

This book about
Research in Architecture
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by Design – provide a framework fo
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professional practice.

This book on **Research in Architecture** is a response to fundamental questions about the rise of research practices in architecture. A range of projects initiated at the School of Architecture at the Technische Universität Berlin demonstrate research trajectories that cumulatively formulate an integrative vision of how knowledge gathering and production can impact our lived-in environments. Four strategic research clusters – City, Energy, Heritage, and Research by Design – provide a framework for both fundamental and applied research. Contributions include the work of interdisciplinary teams and stretch outside of the typical boundaries of architectural academic or professional practice.

Greetings

Speaking
about Architecture,

people
mostly think only of

buildings,

sometimes more
and sometimes less
spectacular.

But in fact architecture comprises much more. It covers not only the interiors of a building, the “hidden spaces” but also numerous aspects of infrastructure and a wide spread of links and relations around. The present publication represents a kind of showcase of research activities at the School of Architecture at TU Berlin. It shows a wide range of different projects giving proof of the seriousness and importance of research in the field of architecture. It becomes apparent that architecture strikes various megatrends and problems of global development as there are for example urbanization, climate change or shortage of resources.

One of the central issues in this publication as well as in today’s landscape of research and innovation are “Smart Cities.” The topic finds a lot of attention in the scientific world as much as in politics and public perception. To work on this, the pooling of many different competencies and experiences is needed, experts from the fields of infrastructure, transport, energy, water, and buildings are involved, not to forget the also concerned social aspects. This interdisciplinary approach may generate new research alliances at our university. Also other topics arise, for example the search for new materials for climate-efficient buildings will open prospective fields of collaboration and pave the way even to new research fields.

I hope the works presented here will not only find interest and recognition in the world of architecture, but may also help to close gaps and build bridges between different fields of science.

Prof. Dr.-Ing. Jörg Steinbach
President

Greetings
—

Is
the idea
of

“Research
in Architecture”

perhaps a
contradiction?

Isn't architecture a creative process far away from science? Some people believe so. We don't. Research in architecture has become a predominant focus in the efforts of the School of Architecture at TU Berlin over the past years. It will be impossible to meet the challenge of creating an interesting, socially just and sustainable environment under the auspices of today's economic framework with mere creativity. A scientifically sound basis must be engaged at the same time and both approaches must come together in common projects. We have integrated this attitude in our Master's degree program in architectural education with actual research projects that engage the students. We have succeeded in this effort in more than 50 different research programs, with funding ranging from small-scale community efforts to multi-million dollar international initiatives. A selection of these projects is contained in this publication.

The outcomes of these research projects can be seen in numerous realized townscapes and buildings, serving as scale 1:1-case studies. We presented it during the 2013 "Research in Architecture" exhibition in the Hauptgebäude (main building) of the university, along a wide range of related publications and more than 100 PhD-theses completed in the past five years. With this academic production and engagement, the School of Architecture at TU Berlin has established itself as a leader in architecture-based research.

We are grateful that we had the opportunity to present these results by invitation of University President Prof Dr.-Ing. Jörg Steinbach in the exhibition, which took place in January and February of 2013, and now in this publication, also supported by the President.

We thank Prof. Jörg Stollmann and his team for their untiring commitment in compiling and displaying these results in this publication as well as in the preceding exhibition designed by Prof. Dr. Stefanie Bürkle and Christian Göbel.

Prof. Dr. Johannes Cramer
Head of Department, School of Architecture

Introduction



What is

Research in Architecture ?

Environments: For this generation and those to come, global urbanization is both an opportunity and a menacing challenge. Our common future will be decided by how we distribute resources in our urban and rural habitats. Thus, spatial and territorial concerns are areas of scientific inquiry with growing recognition and importance. In the course of this spatial turn, the design disciplines concerned with the construction of space have come to fore, informing and transforming research practice. Research in architecture investigates the historic precedents, current conditions and future trajectories for these sustainable environments-to-come.

Scope: Architecture and urban design not only provide the physical support structure for technological, cultural, and societal progress, but it is through them that this process is designed and assessed. In the light of this responsibility, the disciplines aligned with architecture have developed a strong research-based agenda, from critical and innovative design practice to studies on materials and technologies, and finally to the more speculative modes of theory. Key research questions in architecture address design quality and aesthetics while engaging political, economic and social forces, as they are integral to the distribution of resources and space.

Networks: Architecture and urban design are generalist disciplines. “Inter-disciplinary” and “multi-disciplinary” modes of work are the keys to success in practice and academic discourse and the basis for technological innovation. With the aim of combining bodies and systems of knowledge, architecture and urban design synthesize actors, theories, materials and technologies. Designers are part of network-based teams of politicians, engineers, ecologists, developers, local stakeholders and related expert consultants. Architecture and urban design combine and coordinate those different disciplinary inputs and let them take shape in the physical world.

Research and Practice: So what exactly is research in architecture and urban design? From high-tech innovation to the re-evaluation of vernacular building techniques and historical precedents, research in architecture engages with diverse time scales and geographic conditions. At the scale of a building, projects like insulating concrete or energy independent structures are the tangible conclusions of basic and applied research in architecture. In the face of quickening global urbanization, multifaceted layers of infrastructure, landscape, buildings, and programs demand research projects with a close connection to the dynamic real world. Architecture-based solutions invariably bring new questions and concerns to the fore as they create new conditions and potentials for interaction in the human environment. The action – the operation of architecture within the field of observation – is a crucial constituent of research on dynamic contemporary urbanization processes. In architecture and beyond, this close relationship of research and practice challenges established research conventions.

Agenda: The School of Architecture (IfA) at the TU Berlin has developed an agenda that aims to enable its faculty to significantly contribute to this developing international discourse about urbanization and the built environment.

The research clusters City, Energy, Heritage, and Research by Design were formed to guide the research trajectory at the School of Architecture. They were also used to structure the 2013 exhibition “Research in Architecture” which provided for the first time an overview of all research conducted at the School of Architecture, with its inter-departmental and international collaborations. There is a strong interrelation of research activities and modes of practice between these clusters. The School of Architecture contributes far-reaching expertise in the shaping of urban and rural habitats – and this is meant to provide a common ground for inclusive development to sustain the generations to come.

Jessica Bridger
Prof. Jörg Stollmann

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City

—

The
opportunity
and
challenge
of coexistence

Informal Urbanization and the Megacity – Megacities, informal urbanization and housing for the urban poor are interrelated major challenges and raise the common question of how community-based organizations can be included in the planning process.

01

Housing for the Urban Poor

The challenge to adequately house the urban poor is increasingly understood as a matter of structural and institutional arrangements. This research is based on a radical notion of housing that is in contrast to simple efficiency and technical concerns. It implies that the transformation in housing policy and practice is taking place beyond the local arena and involves multi-scale strategies. The project is organized as an international network involving researchers from various countries including the Philippines, South Africa and the US and led by the former chair of the Department for Architectural Design and International Urbanism at the TU Berlin (Habitat Unit), Prof. Dr. Peter Herrle.

Objectives: This research aims at analyzing and interpreting multi-level housing processes in terms of participatory governance and the related integration of civil society. The hypothesis is that the transformed housing process not only influences policy and actors on various levels but brings about a new system of transformed power positions and assertiveness of the urban poor vis-à-vis outside actors.

Methodology: In order to gain knowledge on assumed changing power relations, the proximity and connectivity

of various urban associations will be analyzed. Cases to be studied are associations supported by the Community Organizations Development Institute (CODI) in Thailand and federations affiliated to the Shack/Slum Dwellers International (SDI). The focus is on various levels of relationship-building between organizations in the Philippines, Thailand and South Africa.

Meeting of local federation group of urban poor in Cape Town (Image: Astrid Ley, 2006)



Outcomes: This research seeks to make a contribution to the broader literature on housing. The aim is to understand the transformative housing process as a system – working from local action towards global networks.

Applications: Actors in civil society play a decisive role in the shaping of urban policy. Urban policy and housing processes need to acknowledge the changed landscape of actors and reposition their policy and practice accordingly. The research project raises questions about how to

include community-based organizations and professionalized intermediary organizations (normally NGOs) that are organized nationally or even at an international scale.

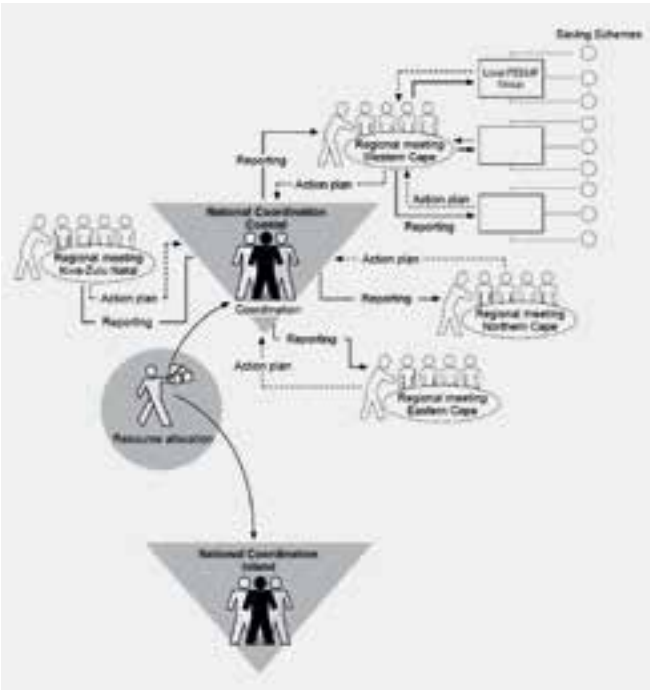


Diagram of the accountability structure of the grass-roots organization Federation of the Urban Poor in South Africa (Image: Astrid Ley, 2010)

