living situations make it possible to have more privacy, for example in a group of mini-apartments surrounding a shared area which in turn allows joint activities. This development is rapidly increasing, but there is only a minimal supply of corresponding housing. Several building societies are constructing this kind of residence themselves, but as yet they are hardly known in the open market.

Desk: Stefanie Reiffert
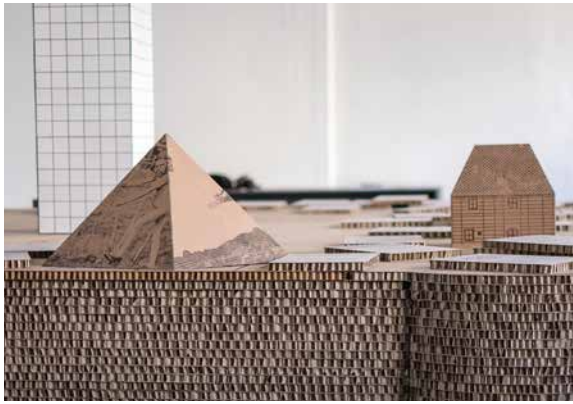
Exhibition "SiedlungsRequiem"
@ Lothringer13 Munich, 16.11.-16.12.2018
Chair of Theory and History of Architecture, Art and Design
Research associate Elena Markus and tutor Nick Förster

The history of the architectural, urban, and social phenomena of siedlung (en: settlement or housing estate) can not be considered separately from the ideological movements, social changes or technical innovations of the modern era. Welfare state housing policy, alienation and volksgesundheit, prefabrication and standardization, cooperative movement and paternalism etc. are DNA sequences of this ambivalent term.
The siedlung: an architectural vessel for a variety of community living experiments offered once an ideal projection surface for utopian fantasies, reformist attempts and philanthropic ideas. However, the utopian core of the idea, its pedagogical mission, determined the fate of the siedlung. In the research and exhibition project SiedlungsRequiem we reflected critically the phenomenon by means of four structures: a monumental mausoleum dedicated to the progressive objectives of the siedlung and by the art objects entitled altar, machine, and ground.

Review 18–19

Looking to the future

Visionizing the effects of technological developments by design research.

PROJECT COOPERATION:
Chair of Industrial Design;
Die Neue Sammlung - The Design Museum,
Pinakothek der Moderne

Supported by:
Hans Sauer Foundation
Stahlbau Pichler
Foldart

Nanotechnology, robotics, virtual reality, artificial intelligence – how will today's technologies change the world of tomorrow? Researchers at the TUM Department of Architecture presented seven future scenarios as part of the FUTURO 50/50 exhibition at the Pinakothek der Moderne in March 2018.

Finnish architect Matti Suuronen constructed the FUTURO exactly 50 years ago. These transportable, UFO-shaped buildings were the world's first plastic houses. Visitors can currently admire and explore a restored Futuro at the Pinakothek der Moderne in Munich. However, this vision of the future, popular in the 1960s, is now history itself.

The world in 2068
How will current technologies influence the world of the future? How will we live and work in 50 years? The curators of the Neue Sammlung – The Design Museum asked TUM researchers for their input on the matter. A team of 28 students from the Industrial Design and Architecture master's degree programs conducted research in various faculties as they developed different forward-looking scenarios. The Pinakothek der Moderne is now showcasing the results of the project in the exhibition FUTURO 50/50.

Seamless monitoring, data reconstruction and cyper crime - all this comprises the future scenarios for digitization. Picture of the students' project "rewind".
(Image: Lukas Schwabenbauer / TUM)
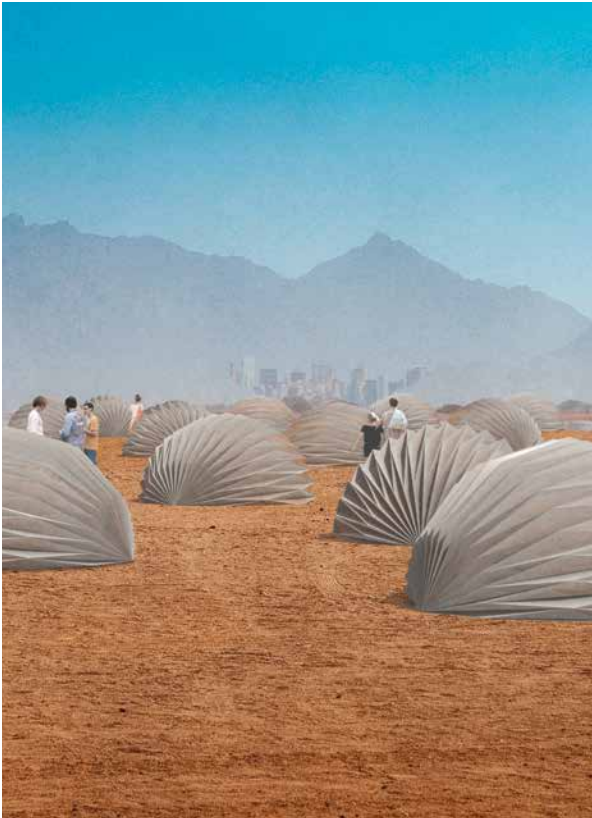
Future climate scenario: Tents made of recycled material offer shelter to climate refugees. (Image: Philipp Brodbeck / TUM)

"The scenarios are highly realistic, as all are based on the latest research findings."

"The scenarios are highly realistic, as all are based on the latest research findings," explains the academic advisor on the project, Dr. Sandra Hirsch from the Chair of Industrial Design headed by Prof. Fritz Frenkler. "Our aim was to analyze the societal relevance of new technologies and in doing so create the framework for responsible design."

Digitization is changing life

An example of the digitization of tomorrow: A video shows how crimes will be solved 50 years in the future. The time-consuming search for clues will no longer be required as investigators can use augmented reality to see what happened at the crucial moment at the crime scene. To make this possible, a small device no larger than a 1 euro coin will be worn at the temple.

At the touch of a button, this device then projects footage of the desired time and place onto the investigator's contact lens. The data used to replay these past events is sourced from CCTV and mobile telephones, which will be stored centrally in future and evaluated by smart algorithms to allow footage to be found and viewed in a specific, targeted manner.

The mobility scenario is another fascinating example. This shows how travelers will travel rapidly from one side of town to the other in future without any delays. Autonomous cars and shared taxis, buses and trams are organized in a smart control system and optimally managed. Traffic jams and long waits at traffic lights therefore become a thing of the past.

The challenge of climate change

Other exhibits demonstrate how people can deal with the consequences of climate change: Farmers who live in river deltas and have lost their livelihoods due to the rise in sea levels receive survival kits which contain everything required to convert plastic waste into new farmland. The waste is bundled up into islands and treated with bacteria cultures that break down the plastic, transforming it into fertile soil. The new islands can be fixed in place with mangroves in shallow water.

Design with practical benefits

The students developed seven scenarios as part of the FUTURO 50/50 project. In addition to digitization, mobility and climate change, the effects of new technologies on education, health, humanity and environment were examined and developed into concrete case studies.

Desk: Dr. Vera Siegler / Stefanie Reiffert

"HUB+" (BA /MA) Winter Semester 2018/2019 - Work in Progress

For the Winter Semester 2018/2019, the Chair of Architectural Design and Participation decided to focus on the Kunstareal in Munich. An urban area of 500 metres x 500 metres in the neighbourhood of Maxvorstadt constitutes the core of the Kunstareal. Our topic is HUB+. A hub is a core, a connector, a meeting point, a node with different links. Interpreted architecturally, these can be both physical and symbolic. What does the Kunstareal need? The interaction between programmes will be defined in each project according to input from surveys, analysis and choice of site.

"Affordable Housing" (BA) Summer Semester 2018

With over one million inhabitants, Ouagadougou is the largest city in Burkina Faso. The city experiences a population gorwth of approximately 100,000 migrants each year from the surrounding rural areas. As a result, Ouagadougou is expanding massively each year, creating new neighbourhoods, many of them without electrictiy or running water. The aim of the programme is to generate new affordable living spaces for low to middle income groups. The project will involve creating a housing module to be used in a new urban development. Throughout the process, the layout of existing neighbourhoods, the city's economic situtation and the local climate will be taken into account.

Image above: Model Kunstareal, all students B.A. + M.A. Winter semester 18/19 of Francis Kéré's Chair; below: tower project Kunstareal, Master students Katharina Kluess and Sarah Gemoll

The Chair of Architectural Design and Participation explores the social role of architecture with a hands-on approach.

Image above: Model Photo, students Barbara Dominguez and Tomas Gonzales ; below: Master plan Ouagadougou, Bachelor students Margarita Konorova and Ramsés Grande Fraile

ORBITU

150 years of TUM: "Orbitum" exhibition in public space

The world of research – as seen by artists

"Orbitum" was an exhibition of art works by students of the Technical University of Munich (TUM). The works, displayed throughout the Munich city center, explored important research fields at TUM, which in 2018 celebrated its 150th anniversary. During the exhibition, from July 18 to July 26 2018, tours were available, and introductions to the exhibition themes were be provided by the Pinakothek der Moderne and the Munich Academy of Fine Arts.

What are the most important issues for the future? What are challenges faced by science? Architecture students at the Chair of Visual Art at TUM explored these questions. They created sculptures, installations, projections and performances inspired by research projects in different departments. During the summer of 2018 they were displayed at various locations on and around the TUM Main Campus. The topics ranged from the city of the future to a germ-resistant operating table, as illustrated by the following two examples:

Flying cars in the city of the future

A futuristic technology seen in such science fiction films as "The Fifth Element" could soon be a reality: Flying cars would make it possible to move roads from the ground to the sky. The start-up Lilium, established by mechanical engineering graduates from TUM, has developed a vertical take-off flying taxi. The film "Liliutopia", created by architecture students, explores how this kind of airborne transportation might change cities.

Is there such a thing as "too clean"?

Bacteria and viruses cause many diseases. The healthcare sector fights them relentlessly, and medical technology specialists are constantly working to develop absolutely germ-free surfaces for hospitals and other applications. Inspired by these research efforts, students created a bench surfaced with mirrors to provoke "reflection" on whether we want or need such germ-resistant materials outside the world of medicine: The gleaming bench, with its sloping seat and irregular deformations reflecting the world around it, appears cold and uninviting.

These "research planets" by students from the Chair of Visual Art were on display around the TUM Main Campus for nine days. In addition to the 30 works the Chair of Visual Art also opened its doors to the public and displayed other works inspired by research at TUM. Films and installations by students were presented at the Karin Sachs gallery and an "information satellite" was designed to help visitors find their way through the exhibition.

For the duration of the exhibition the information Satellite was in orbit on the south side of the Alte Pinakothek.
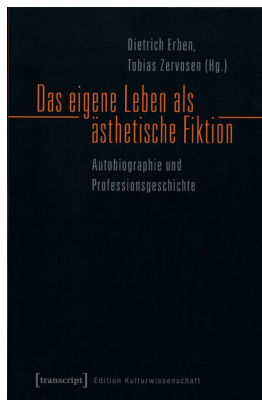
Image: Calvin Nisse and Theresa Finkel

Chair of Visual Arts, Prof. Tina Haase

One's Own Life as Aesthetic Fiction

Discussing autobiography and professional histories at the Chair of Theory and History of Architecture, Art and Design.

Das eigene Leben als ästhetische Fiktion.
Autobiographie und Professionsgeschichte
Dietrich Erben; Tobias Zervosen (Ed.)
transcript Verlag, 2018
ISBN 978-3-8376-3763-2

Professional realities have changed and are changing rapidly within Western employment societies. Currently, now more than ever, new challenges and constraints to personal development in professional activities are becoming apparent. Professional autobiographies are essential media in which these developments are documented. At the same time, they are unexpectedly poetic testimonies to the current transformation from a working to a creative society.

The anthology *Das eigene Leben als ästhetische Fiktion* (*One's Own Life as Aesthetic Fiction*) was edited by the two authors of this short article (published in 2018 by transcript Verlag) and is dedicated to a group of texts whose authors have in the majority of cases not made writing their main task, but are pursuing the so-called middle-class professions. The book documents the results of a conference sponsored by the Fritz Thyssen Stiftung für Wissenschaftsförderung, which took place at the end of April 2016 at the Department of Architecture at the Technical University of Munich. Lecturers and authors included literary scholars as well as representatives from other disciplines who examine the autobiographies of former colleagues. The eighteen contributions focus on individual texts as monographs of their work and from here determine the comparative contexts.

Like the number of books themselves, the social profiles and positions of the authors are difficult to survey – they are politicians and scientists, entrepreneurs and employees, architects and visual artists or musicians. For the members of these professions, autobiographies represent a further form of public communication in addition to the core business of their respective profession; they are addressed to a broader public as publications and are therefore tailored to appeal to a general audience. However, they remain committed to professional and profession-specific interests.

The various books make it possible to obtain information about the cultures of practical, scientific and artistic professions. For the period since the late 19th century considered, this applies in particular to training and recruitment strategies in such professions, the self-image of professionals and the external presentation objectives of the respective profession. Professional autobiographies present themselves as instructive sources for the professional sociology first discussed by Max Weber at the turn of the 20th century, but they have so far hardly been evaluated. In this sense, professional self-assurance on the one hand and the development of an
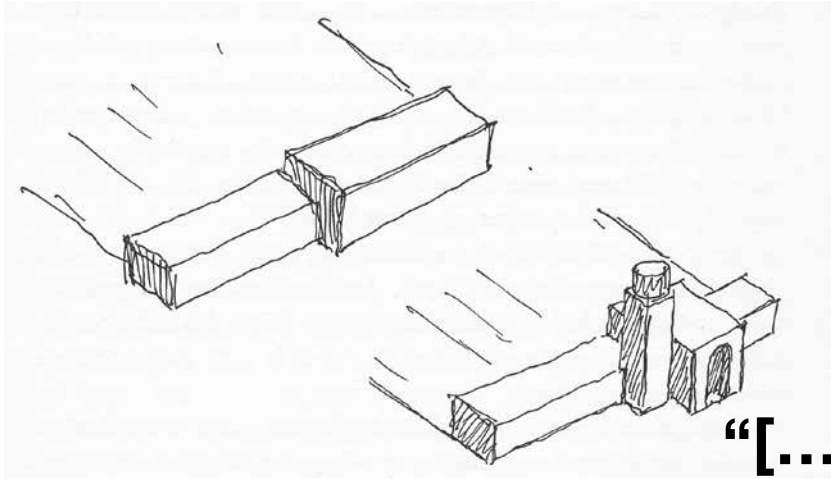
"[…] architects' biographies […] can ultimately follow the high standards of theory."

adequate scientific methodology for understanding professionalization on the other hand are strikingly interrelated at the beginning of modernity. In addition, the writings are indispensable sources for research on the history of professions.

Since the texts are to be understood as a medium of self-reflection addressed to the public by members of individual professional groups, the aesthetic structure of the publications (such as linguistic style, narrative strategies, literary genre, paratexts, illustrations, etc.) is also relevant over and above the content of the programme. Of central interest in this context is also the question of which autobiographies serve as models for later texts. The publication shows that autobiographies of non-professional writers in particular continue to be self-propagated in terms of genre history, whereby the references in the individual cultural milieus present themselves as distinctly different. While Goethe sets an unsurpassable standard in the German-speaking world, this applies to the autobiographical writings of Henry David Thoreau in the Anglo-Saxon language cultures. In most cases the references are immediate enough – Adolf Hitler's "Mein Kampf" is inconceivable without Richard Wagner's "Mein Leben".

The volume also examines the form in which autobiographies describe creative work and productivity. In many cases, they provide information about reasonably basic conditions of creativity that are still mysterious today. The autobiographies describe individual work patterns or talk about phases of success and failure; they describe certain typologies of workplaces (offices, studios, laboratories, etc.) with their communicative environment as sources of inspiration; they also address personal relationships with the obligatory mentors and the proverbial "companions".

In the articles in this volume, further dimensions of the history of professions and mentalities are explored on the basis of individual monographic analyses as

examples of how they can be regarded as characteristic of modernity in particular. We also trace the fact that autobiographies document a new emphasis that can also be observed elsewhere with regard to the significance of the author's own biographical "experience" and his insistence on his own "living through". This not only applies in general to the author's own "contemporaneity" as an instance on its value, but also applies in particular to the biographical path that led to the choice of career. Often enough it is stylized as a solitary "vocation", but sometimes the family milieu, in which later professional networks are already established, is also idealized.

Especially in the case of architects' biographies, autobiographies can ultimately follow the high standards of art theory. For example, the architect Louis Henry Sullivan, whose "Autobiography of an Idea" (1924) is in some way a model for all later architectural autobiographies, described his personal development as an evolutionary process, which he also postulates for the historical development of architecture itself. He explains that his famous maxim "form follows function" necessarily derives from his own life and professional history.

Dietrich Erben and Tobias Zervosen
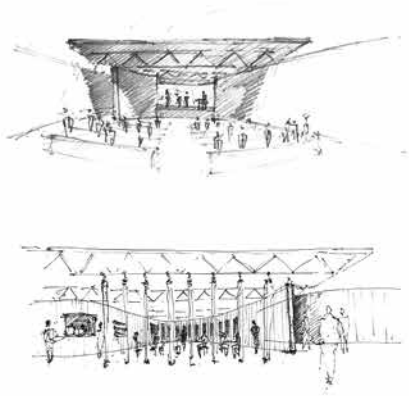
Project "Building means staying"
Chair of Spatial Arts and Lighting Design
Prof. Hannelore Deubzer

On the peripheries of the world, architecture can easily enhance people's living space and define a memorable place in the vastness of the landscape.
in addition to its immediate social and educational perspectives as a learning and living space for children and young people, the project for the St.Ruperts Mission in Zimbabwe enables two fundamental experiences in the implementation of architectural and artistic tasks. On the one hand, the design works are confronted with an extreme reduction of means. The economic circumstances, but also the extreme climatic conditions require a simple, economically efficient and in every respect functional construction method in terms of construction, later use and ongoing maintenance, which does not have to neglect aesthetic criteria, on the contrary.

Images: Design by Dmitrii Aleksandrov, Nicolas Burger, Xiangming Ge, Margarita Konorova and Carole Schmidt (Winter semester 2018/19). They won the 2nd prize at the competition "Studenten | Gestalten | Zukunft" 2019.

Project "Architecture Museum Munich"
Chair of Spatial Arts and Lighting Design
Prof. Hannelore Deubzer

Can built architecture become an exhibition? Yes!
The existing refectory building by Franz Hart itself becomes an exhibit, a contemporary testimony to the architecture of the 1950s and 1970s. Thus the "Franz Hart-Forum" is not a reflection of the contemporary understanding of architecture, but a representation of different architectural layers of time. Following the freedom afforded by non-load-bearing structures, only the reinforced concrete skeleton remains as the necessary structure, allowing maximum flexibility of use. Thus the inner architectural appearance can be changed from exhibition to exhibition vary. The result is not a perfectly pure environment, but a rough character that challenges and stimulates the creativity of the curator and user.

Images: Winning design "Xella Award 2018"
by Maria Schlüter and Korbinian Bromme
(Summer Semester 2018).

On the trails of Norwegian stave church constructions

Building research on the oldest wooden churches in Europe.

Classical building research provides fundamental, scientific facts for the subjects of building history and monument preservation. Dr. Andrij Kutnyi, research associate at the Chair of Building History, Building Archaeology and Conservation, reports about his research on the oldest wooden churches in Europe.

In geographically distant regions of Europe - on the territories of the modern states of Norway, Finland, Russia, Poland, Slovakia, Romania and Ukraine - there are still numerous examples of culturally and historically significant wooden churches. Some of them are already on UNESCO's World Heritage List. The Norwegian stave churches are the oldest of their kind and thus rank among the most important wooden buildings in Europe.

A total of 28 preserved Norwegian stave churches were selected for the planned project in collaboration with Riksantikvaren (The Norwegian Directorate for Cultural Heritage) and Fortidsminneforeningen (Society for the Preservation of Ancient Norwegian Monuments). The main objective of this project is to investigate the construction of the stave churches and the history of their construction.

The focus of the investigations are the representatives of stave churches of the similar type, namely the churches in Hopperstad (constructed around 1131), Kaupanger (1183/84) and Borgund (1180/81). They are located in the region of one of the longest (204 km) and deepest (1308 m) fjords in Europe - the Norwegian Sognefjord. These three belong typologically to the building type of stave churches with an elevated central nave. Over the centuries they have been frequently rebuilt and repaired. After a verification of the later construction phases, the structural development of this type of stave church will be presented in a comparative analysis.