Academic Team: TU Berlin: Prof. Dr. Peter Herrle + Dr. Astrid Ley + Josefine Fokdal
Partners: Prof. Dr. Ananya Roy (Berkeley University) + Prof. Dr. Edgar Pieterse (African Centre for Cities) + Prof. Dr. Emma Porio (Ateneo de Manila University)
Funding Institutions: DFG **Timeframe:** 2011–2014 **Sites of Investigation:** The Philippines + South Africa + Thailand **Publications:** •Herrle, Peter; Fokdal, Josefine; Ley, Astrid: New Urban Players in Africa and Asia: The Role of Grassroots Organizations, Miegl, Harald (ed.): Social Urban Transformations: Social innovations for local and global sustainable change. Earthscan, 2012. •Herrle, Peter; Ley, Astrid; Jachnow, Alexander: The Metropolises of the South: Laboratory for Innovations? Towards better urban management with new alliances. SEF Policy Paper 25, 2006. •Ley, Astrid: Juggling with Formality and Informality in Housing: Some Lessons from the New South Africa, Urban Informalities: Reflections on the Formal and Informal, Colin McFarlane, Michael Waibel (ed.). 2012. •Ley, Astrid: Housing as Governance: Interfaces between Local Government and Civil Society Organizations in Cape Town, South Africa. Berlin/Münster: LIT Verlag, 2010. **Webpage:** www.hup.habitat-unit.tu-berlin.de **Contact:** Peter Herrle: peter.herrle@tu-berlin.de + Astrid Ley: astrid.ley@tu-berlin.de + Josefine Fokdal: josefine.fokdal@tu-berlin.de

The Dynamics of Peri-urbanization in the Pearl River Delta

The research project entitled The Dynamics of Peri-urbanization in the Pearl River Delta is a subproject of the priority program Megacities – Megachallenge: Informal dynamics of Global Change, funded by the German Research Foundation – Deutsche Forschungsgemeinschaft (DFG). The focus of the research is on mechanisms relevant for the decline, growth and change, as well as on local-global economic interactions, in the mega-urban regions of the Pearl River Delta in the south of China. The main assumptions are that: urbanization is a dynamic

Old contrasting new: Men playing Majong inside the urban village Chen Tian
(Image: Josefine Fokdal, 2010)



process of high complexity and flexibility dependent on local-global economic interactions; informal dynamics lead to the emergence of a mega-urban landscape; and “urban villages” are the catalyst for economic development as well as the formation of mega-urban landscape growth.

Objectives: This project aims at analyzing the informal dynamics in peri-urban areas of the Pearl River Delta. Peri-urban areas constitute areas that are neither rural nor typically urban. They need to be defined by typological rather than simple geographical models, based on their distance from urban centers. Specifically, the role

and significance of the urban village as an important actor in the emerging mega-urban region of the Pearl River Delta is explored. While the scope of influence of urban villages is largely local, they represent informal structures that are intertwined with mechanisms of the global economy, as does the entire region of Pearl River Delta.



The spatial result of megaurbanization, fragmented land use in Chen Tian village, Guangzhou, from surrounding fields (Image: Josephine Fokdal, 2009)

Methodology: The project design requires a multilevel approach, with three distinct levels characterized by different scales, methods applied, and types of information generated. While micro-level analysis contributes to

unveiling the mechanisms of formal and informal processes, macro-imaging reveals the scope and dynamics of changes in the urban landscape of the Pearl River Delta. The meso-level analysis creates a platform to interlink micro- and macro-level data and add additional non-spatial information about planning and administrative systems and structures.

Outcomes: The underlying general goal is to develop an understanding of the interplay of formal and informal systems and actors that largely define the urban pattern of the mega-region. Thereby the project contributes to a general theoretical framework for mega-cities/mega-regions, their internal patterns of change and differentiation, and their linkages to global dynamics.

Applications: A final publication is currently in process on the theory of the mega-urban landscape and the multi-actor negotiation processes behind this spatial manifestation. New urban theories are needed in the discourse on cities to better comprehend the underlying processes and ultimately create more livable cities in the future.

Academic Team: TU Berlin: Prof. Dr. Peter Herrle + Prof. Dr. Sonja Nebel + Prof. Dr. Birgit Kleinschmit + Dr. Bodwo Coenradie + Josefine Fokdal + Universität Kassel: Prof. Dr. Detlev Ipsen + Holger Weichler **Partners:** Prof. Dr. Xue Desheng (Sun Yat-sen University, Guangzhou) + Dr. Li Yongning (GASS) **Funding Institutions:** DFG **Timeframe:** 2006–2009 **Site of Investigation:** Pearl River Delta, Guangdong, China **Publications:** •Fokdal, Josefine; Herrle, Peter: Negotiated Space: Urban Villages in the Pearl River Delta, *Dialog* 102/103, 2010. •Herrle, Peter; Ipsen, Detlev; Nebel, Sonja; Weichler, Holger: Wie Bauern die mega-urbane Landschaft in Südchina prägen. Zur Rolle der "Urban Villages", *Entwicklung des Perflussdeltas*, *Geographische Rundschau* 11, 2008. •Fokdal, Josefine; Herrle, Peter: Beyond the Urban Informality Discourse: Negotiating Power, Legitimacy and Resources, *Geographische Zeitschrift* 99 (1), 2011. •Fokdal, Josefine; Herrle, Peter: Dörfer in der Stadt – Städter auf dem Land. Wohnen im Perflussdelta in Südchina. Stuttgart: Karl Krämer Verlag, 2012. •Fokdal, Josefine; Herrle, Peter: Dörfer in der Stadt, Städter auf dem Land – Wohnen im Perflussdelta in Südchina, *Soziale Mischung in der Stadt. Case Studies – Wohnungspolitik in Europa – Historische Analyse*, ed. T. Harlander & G. Kuhn. Stuttgart: Kraemer, 2012. •Ipsen, Detlev: High speed Urbanization, *South China Review* No. 1, 2007. •Ipsen, Detlev: Peasants and the Genesis of Mega-Urban Landscapes, *Topos: The International Review of Landscape Architecture and Urban Design*, No. 66: *Landscape Strategies*, 2009. **Website:** www.megacities-megachallenge.org **Contact:** Peter Herrle: peter.herrle@tu-berlin.de + Josefine Fokdal: josefine.fokdal@tu-berlin.de

Grand Paris – Applied research in the context of urban design positions projects in European cities as inspiration for future urbanisms. After an initial exploratory phase, models have been established for application in pilot areas.

03

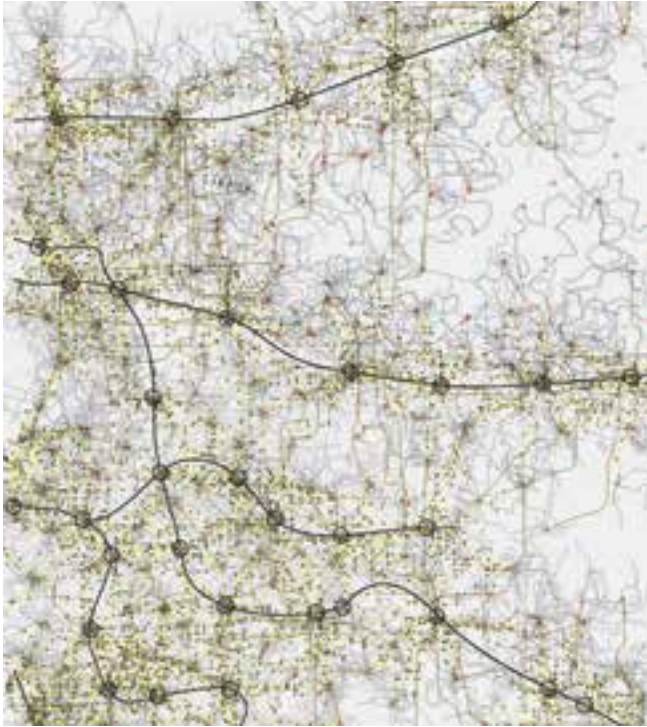
Grand Paris – Métropole Douce

In 2008 the French government, under the direct protectorate of President Nicolas Sarkozy, initiated a research and development project named Grand Paris / Métropole Post-Kyoto. As part of a selection of 10 international research groups, the Laboratory for Integrative Architecture – LIA, the chair of Finn Geipel, along with his and Guilia Andi's architecture firm LIN and its team of consultants were chosen from many initial participants. The project was meant to develop a vision for the metropolis of the 21st century, after the Kyoto Accord, to transform European cities, with Grand Paris as a prototype for future urban development. Its brief contained two distinct areas: the first implied an orientation towards fundamental research about how the metropolises of Europe can be developed further from a general perspective. The second was more suggestive of an applied research approach and involved the development of Grand Paris as a test-site with concrete urban design proposals. Though distinct, both focused on the spatiality of the contemporary metropolis.