This development is illustrated by digital spatial models. For this purpose, detailed measurements of the construction from the threshold to the tip of the roof were first taken from each church. In the first two research missions in April 2018 and October 2018, the stave churches were surveyed and scanned. The entire building geometry and volume as well as decorative elements were precisely recorded with a laser scanner. Details such as wooden surfaces with traces of tooling, inscriptions and sketches were also documented using the RTI (Reflectance Transformation Imaging) method. As support for the determination of the construction phases, dendrochronological investigations were used to determine the age of wood.
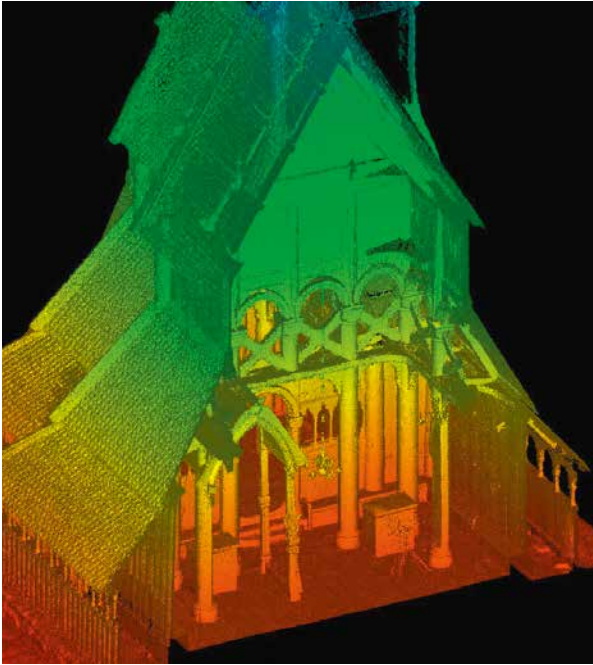
Image above: Measurement data as point cloud.
Cross section of the stave church in Hopperstad.
Image below: Stave church in Borgund 1180/81.
In the background (right) the Visitor´s Centre.
Photo: Andrij Kutnyi

The first findings of the investigations show that arched brackets are an essential structural element in the churches. In addition, wedged wooden bolts are indispensable connecting elements between the most important components.

As a result of the measurements, data with approx. 55,500 million measuring points per church were generated. These measurements will be evaluated by the Chair of Building History, Building Archaeology and Conservation at the TU Munich and converted into drawings and 3D models. The digital 3D models will serve as research models for the visualisation of the varied building history of the stave churches.

Modern technologies of stocktaking and three-dimensional visualisation make it possible to compare the objects and the scientific results easily. In addition, they can be presented not only to the specialist public, but also to interested non-experts in a way that is easier to understand. In the course of the project, the approach of the research work will be documented so that at the end it can also be comprehensibly communicated to visitors. To this end, the findings of the project will also be presented in an exhibition at the Visitor´s Centre in Borgund in 2020. In this visitor centre exhibitions on the history of stave churches in Norway and their role in the Middle Ages will be displayed. The Visitor Centre building was awarded an architectural prize in 2011. The planned exhibition of this stave church project and other public relations work on site is intended to raise awareness of the construction and building history of the stave churches and thus of the preservation of these important monuments.

Andrij Kutnyi

Young Talent Awards

MAIV Prize 2018
1. Prize: Sina Hauswurz, Simone Schiller; Sebastian Rodemeier, Michael Waldenmaier.
2. Prize: Alexandra Bauch, Teresa Gstöttl, Timo Helminger, Moritz Landgraf
3. Prize: Luisa Bauernfeind, Annika Tröger, Maximilian Landgraf, Florian Pesch
Recognition: Sula Kiriakos-Schulz, Markus Müller-Hahl
All supervised by the Associate Professorship of Architectural Design and Timber Construction and the Chair of Timber Structures and Building Construction (TUM Department of Civil, Geo and Environmental Engineering)

Auf IT gebaut 2018
1. Prize: Josephus Meulenkamp, Master thesis,
3. Prize: Dr. Christoph Langenhan, Dissertation,
Both supervised by the Chair of Architectural Informatics.

Auf IT gebaut 2019
1. Prize: Jakob Fellner, Master thesis
2. Prize: Victoria Rusina, Master thesis
Special Prize: Elisabeth Zachries
All supervised by the Chair of Architectural Informatics.

Auszeichnung des Deutschen Stahlbaus 2018
"Warte Haus" by Max Otto Zitzelsberger, research associate at the Chair of Architectural Design and Construction.

Wissenschaftspreis
2. Prize: Dr. Juanjuan Zhao, Dissertation, supervised by the Chair of Urban Development.

Förderpreis für Architektur 2018
Sofia Dona, former research associate at Chair of Urban Design and Regional Planning

Certificate of Excellence in Teaching at TUM
Jonas Bellingrodt, research associate at the Chair of Landscape Architecture and industrial Landscape;
Dorothee Rummel, research associate at the Chair of Sustainable Urbanism.

ALR Preise für wissenschaftlichen Nachwuchs
Advancement award: Denise Ehrhardt, Master thesis "Strategie für die abgestimmte Entwicklung von vier Kleinstädten", supervised by the Chair of Sustainable Urbanism

Advancement award: Anne Gruber, Master thesis "KleinstadtBeLeben", supervised by the Chair of Sustainable Urbanism.
Recognition: Theresa Friedrich, Johannes Hemmelmann und Julian Numberger, Thesis "Werkstatt Wallersdorf", supervised by the Chair of Sustainable Urbanism.

Competition "Restaurant der Zukunft"
1. Prize: Nick Förster and Janina Sieber (TU Berlin), Design "Lucullus Palace"

Competition Campus
Category "Studentenarbeit": Denis Hitrec, Design "Asymptotic Pavilion", supervised by the Chair of Structural Design

Image: "Maso Plaz", Agatha Linck

Prize within 10th Conference of the International Masonry Society
2. Prize: Dr. Roberta Fonti and Jonas Schikore from the Chair of Conservation-Restoration, Art Technology and Conservation Science.

AIV-Schinkel-Wettbewerb 2018
Recognition "Städtebau/ Landschaftsarchitektur": Gero Engeser, Andreas Ebert und Luisa Ehmke, Design "Fortsetzung folgt"

Concrete Design Competition 2018
Hanna Albrecht, Design "Taktiles Wohnen"

Campus Masters 2018
3 Prize: Agatha Linck, Master thesis "Maso Plaz. Ein nachhaltiges Alternativkonzept für eine Ortschaft in sensibler Umgebung", supervised by the Associate Professorship of Architectural Design and Timber Construction

Christiane Thalgott Prize 2018
Agatha Linck, Master thesis "Maso Plaz. Ein nachhaltiges Alternativkonzept für eine Ortschaft in sensibler Umgebung", supervised by the Associate Professorship of Architectural Design and Timber Construction

Senator Bernhard Borst Prize 2018
Tobias Johannes Haag & Yonne-Luca Hack, Matthias Albert Peterseim, Maria Dina Lamott und Katharina Paschburg

Franz-Berberich Prize 2018
Research group "Einfach Bauen - Nutzerverhaltens" (Anne Niemann, Laura Franke, Tilmann Jarmer and Stephan Ott), supervised by the Chair of Architectural Design and Construction.

Bauwelt-Preis 2019
Andy Westner, Werner Schührer und Christian Zöhrer, research associates at the Department

Hans Döllgast Prize 2018
Dimitrij Lakatos, Design "Ein Vermittlungsraum für die Pinakotheken", supervised by the Chair

of Architectural Design and Construction; Matteo Pelagetti, Thesis "Lampedusa, eine architektonische Intervention am Tor Europas", supervised by the Chair of Architectural Design and Construction

Dr. Marschall Prize 2018
Prof. Dr. Jochen Stopper, Dissertation "FLUIDGLAS - Flüssigkeitsdurchströmte Fassadenelemente", supervised by the Chair of Building Technology and Climate Responsive Design

Helmut-Rhode-Preis 2018
Recognition: Matthias Oberfrank

Peter-Joseph-Lenné-Preis 2018
Category "Aufgabe C – International": Gero Engeser and Andreas Ebert (TU Berlin)

Xella Award 2018
1. Prize: Maria Schlüter and Korbinian Bromme, supervised at the Chair of Spatial Arts and Lighting Design

Image: "New education space for the Pinakotheken", Dimitrij Lakatos
Photo © Sebastian Schels

X Urban Promogiovani Award 2018
1. Prize: Jonathan Stimpfle, Master thesis "Ringlocpark. Revitalisation of Augsburgs Railroad District", supervised by the Chair of Landscape Architecture and industrial Landscape

Heinze ArchitektenAWARD 2018
Dominic Ahn, Matthew Dueck und Lukas Prestele, Design "Thick Brick Building", supervised by the Chair of Urban Design and Housing

VDI Preis 2018
Category "Best Start-Up": Julian Trummer und Wolfram Meiner, Project "Roboter für das Adjustieren von Aufzugsführungsschienen", supervised by the Chair of Building Realization and Robotics

Bund der Freunde Doctorate Prize 2018
Dr. Clemens Knobling, Dissertation "Münchner Dachwerke", supervised by the Chair of Building History, Building Archaeology and Conservation

bdla-Nachwuchspreis Bayern 2018
Jan Sihler, Master thesis "Die Grüne Wiese strahlt. Zum Umgang mit stillgelegten Kernkraftwerken in Deutschland. Ein alternativer Entwurf am Beispiel KKW Philippsburg", supervised by the Chair of Landscape Architecture and industrial Landscape; Charlotte Lehner, Bachelor thesis "AllBeton - Wohnen im Grünen. Der Weg ist das Ziel", supervised by the Chair of Landscape Architecture and Public Space

Plea Student Colloquium Award
Viktoria Elisabeth Blum for her Master Thesis at the Chair of Building Technology and Climate Responsive Design.

"Studenten | Gestalten | Zukunft" 2019
1. Prize: Martin Gabriel, Marie Höing, Fabian Jaugstetter, Philipp Weig and Anne Winkelkotte, supervised by the Chair of Energy Efficient and Sustainable Design and Building
2. Prize: Dmitrii Aleksandrov, Nicolas Burger, Xiangming Ge, Margarita Konorova and Carole Schmidt, supervised by the Chair of Spatial Arts and Lighting Design

MAIV Prize 2019
1. Prize: Tomas Bongart, David Stanzel, Veronika Kindler, Yiannis Kyriakou, Felix Hechtl
2.Prize: Lisa Hempfer, Elisabeth Freundorfer, Desheng Yuan, Isabella Pauli, Christina Seonbuchner
3.Prize: Nico Lewin, Colin Bodenstab, Johannes Ernstberger, Manuel Uphoff, Yijun Zhou
All supervised by the Associate Professorship of Architectural Design and Timber Construction and the Chair of Timber Structures and Building Construction (TUM Department of Civil, Geo and Environmental Engineering)

BDA Nachwuchspreis Bayern 2019
Julian Kerkhoff, Master thesis "Die Kelterei – Vom Naturprodukt zum Kulturprodukt" supervised by the Chair of Architectural Design and Conception

Image above: Munich, project for a Richard-Wagner-
Festspielhaus, Aufriss, 1866
Gottfried Semper © Architekturmuseum der
TU München (semp-11-12)
Image below: Munich, New Polytechnic School, 1864-
1868, Gottfried Neureuther
Photo: unknown © Architekturmuseum der
TU München (oa-1026-1001)
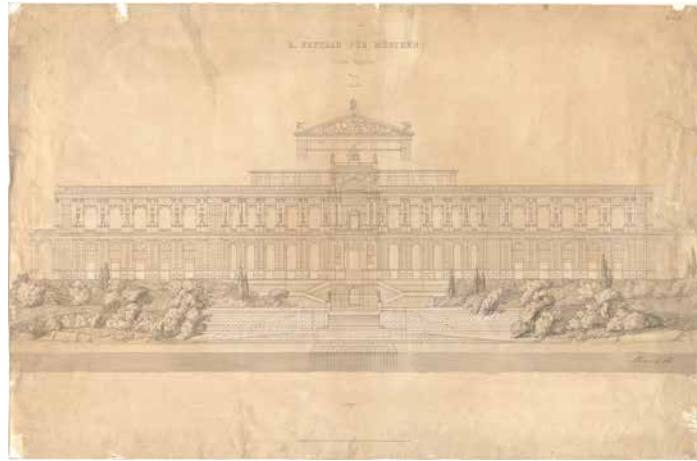
Palaces and Factories – The Architecture under King Ludwig II
@ Architekturmuseum der TUM, 26.09.2018 – 13.01.2019

Curated by Dr. Katrin Bäumler, research associate at the Chair of
History of Architecture and Curatorial Practice

This exhibition, which marked the 150th anniversary of the TU Munich,
shed light on the architectural history of the Kingdom of Bavaria during
the reign of Ludwig II (1864-1886). It provided the first ever survey of
the buildings constructed under his aegis, and of the projects that went
unrealized. The focus was not just on the world-famous royal palaces
and the spectacular theater projects which Ludwig II personally
commissioned, but also on the public and private architectural
developments of his time. These include prominent buildings such as
the Munich Rathaus (Town Hall) and the Bayreuth Festival Theater,
but also buildings which are less well-known, but are architecturally
outstanding and of cultural-historical significance, such as synagogues
and factory buildings, or the original building of the "New Polytechnic
School", now the Technical University of Munich.

Image: Insight into the exhibition (section castle
building) Photo: Ulrike Myrzik
© Architekturmuseum der TU München

Learning Neuperl

g from ach
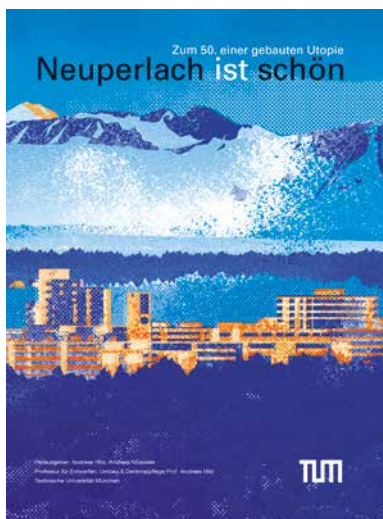
Life and living in a large housing estate: What opportunities and difficulties were there, what prospects and challenges lie ahead? These and other questions were examined for over four years under the direction of Prof. Andreas Hild and Andreas Müsseler in the Munich satellite town of Neuperlach at the Professorship of Architectural Design, Rebuilding and Conservation. The research results are recorded in the newly published publication *Neuperlach ist schön* (*Neuperlach is beautiful*), which is almost seven hundred pages long. A contribution by the editors.

In view of the projected increase in population over several decades (+ 200,000 inhabitants by 2030) and ever-increasing demands for comfort, which are reflected above all in the rapidly growing demand for living space per capita, Munich is facing urban policy challenges that cannot be "optimised away" and which will once again change the face of the city in the coming years, similar to the courageous decisions of the Vogel era. While the solutions to the last comparably large growth period of Munich in the 1960s were marked by an unbridled belief in progress and the desire for a visible new beginning, Munich today faces other challenges: Reconstruction is complete. The buildings and urban design structures of modern and post-modern times are getting on in years. They are in need of renovation and not all of them enjoy the best reputation, but they have themselves become witnesses of our post-war history. In addition, most of the land reserves in the city have been used up. In any case, in the foreseeable future, land appropriation for settlements and infrastructure will have to be drastically reduced in the interests of sustainability. However, self-chastising cuts, such as halving per capita living space requirements, have a comparably utopian character to the erstwhile demand for an increase in the price of petrol to 5 D-Marks.

Neuperlach is beautiful. On the 50th anniversary of a built utopia

The book was launched in December 2018 by Franz Schiermeier Publishers Munich. Editors: Andreas Hild & Andreas Müsseler, Chair of Design, Rebuilding and Conservation, Prof. Andreas Hild, Technical University of Munich. ISBN 978-3-9-943866-65-0. www.neuperlachistschoen.de

34

Review 18–19

Images: Results of the seminar
Neuperlach 2040.
Above: Film poster by Jonas Hercher
and Lea Kimminich; below: Film poster
by Simon Farwer and Marlon Lange
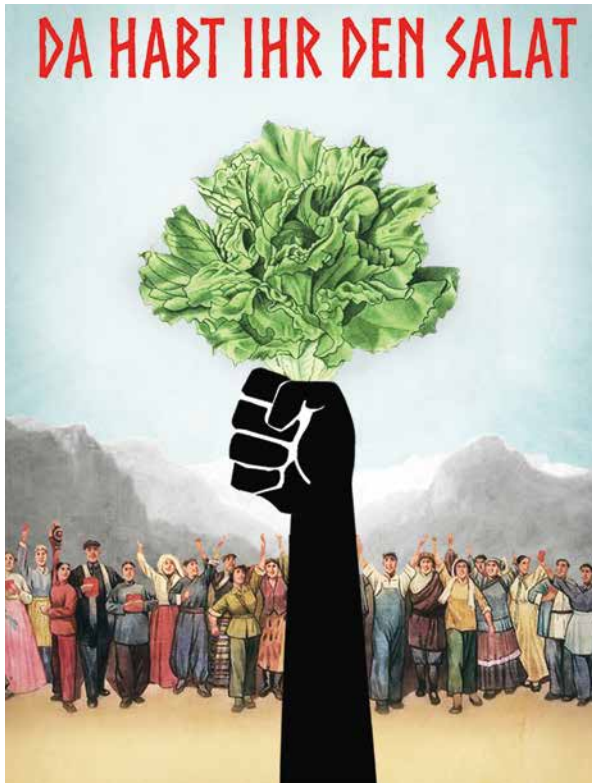
Thus, the order of the day is to search within the urban area for areas whose structures appear robust enough to withstand a relevant population influx and corresponding changes through subsequent densification. These questions crystallise in particular in Neuperlach, the largest overspill city in Germany, planned at that time to accommodate 80,000 inhabitants. The present anthology, entitled Neuperlach is beautiful, attempts a future-oriented revision of the experimental structure of that time.

Origin

In the first section, the study collects different views on Neuperlach today, but also on its planning history. In this context, the book as summary result cannot give a complete overview; it seeks instead to look at the state and achievements of Neuperlach from different angles and to reveal that this young district of the city already has an intricate history. This history generates its own identity, its own beauty, as you can see in the pictures.

The documentation of the story is based on the extensive preparatory work of Sigrid Bretzel. She commented on and classified the resurfaced and prepared planning documents. Part of Neuperlach's history, however, is also the relationship to the urban and architectural experimental set-up of the reconstruction itself, which is outlined in two separate comparative chapters. In terms of construction and urban development, they place the settlement experiment in the circle of corresponding German and European experiments and trends.

Possibilities for action

Our preoccupation with the phenomenon of Neuperlach, however, was driven from the beginning by a fascination of another kind. We wanted to ask ourselves whether and how it would be possible to continue building Neuperlach, which - like all idealistic urban systems - was thought to be perfect and crystalline right from the start. Looking back on this work, which lasted several semesters, one can predict without exaggeration, but with some astonishment, that this urban system is surprisingly versatile. In various systematic chapters it becomes obvious that precisely the simplest and most monotonous linear structures exhibit, in the most positive sense, points of attack at all ends. It almost appears as if they had already been designed with target interfaces for "further construction".

The results of the semester drafts carried out at the Professorship of Architectural Design, Rebuilding and Conservation demonstrate that it is perfectly feasible in architectural, spatial and formal terms to extend the structures upwards, and to add to the end walls and the façade stairwells. This is true despite, or even because of, the student-driven character of these works, which are subject to a liberal approach to technical and legal issues. This chapter is substantially supplemented by the presentation of further extension possibilities. With their increasingly urbanistic or urban-spatial orientation, they form the transition to the most forward-looking issue.
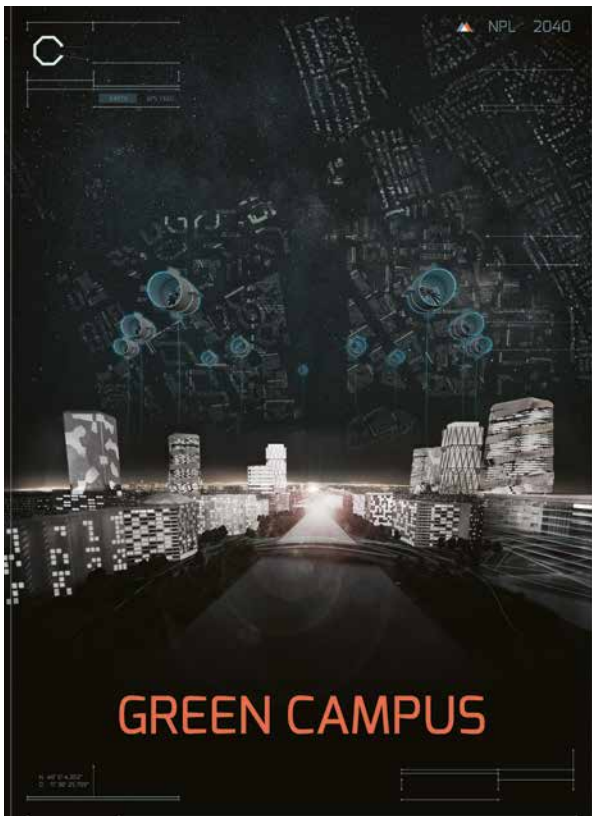
Music of the future

Finally, in the third section, points of view are gathered which revolve around the question of the purpose with which Neuperlach may be further thought. It is beyond dispute that the green space between the buildings is responsible for light, air and sun in all apartments and that the quality of the floor plans was scarcely surpassed in the following decades. It seems equally obvious to us, however, that changed lifestyles, the dissolution of the small family and the exponential increase in the demand for living space per person as a result of prosperity require a readjustment of private and public space, which is based precisely on this green space, which today is regarded as an essential quality.