Objective: The project Grand Paris – Métropole Douce, proposes to transform the two poles of the dense inner city of Paris and its mostly mono-functional and fragmented banlieues (suburbs) into a multi-functional and multi-polar urban landscape, in which the usual confrontation between city and landscape is erased. Three

concepts, one for urban design, one for mobility and one for landscapes are used. The first and most crucial concept is the “Ville Intense/Ville Légère:” the Ville Intense (Dense City) describes an existing system of poles such as his-

Concept: Concepts Micromobility: rapid transit connections will be supplemented in order to support the Ville Légère (Image: LIN/LIA)

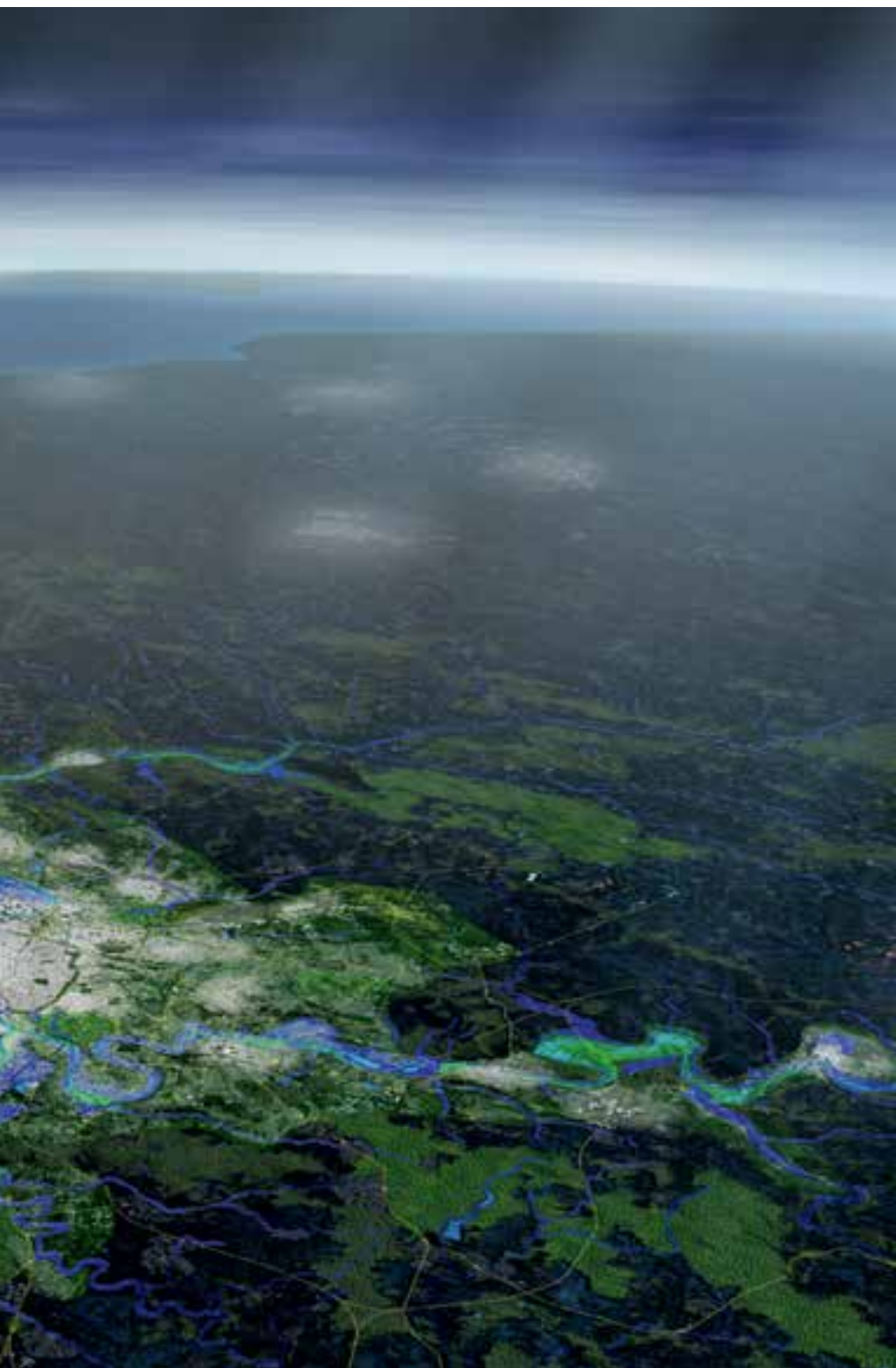


toric centers, parks and forests, infrastructural hubs and office parks, which form the central nodes of the area, whereas the Ville Légère (Light City) describes a system of flexible areas between. Both systems will be intensified with new programs and typologies according to their potentials. The second concept is “Gradual Mobility,” which deals with different types of mobility systems: fast and efficient in between high-density areas, short-distance transportation systems like on-demand bikes/cars or segways in low-density areas. The third concept is “Multi-functional Landscapes,” which entails the coexistence of nature, leisure, housing, services, water-retention, and food- and energy-production within one site.

Methodology: An international and multi-disciplinary team has developed Grand Paris Métropole Douce. Experts in urban planning, theory and history of the city,

Concept: Multifunctional Landscapes, revealing nature within the agglomeration of Paris (Image: LIN/LIA)





philosophy, architecture, ecology, climate change, mobility, and society worked together in a distributed temporary laboratory, collaborating with research institutes of MIT Boston, Oldenburg University, Germany and TU Berlin. Through these collaborations the team has been able to understand the project better in its complexity and develop questions and new ideas resulting from the interfaces of the different disciplines. The close interconnection between academia and practice made it possible to integrate student and office work into the research project. The student work was implemented by applying the outcome of design studios, workshops and theoretical seminars – such as typological or infrastructural studies – in a broader and more experimental way into the larger research



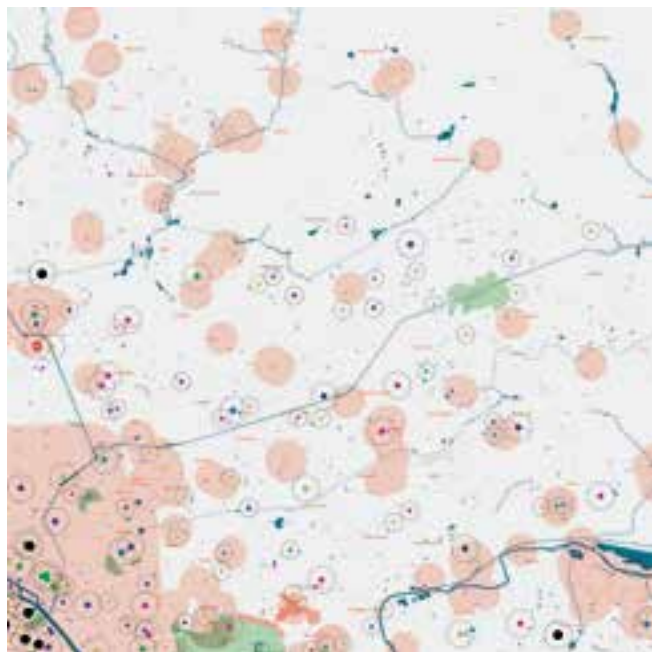
Application: Ville Légère, Grands Ensembles: New typologies and zoning patterns break up the monofunctional landscape (Image: LIN/LIA)

initiative. The work of the office contributed to the project with the analysis and application of more practical design case studies and the coordination of the different teams and ideas. The parallel search for design findings re-informed the research and established the triad of research-teaching-practice.

Outcome: Grand Paris Métropole Douce describes a vision for Paris up to 2030. The first part of the research

project, the fundamental stage, was completed in 2009. LIA and LIN currently develop the model further in a second, applied stage, along with closely related implementation projects in the context of Grand Paris. In the

Application: Mapping of cultural activities in the 5 municipalities and their surrounding areas (Image: LIN/LIA)



applied stage, they focus on a test area in the northeast of Paris, the département Seine-Saint-Denis, including the municipalities of Aulnay-sous-Bois, Sevran, Livry-Gargan, Clichy-sous-Bois and Montfermeil. In this territory, common major problems of the Parisian banlieues are visible, e.g. the disconnection of the banlieues from both the inner city and the other peri-urban centers has been a fundamental challenge from the start. With the planning of a circular fast metro line, which connects the site with the inner city and the surroundings, a concrete vision for the development of the area is given. Accordingly the previous models developed during the fundamental first stage of the research project can be tested.

Applications: Transferability is an important objective of the research project, as it deals with central topics concerning the development of many 21st century metropolises: sustainable development according to the Kyoto Protocol, reorganization and renewal of infrastructure

and the necessary integration and connection of the suburbs. The models developed in the first fundamental stage of the Grand Paris project were created with the possible ease of adaptation to other cities in mind, as this was a central tenet in the original research and development project initiated by the French government.

Academic Team: • LIA: Prof Finn Geipel + Vesta Nele Zareh + Richard Woditsch + Katja Thorwarth + Ken Koch + Giulia Beretta + Yoann Fiévet + Sönke Hartmann + Iris Lacourde + David Malaud + Tristan Zelic **Partners:** • LIN: Prof. Finn Geipel + Giulia Andi + Ali Saad + Heiko Walth + David Levain + Fabienne Boudon + Andrea Alessio + Agnès Billemont + John Klepel + Elena Pavlidou-Reisig + Marie-Elsa Batteux + Marie Charlotte Dalin + Jan-Oliver Kunze + Alice Crumeyrolle + Amir Matallaoui + Judith Stichtenoth + Stephan Becker + Thibaut Pierron + Nathanaëlle Baës-Cantillon + Julien Brunet + Laura Delaney + Steffen Hägele + Alicia Peris + Florian Mathon + Maxime Bon + Pierre Boivin + Raphael Hucliez + Sido Chere! • MIT: Prof. Finn Geipel + Mark Watabe + Lara Davis + Najiyah Edun + Joe Michael + Rafael Luna + Michelle Petersen + John Pugh + Alice Rosenberg + Laura Rushfeldt **Outside Consultants:** Joseph Hanimann, Paris, Society (France) + Kaye Geipel, Berlin, Theory of architecture and urbanism (Germany) + Wilhelm Klauser, Initial Design InD, Berlin, Urban Strategy (Germany) + Liliana Albertazzi, François Jullien, Paris, Philosophy (France) + Fabio Casiroli, Systematica, Milan Cagliari, Mobility (Italy) + Michael Kleyer, Carl von Ossietzky Universität Oldenburg, Urban Ecology (Germany) + Johannes Cramer, Technische Universität Berlin – Histoire de la ville, History of urbanism (Germany) + Andreas Schneider, Institute for Information Design Japan IIDj, Tokyo, Information Design (Japan) + Matthias Schuler, Harvard University Boston, Environmental technology for buildings and cities (USA) + MIT Design Laboratory Boston, Mobility and communication technology (USA) + Jean Michel Place, Paris, Publisher (France) + William J. Mitchell (†) + Anjin Anhut, Werk 5, Berlin, Interactive animation (Germany) + Fabio Casiroli, Systematica, Milan Cagliari, Mobility (Italy) + Ruedi Baur, Integral Ruedi Baur, Zurich, Paris, Berlin, Urban Communication (Switzerland, France, Germany) + David Abbonacci, Berlin, Visualization (Germany) **Funding Sources:** French ministry of culture and communication in partnership with the French ministry of the environment **Timeframe:** June 2008 – ongoing **Site of Investigation:** Paris, Region Ile de France **Successfully Completed Projects in the Field:** • Studies: SAM (Seine Aval/Seine Parc) + PSE (Territory East of Seine Saint-Denis) + PM4 (4 metro stations in Paris, lines 4 and 12) + PAN (Atelier International du Grand Paris, scientific board) + PNE (Grand Paris, Contrat de Développement Territorial de l'Est-Seine-Saint-Denis) • Competition: ARI (Berges de Maine, transformation of the riverbanks) **Publications:** Andi, Giulia and Geipel, Finn, équipe LIN, Grand Paris – Métropole Douce, Propositions for the Post-Kyoto Metropolis. Jean Michel Place, Paris 2009 **Websites:** www.ateliergrandparis.com + www.lia.tu-berlin.de **Contact:** Sekretariat Prof. Finn Geipel, A20, TU Berlin, a20@tu-berlin.de

Young Cities – Sustainable and resilient development will become essential for the future of our cities. A pilot project in Iran takes an interdisciplinary and integrated approach to the development of new urban settlements.

Young Cities – Developing Energy- Efficient Urban Fabric in Iran

04

The development of new towns is one of Iran's prevalent strategies to ease growth pressure on the country's major conurbations, especially the Tehran-Karaj region. To investigate the possibilities and develop methods in planning and building new towns appropriate to the regional conditions, a joint German-Iranian research project was launched in 2008, led by TU Berlin and funded by the German Federal Ministry of Education and Research with a budget of 6.2 million Euros. The topic requires research within and across all fields relevant to urban development. On the German side the demand for interdisciplinary work is met by a large set of partners and associates, integrating 12 TU Berlin chairs along with chairs of the Free University and the Berlin University of the Arts, other external research institutions, private research companies and associations. The major Iranian partnering institutions include the Building and Housing Research Center (BHRC) and the New Towns Development Corporation (NTDC).

Objective: The project's overall ambition is to develop, implement and evaluate planning strategies, design





solutions, technologies and methodologies for the development of sustainable, energy-efficient and resilient new urban settlements in arid and semi-arid regions on the basis of the case study Hashtgerd New Town. This settlement, 65 kilometers west of Tehran, is planned for a



New Quality Building (Image: Young Cities)

target population of 500,000 inhabitants in 2016. The Iranian-German consortium aims primarily at contributing to the mitigation of climate change by developing and applying energy-efficient design and management concepts at all scales, from building construction to urban development for contemporary mass housing within the given cultural, technological and socio-economic regional context. Furthermore, the project aims at implementing solutions and methodologies to adapt the built environment to the effects of climate change.

Methodology: The Young Cities Project integrates research in the fields of architecture and design, architecture, infrastructure systems, transportation and mobility, landscape planning, environmental assessment, climatology, capacity development, awareness raising and project management. These disciplines are organized into three research dimensions elaborating architectural, spatial and infrastructural solutions for energy-efficient urban fabric. A fourth “supportive” dimension covers all

cross-cutting issues such as project management, capacity development, awareness raising and environmental assessment, that help embed the “technical” research results in a conducive surrounding environment. The disciplinary solutions are harmonized through systematic and integrative cooperation across all disciplines and scales.

Outcomes: The project focuses on implementing 5 pilot projects within a 35 hectare pilot area for approximately 8,000 inhabitants in Hashtgerd New Town, in the “Shahre Javan Community.” The project is embedded in a broad scientific context, producing a variety of scientific outcomes such as publications, dissertations and contributions to national and international symposia. The research teams are also creating various manuals and guidelines to cover all aspects of integrated urban and building planning. A variety of software tools for planning and concepts for vocational training in construction have been developed and will be applicable beyond the end of the project.

Young Cities Capacity Development: Vocational Training under supervision of TU Berlin, New Quality Building (Image: Young Cities)



Applications: The legally approved “Detailed Plan” for the Shahre Javan Community serves as a framework for future planning and therefore forms an outstanding research application. The New Quality Building was completed in 2010 and was designed as a pilot project for energy-efficient and earth-quake resistant residential construction. Simulations and measurements indicate the

five-story building consumes 50 percent less energy than a standard Iranian residential building – due to its intelligent architectural design and material choices, high quality construction and energy-efficient building services technology. The New Generation Housing pilot project combines elements of traditional Iranian residential architecture with modern design and technological infrastructure for maximum energy and resource efficiency. The LIFEcenter, as a vocational training center for building construction with various public and semi-public functions, is to demonstrate and disseminate modern and sustainable building methods as well as high-quality construction. The New Generation Office building is a showcase for reducing energy consumption and improving internal thermal comfort, in comparison to existing office buildings in Iran, saving energy and costs mainly through intelligent architectural design.



LIFEcenter for vocational training (Image: Ute Frank)

Academic Team: • Project Coordination and Lead: Prof. Dr. Schäfer (IfA, TU Berlin)
 • Team 1 – Urban Development and Design: Prof. Pahl-Weber (Urban Planning + Urban Design and Architecture, TU Berlin) + Dr. Wulf-Holger Arndt (Transport and Mobility, ZTG, TU Berlin) + Prof. Dr. Heiland (Landscape Planning, TU Berlin) + Dr. Reimer (Climatology, FU Berlin) • Team 2 – Urban Infrastructure Systems: Prof. Dr. Nytsch-Geusen (Energy Management, UdK Berlin) + inter 3, Dr. Mohajeri, p2m, Dr. Sauer (Water and Wastewater Management) • Team 3 – Design, Structure and Engineering: Prof. Dr. Rückert (Structure and Materials, IfA, TU Berlin) + Prof. Frank (Architecture and Engineering, IfA, TU Berlin) + Prof. Steffan (Building Services Engineering, IfA, TU Berlin) • Team 4 – Supporting Dimensions: Prof. Dr. Kochendörfer (Project Management, TU Berlin) + Prof. Dr. Köppel (Environmental

Assessment, TU Berlin) + Dr. Diemel (Awareness Raising, nexus Institut) + Prof. Dr. Meyser (Capacity Development, TU Berlin) + Berufsbildungsförderungswerk Berlin Brandenburg • Evaluation: Prof. Dr. Hansen (TU Berlin) **Partners:** Building and Housing Research Center (Iran) + Ministry of Housing and Urban Development (Iran) + New Town Development Cooperation (Iran) + Atmospheric Science and Meteorological Research Center (Iran) + nexus Institut für Kooperationsmanagement und interdisziplinäre Forschung GmbH (Germany) + FIRST Fraunhofer Institute for Computer Architecture and Software Technology (Germany) + p2m berlin GmbH (Germany) + inter 3 – Institut für Ressourcen Management GmbH (Germany) + Vocational Advancement Service of the Berlin-Brandenburg Construction Industry Association (Germany) **Funding:** Bundesministerium für Bildung und Forschung (BMBF) **Timeframe:** 2008 – 2013 **Site of Investigation:** Hashtgerd New Town, Iran **Publications (selection):** • Young Cities Research Paper Series Vol. 01: Schäfer, R., Nasrollahi, F., Ohlenburg, H. and Stellmacher, F. (Eds.) (2010) Accomplishments and Objectives (in Farsi). Young Cities Research Paper Series, Vol. 01 (Universitätsverlag der TU Berlin) 181 pp. + Vol. 02: Schäfer, R., Nasrollahi, F., Ohlenburg, H. and Stellmacher, F. (Eds.) (2011): Accomplishments and Objectives. Young Cities Research Paper Series, Vol. 02 (Universitätsverlag der TU Berlin) 181 pp. + Vol. 03: Pahl-Weber, E., Seelig, S. and Ohlenburg, H. (Eds.) (2012): The Shahre Javan Community Detailed Plan – Planning for a Climate Responsive and Sustainable Iranian Urban Quarter. Young Cities Research Paper Series, Vol. 03 (Universitätsverlag der TU Berlin) 155 pp. • Pahl-Weber, E., Seelig, S. Forschung für die nachhaltige Entwicklung der Megastädte von morgen: Projektmanagement im BMBF-Projekt Young Cities – New Towns in Iran. In: Liebchen, J.-H., Viering M.-G., Zanner C., Baumanagement und Bauökonomie, Teubner Verlag, 2007, pp. 263 – 272 (see Appendix 9.3.2.) • Ljubijanikic, M; Nytsch-Geusen, C.; Unger, S. (2009). Modelling of complex thermal energy supply systems based on the Modelica-Library Fluid-Flow. In: Tagungsband Modelica 2009. Como: The Modelica Association, S. 335 – 340. • Mosavat, T.; Seelig, S.; Stellmacher, F. (2009). Kooperative Ansätze der Stadtentwicklung und Stadterneuerung in der Megacity Teheran. In: Arbeitskreis Stadterneuerung an deutschsprachigen Hochschulen und Institut für Stadt- und Regionalplanung (Eds.)(2009). Jahrbuch Stadterneuerung. Schwerpunkt "Megacities und Stadterneuerung", Technische Universität Berlin, S. 83 – 99. **Website:** www.youngcities.de **Contact:** info@youngcities.org, Prof. Dr. Rudolf Schäfer (Project Lead), Cornelia Saalman (Project Management), Mathias Orth-Heinz (Project Management), TU Berlin, Secr. A66, Straße des 17. Juni 152, D-10623 Berlin

Cooperative Design – Architecture that is created by and with the stakeholders is a bottom-up strategy to counter top-down policy and finance structures. It empowers communities to become co-designers of sustainable urban environments.