The answers to such a comprehensive spatial issue gain strength in particular when they take up individual elements and reinforce them for testing purposes. An approach that is possible not only, but particularly in the sheltered intellectual space of a university and whose results promise a multitude of starting points.
Of course, the forthcoming transformation of Neuperlach, as well as its creation 50 years ago, should pursue an architectural, urban-spatial and functional-social goal. The spatial recourse to existing cityscapes examined by Hangjae Lee appears here as an almost realistic spatial utopia. The cinematic spatial utopias created by Andreas Kretzer's one-semester work extend the scope even further and touch on issues whose topicality is constantly underpinned by current reports.

The battle for the ground floor is a chapter in itself, in which the frictions between private and public interest have been clearly discernible for several years. A space-creating intervention in this field can only be carried out jointly by landscape architects and planners, because it is precisely these transitional areas that make space a tangible experience. Regine Keller explores the landscape architecture of the interspace.

What if ...

Currently, Munich as a whole is facing problems comparable to those of Neuperlach, and it will no longer be possible to build a new overspill city of this size. Rather it will be a question of rebuilding the existing city. Neuperlach is just one example. The area is 50 years old, and most of the buildings are about to undergo a renovation cycle. A positive commitment to planning is necessary, because the rebuilding of an urban structure - if it is not merely timid preservation - does not work without optimism, enthusiasm and hope. Above all, in tackling new challenges we should not rely on outdated methods. The requirements in individual cases are too complex, too specific. Because the re-evaluation of what already exists needs images which people can rally behind. To this end, the complexity of the challenges must be reduced to such an extent that action becomes possible. This is what design means. Especially when it comes to building on existing structures, designing means discovering and showing the hidden poetry in what is already there. Only then can a spark be created on the basis of facts and research. A spark of enthusiasm, a spark of vision, of imagined possibilities, a positive goal. Design is an attempt to achieve such a goal. The book on the study will provide material for this purpose.

This study does not represent a reappraisal of the history of the district, even though it touches on this history. It does not attempt to place it within the context of world architecture, although the context of world architecture is taken into account. Nor do the findings offer an overall redesign of the area, although suggestions are made on how to proceed strategically with such planning. The study simply aims to make us aware of an area that has now been almost forgotten in terms of planning, in order to visualise its potential. It tries to show what is already there and to uncover the underlying influences and hidden potential. This should help to understand the complexity of Neuperlach as a social construct. "Wanting to understand" through classification entails research. But understanding, observing and interpreting are not an end in themselves in this context. It is also about transformation, about action. Neuperlach is beautiful attempts a future-oriented revision of the experimental set-up of that time. Inspired by the belief in the future of the German economic miracle years, the reflections, reports and issues are deliberately related to a narrative that follows the "what if".

Andreas Hild and Andreas Müsseler

"The Dense Urban City"
Chair of Urban Architecture, Prof. Dietrich Fink

The Chair of Urban Architecture examines the conditions of architecture in contemporary cities at all scales and the associated development of sustainable urban concepts for tomorrow's cities. Teaching at the chair takes the form of lectures, project work, seminars, day trips and week-long field trips and focuses on examining and developing architectural models for "The Dense Urban City". Urban architecture, although experienced first and foremost in its three-dimensional form, is understood, analyzed and reconceived as a complex, man-made artifact. Knowledge of the history and theory of architecture and the city in turn informs the development of architectural and urban design projects. The aim of project and seminar work is to acquire a methodological understanding of the parameters that shape the development of urban architecture and urban space at the level of the city as a whole, the neighborhood, the building, and its details. These criteria form the foundation for designing in urban situations.

Project "Residental Complexes"
Image above: Laura Eberhardt and Anella Agic; below left: Daniel Reh and Jakob Sprenger; below right: Kristina Kanzler and Lukas Naumann
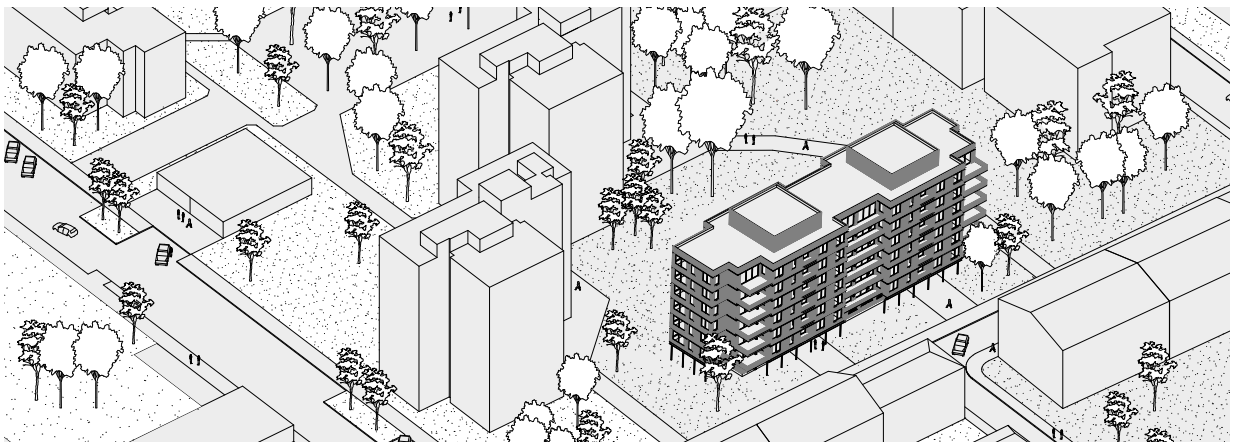
Above left and right: "Cooperative",
multi-award winning Master Thesis
by Maximilian Blume;
below: Design by Philipp Rothbächer and
Jonas Schergun (special award winner of
the "AIV-Schinkel-Wettbewerb" 2019)

Digital transformation and urban spatial organization in Europe

Development of a concept paper for a Collaborative Research Center.

The SFB steering group is comprised of the following:

- Chair of Urban Development
  Nadia Alaily-Mattar
  Alain Thierstein
  Markus Weinig
- Chair of Architectural Informatics
  Frank Petzold
  Gerhard Schubert

What are the current and potential impacts of digital transformation on urban spatial organization? How does the networking of value chains, availability of digital mass data, automation and digital customer interfaces affect current urban spatial organization? How will new possibilities enabled by augmented reality, image recognition and the Internet of Things transform spatial organization? Knowing that the speed of change of technologies and innovation, such as autonomous vehicles, drones and crowd logistics, has a different rhythm and velocity than that of policy and legislation, infrastructure, and consumer acceptance, how can the level of readiness of the spatial environment for the adoption of new technologies be matched to the speed of technological innovation?

The Department of Architecture at TUM is preparing a concept paper for a Collaborative Research Centre (Sonderforschungsbereich (SFB)) to be submitted to the German Research Foundation (Deutsche Forschungsgemeinschaft (DFG)) in 2019. Collaborative Research Centres are long-term university-based research institutions, established for up to 12 years. They are founded with the objective of enabling multidisciplinary research programmes, allowing researchers to tackle innovative, challenging, complex and long-term research undertakings through the coordination and concentration of individuals and resources within the applicant universities. (Source: http://www.dfg.de/en)

The objective of the proposal of the Department of Architecture is to enable the development of a center of competence at TUM to investigate the impacts of digital transformation on the current and future urban spatial organization in Europe, and hence, position TUM at the forefront of international research. By digital transformation we refer to the progressive invasiveness/ penetration of all areas of life (e.g. socialization, communication, production, consumption, education, entertainment, mobility, etc.) through digital technologies and applications.

By urban spatial organization we refer to the constitution, governance, production and usage of urban space. So far academic research has only approached the subject of digital transformation from sector specific viewpoints, in particular, the digital transformation of business models. Indeed, the German Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) has already acknowledged a need to trace spatial and cross-sectoral effects by calling upon "the research sector to also

DIGITAL TRANSFORMATION

AUTOMATION
Additive Production
Autonomous driving
Robotics
Drones

DIGITAL USER INTERFACES
Infotainment
Social Networks
E-Commerce
Mobile Internet / Apps

URBAN SPACE

How will digital natural-technological systems (hybrids) influence the environmental sensitivity of the urbanites, their understanding of 'urban natures', their behavioral patterns and future well-being?

GOVERNANCE OF SPACE
Planning
Laws
Management

PRODUCTION OF SPACE
Private Development
Real Estate

ORGANIZATION OF SPACE
Physical Structure
Built Environment

Which urban areas are at the forefront of introducing digitalization linked to sustainable development, and what makes them pioneers?

USAGE OF SPACE
Everyday life
Interaction
Performance

DIGITAL MASS DATA
Wearables
Big Data
Predictive Maintenance
Data-based Routing
Internet of Things

NETWORK VALUE CHAIN
Cloud Computing
Smart Factory
Broadband
Digital Products

URBAN SPATIAL ORGANIZATION
MUNICH METROPOLITAN AREA

How can the influences of the digital transformation on urban spatial organization be taken into account during the planning process and integrated as a supporting tool into the decision making process?

What kind of spatial scope is fostered within technology-driven urban governance processes?

Is there something specifically European about the reconfiguration of urban and digital infrastructures in places like Berlin, Stockholm or Tallinn?

What is the relation between environmental qualities of urban spaces and people's individual mobility?

How do levels of readiness for the adoption of Autonomous Vehicles in the domains of laws and legislations, consumer acceptance and infrastructure affect each other?

examine the spatial and ecological impact of digital technologies and digital transformation" BBSR (2017: 32). We have very carefully chosen "urban space" as a category of investigation rather than the "city". We believe that the city is a political construct whose continuity has been granted by normative pervasiveness; urban space by contrast is a theoretical construct which has been continually subjected to scientific scrutiny.

We postulate the well-documented advancements of digital technologies and ask what changes in digital technologies with particular impact on urban space in Europe have occurred since the 2000's till the year 2020 (the SFB starting period), and what consequences this will have on the constitution, governance, production and usage of urban space. The impacts of the first and second industrial revolution on urban spatial organization are well documented by archaeologists and urban historians (Childe, 1950, Mumford, 1961, Benevolo, 1971, Kostof 1991).

Since the 1970's, there have been recurring efforts by sociologists, geographers and planners to develop theories (e.g. Lefebvre, 1970, Friedmann, 1986, Soja, 2000, Sassen, 2001, Amin and Thrift, 2002, Scott, 2011, Brenner and Schmid 2015) and provide empirical evidence (e.g. Graham and Marvin, 2001, Taylor, 2004, 2013) to describe and explain the emerging spatial organization under the impacts of the unprecedented

scale and intensity of connectivity of people and industries which the third industrial revolution has enabled. Scott (2011) suggests that under the impacts of the third industrial revolution a third wave of urbanization has ensued, Soja (2000) states that the third urban revolution came to a close in the 1970's, but falls short of naming its successor.

This SFB proposes to continue these efforts to describe, understand and explain the emerging spatial organization by expanding the empirical evidence on the changes in the constitution, governance, production and usage and of urban space. The SFB focusses the attention on the impacts of digital technologies in particular on the latest technological developments since the 2000's.

The SFB will disseminate knowledge about how urban spatial organization in Europe is and will be affected by digital transformation, how policy makers, citizens, city administrators and planners are addressing this, and what academics from different disciplines at TUM think the next challenges related to these transformations will be. The SFB will also identify the obstacles posed by unresponsive spatial transformation processes, thus hindering or delaying the reaping of potential benefits of digital transformation.

We are convinced that valuable knowledge can be created by focusing on the European context in particular, where 'slow' democratic practices, cultural heritage, and the resilience of the city as a political and social organization collide with hyper-fast digital transformation processes. In the long term, such knowledge may enable European stakeholders to become shapers of this disruption rather than being subjected to it. This will also enable framing innovations by design within the ethical boundaries shared by the European Community, for example by including particular concerns such as safety, security, privacy, and so on, that might not be prioritized in other non-European contexts.

By providing a platform of exchange and a common cause to deliver new insights about specific aspects of the impact of digital transformation on urban spatial organization, a center of competence can greatly enhance the fertilizing potential of the abundant – albeit dispersed – knowledge at TUM. *(Figure as of October 2018.)*

Nadia Alaily-Mattar, Markus Weinig

"An economy of means. Residential transformation in Athens"
MA Project – Winter Semester 2018/19
Chair of Urban Design and Housing

Professors: Stephen Bates, Bruno Krucker
Supervising research associates: Simon Burko, Adam Gielniak, Werner Schührer

To work with an economy of means, to transform what exists with deft hands, making new things working with what is already there, allowing it to grow and transform into something else feels like an appropriate strategy to counter the twenty-first century tendency to live beyond our means, in denial of environmental reality. It requires us to go beyond the limits of Modernism and to work with a more inclusive approach to form and language, to create new interpretations which are contemporary, relevant and comfortable. Putting pre-existing elements and materials together in new ways, using whatever is at hand, re-combining them to create something new suggests engaging with the notion of bricolage.
This semester we investigated this attitude through the transformation of existing structures in the modern metropolis of Athens to create revitalised forms of living and working which contribute towards an optimistic urban collective.

Images: Students' designs of the Master project.
Left page above: Michaela Burchard, Lu Kück
and Elisabeth Vögele; left page below: Mirjam
Elsner and Luis Huber
Right page above: Gloria Glatt, Kim Neubüser
and Riccardo Stellato; right page below:
Korbinian Bromme, Ann-Christin Decher and
Isidora Ristov

Integrated Urban Design and

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The population pressure caused by immigration and a lack of emigration is not a new phenomenon in Munich. Initially the population overspill was accommodated in the peripheries of the city. The conversion of abandoned industrial estates and railway yards into new residential and working quarters in the city provided temporary relief in a saturated housing market. With most of these inner-city wastelands now absorbed by the market and space for further urban expansion scarce, the pressure is now spread over all developed districts, from the city centre to settlements on the outskirts. At the same time, resistance against processes of internal densification is growing. Transformation of the existing urban fabric can unleash destructive forces, but where carefully implemented, it can also contribute to radical improvements for the local population – a fact too often elided in the public debate. How can architects, urban planners and landscape architects exploit the opportunities to create better urban living spaces through progressive design concepts and smart planning strategies?

Careful examination of the existing spaces on the one hand and the needs of its current and future users on the other is key. Which uses and programmes are compatible and connectable, and can react appropriately to the changing needs of the urban population? Which outdoor spaces are experienced as homely, appropriable or attractive, which are less conducive to the development of urbanity? When does urban redevelopment threaten to exceed its quantitative and social capacity? Which components of the spatial structure are to be maintained, which are to be adapted or replaced?

Particularly in existing buildings, these considerations call less for quantitatively driven standardisation than for a professionally informed and justified sense of proportion and the design exploration of future potential. Productive ideas can be found in careful functional planning, but also in differentiated and three-dimensional proposals for solutions to the architectural and landscape elements of the city. In recent years, they have been attracting more and more attention in specialist literature, often driven by the emergence of new, conventional forms of living and working, as well as the provision of living space by new groups of actors.

For example, sharing schemes, i.e. the shared use of resources, are also gaining in importance in the residential sector. In the general language, where the term is primarily associated with (mobility) services in the urban

Landscape Architecture Studio

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Image above: Perspective Gotzinger Platz;
Image below: Site plan.

The flagship in the basic training for urban planning and the development of urban planning qualities is the study project in the 4th semester. Architects and landscape architects work together in interdisciplinary design teams as a decisive unique selling point. Something that is omnipresent in everyday professional life, namely being able to act and discuss beyond the boundaries of one's own profession, is taken to extremes in this studio.

environment, the cooperative use of spatial services agreed in limited communities is gradually finding its way into private living environments. This includes the emergence of workplaces in co-working locations instead of integrated study rooms, communally managed gardens for house dwellers instead of private gardens, or letable rooms for guests and communal kitchens in cluster/satellite dwellings or residential complexes.

This change is accelerated by the high prices in the housing market, and yet the success of the model, even far from the metropolitan cores, points to a more profound change in society: The boundaries between the individual and the community, the consumer and the provider have begun to shift. At the same time, there is a change on the supply side. In addition to a conventional real estate market, a dynamic complementary actor structure is emerging that is open to experimentation, which bundles forces in joint or cooperative formats and thus becomes a driving force for urban renewal. This is flanked by the adaptation of the legal framework, which aims to promote the integrative transformation process with instruments such as the "urban zone" (Urbanes Gebiet).

Thus, cities that are dense and yet worth living in are possible through careful and site-specific further development of the (external) existing space and its use. This applies both to newly created neighbourhoods and to retrofitting and adaption of existing structures: The "appropriable" city is never finished. Rather, it is the spatial template that enables a cautious but constant change in urban lifestyles, taking into account the interests of local residents and appropriation by new user groups.

Nowadays, the adaptability of a structure is often equated with extremely reduced specifications, but the opposite is true. In European urban history, those urban structures that have both strong character traits and openly conceived elements for adaptation have proved to be particularly successful in adapting and changing. A sustainable city, because it is constantly reinventing itself and thus renewing itself, thus has to do in particular with the careful formulation of formal, urban planning and landscape architectural structures and elements.

To conceive elastic yet robust structures requires much more from the designer than just unwinding a standard planning repertoire of standard types. Rather, the potential of transformation in the concrete context must be recognised and developed in the special features of urban planning sections, neighbourhoods and functional superimpositions. An urban development that takes the already existing situation into account attentively

and appropriately recompacts it, can thus also lay the foundations for a new urbanity in the historical building stock.

An important key to this is the joint thinking and development of building structures and more usable open spaces. However, this holistic approach to urban space can only be achieved through the cooperation between a number of disciplines, each with its own specific knowledge, readings and objectives. "Making a city" can therefore not be a process that relies solely on one area of expertise. Rather, it is important to engage in the negotiation process as early as the design stage. And these skills must be taught and practiced in the university teaching environment.

This is why students of architecture and landscape architecture at the TUM design proposals for the conversion and further construction of the city in joint project work such as the integrated design of urban planning and landscape architecture in the 4th semester as early as bachelor level. The enormous potential and advantages of a coordinated collaboration are identified and promoted right from the conception phase.

In practice-oriented tasks in Munich, typical standard situations for later professional practice are considered. These are accompanied by research on current landscape and urban challenges, such as innovative forms of living and working, the mechanisms of providing living space, structural and functional redensification or the fundamental change in the appropriation of open space in the city.

For the students, new space for living and working is therefore conceivable even in old city quarters, which significantly increases the quality and usability of the living environment for all residents - established residents and new arrivals. As will be demonstrated here in the summer semester 2018 in an interdisciplinary project between the Münchner Großmarkt and Sendling, the students trace the potential for the renewal and improvement of existing living and working environments and practice the discussion and negotiation between various specialist perspectives.

Although at the beginning of the one-semester design studio there may still be an idea of the "division" of the task into the built-up area and the and the exterior space, the integration of both disciplinary perspectives in the final project proposal often goes a surprisingly long way, demonstrating convincingly the synergetic potential of this mode of co-creation. "Plans without white" as a tool impressively demonstrate the conceptual-integrative power of dialogue, which goes far beyond the additive. Specific open space concepts call for special urban constellations and, conversely, landscape elements support the qualities and spatial variations that have been worked out through urbanistically conceived architectural settings. Combined in plans and models on a scale of 1/500, the quality of the design often

reveals itself less in excitement than in a naturalness of coincidence, which is otherwise at best associated with the characteristics of established urban structures in the European city.

The integration of the latest developments in knowledge into landscape architecture and urban planning or new typological solutions is by no means sidelined. Rather, the innovative characteristics of these structures and the changing lifestyles in the city are used in an imaginative and context-specific way. For many a hitherto only inadequately usable setting, the special layout of cluster/satellite housing schemes or neighbourhood squares, new forms of working in the city, changing everyday uses of open space, or appropriation by complementary user groups represent enormous potential for (re-) vitalisation.

At first glance, the proposed projects might appear cautious, but on closer inspection they stand out for their precise distinctions, further variations on well-known types and standards of landscape architecture and urban development, and for their optimistic attitude to urban change. Insights are provided into how future designers hope to help shape the future of this city worth living in. Non-Finito!

Mark Michaeli and Andy Westner

Image: Perspective inner courtyard

All images © Project authors (Sendling +):
Katharina Dropmann (cand. B.Sc. Landscape Architecture),
Katharina von Unold (cand. B.Sc. Landscape Architecture),
Johann Klause (cand. B.A. Architecture),
Kéan Koschny (cand. B.A. Architecture)

Offshore - wind energy, landscape aesthetics and acceptance

Research in landscape architecture as structural provider for contemporary urban, suburban and rural social environments .

Energy production changes the landscape. In comparison to fossil sources, renewable energies do not produce fundamentally new landscapes, but they do significantly change their visual appearance and meaning, and affects social acceptance. Together with joint project partners from the fields of psychology and physics, the Chair of Landscape Architecture of Regional Open Spaces has spent two years investigating how renewable energies can be combined aesthetically and structurally with the existing landscape and how this can be developed as an instrument of planning participation and improved acceptance. In 2018, the final report was released for publication by the Ministry.

A research project on offshore wind parks (OWP) in the Baltic Sea investigated whether landscape appropriate design and public perception is also possible at coastal zones.