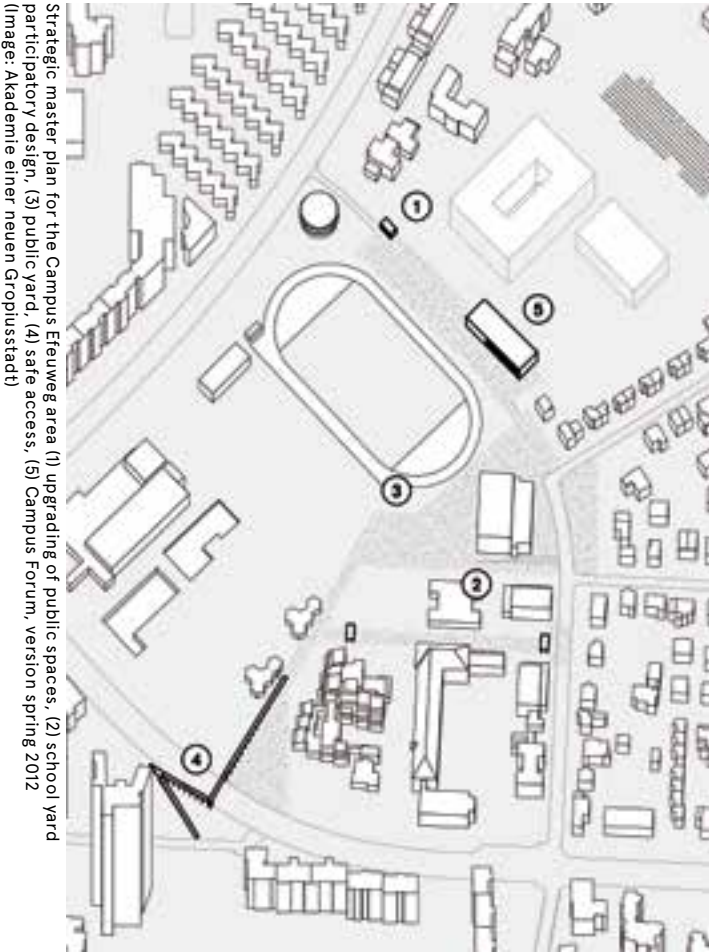
05

Akademie einer neuen Gropiusstadt

The Akademie is a protagonist of cooperative and community based research, design and education. It involves educational and planning institutions, housing corporations and inhabitants as stakeholders in urban development. The Akademie promotes the convergence of top-down and bottom-up planning to redefine the city as common ground and for the common good. The Akademie positions itself in Gropiusstadt, a large modernist housing estate in Berlin with 36,000 inhabitants, developed according to Walter Gropius' master planning efforts from the 1960s. It is coordinated by the chairs of Prof. Donatella Fioretti and Prof. Jörg Stollmann. In anticipation of the upcoming International Building Exhibition IBA 2020, the Akademie will consult, plan and design a climate-efficient and socially just urban future for Gropiusstadt. The Akademie is supported by the Senate of Berlin, the District Council of Neukölln, the degewo housing society and various project-related partners and funding institutions.

Objectives: As a mass-housing estate, Gropiusstadt is an exemplary model for climate-efficient urban development, with vast green open spaces; minimal land consumption per capita; easy to optimize building stock; efficient top-down administration and good public transport infrastructure. Yet in terms of social issues there are

long-standing challenges, especially in relation to the expected changes in tenant profiles: conflicts between long-term and new inhabitants, few job opportunities in the vicinity and a concern for security in public spaces. The



Akademie's hypothesis is that through emancipatory and cooperative design – along with the reactivation of civic imagination – the mass housing settlement of Gropiusstadt can become a model for a resilient urban environment. The central research question is: how can an academic institution become a broker for sustainable community-based mass-housing development?

Methodology: The Akademie is developing a methodology of cooperative urban research, community based design and education tools in three steps. First: in research

U-Rangerie, a greenhouse connected to the subway vent holes by Maite Heinze, Zara Pfeiffer, Paul Künzel, Stefan Liczkowski, Sara Lusic-Alavanja, Johanna Streicher (image: Maite Heinze 2012)





and design studios, students and academic staff work in close cooperation with local stakeholders on future spaces and uses. Mapping, workshops, drawing and modeling, visualization, and scenario planning are integral parts of architecture and urban design education for non-professionals. Second: strategic urban planning proposals and guidelines for policy development support the local council



Poster for Soko Klima, an educational tool-box for climate efficient and participatory planning and urban development (Image: Julia Wolf)

and senate planning departments and facilitate the cooperation of public and private stakeholders. Project funding acquisition is supported. Third: accompanying research projects evaluate the outcomes and facilitate transferability.

Outcomes: Local stakeholders can only be engaged if the project’s trajectory is towards implementation. The Akademie has achieved the following: (1) a strategic master plan for the Campus Efeuweg schools’ open spaces and

shared education and sports facilities; (2) a feasibility study for new public spaces and access areas to Campus Efeuweg; (3) acquisition of 300,000 Euro QF4 (local development) funding for a participatory design project for a school yard; (4) cooperation on the building competition brief for the Lise-Meitner School and the training of local members of the competition jury; (5) the Soko Klima research project to develop a tool-box for primary and secondary schooling on climate-efficient urban design and participatory local planning (6) proposals for energy-efficient and sustainable renovation strategies in close cooperation with housing corporations. In August 2012, as part of the 50th anniversary of Gropiusstadt, the Akademie's projects were exhibited and a range of workshops and discussions were held in order to define the future research and design curriculum of the Akademie.

Applications: Until 2020, with the support of the Senate of Berlin and local District Council of Neukölln, the Akademie aims at an eight-year project perspective. Research projects and closely linked implementation projects will be developed. In cooperation with Kompetenzzentrum Großsiedlungen e.V., transferability will be an important objective of research, as the sustainable development of mass-housing estates is a global challenge.

Academic Team: Chairs of Prof. Donatella Fioretti and Prof. Jörg Stollmann + Kubus
Partners: Senate of Berlin + Kompetenzzentrum Großsiedlung e.V + District Council of Neukölln • Campus Efeuweg (1, 2, 3, 4): Bauhausuniversität Weimar + Educational Association Efeuweg + degewo + Neighborhood Management Neukölln + other local stakeholders • Soko Klima (5): UfU Berlin + Ifeu Heidelberg • Renovation studies (6): degewo + Gropiuswohnen
Outside Consultants: Montag Stiftung Urbane Räume
Funding Institutions: Ministry of Environment BMU + Senate of Berlin + degewo + District Council Neukölln + Lotto Foundation + Cultural Network Neukölln
Timeframe: 2010 – 2020
Site of Investigation: Gropiusstadt, Berlin-Neukölln
Publications: • Stollmann, Jörg; Bartoli, Sandra; Kaspar, Anita: Akademie einer neuen Gropiusstadt. Campus Efeuweg – 36 Tools für ein neues Quartier, Universitätsverlag der TU Berlin, Berlin 2012 • Stollmann, Jörg; Bartoli, Sandra; Kaspar, Anita; Heyden, Mathias: Akademie einer neuen Gropiusstadt. Die Gründung – Denken, Universitätsverlag der TU Berlin, Berlin 2012 • Stollmann, Jörg; Bartoli, Sandra; Kaspar, Anita; Heyden, Mathias: Akademie einer neuen Gropiusstadt. Die Gründung – Machen, Universitätsverlag der TU Berlin, Berlin 2012
Website: www.akademie-einer-neuen-gropiusstadt.de **Contact:** Secretariat Prof. Stollmann, A30 TU Berlin, jessica.luettket@tu-berlin.de

U-Lab: Urban Research and Design Laboratory

The Urban Research and Design Laboratory was initiated in 2010 at TU Berlin with the aim of restructuring teaching, an effort supported by the president of the university. Based on the model of dialogic formats, it encourages exchanges between teaching, research and practice, responding to the demands of interdisciplinary project work as well as case study-based and activity-oriented functioning in the education of future city planners, urban designers and architects.



Learning through dialogue, socially inclusive neighborhood development on the border of Tempelhofer Feld, Berlin, 2011 (Image: U-Lab)

Objectives: Through close cooperation with all stakeholders involved in the respective case study, U-Lab provides new approaches to research and development in the participatory design of urban space. Presented with cooperative working formats, students get the opportunity to

deal with the complexity of their future tasks and fields of action and learn about an integrative and collaborative way of working during their studies. The increasingly essential transfer of knowledge between universities and other partners is supported by the attendance of students and lecturers at planning projects, which are located in sensitive areas and arranged in complex planning processes.

Methodology: In terms of methodology, U-Lab conducts basic and field research, including active spatial research. It employs participative planning approaches in communication and cooperation with planning institutions. The results range from surveys, analyses, concepts and scenarios for planning processes in the development of design projects. Due to the focus on urban design, the courses are also open to students from the departments of City and Regional Planning as well Landscape Architecture. U-Lab's innovative character and potential to function as a model is contained within three specific action areas. The first is to establish integrative project work in case-study and action-based teaching and learning. Next, the program hopes to create concrete links to the planning industry through cooperation with actors external to the university by means of current research and planning projects. Last, U-Lab tests innovative forms of teaching and learning through the application of new media.

Outcomes: Within the first construction phase a network of partners and contacts from the administration and planning practice was established. First collaborative project proposals with publications and competitions have been successfully completed. As a consequence, the Urban Research and Design Laboratory positioned itself as a relevant partner for the implementation of cooperative projects between higher education, administration, those at the district level, and the circle of stakeholders involved in urban planning. Key results will be accumulated and presented in symposia and a series of publications. Furthermore, the monitoring of projects beyond the time frame of university courses will be ensured.

Applications: In the future, U-Lab plans to emphasize contributions to long-term research in planning processes within specific topics such as urban housing and the development of temporary uses of urban space.

Moreover, the focus will be on securing cooperation with events and agencies outside the university – the VorOrt-Laboratories in particular – that go beyond the university's own support budget. Participating in external events allows strategies and research findings from both planning workshops and spatial interventions to be tested directly in the planning area, and to initiate a process of communication between planners, the local population and the interested public.



Learning dialogue, 'Obere Stadtspre', 'Stadtspre/Kiezspree', 2010 (Image: U-Lab)

Academic Team: Dr.-Ing. Paola Alfaro d'Alençon (Project manager) + Dr.-Ing. Daniela Konrad (Project manager) + Dipl.-Ing. Bettina Bauerfeind (Scientific research) + Mandy Held (Student assistant) + Anton Katzer (Student assistant) **Partners:** Reiner Nagel (Head of Division 1: Urban and Open – Space Planning, Senate Department for Urban Development Berlin) + Takis Sgouros (Project Officer for Spree Region, Division 2: Urban Planning and Projects, Senate Department for Urban Development Berlin) + Carl Herwarth Von Bittenfeld (Managing consultant, Planning Agency Herwarth + Holz) + Katharina Rohde (Architect and expert in urban design research) + Ulla Luther (Urban planner, State Councilor A.D.) + Matthias Böttger (Director, Deutsches Architektur Zentrum) + Jan Dohnke (Institute for Geographical Sciences, Freie Universität Berlin) + Kerstin Schmiedeknecht (Neighborhood manager, Schillerpromenade, Berlin) + Gabriele Kaupmann (Tempelhof Project GmbH) + Ralf Steeg (Managing director of LURI.watersystems.GmbH and Project initiator of SPREE2011) + Christian Schöningh and Angelika Drescher (Die Zusammenarbeiter GmbH) **Funding Sources:** LSK TU-Berlin + Wüstenrot Stiftung + EU-Programm/Erasmus Mundus **Timeframe:** Initiated in 2010, Projects time frames range between 6 months and 2 years **Site of Investigation:** • Obere Stadtspre + Randflächen Tempelhofer Feld, Nord Neukölln + Lichtenberg • Additional research on ephemeral structures in German cities and global learning **Successfully completed Projects in the Field:** Obere Stadtspre + Randflächen Tempelhofer Feld- Nord Neukölln **Publications:** • Beyond Planwerk Innenstadt. Neue Ideen – Strategische Entwicklung Weiterdenken! Documentation of January 2010 workshop on the Center for Metropolitan Studies at TU Berlin. Includes presentations by Paola Alfaro d'Alençon and Daniela Konrad. PDF of complete publication: www.think-berlin.de • Angewandte Forschung im Spreeraum (Applied Research on

the Spree Area): Students and stakeholders discuss visions of the Mediaspree, Informationsdienst Wissenschaft, Deutsche BauZeitschrift, Architektur-Welt
 • StadtSpree KiezSpree, LURI.watersystems.GmbH – Spree 2011. **Website:** www.ulab.architektur.tu-berlin.de **Contact:** ulab@architektur.tu-berlin.de, Tel: +49 (0)30 314 29177

Agenten und Komplizen

07

Agenten und Komplizen considers inventive means of acquiring locally-specific knowledge as the mainstay for developing relevant projects in particular neighborhoods. It actively encompasses a diverse group of local players through participative design to forge strategic partnerships between school and neighborhood. Agenten und Komplizen advocates people's demands and desires for the use and experience of space as a potential social resource, which must be appraised if users are to identify with the built environment. Research projects include Open Source School in Berlin's modernist housing estate of Gropiusstadt, Social Club Wedding in Brunnenviertel and Agenten und Komplizen in north Neukölln.

Objectives: In collaboration with a diverse group of local participants – Rixdorfer Primary School pupils, teachers, care workers, parents, residents, neighborhood management and local businessmen – Agenten und Komplizen instigates locally-specific architecture for alternative forms of community education initiatives. The project aims to acquire local knowledge through the identification of new stakeholders, connecting existing neighborhood resources and engaging local enterprises and university research in the production of socially-engaged architecture. The central question is: how can existing educational resources be ascertained to inform new spaces for learning that benefit the school and local residents, and to improve the overall quality of life in the area?

Methodology: Through tailored workshops, presentations and open feedback sessions with the various participants, the architecture students identify, consider and augment the needs and possibilities within the neighborhood. A game specifically designed for Donauquartier



Public presentation of working models (Image: FG Hofmann)

generated seventy education network ideas that illustrated the potential for inter-generational and community learning initiatives. These suggestions informed the students' proposals, both programmatically and architecturally, for open, low-threshold and user-friendly education programs. The resulting designs were publicly presented and discussed with the community and local politicians.

Outcomes: Participating pupils and residents have the opportunity, often for the first time, to express their desires and needs for their surrounding environment to architects and decision-makers and to actively participate in the design process. Through broad-reaching participation and open public discussions about tangible proposals, a more socially robust architecture emerges that acts as a catalyst within the neighborhood. Early on during the course of their higher education, students are given the opportunity to confront current issues and discuss their ideas with the public.

Applications: On-the-ground, practical experience coupled with academic research enables Agenten und

Komplizen to further develop their research and test alternative modes of participatory design in different situations. Methods are derived from locally-developed projects that can be transferred and adapted to other typologies and contexts. Currently, the team is investigating affordable housing options in Moabit and intelligent neighborhoods. Combining practice, design and research enables students to learn the practical reality of design and construction in parallel with independent “research by design” and “design by research.”

“Quartierspiel Donaukiez”: a game developed for the Donaustrasse neighborhood in Berlin as a tool for participatory research and planning (Image: FG Hofmann)



Academic Team: Prof Dr.Ing. Susanne Hofmann + Dr.Ing. Andrea Benze + Dipl.Ing. Urs Walter **Partners:** •Prof. Dr. Angela Uttke, ISR, TU Berlin + Prof. Rückert, IfA, TU Berlin (structural engineering) + Prof. Steffan, IfA, TU Berlin (climate engineering) •Pfefferwerk Stadtkultur gGmbH + LebensWelten gGmbH •Neighborhood Managements Lipschitzallee, Brunnenviertel und Donaustrasse •Various primary, secondary, and occupational schools in Berlin **Outside Consultants:** Montag Stiftungen Urbane Räume + degewo **Funding Source:** degewo + Programm Soziale Stadt + BIWAQ Project “Schule aktiv,” **Timeframe:** Since 2009 **Site of Investigation:** Socio-economically disadvantaged areas of Berlin (Brunnenviertel, Gropiusstadt, Nord-Neukölln) **Successfully Completed Projects:** Quartierspiel Agenten und Komplizen + Social Club Wedding + Open Source School Gropiusstadt + Social Club Brandenburg + **Publications (selected):** •A. Benze and U. Walter: Agenten & Komplizen – Strategische Partnerschaften zwischen Schule und Stadt, Die Grundschrift Nr. 255/256, 2012 •S. Hofmann, S. Pfeiffer and U. Walter: Open Source School – neue Synergien zwischen Schule und Kiez in Gropiusstadt, Universitätsverlag TU Berlin, 2010 •F. Kyriakopoulos and U. Walter: Stadtvisionen – Schulen als Standortfaktor, Die Grundschrift Nr. 255/256, 2012 •S. Hofmann and U. Walter: Stadtvisionen denkbar? machbar! – Strategische Partnerschaften zwischen Schule und Stadt im Brunnenviertel, Universitätsverlag TU Berlin, 2011 •A. Benze, S. Hofmann and U. Walter: Agenten und Komplizen – strategische Partnerschaften zwischen Schule und Stadt, Universitätsverlag

TU Berlin, 2012 • S. Hofmann and U. Walter: Social Club Brandenburg – innovative Orte des Lernens für Jugendliche auf dem Lande, Universitätsverlag TU Berlin, 2011 • S. Hofmann, Wetter und Architektur, gefühlt und gemessen, Metropole: Ressourcen, IBA Hamburg, Entwürfe für die Zukunft der Metropole, 2009 • S. Hofmann, Interaktive Entwurfsstrategien für Architektur und Städtebau, Metropole 6: Zivilgesellschaft (Metropolis: Civil Society), IBA Hamburg, Berlin 2012 • S. Hofmann, Erfolgreiche Beteiligungsprozesse. Über das partizipatorische Entwerfen und das Konstruieren von Atmosphären, in: Materialien zum Schulbau. Pädagogische Architektur und Ganzttag Teil 1, Der Ganzttag in NRW. Beiträge zur Qualitätsentwicklung, ed. V-L. Schneider, E. Adelt, A. Beck, O. Decka, 2012 **Website:** www.fg-hofmann.blogspot.de **Contact:** Prof. Dr.-Ing. Susanne Hofmann, A27, TU Berlin, Secretariat: sabine.remus@tu-berlin.de

Real Estate — Real estate portfolio management has long followed the Modern Portfolio Theory of diversification and risk-reward trade-offs. We must use assessment tools to determine the real-world performance of this complex asset class.