Normally, German offshore wind farms are erected in shapeless zones in which the turbines are clustered due to the many spatial restrictions. Little care is given to particular forms or arrangements. In Scandinavia, on the other hand, the aesthetic readability of offshore wind farms is taken for granted. In addition, the simple clustering of turbines is not necessarily energetically optimal and can now be improved using computer modelling. However, computer generated arrangements are even less recognizable as a coherent form, which, in addition to the appearance of the landscape, is also detrimental to the safety of shipping traffic. In the project we explored how best to combine energy-efficient and aesthetic design.

The arrangement determined by the computer algorithm on the basis of annual wind distribution reveals certain heuristic principles. The algorithm spaces the turbines in the front rows at wide intervals in relation to the direction of the prevailing winds so that as much wind as possible can penetrate deep into the park, and those in the succeeding rows at narrower intervals. As the depth of the wind farm increases, this is reversed: the back rows are spaced far from each other, but the turbines in the rows are closer together.

On the basis of this principle and the rules of safety of shipping traffic, aesthetic design principles can be developed whereby wind farms close to

the maximum possible yield can be given a distinctive form that is easy for residents, tourists and shipping officers to read. There is no one 'correct' form, but different ones.

In our project, two designs were finally selected from a larger number of configuration variants (from basic geometric forms such as circles, arches, squadrons, belts, compartments or basic organic forms such as amoebas). Local residents and tourists were interviewed by environmental psychologists from Halle and shown posters, desktop models and a visualization dome at ETH Zurich (an igloo-shaped 360° cinema):

Windbelt design

The wind turbines are arranged "like a belt in the wind" in curved lines. This particularly concise form seems to circumvent the principle that a field is occupied as evenly as possible with 'playful ease', even though it is energy-optimised, i.e. oriented metaphorically and physically to the phenomenon of wind.

Fan design

The wind turbines form a clearly limited area, but at the same time are arranged in such a fan-shaped way that they always appear one behind the other from particular visual perspectives, from jetties and piers at the seaside resorts or from prominent vantage points.

Both residents and tourists clearly distinguished between the designs shown: The fan design most often appealed to the interviewees. The standard planning 'non-'shape, developed according to conventional procedures, was the least preferred. Acceptance, however, increased when planning was based on promised higher energy yields.

An earlier study on the acceptance of offshore wind energy use in the North Sea and Baltic Sea also showed preferences for different conceptual designs based on spatial design and landscape-compatible arrangements. Both results confirm the positive influence of the landscape-fair arrangement and spatial design on the acceptance of wind farms and other infrastructure projects.

The clear design of OWP (formation of characteristic wind farm images as a visual structuring of the space, in contrast to the supposedly random distribution promulgated in the media and popularly known as 'asparagus planting') practised in neighbouring countries (Denmark, Sweden) could also lead to an improvement in acceptance in Germany. In addition to taking account of regional concerns, acceptance-promoting design principles are likely to be simple, recognizably ordered orientations.

Sören Schöbel-Rutschmann

Images: Offshore wind farm formations in windbelt and fan design. © Professorship of Landscape Architecture and Regional Open Space
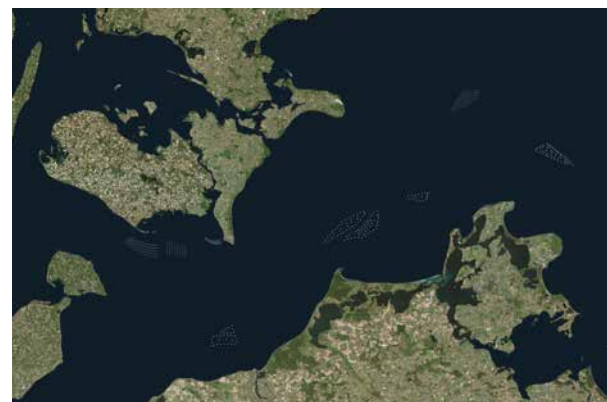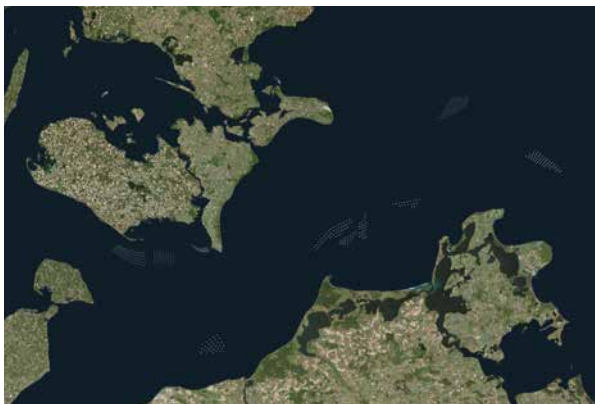
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Planning and building with living construction materials: Prof. Ferdinand Ludwig founded the research field of "Baubotanik" in 2007. In an Interview the architect and Professor for Landscape Architecture talks about the techniques he uses to get plants into the desired form and how living buildings improve our lives.

What excites you so much about using trees and other plants as construction materials?

As a rule a structure is a purely technical, precisely designed object. But a tree isn't conceived on the drawing board, it takes its shape primarily from environmental conditions. And there's no way to plan that exactly. A tree is never completed, it keeps on growing – until one day it dies. It's precisely this contrast that fascinates me. In Baubotanik we integrate plants in architecture. I started working on this dynamic in the very first semesters of my university studies. There are historical examples such as living bridges in India or the "Tanzlinde" dance linden trees in Germany: fascinating, artificially shaped trees with platforms used as a dance floor. That caught my attention, since these archaic architectural forms can be developed further and can thus offer solutions to the urgent issues we face today.

Are you thinking of climate change?

The idea is to better adapt to the impacts of climate change. Especially in cities, where a large portion of the ground is sealed with stone, concrete and asphalt. These materials heat up quickly when the temperatures

The approach of Baubotanic (living plant construction), a building method based on botanical principals, can only be successful if the botanical growth rules become fundamental rules of construction and design.

"Based on interdisciplinary collaborations my goal is to develop new concepts for green architecture."

Ferdinand Ludwig

rise, and people and animals in the cities suffer from heat stress. Plants have a cooling effect and provide for a better climate in the city. With Baubotanik it's not necessary to create extra space for plants, since they are integral components of the structures. Another aspect is the alienation of the human from nature: In the city people can still experience nature when for example they have the feeling that they are living in the treetops.

How do you go about planning a building that is partially made up of plants?

That's the exciting part. First you have to take a very precise look at the characteristics and requirements of the organism in order to be able to create plausible designs – even though a certain unpredictability is of course unavoidable. Here we call on the entire range of knowledge in botany, forestry and horticulture. For example, how large is the plant's growth potential and how can we control it? We also use certain technologies such as plant addition, in which the plants fuse in order to achieve the desired plant volumes faster.

Can you tell us some more about plant addition?

In projects such as the "Baubotanik Tower" or the "Plane Tree Cube Nagold" we joined several hundred young trees with one another in such a way that they merge into a single unit. Only the trees in the lowest level are planted in the ground, the rest of the trees are placed in special plant containers on several higher levels, supported by a temporary steel framework. The trunk of each respective tree is screwed together with a trunk on a higher level. Over time the bark and woody tissue fuse, resulting in a trunk structure resembling a timber-frame structure which is completely provided with nutrients from the roots of the lower trees. The steel framework is removed as soon as this structure has become stable enough to carry its own weight.

Is a building made of living plants safe?

Everything that is alive can die, so there's always some risk involved. But the closer the orientation of the architectonic concept to the natural growth patterns of the plants, the better. My goal is to improve research here at the Technical University of Munich into the growth patterns of plants, and also to develop new concepts and strategies for green architecture. Interdisciplinary collaboration is also essential here. This is evident for example in our current project Urban Micro Climate Canopy: We are letting climbing plants grow on a structure made of resin-impregnated bundles of fiberglass to create an artificial tree canopy three meters high. Here we're using computer-driven simulation methods for the design as well as robotics in constructing the framework. We've already exhibited the artificial tree canopy with great success at the Luminale in Frankfurt am Main. We will now set up the project on the test field on the campus in Weihenstephan.

Desk: Stefanie Reiffert

Prof. Ferdinand Ludwig is joining the trunks of two trees. (Both images: Uli Benz / TUM)

Transforming Alpine Industrial Landscapes

Landscape architecture research in 7 countries, with 10 project partners and 14 observers.

The project trAILs - Alpine Industrial Landscapes Transformation is founded within the EU-Interreg Alpine Space Programme (Priority 3 - Liveable Alpine Space, Specific objective 1 - Sustainably valorize Alpine Space cultural and natural heritage) with 2.187.400,30 Euro and will last until April 2021. More information, news and events can be found on the project website: https://www.alpine-space.eu/projects/trails

The decline of traditional heavy and manufacturing industry is occurring nowadays even in peripheral and less urbanized regions, such as the Alps. Here, in the so-called "green heart of Europe", this process is leaving behind impressive former productive landscapes of relevant size and complexity: Alpine Industrial Landscapes (AILs).

The potential value of AILs in terms of sustainable development is strongly connected to Alpine-wide ecological, economical and social key challenges, such as the regeneration/improvement of blue and green infrastructures, the reactivation/upgrade of regional economies and the promotion of local identity and cultural heritage.

However, at the present only few AILs have been reused and transformed for these purposes, mostly those located in proximity or within large Alpine cities and urban agglomerations, where good accessibility and a rather developed socio-economic environment have allowed so. The majority of AILs are indeed to be found in small municipalities and economically marginal contexts, burdened by financial, technical and planning limitations.

The project *trAILs - Alpine Industrial Landscapes Transformation*, initiated in 2017 by the Chair of Landscape Architecture and Industrial Landscapes of the Technical University of Munich and officially approved by the

Image: The team of the *trAILs* research group (Photo: Roberta Marchesi).

Overview of Eisenerz in the Münichtal.
(Photo © Bwag/Wikimedia)

Interreg Alpine Space Committee in April 2018, aims to generate significant knowledge about AILs and to develop and test sustainable transformation strategies applicabile and replicable in the whole Alpine space. To achieve these objectives, the project builds on a strongly multidisciplinary and transnational partnership combining proved expertise in the fields of landscape architecture and environmental sciences (Technical University of Munich, University of Ljubljana), spatial planning (Polytechnic University of Milan, Vienna University of Technology) and socio-economic sciences (University of Verona) with regional and local Alpine communities represented by regional development agencies in Austria (VESTE/Styria), Italy (LAMORO/ Piedmont), France (CAUE84/PACA) and Slovenia (BSC KRANJ/Gorenjska).

The foreseen activities are structured around four work packages. The first one (Map AILs) deals with the implementation of an AILs database starting from the data available in the project pilot regions and the subsequent development of an interactive GIS web-based platform to visualize the current situation across the whole Alpine Space. The second and third work packages (Assess AILs and TestAILs) are based on the project pilot sites (Eisenerz/AT, Borgo San Dalmazzo/IT, L'Argentière-la-Bessée/La-Roche-de-Rame/FR, Tržič/SLO) and focus respectively on the comprehensive and multi-criteria assessment of AILs actual conditions and the development of a test-design procedure for AILs transformation. Test-design, in particular, represents a core activity of the whole project, since will bring together project partners, regional stakeholders, experts and international observers in a participatory planning process taking place on-site through a workshop format of several days.

The last work package (Manage AILs) will transfer the generated knowledge to end-users through the establishment of an AILs knowledge exchange, information and decision support platform as well as the publication of a methodology handbook and a learning module for advisory and training activities.

With this approach, the project will support local and regional stakeholders in the complex process of sustainable AILs transformation, providing them with clear strategic planning tools for the future as well as with hands-on experiences. Several institutions have already expressed their interest in the project activities and outputs, and thus joined the project as observers. Among them,w the Regional Authorities of Bavaria, Lombardy, Piedmont, Auvergne Rhône-Alpes and Provence-Alpes-Côte d'Azur, the Slovenian Ministry of Spatial Planning and Environment, Alpine-wide organizations such as the Permanent Secretariat of the Alpine Convention and CIPRA International, and the universities of Graz, Zürich and Bergamo.

Udo Weilacher and Marcello Modica

Exhibition "CANALETTO —
Open Spaces Along the Nymphenburg-Biedersteiner Canal"
Chair of Landscape Architecture and Public Space, Prof. Regine Keller
and Guest Professor Silvia Benedito (GSD Harvard)

Supervising research associates: Tanja Gallenmüller,
Johann-Christian Hannemann, Felix Lüdicke

The aim of this Master's project is to capture the open space
characters of the Nymphenburg-Biedersteiner Canal in its entire extent
and to depict hidden structures and qualities. On this basis, guidelines
for further development are developed collectively. Using design
drafts and proposals for activation, a critical analysis of the urban
development, open space planning and ecological structure is carried
out. The inclusion of the interests of heritage protection and nature
conservation is of outstanding importance here. The various research
topics have been edited as part of the integrated discipline.
"CANALETTO" will be shown once again: from June 4-18, 2019
@ Department of Urban Planning and Building Regulations Munich

All images: Laura Loewel

Build Simply

Developing integral strategies for energy-efficient, simple building with wood, light-weight concrete and highly thermally insulating masonry.

"Build Simply" ("Einfach Bauen") is a research project under the direction of the Chair of Architectural Design and Construction in cooperation with four other chairs at the department. Over a period of two years, engineers and architects have sought to develop a new building culture of simplification.
More information on www.einfach-bauen.net

The complexity of construction and building technology has been increasing steadily for decades. This concerns the requirements for stability, heat, moisture, fire and sound insulation, hygiene and health as well as general user comfort. This is reflected in an almost unmanageable and increasing number of standards and building laws. The goal of quality assurance is often not achieved: The consequence of this complexity is a high error rate in planning and execution as well as excessive demands on building owners and users.

The aim of "Build Simply" is to mark the starting point of a new, opposing trend in construction and thus provide an important impetus for the German construction industry. The "Build Simply 1" research project, completed in October 2018, is part of the "Build Simply" overall project, which has three phases:

- Build Simply 1: Research into the principles of Build Simple.
- Build Simply 2: Practical application in three pilot buildings and development of a guide.
- Build Simply 3: Verification of the qualities by measurements during the use phase in order to understand the potential of Build Simple in concrete terms.

Build Simply 1
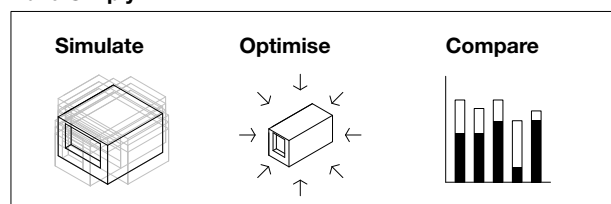
Build Simply 2
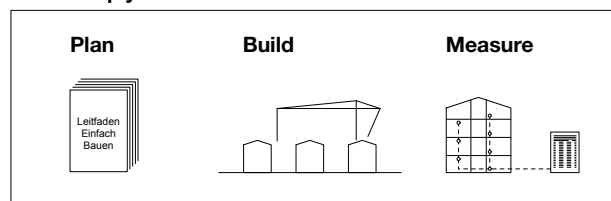
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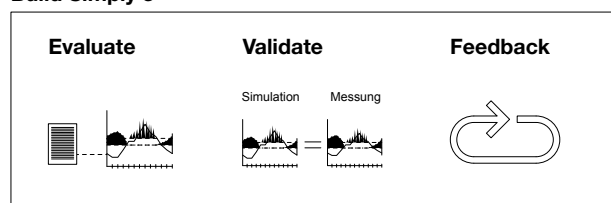
Image: Schematic diagram of Build Simply research projects 1, 2 and 3

| **Parameter study at room level** | **Investigation of robustness** | **Investigation at building level** |
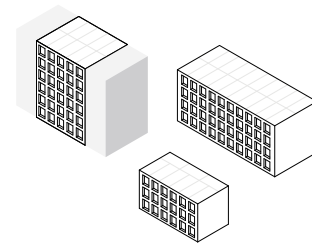
Image: Stages of work

The Build Simply 1 team examined the extent to which buildings with simple and robust construction as well as building technology can be constructed and how they compare in terms of environmental impact and life cycle costs - also in terms of user behaviour - with conventional residential buildings and low-energy residential buildings over a period of 100 years.

The starting point for the investigations were the highly developed construction materials solid wood, lightweight concrete and highly heat-insulating masonry as low-layer or monolithic wall structures. After extensive product and project research, the researchers developed optimised designs, spatial and technical concepts, as well as detailed solutions, and presented these in a comparative overview.

On the basis of these findings, they were able to design individual rooms and investigate their energy consumption. In the next phase, the results were added to schematic buildings and supplemented with building services systems. For this purpose, the research team determined the costs for construction and operation as well as the environmental impact.

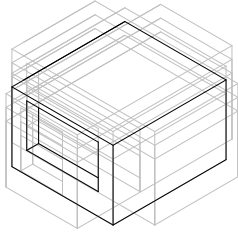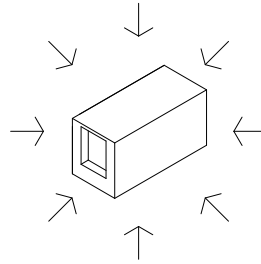It was found that room variants with a reduced proportion of envelopes, thermal storage masses and optimised window areas with a daylight ratio of 2% proved to be optimal with regard to low heating requirements and reduced overheating in summer. These successful room configurations were then used to investigate the robustness against unsafe boundary conditions.

Investigation of robustness

The aim of previous planning processes was to find the optimum solution for the task at hand. For example, a low-rise house achieves the best possible values in terms of heating requirements. However, there is often no consideration of the fact that the environmental parameters assumed to be ideal can change dramatically in reality. The team takes this assumption as the basis for the robustness analysis.

For comparison purposes, in addition to the three simple construction methods examined (masonry,

infralight concrete and solid wood), a room model in standard construction and in low-energy construction was also considered, resulting in a variant number of 128.

The investigation showed that the ventilation behaviour of the user has the greatest influence on the heating demand, both in negative and positive terms. In summer, the weather and internal gains are the factors that have the greatest influence on overheating. Overall, simple construction methods are more robust against the influence of the user than the parallel room models with standard and low-energy concepts.

Life cycle and cost analysis

For all room variants, the environmental impact, focused on the global warming potential GWP, and the life cycle costs were calculated and compared. The raw material extraction or production, the operating phase over a period of 100 years and also its disposal were examined.

It turned out that operation clearly dominates production in all variants, both in terms of global warming potential and operating costs. The more compact the design, the smaller the latter. The three Build Simply variants were roughly comparable to the standard and the low-energy house. If, however, the uncertainty in the boundary conditions is taken into account in addition to the static LCA and LCC characteristic values, Build Simply constructions have a significantly lower spread of the heating requirement and thus a more robust system than the more complex standard and low-energy buildings, which are more sensitive in terms of design and operation. This is not only evident in the heating demand, but also in the high demand heating hours, because these fluctuate in a narrower band in "Build Simply" and thus also show a higher robustness both against unforeseen user behaviour and against external influences (global warming), or non-functional subsystems.

Conclusions

Building is too complex to allow a simple formula for how to build "simply". Each construction project has specific boundary conditions that need to be considered

(e.g. available energy source, type and orientation of property, etc.). In "Build Simply 2" guidance should be given on how to design a simple house down to the last detail. Some considerations are generally valid:

The house

The simplicity of a building in terms of low maintenance and energy requirements starts with urban design. Urban designs, i.e. multi-storey and compact, save envelope space and thus energy both in construction and consumption. High density leads to efficiency and synergy in land consumption, development expenditure and traffic volume through construction and use.

The proportion of glass in the building should be moderate enough to create a balanced relationship between daylight penetration, solar penetration and heat loss. This means that additional solar shading or even energetically nonsensical solar shading glass can be dispensed with. Insulation of the building beyond the current standard hardly creates further energy savings in multi-storey, compact buildings and makes no ecological or economic sense.

The human being

Low-energy concepts usually rely on ventilation systems with heat recovery in order to reduce heat losses caused by the necessary fresh air supply to the living space. If these systems are understood and accepted by the residents, there is also a higher probability that the user will behave accordingly, e.g. using window ventilation. The investigations have shown how negative the effects of divergent usage behaviour can be on the energy balance during use. It seems sensible to invest efforts in educating the user and at the same time only use technical systems that are robust enough to achieve the desired results, even where the user behaves otherwise.

Time

Many buildings are preserved for a long time, even if this is rarely considered during the planning phase. In order to be able to use them in the long term, changes should be possible and therefore already considered in the planning process. Flexible floor plan structures enable changes in use. Durable surfaces guarantee the longevity of buildings. The separation of building services and building construction makes it easier to replace obsolete technical systems. As a matter of principle, it is important to ensure that the components can be joined together simply and easily using manual methods. Thus, it is not necessary to consult a specialist company for the renovation and repair of buildings. Even a skilled user can repair damage and replace components themselves - simply build!