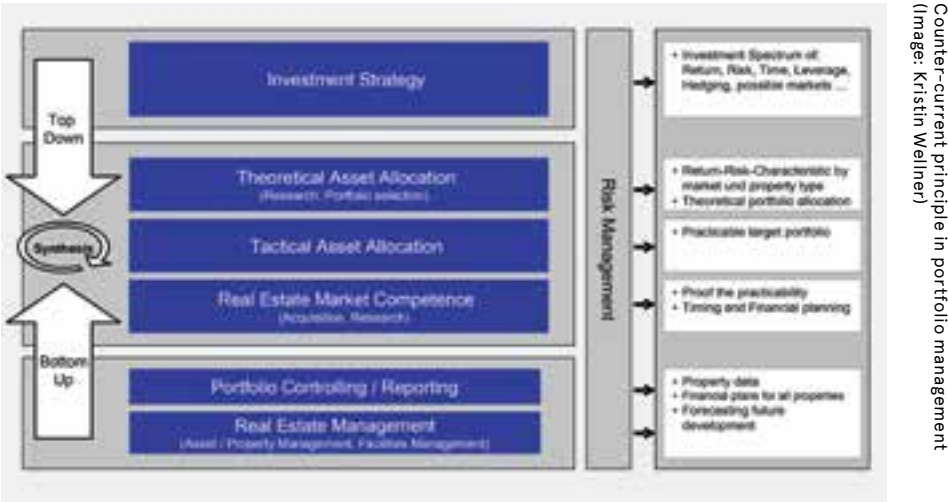
Real Estate Portfolio: From Theory to Reality

08

Real estate is one of the most important asset categories internationally because of its diversified impact. However, as a result of special characteristics, there are a variety of problems in selecting the appropriate asset allocation in real estate portfolios. Modern Portfolio Theory (MPT), introduced by Harry Markowitz in 1952, postulated increased returns and minimized risk through diversification and risk-return trade-offs. MPT changed the way people structured investments, but it is difficult to apply the theory to the reality of real estate portfolios. The reasons for application problems in real estate portfolios lies both in the assumptions of MPT itself, as well as in the characteristics of the real estate asset class.

Objective: The aim of the research project is to develop a real estate allocation method for finding a risk diversified realistic portfolio of direct investments. By moving asset allocation models from the scientific financial theory to the investment reality, institutional real estate investors are confronted with a number of problems in the day-to-day business. The literature of the last 20 years shows a high level of diversification effects by using MPT

for real estate portfolios. But there is still a dilemma of how to transform these results into a daily allocation process. This research project gives an outlook for the practicable application of the results using the “Markowitz theory” in consideration of the uncertain and imperfect real estate markets. In practical consideration, there are still problems regarding the properties of direct real estate investments and their markets, for example the characteristics



of properties, real estate market situations and sizes. On the basis of empirical statistical tests – based on real estate total return indices – this project aims to find a solution to overcome these difficulties.

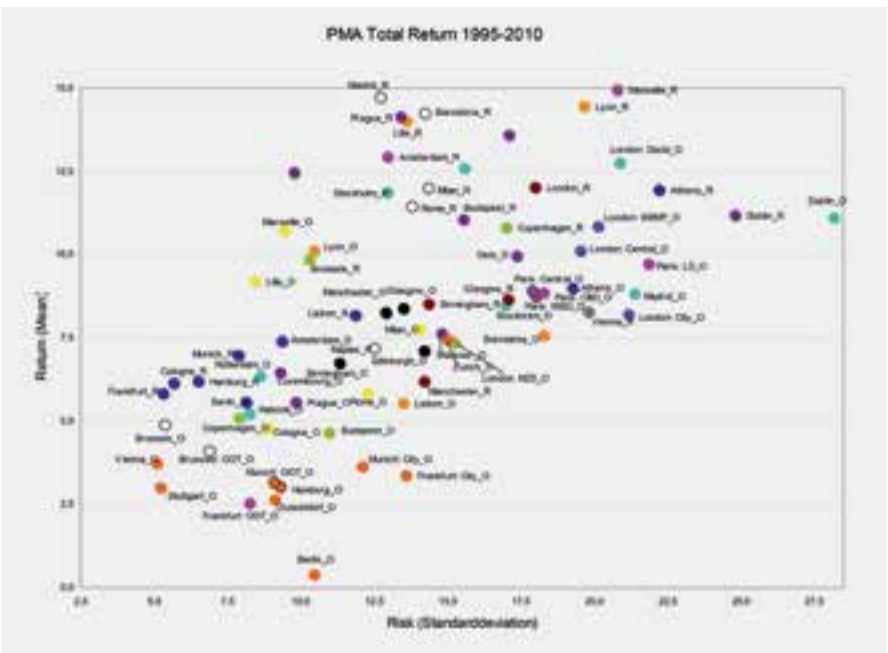
Methodology: The new find transformation process – as one first result of this project – is using clustering methods and different return calculations, offering more possibilities for choosing the suitable components for an existing real estate portfolio. With a top down to bottom up procedure according to a counter-current principle, it is possible to find properties which are suitable in practice. This procedure (see graphic) is an important part of the findings.

Outcomes: The following considerations should offer assistance in practice. Even if a practical use is not possible without pragmatic adjustment, it is still recommended, as the presented solutions contribute to support the decision process and can provide information regarding the

future development of the selected portfolio constellations. The results achieved from the empirical semi-analyses can be summarized as follows:

- Cluster formation allows substitutions of homogeneous markets and it allows for a pragmatic implementation as several possible markets fulfil conditions, depending on actual availability. It prevents a strict elimination of markets of similar quality at slightly lower returns or minimal higher risk, since in practice, these minimal differences are of no real importance
- Restriction of all portfolio components to a maximum rate (of e.g. 20 percent) allows the integration of naive diversification in the “sharp” mathematical calculation along with reduced dependence on theoretical,

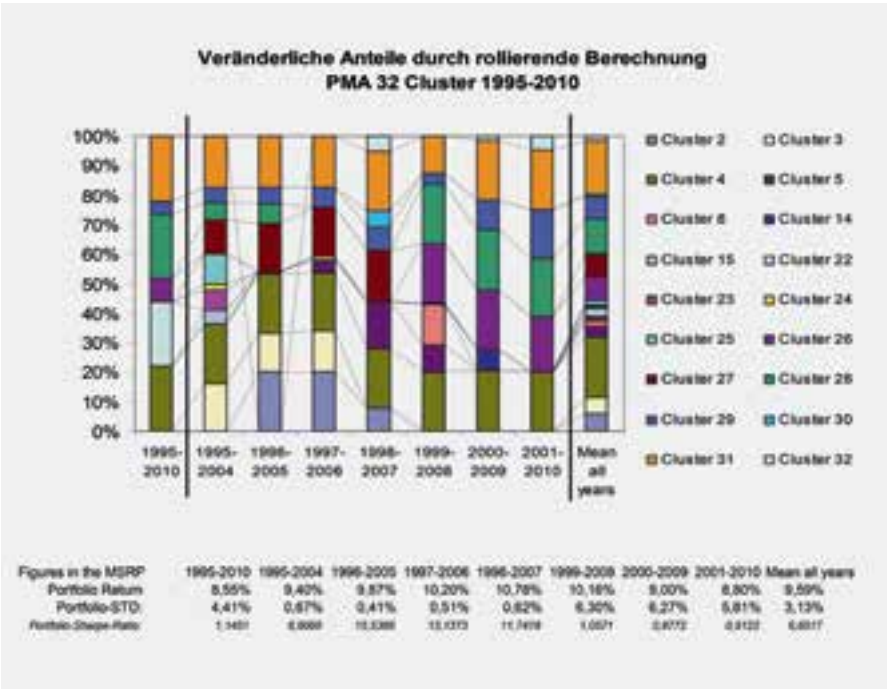
Return-Risk-Diagram with correlation (same colour = high positive correlation) as a basis for clusters. Source: Own compilation using data from PMA, Total Return, Office (O) and Retail (R), 1995–2010



technical-statistical results that analyze the future only ex post. It also allows the restriction of the statistical increase in grades of error of “pragmatic significance”

- Rolling calculations show the sensitivity of the selected time-frame; markets that sustain in multiple calculations should also be represented in the target portfolio. Rolling calculations also make the selection of efficient portfolio building blocks more secure and independent regardless of the selected time-frame. Finally the analysis can make

individual influences and statistical outliers visible in the time-frame to eliminate them, through analysis of historical time-frames and their forecasts and through



Rolling computation of optimal portfolios in four 10 year-segments compared to the total period. Source: Own compilation using data from PMA, Total Return, Office and Retail, 1995 – 2010

showing the sensitivity of the selected timeframe. Markets that sustain in both time-frames (i.e., are good for an optimal portfolio in the past and the future), should also be represented in the target portfolio.

Applications: The fundamental conclusion of this analysis is that a single evaluation of an optimal portfolio from which a real target portfolio would then be derived is grossly negligent. There are always a number of simulations to be carried out over the course of time with the help of different raw data, varying indices, ex post and ex ante data and pragmatic adjustments such as cluster formation and the restriction of maximum shares. Knowledge can be gained initially through much evaluation, and should serve to support any decision for defining the marketable target portfolio from the theoretical model portfolios. This will hopefully help to develop a realistic diversification approach to asset allocation in real estate portfolio management.