Anne Niemann and Tilmann Jarmer

Image: Three façade models in thermal insulation masonry, solid wood and lightweight concrete construction (Photo: Tilmann Jarmer)

Building a Bhodi
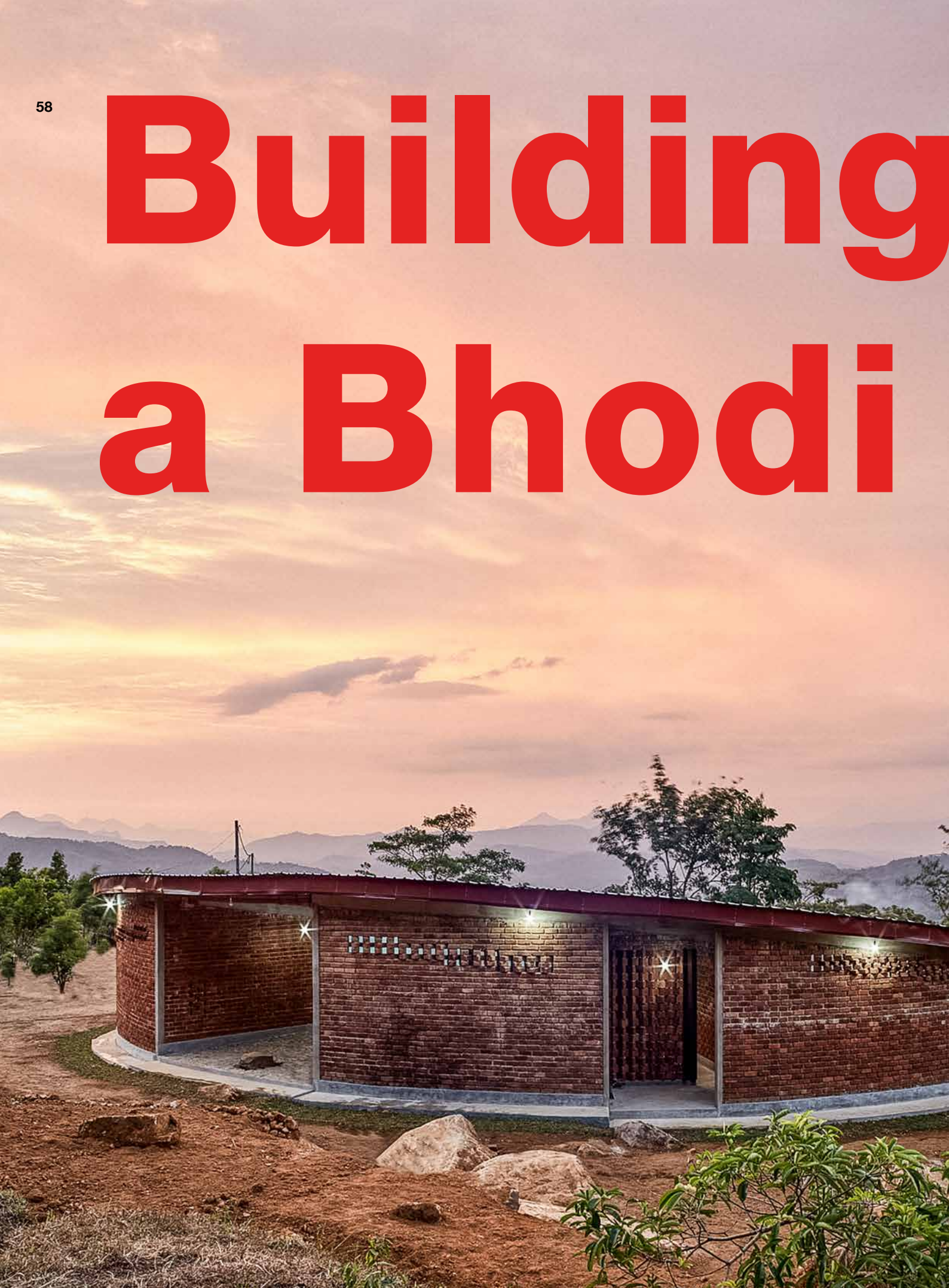
around tree

As a Buddhist monk you can either live a very enclosed life in the monastery by depending on food donations of the believers or you can dedicate your existence to social service to the community. Omalpe Sobitha Thero, the founder of the Sri Bodhiraja foundation, a monastery in the Southern inland of Sri Lanka, belongs to the second group. The foundation offers a school, a kindergarten, an old people's home and further community services for the people of the lowland area of Embilipitiya. One hour's drive to the north the landscape becomes hillier and paddies are replaced by tea estates. In this region the monks founded a meditation center above the small town of Rakwana. While getting to know the people and surroundings, the monks were asked for their help supporting the abandoned and abused children of Tamil tea pluckers who work on the tea estates. As the idea matured to build a children's home, a previously established contact to the TUM DesignBuild project was therefore reactivated.

Since the TUM DesignBuild program was founded in 2006, ten projects have been undertaken in sub-Saharan Africa, all financed by German NGOs. So this project was virgin territory on different levels: This was the first time operating in the Asian cultural area and also the first time a project had been financed by a local foundation

This fact made it much more special for the students in particular, who had to deal with a real client who would also finance the project rather than simply being the future user. This made for a much more involved experience, which was evident in relating costs to the approach to building and required many realignments and changes in the accompanying building process, planning and adaptation.

To understand these additional challenges it is worth taking a second look at the ideas of the TUM DesignBuild program. In the real-studio classes, TUM DesignBuild offers architecture students the opportunity

TUM DesignBuild project in Rakwana, Sri Lanka. Project supervisors: Matthias Kestel, Anne-Carina Völkl, Hubert Anesser, David Wolfertstetter, Elke Kirst. Particpating students: Jonas Aehling, Antonie von Bismarck-Osten, Max Blume, Anna Gehringer Tobias Grund, Felipe Imhoff, Daniel Kleber, Omar Mekati, Marion Montiel-Gabreba, Sarah Seitz, Franz Siebler, Tanja Sinzinger, Philip Lanthaler, Italia Cazar, Bianca Woisetschläger, Julian Bustamante, Jana Wunderlich, Nikola Schiemann, Melanie Schneider. (All images © Matthias Kestel)

"The goal […] is to nurture mature architects who are able to tackle global challenges with social responsibility and apply their community sense in future social engagement."

to design, plan and implement socially engaged projects while gathering practical experience over the course of one year under the supervision of the chair's team. Students from the TUM were able to come together with local students, trades and craftsmen in developing nations, and quickly construct the planned buildings under the guidance of experienced architects. The exchange of knowledge and experience between locals and students, as well as architecturally sophisticated constructions contribute to well-rounded projects. Research, prototyping, testing and implementing new constructions with familiar materials – as well as monitoring the projects afterwards to provide data and building manuals for the local communities' future building projects – is the aim of the studio.

The goal of the program is to nurture mature architects who are able to tackle global challenges with social responsibility and apply their community sense in future social engagement. High architectural standards, the recognition and development of indigenous construction methods, and the use of sustainable building materials are just as much a part of our ethos as our close co-operation with our partner NGOs and the local population. The involvement of the community in Rakwana by recruiting the neighboring people as construction workers promoted the acceptance of the project itself alongside the close collaboration with the monks. By enthusing the people for unusual and sustainable construction methods by re-awakening their traditional building knowledge, both sides benefited from the children's home project. During the first round of talks with the monks the preference for concrete echoed previous projects in Africa, as did the discussion of sustainable substitutes which followed.

But in contrast to the African projects, Sri Lanka offered its own architectural language beside from simple indigenous building and its colonial heritage, which made a huge difference. The renowned figurehead of this Sri Lankan architecture is Geoffrey Bawa. Bawa found a very sensitive and unique way of interweaving his buildings with the surrounding natural environment. So the students had the chance to refer to him as a role

model in terms of a mixture between vernacular and European classical and modernist building culture. Nevertheless, students had to go through an intensive research period with the main questions facing a culture they only knew from reading, a site they were not able to visit themselves, and materials with properties which had to be discovered during the process.

20 students proposed ten designs, which were merged into four remaining projects after three rounds of criticism, followed by another month until the final design was chosen for a construction preparation phase, which in turn lasted for another semester for a smaller group.

One of the principal reasons the jury chose the winning design was because of its ring shape, which combined the warm and protecting atmosphere of an inner courtyard with a very unique architectural expression on the outside. This kind of real world project sometimes raises much more elementary questions than expected; the change of the building site in the middle of the project brought new challenges for the chosen design and the student planning group.

Since religion has played a huge role in Sri Lankan history as well as in this design project, the ring-shaped building reacts to the slope of the new site with the possibility of providing a view from every place on the veranda around the inner courtyard on Adam´s Peak (a mountain which in Buddhist tradition is held to be the footprint of the Buddha), and optimally adapts to the change of the site.

Following Bawa, the circular shape needed to connect with the surroundings, so three areas interweave with the landscape, a washing area opens up to the west and allows an existing rock to break the outer circle, and on the southeast side an even bigger rock guides visitors into the inner courtyard. The third area is a more sheltered, where the Hindu gods find a place and the outlook is directed to a very Buddhist symbol – a Bodhi tree – so both religious groups can feel united in this room.

The holistic idea of the circle is also extended by not only integrating the remaining rocks into the building but by the choice of material. Coconut-palm wood as waste product from coconut farms is used for the roof, while the fired bricks come from a small family-run business, and the base is made of stones from the removed rocks on site.

Zooming out to a macro scale again, the whole design and building cycle can be conceived as an inclusive process, which made it possible to create an iconic building by bringing together different cultures, different religions, and many people, interwoven in a built structure and social interactions, which will be the foundation for further interactions. The monks would maybe consider it an omen that they found this Bodhi tree on site.

Matthias Kestel

Intervie

Prof. Hermann Kaufmann explains why he sees wood as the building material of the future

The Professorship of Architectural Design and Timber Constructionen remains unique in Europe. By establishing it, the university made a strong commitment to research and development in the field of timber construction.

Prof. Kaufmann is one of seven TUM professors involved in the TUM.wood project, which explores various aspects of wood. The aim of the project is to promote better utilization of wood as a material.

After years of relative neglect, timber construction is making a comeback. All over the world, architects are now using wood in designs of houses and even high-rise buildings. Hermann Kaufmann is professor for architectural design and timber construction at the TUM Department of Architecture. In this interview he explains why wood is an excellent choice as a climate-friendly material and how it can be used to build affordable housing.

Professor Kaufmann, what is behind this growth in timber construction?
Hermann Kaufmann: In view of climate change, renewable raw materials are becoming more important, and wood is seen as a very promising example. That's because timber construction can help us to address the issue of carbon emissions: Trees capture CO_2 from the atmosphere and bind it in the form of carbon in wood. By using that wood in construction, we create space for new forest growth. Building wooden houses can be seen, in a sense, as building a second forest or an extra carbon store in our villages and cities. Wood also replaces fossil fuel-based building materials. And finally, when a timber house reaches the end of its useful life, the material can either be repurposed or used in carbon-neutral energy production.

You were a big believer in wood even before sustainable construction attracted widespread interest. What is it about this material that you find so fascinating?
Wood is a natural material, and therefore has a strong appeal to the senses. It smells good, it's pleasant to touch, and has been familiar to people since time immemorial. Wood epitomizes warmth, comfort and a sense of well-being. Having grown up in a carpenter's family in Bregenzer Wald, the forested region near Lake Constance in Austria, I have always had a special relationship with wood. In the modern era, however, the main construction materials were steel, concrete and glass. People forgot about wood. When I was studying architecture, I realized that I wanted to help revive timber construction – through good architecture.

What does "good architecture" mean in the world of timber construction?
Using a renewable raw material doesn't make an architect exempt from the obligation to produce good designs – and for me that is a priority. Every material shapes the design through its inherent design principles – and good timber architecture follows the design principles of wood. Looking back,

Exterior shot IZM Ilwerke Zentrum
Montafon (Image © Bruno Klomfar)

W

I can say that architecturally interesting projects have done more than anything else to draw attention to timber construction. For example, there is the community center that I built around 20 years ago in Ludesch. It contains low-emission materials and has very low energy requirements – and is also a very successful design in architectural terms. The building has attracted many visitors and inspired a few other people to give timber construction a try.

Is a modern timber house different from a traditional one in Bregenzer Wald?
Yes and no. To keep houses warm in the Alps, they used to build them with layered beams – or, as we call them, "knitted" beams. Modern timber houses must meet higher energy standards. As a result, people often use thick, multi-layered insulation. This requires great care during construction and also poses environmental challenges in disposal, recycling and demolition. For those reasons I am currently seeing a revival of old construction principles, inspired by a desire to return to simpler ways of doing things.

Even if there are more and more timber houses, timber construction is not yet mainstream. Are timber houses a luxury for those who can afford it?
Today it is definitely possible to use timber for social housing, too. Standardization is simplifying the construction process more and more. By pre-fabricating components – in other words, by moving most of the construction work into factories – houses can also be built more quickly and at very high quality standards. What's more, construction time is much faster, and takes just one third or even one quarter as long as compared to conventional methods.

"Timber construction helps to address the issue of carbon emissions"

But timber buildings are still the exception …
Regrettably, timber construction is still subject to many preconceptions. One of them is that, because wood burns, it poses a safety risk. In response, I can only say: Yes, it's true that wood burns. But the choice of building material has no influence on the number of deaths in a fire. In a burning timber building, firefighters have plenty of warning that the structure is going to fail – which is not always the case with other materials. So wood burns "safely". You also hear people saying that wood doesn't last. But in the Alpine region, where there's plenty of wind and rain, you see 500 and 600-year-old farmhouses.

Do you think that timber construction can gain wide acceptance?
If we want to achieve climate-neutral construction in the future, we will be forced to adopt renewable raw materials. When deciding what to build and how to build it, we should therefore be applying solid, evidence-based information on the performance of materials.

Desk: Lisa Pietrzyk

New momentum for the Department's urban design

A new department member was welcomed in October 2018: Dr. Sc. Benedikt Boucsein was appointed professor for Urban Design. Boucsein worked for several years as an assistant at the ETH Zurich, received his doctorate with a thesis on "Grey Architecture" and is co-founder of the architecture magazine Camenzind published by the BHSF architectural office. Under his direction, the Chair of Urban Planning and Regional Planning, most recently held by Ordinaria Sophie Wolfrum, will be continued from the winter semester as Professor of Urban Design. In view of the current challenges, the professorship aims in particular at a more in-depth examination of the research question of how the urban developments of the last few decades and the social progress associated with them can be transformed into new paradigms while consuming substantially fewer resources. As the "Laboratory for the Everyday City", the professorship will also actively engage in a dialogue with society. In the tradition of the first chair holder Theodor Fischer and his successors, the professorship's curriculum will continue to be understood as a spatial discipline closely linked to architecture. The focus will be on the reconstruction of everyday urban quarters of the post-war period, negotiation processes of urban infrastructures (especially in the vicinity of airports) as well as pioneers of a sustainable urban lifestyle (with a focus on cooperatives). In addition, the interconnecting issue of the production conditions of architecture and urban design should broaden the thematic discourse.

Starting up with robot systems

2018 has been a successful year for numerous start-ups that evolved out of the TUM Department of Architecture. "Levaru" had been developed during a semester project at the chair of Building Realisation and Robotics. Students of Prof. Dr. Thomas Bock established an idea that has since become a highly successful start-up. It was founded by Julian Trummer (Architecture), Wolfram Meiner (Architecture), Hector Gartner (Mechanical Engineering), and Swagat Chopra (Electrical Engineering). Levaru saves time and money in the construction of elevators, and provides an increased level of quality and work security. A robot adjusts the initial elevator guide tracks with an accuracy of 0.2mm. In 2018 Levaru won the VDI Award for "Best Start-Up". However, Levaru is not the first business success to emerge from the "Advanced Construction and Building Technologies" master's program. The fruitful invention "Kewazo" was co-established by Leonidas Pozikidis and Artem Kuchukov, both TUM alumni

of the program. Kewazo's intelligent robot system significantly improves scaffolding construction and its processes. The robots move vertically and horizontally along the scaffolding, speeding up the mounting process, whilst saving up to 30% of the costs. Kewazo received the Department's Franz-Berberich-Prize which aims to promote outstanding research work of a project-related character among young researchers. Built campus meeting point

Constructed campus meeting point

A year ago, the INSIDE/OUT pavilion was set up on the main campus inner courtyard at the Technical University of Munich. The experimental pavilion displays a new method of constructing freely designed shapes by means of very simple and affordable processes. It is the first architectural structure that utilizes the geometric potential of so-called asymptotic curves to construct a gridshell from elastically bent lamellas. Eike Schling is research associate at the Chair of Structural Design and planned the construction as part of his completed doctoral thesis "Repetitive Structures" with assistance from Denis Hitrec and Jonas Schikore, and under the supervision of Prof. Dr. Rainer Barthel. The newly developed design method is based on asymptotic curves on a minimal surface. This has three decisive advantages. The curves have zero normal curvature and can be fabricated as straight and flat lamellas. They always intersect at 90 degrees and can thus be constructed with identical joints. Finally, the slender lamellas are positioned upright within the grid and can thus carry loads via their strong axis. The construction process is simple: The lamellas are cut straight and flat, and can be easily packed and transported. They are slotted together

Jacques Herzog and Pierre de Meuron
(Image: Matthias Kestel / TUM)

by hand into flat segments. Once all the joins are fixed, these segments are elastically bent into the desired geometry. By fixing every node to 90 degrees, this shape is retained. The pavilion was constructed from nine of these segments, which were combined on site, like a large 3D puzzle. By adding edge profiles, supports and bracing, this structure becomes an efficient, load-bearing gridshell. The minimal surface is designed to adapt to the complex outlines of the inner campus' green building site during summer and has become a popular spot for a photo opportunity, as well as a meeting point and place to relax.

The INSIDE\OUT Pavilion at the main TUM campus was completed in October 2017. (Photo: Martin Ley)

"Pioneers of individuality"

Outstanding achievements in architecture and urban planning as well as in international teaching and research – on October 16, 2018, Jacques Herzog and Pierre de Meuron, both famous Swiss architects, received an honorary doctorate from the Technical University of Munich (TUM). At the Vorhoelzer Forum at the Department of Architecture, TUM Vice President Prof. Juliane Winkelmann presented them with the certificatestes. The Allianz Arena in Munich, the Elbphilharmonie in Hamburg, the National Stadium in Beijing, the conversion of the Tate Gallery in London and many other famous architectural projects were designed by Jacques Herzog, Pierre de Meuron and their team. Shortly after obtaining their diplomas at ETH Zurich in 1978, they founded the now renowned architecture firm Herzog & de Meuron in Switzerland. The buildings which have been implemented since then have been noticed by a broad audience far beyond architectural experts. Dietrich Fink, Professor for Urban Architecture at the TUM, said in his laudation to around 150 invited guests at the Vorhoelzer Forum that the buildings had a special charisma. For decades, the projects of Jacques Herzog and Pierre de Meuron had influenced architects and students. "We honor you as pioneers of individuality, as visionaries with an unmistakable intuition for the themes of the future, and as seducers whose primary interest lies in the richness and complexity of the phenomena of this world", Prof. Fink continued in his laudation. "The Department of Architecture at the Technical University of Munich is pleased and to award you with the honorary doctorate."

Interaction between humans and the built environment

Tobias Wagner

On the 10th anniversary of the highly successful postgraduate Master's Program in ClimaDesign at the Department of Architecture, a symposium on "Recent and New Approaches to the Interaction between Humans and the Built Environment" was held in the Vorhoelzer Forum in December 2018. Selected speakers addressed key future challenges related to the built environment, among them Professor Thomas Auer, Professor Gerhard Hausladen and Professor Thomas Herzog. The occasion also marked the official initiation of the collaboration between the Department of Digital Architecture and Planning (Professor Michael Hensel) at TU Vienna and the Chair of Building Technology and Climate Responsive Design at TUM.

The perfect blend for disruption

Fostering architectural entrepreneurship and architectural design thinking by interdisciplinary workshops at the TUM Department of Architecture.

PROJECT BACKGROUND

- the workshops are part of the 3-year Erasmus+ Strategic Partnership "Strengthening Architecture and the Built Environment Research" (SABRE)

- the BauHow5 alliance is a partnership of five leading European research intense universities in architecture and the built environment (UCL, TU Delft, Chalmers, ETHZ, TU Munich)

- SABRE is co-funded by the Erasmus+ programme of the European Union

With rising complexity in industries, markets and societies, management disciplines have started to look at the design-led professions to improve their innovation capabilities, and learn from the alternative and non-linear thinking of designers. While the field of industrial design and software engineering has successfully implemented their approach of design thinking in different industries, architecture has not yet leveraged its potential, though it has been at the forefront of design thinking for the past century.

In cooperation with the BauHow5 Alliance and an Erasmus+ Grant on Strengthening Architecture and Built Environment Research (SABRE), the Department's Architecture Research Incubator (ARI) addressed the potential of architectural thinking by testing creativity and innovation methods in interdisciplinary workshops. Design Sprints, Hackathons, Business Games, Makathons and Design Thinking Labs are used in practice across industries to foster ideas and develop new products, services, processes and business models. The underlying hypothesis while conducting some of these formats at TUM was that architects can positively impact innovation methods and operate effectively in modes of collaboration and co-creation. It also allowed us to prove the usefulness and applicability of various formats, and to link challenges from the creative industries, consulting, project development, manufacturing and local authorities to architectural education and research. Architects have a specific way of thinking and a skill-set which constitutes a perfect blend for thinking the new. By not doing what a client wants, by embracing complexity and being single-minded in realizing a vision architects create what ought to be, not what has been market-tested or expected. As Denys Lasdun or Jean-Philipp Vassal point out, architects look behind the task given, and seek for the deeper problem to solve. They work under contradictory constraints and withstand uncertainty till the end of a project. These characteristics and skills are similarly described in management as core to innovators, disruptors and entrepreneurs. To test and evaluate the hypothesis mentioned, and to integrate architectural students and their specific skill-sets in other settings, three activities were planned.

The first activity was developed with the architectural practice Allmann Sattler Wappner and furniture manufacturer Vitra. In a five-day **Design Sprint** 35 students worked in 6 groups on the topic of "The Circular University" and how circularity can be thought beyond the physical in terms of knowledge sharing and social participation.

"[...] architects can positively impact innovation methods and operate effectively in modes of collaboration and co-creation."

The results ranged from solutions for a new waste collection systems, a communal circularity center, to a virtual knowledge platform connecting students at the university.

The second workshop took shape as **Creative Business Game**, where mixed teams of architectural and management students worked on "Start-Up Architecture" and how digitization may lead to new business models or disruptions in the AEC industry. The 2-day event was supported by international architectural practices of HPP Architekten, AECOM Design&Consulting and AllesWirdGut, which posed a challenge for 6 teams to solve. Developing an intelligent file management system for design details or rethinking architectural offices as nomadic incubators were two of the outcomes.

In the third event, an enterprise design thinking method was applied to envision futures of work. With the theme of "Workspaces for DigitalYou", 6 interdiscicplinary teams from architecture, engineering and management worked for three days in a **Design Thinking Lab** on concepts at the interface of analog and digital environments. To gain a holistic understanding, the topic was viewed from a business, IT, and a spatial perspective, supported by The Boston Consulting Group, IBM Watson IoT and UCL. The students presented workplace devices, ethically & empathy driven AI and digitally augmented spaces for meetings.

The evaluation of all activities revealed a strong interest and positive acceptance by students and involved partners. It also showed, that an architectural approach to design thinking can create new meanings within the built environment. How to live, work, move, produce and consume is increasingly becoming a matter of design, and architects are well-suited to change and disrupt other markets beyond building design. The workshops were intended to encourage the entrepreneurial mindset of architectural students and raise the consciousness of their capabilities.

For 2019, an Urban Design Lab on Re-defining Community is planned as well as the development of an independent format which corresponds more to the specific skills of architects and connects the architectural design thinking approach directly to other industries.

Christos Chantzaras

Open Studio Day 2018

Image: Visitors at the Chair of Urban Design and Housing (Photo: Andreas Heddergott / TUM)

Electric heating could save CO$_2$ emissions

Using building stock as an intelligent component in the energy transformation.

PROJECT BACKGROUND

- Project lead: Chair of Building Technology and Climate Responsive Design

- Funded by the Research Initiative "Zukunft Bau" of the Federal Institute for Building, Urban and Regional Research. Additional support by numerous partners in industry.

- The study expands on the results of a project, published in 2014 by Prof. Auer's predecessor, Gerhard Hausladen (now professor emeritus).

The dependence of renewable energy generation on the time of day and the seasons is one of the biggest challenges for the transition to a sustainable energy model. A new study by a scientist at TUM Department of Architecture and his team proposes a way to even out the peaks and troughs: Surplus output could be used for heating and cooling purposes.

The German government has set a target of generating 80 percent of the country's electric power with renewable sources by 2050. However, renewable energy generation depends on natural sources and therefore it is difficult to control. Consequently, experts have been working for years on ways to store surplus power or adjust consumption to generation. Potential intelligent components in future energy systems could be buildings. This would also make a carbon-neutral building stock a more realistic possibility.

That is the conclusion reached by Thomas Auer, Professor for Building Technology and Climate Responsive Design. He worked with Prof. Thomas Hamacher and Prof. Ulrich Wagner from the TUM Department of Electrical and Computer Engineering to develop a simulation tool to link the electric power and building sectors.

Toughest challenge: The building stock

"Everyone keeps looking for ways to save energy in new buildings. The talk is all about zero energy buildings – but new buildings are not our biggest problem," says Prof. Auer. "The major part of our building stock dates back to the time before 1980 – in other words, it predates the German ordinance on thermal insulation. We can't remedy the overall situation with a few new buildings here and there." Auer shows how existing buildings can be used intelligently to help bring about the energy transformation. And he is not referring to energy retrofits, which are often difficult to implement.

Building as load management buffers

Auer proposes linking the operation of buildings more closely to the electric power network to balance out the fluctuating supply from renewable sources. In the winter there is more wind – and therefore more wind energy – than in the summer. This could be used to supply heat by means of heat pumps. At present, most heating in Germany depends on fossil fuels, specifically oil and gas.

PUBLICATIONS ON THE TOPIC

Auer, T; Hamacher, T.; Wagner, U.; Atabay, D.; de-Borja-Torrejón, M.; Dornmair, R.; Kuhn, P.; Maderspacher, J.; Sänger, F.; Laenge, J.; Finkbeiner, J.-L.: Gebäude als intelligenter Baustein im Energiesystem. Lastmanagement-Potenziale von Gebäuden im Kontext der zukünftigen Energieversorgungsstruktur in Deutschland. Im Endbericht der Forschungsinitiative Zukunft Bau, Technische Universität München, 2017, p. 85.
The report is available online.

Sänger, F.; Atabay, D.; de Borja Torrejón, M.; Dornmair, R.; Maderspacher, J.: Demand Side Management potential of buildings. 6th Colloquium of the Munich School of Engineering. In: New Concepts in Energy Science and Engineering. Munich School of Engineering, Garching, 2016, p. 10.
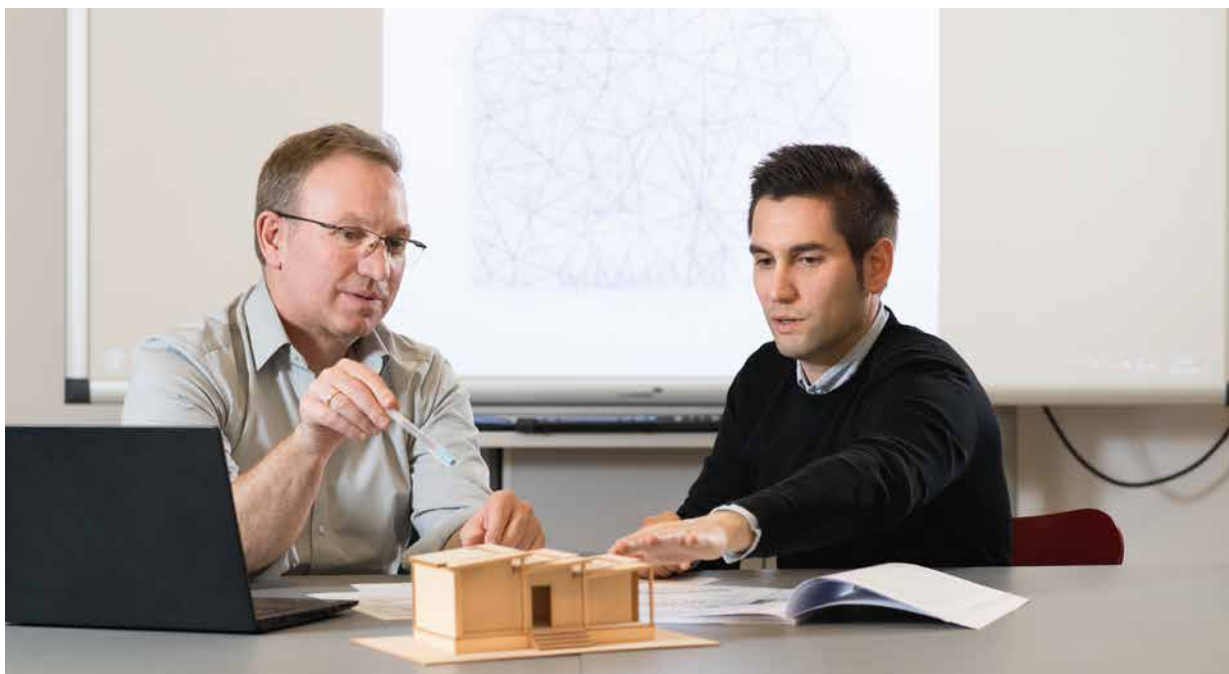
The excess power generated by solar cells in the summer months could help to cool buildings – a function that will become more important through the effects of climate change, says Prof. Auer. "We need to adjust the setpoint temperature of rooms to the peak generation in the power network. That would turn the building stock into a sort of buffer for load management – in other words a means of managing power consumption." This way, huge power loads could be shifted towards the building stock in a very short period of time.

A comprehensive simulation tool
In the simulation, the team of researchers linked a model of Germany's overall energy supply system to a detailed model of the building stock. The energy supply model incorporates various development scenarios for renewable energy sources up to 2050. The building stock model is able to represent up to 75 percent of the current energy demand for heating in Germany and takes into account several building types and energy efficiency classes. For example, the energy consumption of an office building differs from that of a one-family home. In addition, this model permits the study of scenarios based on the different possible upgrade decisions and energy technologies used in buildings. Auer calculates the electric power consumed within one hour – known as the load profile.

The combined simulation shows that under this approach, a carbon-neutral building sector would be possible by 2050 – although the use of electricity to operate buildings could almost double peak power demand during a cold period with lack of wind and sun. This would require an upgrade of the power infrastructure.

Desk: Lisa Pietrzyk

With the model of Prof. Thomas Auer (l.) and Manuel de-Borja-Torrejón (r.) different scenarios of retrofit decisions and plant engineering can be investigated. (Image: A. Eckert / TUM)

Digital Computational Tools for Urban Planning: A Case Study

Supporting political decision-making processes, city planning and public participation with new implements.

Urban Strategy Playground (USP) is a research project at the Chair of Architectural Informatics in collaboration with GEWOFAG and the Palais Mai architectural office.

Cities and metropolitan regions in Germany are experiencing an increase in immigration. This has increasingly problematic repercussions on the housing market. The situation in Munich is a good example of this. In order to meet the challenges and avoid uncontrolled growth, sound methods and strategies are needed to analyse the potential of existing buildings and to derive strategies for redensification, taking into account both overarching urban issues and factors influencing the local neighbourhood context.

In the Urban Strategy Playground (USP) research project, the Chair of Architectural Informatics is developing digital planning tools for this application context. On the basis of various analyses and simulations, the tools will support planners in developing strategies, evaluating them and visually preparing them for political decision-making processes and public participation. The aim is to evaluate and compare possible planning measures on the basis of objective criteria.

In recent years, a number of tools have already been designed and prototypically implemented. Examples are the simulation of construction rules such as distance areas, automatic calculation of key figures for structural density and vegetation provision, simulation of shading, building

Fig. 1: Creation of an abstract space, showing the maximum possible area to be built on under the assumption of certain building code settings.

Fig. 2: Design variant with analysis of the existing tree population. (Both figures show fictional buildings and no real design variants created within the project.)

energy and noise dispersion. To visualize the planning results, interfaces for the 3D printing of the city models, as well as web viewers and a connection to augmented reality terminals were realized.

The focus now is to take the USP tools out of the research context and test them in actual practice. As part of this, at the beginning of 2018 there was a collaboration with GEWOFAG and the Palais Mai architectural office. The starting point was a post-compaction study for several residential complexes. In the first phase of the project, an evaluation was carried out as to which tools of the existing USP software prototypes are already suitable for use, which functions are to be modified or additionally implemented during the course of the project.

For this purpose, the post-compaction variants developed by the architects for the first residential complex were mapped with the USP software and evaluated using the existing analysis methods. By comparing the key figures calculated by the architectural office with the results of the calculation and analysis methods already implemented in the USP software, and by coordinating the interpretation of the underlying rules (e.g. distance control), the first step was to create a common starting point.

The parameters essential for the planning process were then determined: In joint meetings, an analysis of

the architectural firm's design rationale made it possible to evaluate the criteria relevant to the development of post-compaction strategies. The main factors identified were building regulations, existing trees, parking facilities and the overall technical infrastructure (e.g. location of main water and power lines).

Based on the identified parameters, new tools were implemented for the further progress of the project:

Presentation of the maximum volumes: The most important criterion for structural consolidation is usually building regulations. Here, the given distance areas act as a limiting factor. The approach to developing a tool in this area was to generate an abstract volume which, assuming certain framework conditions (e.g. distance factor, minimum distances, fire walls), represents the given building regulation in spatial terms. For the results of the analysis different representation forms were developed (as volume or as base area with assumed building height)

Analysis of the existing trees: In the discussion of strategies for structural compaction, the tree population proved to be a relevant factor. Here, a tool was developed with which the effects of post-compaction strategies on the existing tree stock can be estimated. The excavations necessary for new buildings are calculated under the assumption of an angle of slope and the trees to be felled are represented.

Presentation of technical infrastructure and car park supply: Various additional information levels were stored in the city model. The aim was to enable access to essential objects in addition to the buildings, if required. Specifically, the plans for the electricity and water supply as well as existing parking spaces were stored in the model. By intersecting the objects with possible new buildings, information could be given on whether, in a compression scenario, e.g. main lines would have to be laid or how many additional parking spaces would have to be realised under the assumption of a specific parking space key.

In conclusion, it was possible to demonstrate the fundamental potential of digital tools for the development of post-compaction strategies. The newly implemented tools and the principles developed in the USP provide a basis for decision-making and rationale. The aim was to evaluate and compare planning variants on the basis of objective criteria. Certain monitoring steps could be automated in order to evaluate decisions and identify non-obvious risks.

In addition to avoiding errors, the implemented tools have shown potential ways of making planning steps more efficient. Through the direct visualization of intermediate results and the possibility of retrieving required information as required, they serve as a basis for communication in the planning process.

Nils Seifert

Project "Artists' Colony - At the Salzbrücke"
Chair of Building Construction and Material Science
Prof. Florian Musso

Due to the high rents, areas suitable for the production of art are expensive in Munich. The lack of cheap rental space makes it difficult for subcultures and scenes to emerge. Within the framework of an artists' colony, the city of Munich would like to create a breeding ground for progress in art and culture, where artists can rent studios and living space for a limited period of time. The task of the students was to accommodate as many horizontally addable units as possible on an area of 145x65m for settlement with individual studio and workshop facilities.

Images left page above: Student group "Kolonie 4"; below left: Final Presentation; below right: Student group "8Fäustefür1Halleluja".
Image right page: All design models of the project.
All Images © Chair of Building Construction and Material Science
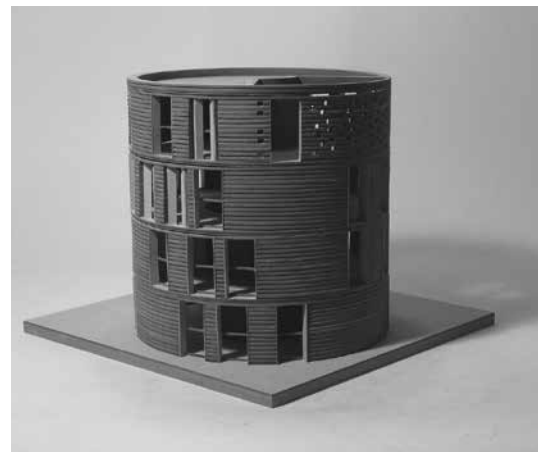
How technology turned into architecture

What is a gasholder and how was it conversed into a building-type of its own?

Research associate Barbara Berger came across gasholders on her Erasmus exchange in Venice and got fascinated by the derelict, rising structures, that led her to investigate this uncommon and underestimated architecture. In order to create a wider understanding and framework on the whole development of the gasholder, whose roots are based on technology, she wrote an all-encompassing encyclopedia. The following report provides summarizing insights.

Gas Lighting

Before the rising structures of gasholders changed the cityscapes, it was gaslight that was revolutionizing the daily life in the cities at the beginning of the 19th century: In 1813 public illumination from gas was introduced for the very first time in the London district of Westminster (UK). This new lighting technology revolutionized cities worldwide – 1819 in Paris (FR), 1825 in Hannover (DE), and 1838 in Turin (IT).

Thus, the gasholder was introduced as an industrial building for the storage of locally produced coal gas. Its iron structure presented a new kind of industrial architecture and became symbolic of the gas industry (Fig. 1).
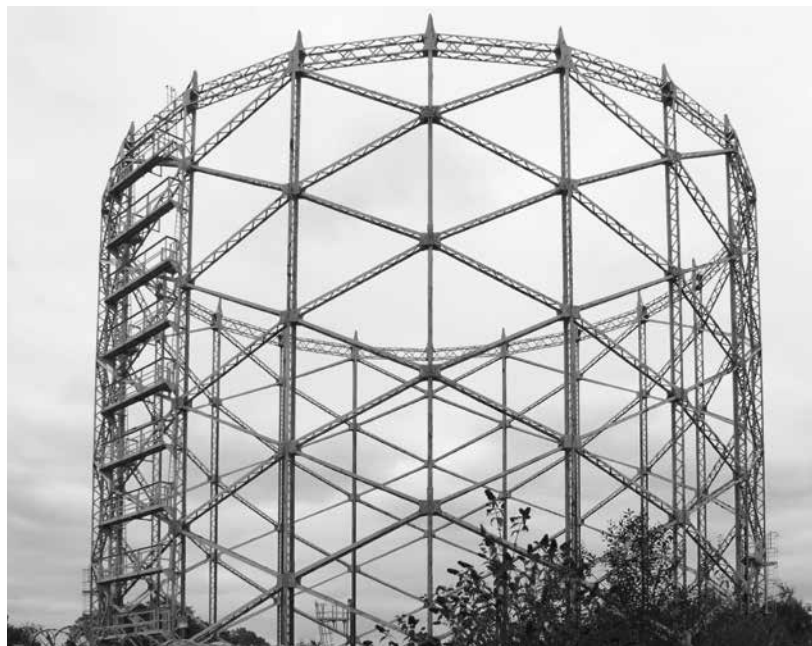

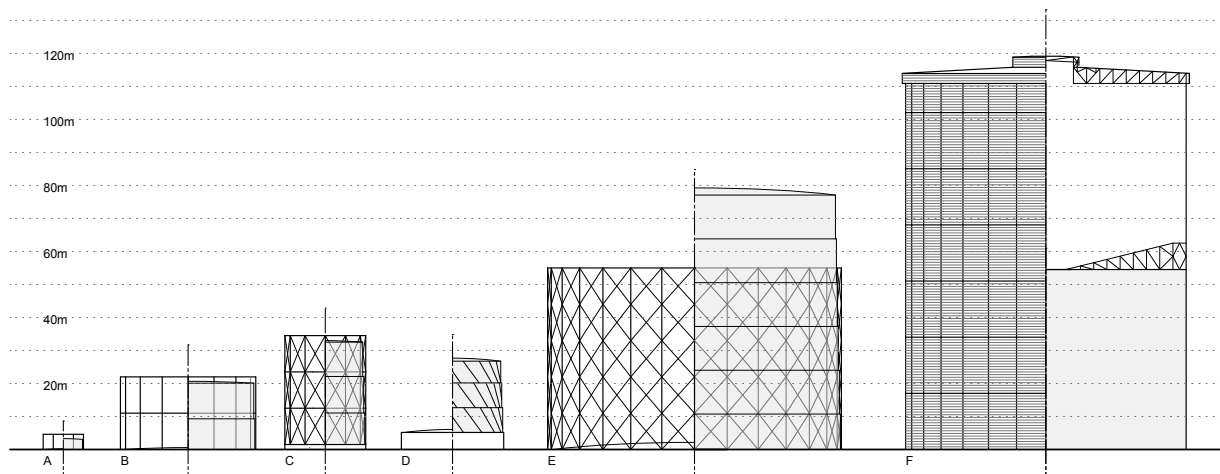Fig. 1: Gasholder in Hornsey, London - 2015

Fig. 2: Development of the gasholders

Form and Function

The gasholder`s structure was determined by its function in that it had to fulfil two basic requirements: First a variable capacity, secondly a gas tight construction.

A water-based system met both requirements. It was composed of two primary elements: a water tank and a closed vessel for the gas. The latter was immersed into the tank and rose and fell according to the current content of the gas. If the lift wasn't visible at all, the gasholder was empty. But if it reached the top, it was obviously full. Thus the lift was a kind of gauge of the current gas content. An external guide frame guaranteed the reliable movement of the lift and had prepositioned guide rails on each column or standard, on which the lifts` rollers ran up and down. Because of the increasing demand for gas, receptacles with more storage were needed. In the 19th and early 20th centuries, there were generally two different kinds of water sealed gasholders: Bell-type gasholder (or single-lift gasholder), Telescope-type gasholder (or multi-lift gasholder).

Initially, the lifts of both types were linear, guided via an external guide frame (Fig. 2 - A, B, C, E) and served primarily to light main squares and streets of the cities. Because of the increasing demand for gas in the second half of the 19th century, gasholders with more storage capacity were required.

British gas-engineers, who were the pioneers in this field, developed large-scale multi-lift gasholders with wide spanned crowns and high rising guide frames, which became important land-marks in cities (Fig. 2 - E, F).

In order to reduce building time and costs of guide frames, Sir George Thomas Livesey – a well-known gas engineer from London – invented the so called flying lift in 1887. The upper lifts were literally able to fly over the edge of the guide frame and did not require the support of a guide frame (Fig. 2 - E).

Based upon this technique, the first entire frameless system was patented 1887 by William Gadd and William F. Mason*: The spiral-guided gasholder (Fig. 2 - D)

was composed only of lifts and a tank. The guide rails were fixed diagonally on the sides of the lifts and gave them a screw-like movement. So the gasholder almost vanished when empty or all the lifts rested in the tank. Another special form was the so-called gasholder house, which completely hid the filigree iron structure of the gasholder; the façade was often architecturally ornate.

Over the century, the development advanced from the water-sealed to the waterless or dry-sealed system: The piston-type gasholder (Fig. 2 - E) was invented in 1913 in Germany by Matthias Jagschitz, an engineer at MAN, Gustavsburg. The new sealing technique was adapted along the edge of the piston and guaranteed a gas-tight contact between the piston and the shell of the cylinder. This new sealing technique led to a new appearance and form of the gasholder.

Reuse

The arrival of natural gas was the beginning of the decline of coal gas and historic gasholders because the increasing demand on gas required new storage systems – thus new types of gasholders.

Today, historic gasholders are industrial relics, although many of them have been demolished. The remaining examples are often abandoned and their architectural value not realized: A gasholder facilitates a column-free, tall, symmetrical space, that offers a wide range of possible reuse projects, as various examples show: The gasholder-triplet at King`s Cross, London or the Asisi-Panometers in Dresden, Leipzig and Pforzheim.

Summary

The gasholder is a unique building type that owes its structure to the sealing technique, the inventive engineers, craftsmen and the advancing iron technology in the 19th century. Next to their meaning and history the remaining gasholders should be considered as architectural conversion projects rather than candidates for demolition.

<div align="right">Barbara Berger</div>

Adaptive & Additive

Nature as inspiration for developing new building envelopes.

Work on the polyvalent implications of building envelopes has been gradually developed and expanded at the TUM Department of Architecture over the last years.
At the centre of teaching and research at the Professorship of Architectural Design and Building Envelopes is the analysis of the multiple concepts of façade design. Interdisciplinary study and research, geared to the development of innovative components for building envelopes, are fundamental to the work undertaken here.

Sun and noise screening, ventilation, insulation: The façade of a building fulfils important functions in addition to representation. It mediates between the urban or rural context and our recreational spaces. Philipp Lionel Molter and Moritz Mungenast from the Chair of Design and Building Envelopes now aim to produce building envelopes more simply, quickly and sustainably – with the help of 3D printing and intelligent façade elements, and taking nature as a role model.

At the moment, heating and cooling buildings consumes 40 percent of the world's energy. Generously glazed high-rise buildings consume a great deal of energy for heating and cooling. Although they offer a lot of natural daylight, regulating heavily glazed high-rise buildings requires a high level of technological complexity to maintain building services. Philipp Lionel Molter and Moritz Mungenast are both working on low-tech solutions and use two different approaches to show what the façades of the future might look like.

"Our approach is fundamentally different from all previous concepts: For decades, air conditioning in glazed office and administration buildings has become increasingly complex. We, by contrast, are developing low-tech solutions that are also very efficient," reports academic advisor Dr. Philipp Lionel Molter. Molter focuses his research on human skin. In collaboration with the façade manufacturer FRENER & REIFER, he has developed a self-regulating window that opens and closes autoreactively with no electrical motor.

Double-glazed windows have long been common in the glass façades of high-rise buildings. Until now, however, the problem has been that in summer too much heat accumulates between the panes and the room warms up. This is why Molter has developed Ventflex technology, which allows a pane of double glazing to be opened and the accumulated warm air to escape. It connects the double glazing panes with so-called paraffin-filled thermal cylinders, which are already being used successfully in greenhouses. When the temperature between the panes reaches more than 23 degrees, the wax-oil mixture in the cylinders expands and pushes them apart telescopically. This opens the outer window pane by up to five centimeters. When the temperature drops again, the cylinder contracts and the window closes. This simple physical reaction eliminates the need for electronic sensors to measure the temperature between the panes.

While Molter is optimizing existing methods, Moritz Mungenast is designing a completely new type of façade. Inspired by the wave movements of the sea, he uses 3D printing to produce a multifunctional, translucent, stable and cost-effective façade element that will subsequently lay like a cloth within the building. "3D printing gives us unprecedented design opportunities. We can use this freedom to integrate functions such as ventilation, shading and air conditioning. This eliminates the need for the expensive sensors, control programs and motors that were previously required," he explains.

The three different wave sizes are not only responsible for the title of the "Fluid Morphology" research project, but also fulfil different functions in the façade. So-called macrowaves exist, which emerge as wave crests and whose size can be adapted to the desired properties of the façade. Meso waves are used for sun protection and shade the façade in summer, while in winter they let in the light because the sun is lower. The micro-waves provide sound insulation and good acoustics.

In addition, thanks to the free design of the additive manufacturing process, ventilation systems can be integrated into the façade. Vertically recessed trachea tubes ensure air exchange from the interior to the exterior. The longer the tube, i.e. the wider the façade, the warmer the interior becomes. At the same time, cells embedded in the interior insulate the façade. "You have to imagine it as a termite structure. In warm weather we need short ducts, so we want a quick exchange of air. During the transition period or in winter we want longer ducts to maintain this pre-temperature. And you would then be able to control a regulator on the inside that the user can operate," says Mungenast.

Both research projects are so far at the conceptual level and are being tested on the roof of the TU Munich to check their robustness and function. Previous simulations carried out at the TUM Chair of Building Technology and Climate-friendly Construction show that Philip Lionel Molter's new low-tech concept is extremely efficient: Compared with modern façades, up to 50 percent of the energy required for heating and cooling can be saved.

2019 will also show whether Moritz Mungenast's concept is viable. He sees future application potential initially in specialized buildings such as museums, libraries, shopping centers or meeting rooms: "Specific solutions are particularly in demand here, and it doesn't matter that the 3D printer's plastic façades are not completely transparent like glass panes, but translucent. Translucent light creates a very special and attractive atmosphere."

A first promising success is already imminent: the innovative façade is to cover the temporary entrance to the Deutsches Museum during its refurbishment.

Translucent building facades produced by 3D printer at the Professorship of Architectural Design and Building Envelope, Technical University of Munich.
(Image: Andreas Heddergott / TUM).

Building heritage in construction

Andreas Putz, Europa Frohwein

In the field of construction, recent building heritage is of great interest. A testimony to the emergence of the present, the built legacy is characterized not only by its materiality, design, and usage, but by the traces of changes and adjustments made over time. Continuing a story already commenced, building heritage conservation seeks not to recover of identities, but to conserve the significant features which mark built remnants as historic documents and sources worthy of further study and discussion. It is in the little differences – the discrepancies, inconsistencies, shortcomings – that we find the questions that enable us to think architecture anew. Challenges arise from the shoddiness of non-durable modern building materials and prefabricated ele-ments, which prohibit sustainable repair and replacement. These range from the ever-increasing significance of building installations and technical infrastructures, which demand new concepts of prolonged performance and continuous use, to the processes of ongoing rebuilding and maintenance under changing constraints, not least because of new technical standards, protocols, or regulatory demands. Appointed as TT Assistant Professor for Recent Building Heritage Conservation in 2018, Prof. Dr. Andreas Putz's practical experience as an architect is in the adaptive re-use and restoration of 20th century building heritage.

The seminar "Ghostbuster" at the Professorship of Recent Building Heritage Conservation gave an overview of topical questions and the objects of building conservation. Image: Siemens high-rise building.
(Photo: Europa Frohwein)

Symposium on "Sustainable Development in Africa"

Barbara Schudok

Over 450 participants of scientific institutions, representatives of African consulates, Bavarian ministries of state and an engaged public contributed to the symposium "Sustainable Development in Africa" organised by the TUM Emeriti of Excellence in cooperation with the TUM School of Governance on the occasion of TUM's 150th anniversary. The Department of Architecture was represented by Professor Francis Kéré (keynote speaker) who captivated the audience with his lecture about his home-continent Africa. The potential role Africa can assume in the world now and in the future was clear. The sensitive approach inherent in his architectural and social projects and the art of actively involving the community impressed the public and provoked a lively discussion. Afterwards, the presentations of TUM's collaborative projects with various universities in Africa showcased the successful partnerships already in progress, for instance with KNUST: the new TUM partner university of in Kumasi, Ghana. The numerous participants received a wealth of information about TUM's current African projects during the lectures and the accompanying exhibition. Many visitors joined in as the renowned participants at the round table discussion addressed the challenges of "Governance and Education in Africa". The informative and productive symposium broadened perceptions of the African continent and its potential to redefine the global order in the future.

As part of her work as a visiting professor at the TUM of the Sto Foundation, Mikala Holme Samsøe is heading the Master's project "Conceptual design of a grammar school in Munich based on Scandinavian models" at the Chair for Spatial Art and Lighting Design in the winter semester 2018/19. The questions "How can architecture promote learning processes?" and "How do we communicate and convey architectural ideas?" are just as important as the examination of the material, the contextual analysis of the environment as well as aesthetic and sustainable decision-making processes.

Image: Francis Kéré as key note speaker at the TUM.Africa Symposium

View north — from the Scandinavian perspective

A new educational initiative at the department focuses on social trends and pioneering teaching content as well as applied research and design practice with a Scandinavian perspective. The programme was initiated and financed by the Sto Foundation, which for the first time directly supports teaching in Germany. The contract for the programme entitled "The Changing Shape of Architectural Practice: View North" was ceremonially signed in spring 2018 – in the presence of Prof. Peter Cheret, Member of the Board of Trustees for Architecture, Uwe Koos, Chairman of the Board of Trustees, Till Stahlbusch, Member of the Board of Trustees, and Dean Professor Andreas Hild. The guest professorship programme will run for a period of two years until 2020. Guest lecturers from Nordic architecture offices and universities will introduce students and lecturers at the TUM Department of Architecture to Scandinavian approaches to theory and practice. Professor Michael U. Hensel and Defne Sunguroğlu from the AHO - Oslo School of Architecture and Design, Norway, he Danish architect Mikala Holme Samsøe and Kasper Guldager Jensen (Senior Partner 3XN) have already been appointed.

Connecting digital talents and the construction industry

Sandro Pfoh, Christian Philippen

The Project Platform Energy (PPE), a joint initiative of Bavarian Construction Industry Association and the Institute of Energy Efficient and Sustainable Design and Building (Prof. Werner Lang), acts as facilitator between industry and TUM researchers. The Digital Future of the Construction Industry trend seminar in cooperation with the Center for Digital Technology and Management (CDTM) analyses the digital future of buildings and how they are built. The CDTM students showcased how digitization will affect medium-sized construction enterprises and developed five potential start-up ideas ranging from "Siri" for the construction site to BIM lenses to connect the digital planning world with builders. The PPE will facilitate the development of a prototype in early 2019, thereby strengthening the connection between the construction industry and talents at TUM. Further information on www.ppe.tum.de

Statements on gender equality

The Women's Representatives at the TUM Department of Architecture provide advice and assistance for women students, members of staff and professors and assist the department in implementing the state's gender equality policies. They organize events on aspects of the profession specific to women. Each semester they award a lectureship on "Gender Studies in Architecture" and a lectureship on "Questions of Science and Society in Architecture and Urbanism", open to women and men alike.

How important is the task of the Women's Representatives in an architecture school — how important in our TUM Department of Architecture?

The importance of equality work for architecture departments is clearly shown by the disproportion of female students to female architects in professional life. In architecture studies, the numbers of students are evenly balanced, with a slight predominance of female students. This makes it all the clearer that the few women who are in the foreground in professional life - in architectural practice as well as in academics - continue to make architecture characterised by the cult of the master architect, patriarchal structures and gender-related networks. These conditions can slow down women's careers. Leading positions in architectural offices as well as professorships are largely held by men. In the same way, the time-consuming forms of study and work in architecture remain problematic for any form of family life or simultaneous professional activity as well as motherhood or fatherhood. The question of why this is so must be asked again and again.

The mandate for change is not limited to the institution of the Department of Architecture, but must be extended to the job description and the culture of work and cooperation. Here in particular it is important to address the prevailing conditions, and mindsets, to promote new role models, to make them visible and to make them a self-evident part of teaching. What seems to me to be very important in our department is - especially in the claim that the TUM makes to be excellent, with "top performance in research and teaching" - to actively advocate gender equality. This should be one of the main tasks of the department.
Some of the issues raised here can also be easily addressed. For example, it would be easy to raise the profile of female architects in the department and in teaching by appointing female professors and by inviting women for lectures and critical appraisals.

However, the figures alone do not change the institutional culture, nor the culture of work and cooperation; it does not dissolve the gender-concentrated structures of the institutions, including our department, nor the professional field. In this respect, I would also like to encourage you to question the teaching formats - especially critical appraisals of design projects - with regard to the institutionalisation of role models.

What concrete goals can be defined as a consequence of these circumstances? And what has been achieved so far and how?

One goal is clearly to contribute to the implementation of the Equal Opportunities Act in cooperation with the committees and the department management. In concrete terms, this means that the current number of female professors must be significantly increased.
Equality work is more than committee work, but above all it means sensitising people to and pointing out the everyday balance of power and authority in relation to the distribution of knowledge, funds and visibility. A longer-term goal is to expand the department to include a professorship that brings precisely this perspective to social power structures, especially in architecture, as a starting point and focus of teaching.

In 2018, the Parity Jour Fixe was introduced, which is currently organised by the Women's Representatives, serves as a platform for discussions on parity at the Department of Architecture and aims to promote a fair, diverse and inclusive working and research culture. The EDI-Initiative (Equality, Diversity & Inclusion), founded at the end of 2017 within the BauHow5 network in Munich, successfully held its first of three planned workshops on "Building Diversity" in Delft in 2018. Best practice lectures by representatives of international universities led to intensive discussions and exchanges on aspects of equal rights at schools of architecture.

What is on the agenda for this year?

In 2019, we want to raise the profile of the equal treatment project in everyday study and work life and involve all members of the department in the discussion. We started the year with a New Year's networking meeting of the women at the institution.
Two further EDI initiative workshops of the BauHow5 network will be held, in which members of our department will participate. We would like to host the workshop planned for 2020 at our TUM Department of Architecture; for which we would be responsible for the conception and organisation.

The Parity Jour Fixe will be continued and some commission work for upcoming replacements will be undertaken.
There are also several ideas for integrating aspects of gender parity into teaching of architecture in order to convey more diverse and perhaps new roles and models for architectural work. These will be promoted in 2019.

Women's Representatives:

Doris Hallama

Anna Partenheimer

Sandra Schuster

Stefanie Seeholzer

Maria Heinrich

Amelie Pretsch

Selection of Publications & Articles

Alaily-Mattar, Nadia: Repositioning Cities through star architecture. Metrópolis del futuro, 2018

Alaily-Mattar, Nadia: The circulation of news and images: Star architecture and its media effects. Star Architektur, internationale Architektur- und Planungsfirmen und die urbane Transformation der Europäischen Städte (II), 2018

Alaily-Mattar, Nadia; Bartmanski, Dominik; Dreher, Johannes; Koch, Michael; Löw, Martina; Pape, Timothy; Thierstein, Alain: Situating architectural performance: 'star architecture' and its roles in repositioning the cities of Graz, Lucerne and Wolfsburg. European Planning Studies 26 (9), 2018, 1874-1900

Alaily-Mattar, Nadia; Dreher, Johannes; Thierstein, Alain: Repositioning cities through star architecture: how does it work? Journal of Urban Design 23 (2), 2018, 169-192

Alaily-Mattar, Nadia; Dreher, Johannes; Wenner, Fabian; Thierstein, Alain: Public real estate development projects and urban transformation: the case of flagship projects. In: Heurkens, Erwin; Peiser, Richard; Squires, Graham (Ed.): Companion to Real Estate Development. Routledge, 2018, 43-55

Alaily-Mattar, Nadia; Gilliard, Lukas; Thierstein, Alain; Nitsche, Philipp: München Nord: Stadtzentrum 3.0 einer polyzentrischen Stadtlandschaft. Technische Universität München, 2018

Alaily-Mattar, Nadia; Thierstein, Alain: Urban transformations through exceptional architecture: introduction to the special issue. Journal of Urban Design 23 (2), 2018, 165-168

Alumni-Club Landschaft TUM e.V. (Ed.): nodium#10 – Menschen Pflanzen Attraktionen. Technische Universität München Fakultät für Architektur, 2018

Bentlage, Michael: Applying the method of reflections to interlocking firm networks of the knowledge economy in Germany. , Winter Seminar der Gesellschaft für Regionalforschung, 2018

Bratoev, Ivan; Schubert, Gerhard; Chokhachian, Ata; Petzold, Frank; Auer, Thomas: Interactive Solar Potential Simulation for Early Stage Urban Planning. BAUSIM 2018, 2018

Busen, Tobias: Baugeschichte Bauforschung Denkmalpflege – an der Technischen Universität München 1868-2018. TUM INSIGHTS. TUM.University Press, 2018

Deubzer, Hannelore; Mueller, Bettina-Maria; Pfab, Peter (Ed.): hej! – the scandinavian approach. dänemark & schweden. Technische Universität München, Fakultät für Architektur, 2018

Dietz, Birgit (Ed.): Demenzsensible Architektur. Planen und Gestalten für alle Sinne. Fraunhofer IRB, 2018

Ehrhardt, Denise; Michaeli, Mark; Seeholzer, Stefanie; Colandrea, Efisio: Next Step Trostberg – Abschlussbericht und Projektkatalog. , TU München (Ed.): Lehrstuhl für Nachhaltige Entwicklung von Stadt und Land; Michaeli, Mark; Ehrhardt, Denise; Seeholzer, Stefanie; Colandrea, Efisio: TU München in Kooperation mit Stadt Trostberg, Eigenverlag (München) 2018

Erben, Dietrich; Zervosen, Tobias (Ed.): Das eigene Leben als ästhetische Fiktion Autobiographie und Professionsgeschichte. transcript, 2018

Fink, Dietrich: Das urbane Wohnhochhaus. Immobilienwirtschaft Bayern (2), 2018, 24-26

Geier, Sonja: Analysemodell für das vorgefertigte Bauen mit Holz – Lösungsansatz zur Einschätzung und zum Umgang mit Komplexität. Argumentarium – Entwicklung – Anwendung. Dissertation, 2018

Gilliard, Lukas; Wenner, Fabian; Biran Belahuski, Gal; Nagl, Elisabeth; Rodewald, Anna; Schmid, Fabian; Stechele, Maximilian; Zettl, Michael; Bentlage, Michael; Thierstein, Alain: Using Boundary Objects to Make Students

Brokers Across Disciplines. A Dialogue Between Students and Their Lecturers on Bertolini's Node-Place-Model and Interdisciplinarity. Transactions of AESOP 2 (1), 2018, 81-90

Graff, Uta: In Material gedacht / Thinking Through Material. Detail, 2018.
The theme of the book is the materiality of architecture in the design process. At what stage(s) in the architectural design process does the issue of materiality arise? What role do the context and its particular conditions play? Does typology have an effect on the material formulation of buildings? What relevance does function have for the choice of a material? Is the duration of materials taken into account in the design? And can light be understood as material? These and other questions characterize the process of designing buildings for craftsmen. The models and drawings of the designs are interspersed with contributions by the architects Andreas Bründler, Piero Bruno and Thomas Kröger and are as readable in connection with the dialogues as they are independent of them.

Grüner, Lena S.: Ein Papiertapetenfragment der Manufaktur Dufour. Zur Rekonstruktion eines verlorenen Dekorationsensembles von Schloss Kirchberg an der Jagst. Württembergisch-Franken. Jahrbuch 101, 2018

Grüner, Lena S.: Schloss Kirchberg an der Jagst - ein „fester" Witwensitz? Burgenforschung - Europäisches Correspondenzblatt für interdisziplinäre Castellologie, Marburger Arbeitskreis für Europäische Burgenforschung e.V., Esslingen, Germany: 2018

Güttler, Jörg; Bittner, Andreas; Langosch, Katharina; Bock, Thomas; Mitsukure, Yasue: Development of an affordable and easy☐to☐install fall detection system. IEEJ Transactions on Electrical and Electronic Engineering (13), 2018, 664-670

Güttler, Jörg; Langosch, Katharina; Bock, Thomas: Current concepts for technology allowing independent and active living for elderly people. Proceedings of the XXVIIITH International conference Research for Furniture Industry, 2018, 143-149

Haase, Tina: Orbitum – Künstlerische Reflexionen über die Forschungsplaneten der TUM. TUM University Press, 2018

Haase, Tina: Wie nimmt eine künstlerische Arbeit Platz? In: Herrmann, Wolfgang A. (Ed.): Bauten und Kunst, Technische Universität München 1868–2018. Technische Universität München, 2018

Hannemann, Johann-Christian: Draußen. Out There. Ausstellung im Architekturmuseum der TU München. nodium. Zeitschrift des Alumni-Clubs Landschaft der TU München (10), 2018, 90-91

Hannemann, Johann-Christian: Gefährliche Landschaften. Garten+Landschaft (2), 2018, 8

Häupl, Nadja: Baukultur: Fokus Land. TU München (Ed.): Lehrstuhl für Nachhaltige Entwicklung von Stadt und Land; Michaeli, Mark: Bayerisches Staatsministerium Ernährung, Landwirtschaft und Forsten, Amt für ländliche Entwicklung BZA, Eigenverlag (München), 2018

Herrmann, Wolfgang A.; Meissner, Irene (Hg.): Bauten+Kunst – Technische Universität München 1868. TUM University Press, 2018.
Buildings + Art is the first comprehensive and opulently illustrated overview of the building history of the Technical University Munich. Following the description of the construction developments of each individual location, selected examples of buildings for teaching and research will be highlighted. Among them a nuclear reactor, a brewery and a clinic chapel. Works in excess of 200 artists are part of these structures, many of whom were created by professors of Munich's architecture department. Numerous new photographs and drawings display an impressing panorama of a lively construction and scientific history, emphazising for the first time the art found at the university.

Herrmann, Wolfgang A.; Nerdinger, Winfried (Ed.): Die Technische Hochschule München im Nationalsozialismus. TUM University Press, 2018

Heß, Regine, Architecture and its Actors in Postwar Society: Practice, Public, Ethos. 2018

Hild, Andreas; Müsseler, Andreas (Ed.): Neuperlach ist schön. Franz Schiermeier Verlag , 2018

Hoffmann, Sophie Charlotte; Michaeli, Mark: Ohne gesundes Land keine vibrierenden Städte. Gespräch zur Rolle des Umlandes für das Stadtwachstum. Garten und Landschaft. Magazin für Landschaftsarchitektur, 2018, 32-25

Ihde, André; Middleton, Wilfrid; Ludwig, Ferdinand: Growing bridges. In: Hortitecture - The power of architecture and plants. jovis Verlag, 2018, 176 - 183

Jenney, Sarah; Mühlhaus, Michael; Seifert, Nils; Petzold, Frank; Wiethoff, Alexander: Escaping Flatlands - Interdisciplinary Collaborative Prototyping Solutions to Current Architectural Topics. eCAADe, 2018
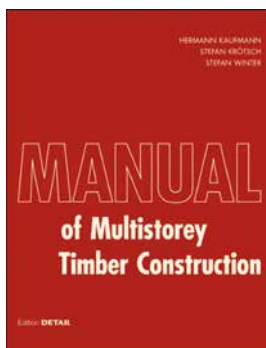
Kaufmann, Hermann; Krötsch, Stefan; Winter, Stefan (Ed.): Manual of Multistorey Timber Construction. DETAIL, 2018.
Wood is suitable for use in multistorey building construction with barely any restrictions. This is new and requires creative rethinking of tried and tested practices in wood construction: classical categories can be replaced by mixed construction methods as necessary within a project, which yields completely new possibilities in designing wood structures. The Manual provides architects, engineers and wood specialists with the essential expertise on the new systematics and construction methodology, from the design to prefabrication to the implementation on site. It lays the grounds for mutual understanding among everyone involved in the project, to facilitate the necessary cooperation in the integral planning and construction process.

Keller, Regine ; Lüdicke, Felix ; Hannemann, Johann-Christian (Ed.): URBEEN: ein Bienenfeld an der Ludwigstraße – Dokumentation zum „studio1zu1" ; Winter- und Sommersemester 2017/18. (1. Aufl. . Aufl.), 2018
Kilian, Martin; Wang, Hui; Schling, Eike; Schikore, Jonas; Pottmann, Helmut: Curved Support Structures and Meshes with Spherical Vertex Stars. 2018

Leonhartsberger, Roman; Michaeli, Mark: Potato Plan Collection. In: Züger, Mirjam; Christiaanse, Kees (Ed.): Munich Potato Plan. nai 010 publishers, 2018, 144-148

Lepik, Andres; Bäumler, Katrin (Ed.): Königsschlösser und Fabriken – Ludwig II. und die Architektur. Birkhäuser Verlag, 2018.
Ludwig II of Bavaria (r. 1864-86) is more internationally known for his royal palaces than hardly any other regent of the nineteenth century. They are the symbol of a personal architectural vision which, to this day, fascinates people from all over the world. However, the fame of his palaces has eclipsed other construction activities in the Kingdom of Bavaria: urban development, hospitals, schools, theaters and museums, but also factories, railway stations, apartment blocks, churches, and synagogues were created under his regency. This book, for the first time, sheds light on the comprehensive range of architecture in this epoch. Essays and overview illustrations of the building types of the times provide insights into the diversity of the then building culture and, at the same time, open up a new perspective on the royal palaces.

Linner, Thomas; Pan, Mi; Pan, Wen; Taghavi, Meysam; Pan, Wei; Bock, Thomas: Identification of Usage Scenarios for Robotic Exoskeletons in the Context of the Hong Kong Construction Industry. Proceedings of the 35th International Symposium on Automation and Robotics in Construction (ISARC), International Association for Automation and Robotics in Construction (IAARC), 2018, 40-47

Ludwig, Ferdinand: Licht in unseren Städten von morgen. luxlumina (23), 2018, 46 - 47

Ludwig, Ferdinand; Schönle, Daniel: Baubotanik - Vorwärts zu neuen Wurzeln. polis, 2018, 34 - 37

Ludwig, Ferdinand; Schönle, Daniel: Growth as a concept. In: Hortitecture - The power of architecture and plants. jovis Verlag, 2018, 64 - 71

Ludwig, Ferdinand; Vees, Ute; Zintl, Isabel; Boigner, Lorenz (Ed.): ParkHaus Garching – Prozessuale Entwürfe zu neuen hybriden Typologien. Technische Universität München, Fakultät für Architektur, 2018

Ludwig, Ferdinand; Zintl, Isabel: Vertikale Freiräume - Chancen für die dritte Dimension in der Landschaftsarchitektur. Stadt + Grün, 2018

Michaeli, Mark: Bauten und Kunst: Technische Universität München 1868-2018. In: Herrmann, Wolfgang A.; Technische Universität München (Ed.): Campus Garching: Universität wird Stadt. TUM University Press, 2018, 204-215

Michaeli, Mark: Das Dorf braucht Baukultur. Garten und Landschaft. Magazin für Landschaftarchitektur, 2018, 35

Michaeli, Mark: Die Stadt des Zusammenlebens. News from the City. Abschlussveröffentlichung zum Kolleg Europa 2017/18 der Studienstiftung des Deutschen Volkes, DAAD, Alfred-Töpfer-Stiftung, 2018, 2

Michaeli, Mark: Getting in Touch - Wie beobachtet man Stadt. News from the City. Abschlussveröffentlichung zum Kolleg Europa 2017/18 der Studienstiftung des Deutschen Volkes, DAAD, Alfred-Töpfer-Stiftung, 2018, 9

Middleton, Wilfrid; Ludwig, Ferdinand: Growing bridges. In: Hortitecture - The power of architecture and plants. jovis Verlag, 2018, 176 - 183

Molter, Philipp Lionel, Tillmann Klein: Autoreaktive Fassadenbelüftung - Mit Low-tech gegen den Treibhauseffekt. Deutsche BauZeitschrift DBZ Energie Spezial (03/2018), 2018, 102

Molter, Philipp Lionel: Einfache Technologien für mehr Nutzerkomfort. Deutsches Ingenieurblatt DIB (4-2018), 2018, 22

Mühlhaus, Michael; Jenney, Sarah; Petzold, Frank: TAKE A LOOK THROUGH MY EYES: AN AUGMENTED REALITY PLANNING COMMUNICATION SYSTEM, 2018

Mühlmann, Andrea: Findbuch Archiv Gottfried Hansjakob und Anton Hansjakob – am Architekturmuseum der Technischen Universität München. Lehrstuhl für Landschaftsarchitektur und öffentlichen Raum (1. Aufl.), 2018

Nandavar, Aniruth; Petzold, Frank; Nassif, Jimmy; Schubert, Gerhard: Interactive virtual reality tool for bim based on ifc: Development of OpenBIM and Game Engine Based Layout Planning Tool - A Novel Concept to Integrate BIM and VR with Bi-Directional Data Exchange. In: Fukuda, Tomohiro; Huang, Weixin; Janssen, Patrick; Crolla; Kristof; Alhadidi, Suleiman (Ed.): LEARNING, PROTOTYPING AND ADAPTING. , 2018, 453-462

Planphase – Issue No 7 – Learning from. Technische Universität München, 2018

Restrepo Montoya, Omar Alejandro: Concrete Home – Betonfertigteile als Weg, die Effizienz in Entwurf und Konstruktion sozialer Wohnbauprojekte in Antioquia zu verbessern. Dissertation, 2018

Schling, Eike: Design and Construction of Curved Support Structures with Repetitive Parameters. Advances in Architectural Geometry 2018, Gothenburg, Sweden: 2018

Schling, Eike: Repetitive Structures – Design and construction of curved support structures with repetitive parameters. Dissertation, 2018

Schüller, Katharina; Förster, Agnes; Thierstein, Alain; Ottmann, Matthias: Gamification, Prognosemärkte, Wikis & Co: Neues Wissen für die Stadt? Experimenteller Wohnungs- und Städtebau (ExWoSt). Bundesinstitut für Bau-, Stadt- und Raumforschung, 2018

Seifert, Nils; Petzold, Frank: Architects & Algorithms - Developing Interactive Visualizations for Architectural Communication. eCAADe, 2018

Stopper, Jochen Marc: FLUIDGLAS - Flüssigkeitsdurchströmte Fassadenelemente – Anwendbarkeit von flüssigkeitsdurchströmten, transparenten Fassadenelementen zur Kontrolle der Energietransmission von Gebäuden in der Gebäudehülle. Dissertation, 2018

Taghavi, Meysam; Heredia, Homero; Iturralde, Kepa; Halvorsen, Håvard; Bock, Thomas: Development of a Modular End Effector for the installation of Curtain Walls with cable-robots. Journal of Facade Design and Engineering, Vol 6 No 2: ICAE2018 Special Issue 6 (2), 2018, 001-008

Thierstein, Alain: Das Kind mit dem Bade ausschütten? Arch+ 231, 2018, 108-109

Thierstein, Alain: The Connected and Multiscalar City: Porosity in the Twenty-first Century. In: Wolfrum, Sophie; Stengel, Heiner; Kurbasik, Norbert; Kling, Norbert; Dona, Sofia; Mumm, Imke; Zöhrer, Christian (Ed.): Porous City, From Metaphor to Urban Agenda. Birkhäuser, 2018, 222-225

Tutsch, Joram; Rehm, Jörg: Die Vierungskuppel von St. Ursula in München. 2018

Weilacher, Udo et. al.: Lehrstuhl für Landschaftsarchitektur und industrielle Landschaft, Prof. Dr. Udo Weilacher (Ed.): Inspiration High Line – Comments of international experts on James Corner's popular project in New York City. Technische Universität München (1.Auflage. Aufl.), 2018

Weilacher, Udo: Porosity as a structural principle of urban landscapes. In: Wolfrum, Sophie (Ed.): Porous City. From Metaphor to Urban Agenda. Birkhäuser, 2018, 230-234

Weilacher, Udo: The larger world, which we usually call a landscape. Udo Weilacher interviews landscape historian John Dixon Hunt. nodium. Zeitschrift des Alumni-Clubs Landschaft der TU München (10), 2018, 4-9

Weilacher, Udo; Hopstock, Lars: Stabilizing landscape structures for living urban spaces/ Stabilizzare le strutture del paesaggio per abitare gli spazi urbani. In: Fondazione Benetton Studi Ricerche-Antiga Edizioni (Ed.): Prati urbani. I prati collettivi nel paesaggio della città/ City meadows Community fields in urban landscapes. Fondazione Benetton Studi Ricerche, 2018, 77-101

Wenner, Fabian: Brain Train or Brain Drain? The role of High-Speed Rail accessibility for knowledge-intensive firms and regional development. mobil.TUM 2018, 2018

Wenner, Fabian: Sustainable urban development and land value taxation: The case of Estonia. Land Use Policy 77, 2018

Wenner, Fabian; Thiel, Fabian: Land taxation in Estonia: An efficient instrument of land policy for land scarcity, equity, and ecology. In: Gerber, Jean-David; Hartmann, Thomas; Hengstermann, Andreas (Ed.): Instruments of Land Policy. Dealing with Scarcity of Land. Routledge, 2018, 78-88

Wischnewski, Stefan; Stadt Burghausen (Ed.): No Look Pass. Edition Metzel, 2018.

For years, the Munich sculptor Stefan Wischnewski has been preoccupied with net mesh material based on plastic, borrowed from ball sports. The rhombic, seamless knotting of the meshes is set as a movement index relating to the room in an object-like, installative manner, in each case engulfing a highly specified volume. Almost playfully, geometry and materiality of the settings lead into an intermediate state of seemingly accessible reverie, quite analogically happening in the room. The latest work series consistently deals with questioning this so far used borderline characteristic of the material. [...] Although the increasing vagueness of the initial structure, together with the gestural manner of the paint layers, suggest a painter's attitude, the work process in its own right is determinedly sculptural [...]. (Max Weisthoff)

Yordanova Mariana; Ludwig, Ferdinand; Deubzer, Hannelore; Hausladen, Gerhard: Fassadenbeleuchtung und Vertical Farming aus einer Lichtquelle? Licht, 2018, 60 - 63
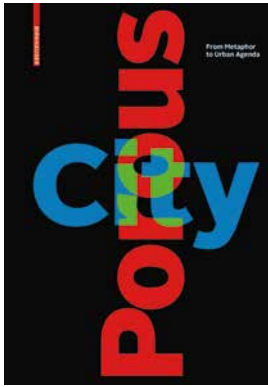
Wolfrum, Sophie (Hg.) : Porous City From Metaphor to Urban Agenda. Birkhäuser Verlag, 2018.

Some time ago, Walter Benjamin and Asja Lacis used the term "porosity" with reference to Naples' urban characteristics – spaces merging into each other and providing the backdrop for the unforeseen – improvisation as a way of life. Today, the term "porosity" in this context is increasingly used conceptually. Well-known authors from the worlds of architecture, town planning, and landscape design embark on a search for new concepts for a life-enhancing, user-friendly city – with reference to this enigmatic term. The term refers to the overlaying and interweaving of spaces and structures, to urban textures and their architectural properties and qualities – to cities with radically mixed urban functions.

Yordanova, Mariana; Ludwig, Ferdinand; Deubzer, Hannelore: Lichtzukunft in den Städten: Agricultural Lighting Facade. luxlumina (23), 2018, 48 - 51

Zahedi, Ata; Petzold, Frank: Seamless integration of simulation and analysis in early design phases. Proceedings of the Sixth International Symposium on Life-Cycle Civil Engineering (IALCCE 2018), 2018

Zahedi, Ata; Petzold, Frank: Utilization of Simulation Tools in Early Design Phases Through Adaptive Detailing Strategies. LEARNING, PROTOTYPING AND ADAPTING, 2018

Zintl, Isabel; Ludwig, Ferdinand; Wahlers, Simon: Freiraum vertikal Denken - Neue Perspektiven durch Vertikale Freiräume. Technische Universität München Fakultät für Architektur, 2018

Thinking about verticality - A change of perspective expands space and opens up for new points of view. This change also enables a new way of thinking about the future of urban open spaces. Because if we expand horizontal open spaces into verticality, we find new and inspiring perspectives. Considering urgent social problems and climatic challenges worldwide, these new approaches are more necessary than ever: How do we want to live together in the city of the future? We need to find new answers - especially spatial ones.

Thierstein, Alain: The Connected and Multiscalar City: Porosity in the Twenty-first Century. In: Wolfrum, Sophie; Stengel, Heiner; Kurbasik, Norbert; Kling, Norbert; Dona, Sofia; Mumm, Imke; Zöhrer, Christian (Ed.): Porous City, From Metaphor to Urban Agenda. Birkhäuser, 2018, 222-225

BOXES

PIKTOGRAMME

GESAM

LAGEP

LAGEPLAN M 1:200

GESAMTANSICHT M 1:200

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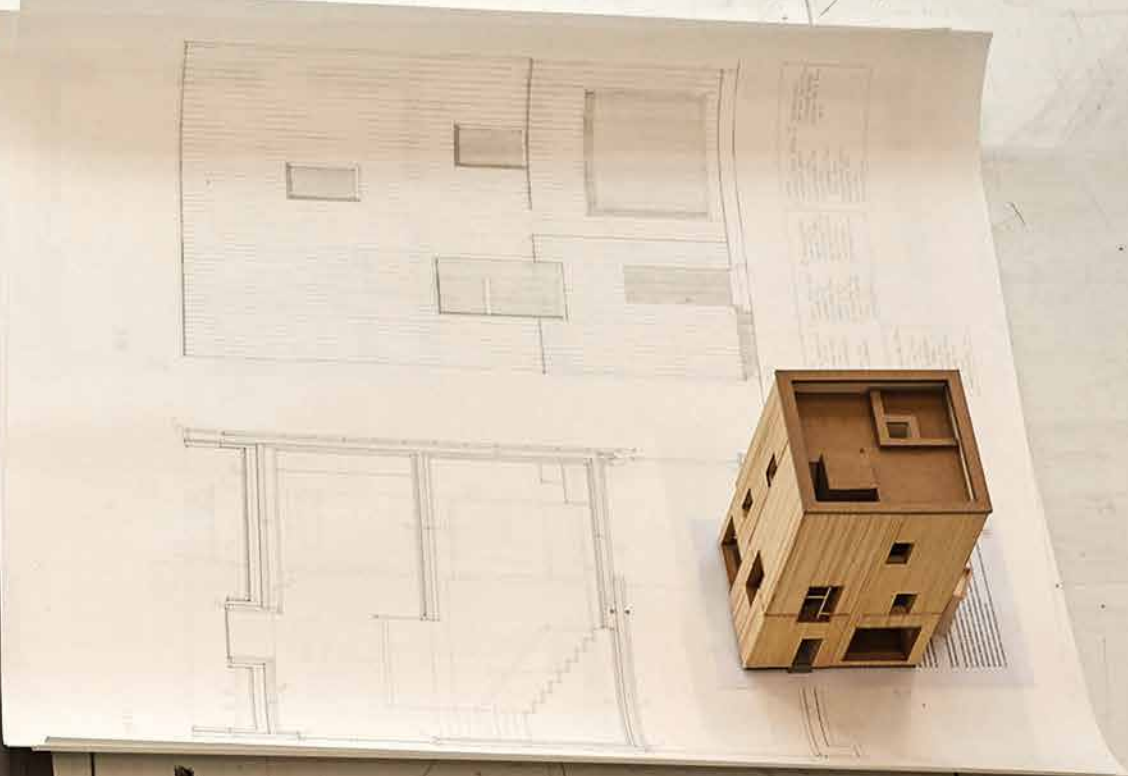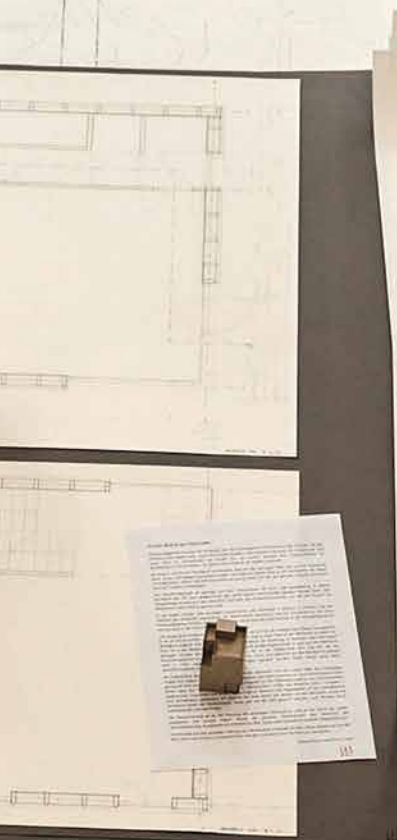
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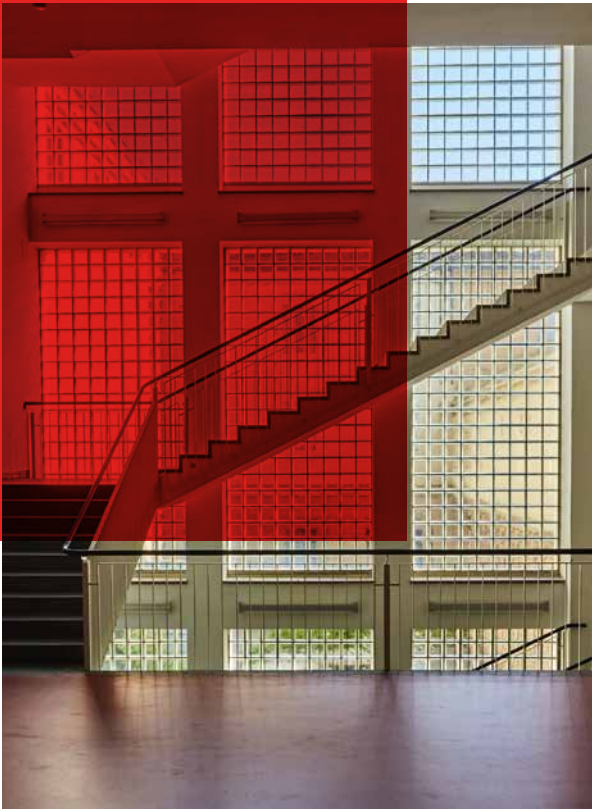
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