Academic Team: Prof. Dr. rer. pol. Kristin Wellner **Publications:** • Mathias Thomas, Kristin Wellner, Diversifikation nach Nutzungsarten und Regionen, in: Handbuch Immobilien-Portfoliomanagement, Hrsg. von Schulte, K.-W./ Thomas, M., Köln: Rudolf Müller 2007, p. 107 – 120 • Kristin Wellner, Transforming Markowitz portfolio theory into a realistic real estate portfolio allocation process, Paper presented at the Annual Conference of the European Real Estate Society Eindhoven, 2011 • Kristin Wellner, Grenzen der Portfoliooptimierung in der Praxis: Korrelationen und Cluster von Immobilienstandorten und Sektoren, in: Junius, K.; Piazzolo, D. (Hrsg.): Praxishandbuch Immobilienmarktrisiken, Köln: Immobilienmanager Verlag 2009 **Data Source:** • PMA, Property Market Analysis LLP, London 2011, www.property-m-a.co.uk • IPD, Investment Property Databank, London 2011, www.ipd.com **Contact:** Prof. Dr. rer. pol. Kristin Wellner, Chair for Planning and Construction Economics/Real Estate, kristin.wellner@tu-berlin.de

Berlin Smart City — The Berlin City Vision proposes to generate synergies between diverse research fields, their prototypes and their incubators, turning Berlin-Brandenburg into a smart Start-up City.

09

The Vision for Berlin Smart City

Why do we need Smart City start-ups? According to Germany's foremost climate change scientist Joachim Schellnhuber there is a real threat that the earth's temperatures will rise by 4° Celsius by the end of the century. This will cause unimaginable calamities, and change, if not threaten completely, people's relationship with the earth. Since most of humanity now lives in cities, cities need to become test sites for managing energy behavior now and in the future. Energy efficiency makes sense economically but also it needs to be shown that it has to become a cultural project that nurtures dreams and fosters well-being. We imagine that the sum of projects at TU Berlin, and additional associated ones, could become a laboratory of test-beds or incubators for experiments that show lifestyles, entrepreneurships and manufacturing processes, that each contribute to the management of earth's temperature rises.

The proposal for Berlin Tempelhof: Airlift into the future won the first prize in an ideas competition for the Tempelhof airfield in 2009. CHORA and partners GROSS.MAX and Buro Happold intend to turn the former airport site into an Urban Incubator. It has, because of its spatial dimensions and its historic significance, unique opportunities to show what the future of our cities is going to look like: cities will not only consist of low

energy structures, but also of energy producing systems and smart networks. This includes a new type of landscape as a space where technologies and nature merge, a space where energy is produced by a series of different technologies and it will be a space for learning and experiments.

As a Research Incubator, the Urban Gallery (UG) is a practical use of methodology developed and tested by CHORA and first defined in the book *Urban Flotsam*. It is a support system for prototype projects. It is an interactive planning tool used in dynamic master plans in which prototype projects play a significant role to either achieve efficient energy management, link operations of very different sectors and stakeholders or create a pattern of sustained growth or evolution. The Urban Gallery is a tool related to Prototype Projects (PT) that enable the stakeholders to act jointly or collaborate over longer periods of time and to develop, monitor and evaluate prototypes as pilot projects within an overall plan. The Urban Gallery is a public arena where stakeholders can meet and cooperate, and it is also a management tool for the knowledge and experience gained.

Following that approach and developing it further, the Research Incubator called BrainBox (BB) is a proposal for an interactive environment for planning and the subse-

The BrainBox is a performance space and a participatory interactive planning tool, Xiamen, China (Image: CHORA, 2009)



quent negotiation of dynamic master plans. It is a real-time modeling, decision-making and management tool that enables different stakeholders to create, assess and modify scenarios of development for a particular area.

The scenarios are created by direct interaction between the stakeholders, through their real-time manipulation of a digital database. Compared to current-generation GIS-based simulation and negotiation tools, which require a lot of specialist knowledge, the BrainBox is a more generalist and intuitive tool that operates with “lighter” data and is therefore more supple and dynamic. This gives the opportunity to manage development strategies that can be constantly reassessed and modified, depending on the current conditions, policies and requirements. The BrainBox measures and represents the impact of the created scenario in terms of energy efficiency and calculates carbon emissions as feedback information to optimize a modeled scenario.

Applying all of the components above as a strategy for Berlin, we propose to combine all of the recent and potential Urban Incubators into the Berlin Smart City Vision. Within that framework we can test the concept’s viability, disseminate potential compartments and test out and evolve prototypes. We can join forces in order to turn the Berlin into a Startup-City. The TU Berlin Urban Lab: Platform for the Smart City was established to accomplish these goals.

Academic Team + Partners: CHORA City & Energy, Urban Design and Sustainable Urban Planning, Prof. Raoul Bunschoten + Respective IfA chairs + ISR Bestandsentwicklung und Erneuerung von Siedlungseinheiten, Prof. Elke Pahl-Weber + cooperation with faculties “Internet Network Architectures”, Prof. Anja Feldmann + Numeric Mathematics, Prof. Dr. Volker Mehrmann **Outside Consultants:** CHORA Cloud + Gross.Max – Büro Happold **Timeframe:** 2001–ongoing **Site of Investigation/Location of Project:** Berlin Brandenburg Metropolitan Area **Publications:** Urban Flotsam/Stirring the City/Chora (Bunschoten, Binet, Hoshino, 010 Publishers, 2001) **Website:** www.chora.tu-berlin.de + www.math.tu-berlin.de + www.matheon.de + www.inet.tu-berlin.de + www.urban-gallery.net

TU Berlin School of Architecture Projects
– *Berlin Smart City Map*

Berlin's urban heritage tells the story of its built history, including almost every prototypical approach. These utopian fragments form a heterogeneous city pattern exemplary of the so-called "European City." To handle with this incorporated heritage and to transform the built environment according to the challenges of today and the future is a core assignment for architects and planners and a fundamental duty for architecture and urban planning education in particular.

The TU Berlin School of Architecture is continuously engaged in research about the contemporary status of the Berlin-Brandenburg metropolitan area and proposes solutions for the transformation of important hot-spots, key areas and even remarkable leftovers according to technological, economic, social and environmental as well as political and cultural challenges. We introduce research terms into the traditional urban and architectural planning modes, such as climate protection and energy production, climate change mitigation and adaption, smartness related to materials, infrastructure, mobility and communication, prefabrication, participation in the city building processes, as well as research by design, forming and shaping.

The following map illustrates a selection of 89 recent projects based at the School of Architecture. Each forms a proposal for a Berlin incubator as part of the TU Berlin Urban Lab: Platform for the Smart City.





Energy

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The
economization

and

distribution
of resources

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Watergy Projects – Water and energy issues are increasingly central to discussions of urbanization. The connection between horticulture, agriculture and architecture is the subject of innovative research for the development of sustainable resource management.

10 Watergy

For the Watergy project, a humid-air solar collector system was developed for horticultural use in arid climates and building applications. The main goals were heating and cooling, water recycling, advanced horticultural performance and solar thermal energy capture. The system consists of a closed greenhouse connected to a solar tower. Plants are an essential part of the process, as a source of air humidification. An air-water heat exchanger contained in a cooling duct inside the tower provides the climate control of the greenhouse. Condensation from the cooling of the nearly saturated air also provides distillation of water. Thermal energy released in the process is stored outside the greenhouse for heating or further water distillation at night.

Objectives: Heat transfer using humid air and related evaporation and condensation processes were used for space heating/cooling and water recuperation at the same time. Planning, construction and monitoring of two prototypes were aimed to justify the mathematical model and allowed demonstration of the new technology to the public.

Methodology: The function of the climate control system was tested with the thermal simulation tool “Smile.” The first prototype was built near Almeria, Spain with the success of a water recycling rate up to 85% without using energy-consuming components like heat pumps.

A further success was crop production completely free of pesticides over the course of two years. A second prototype was built in Berlin, in this case a closed greenhouse attached to a building façade. Using a collector element for heat generation proved to be successful. The main advantage of this method compared to conventional solar thermal systems is the use of an air-to-water heat exchanger to transport energy into seasonal storage, where the same heat exchanger can be used for heating building space with very low supply temperatures between 22 and 28°C.

Outcomes: The horticultural greenhouse allowed water recuperation of 85% at generally lowered water need per surface area. Additionally, enhanced biomass production was the system's main output, as a closed greenhouse allows the avoidance of pesticides and efficient CO₂ supply for increased plant nutrition. A seasonal thermal storage was loaded successfully to temperatures around 70°C and was successfully used for space heating throughout two winter seasons. Further developments of the

Prototype 1: Greenhouse in Almería, Spain (Image: TUB gte)



system for it to reach completion are: the use of more efficient and cheaper direct-contact air-to-water heat exchangers, and the use of liquid desiccants instead of water within a modified open absorption heat-pump system.

Prototype 2: Zero Heating Energy House in Berlin-Dahlem (Image: Werner Hutmacher)





Applications: This project approaches building technology as an integrated system that connects energy and water issues via heat transfer provided at the phase change from water to vapor. Such a method allows the development of completely new technologies for the supply of heat and cold, and for the recuperation and re-use of waste water.



Prototype 1: Interior (image: TUB g'te)

Academic Team: TU Berlin, Chair Building of Technology and Design, Prof. Claus Steffan + Wageningen University (Netherlands) + Estación Experimental de Cajamar "Las Palmerillas" (Spain) + Clina Heiz- und Kühlelemente GmbH (Germany) **Partners:** TU Berlin + Wageningen University (Netherlands) + Estación Experimental de Cajamar (Spain) + Clina GmbH (Germany) **Funding Institutions:** The 5th Framework Program of the European Union (2.1 million euros) **Timeframe:** 2004 – 2006 **Site of Investigation:** Prototypes built in Berlin, Germany and El Ejido/Almería, Spain **Contact:** TU Berlin, Chair Building of Technology and Design, Claus Steffan + Dr.Ing. Martin Buchholz, martin.buchholz@tu-berlin.de

EXIST: Energy Generated from Humid Air

The goal of the Watergy Thermo-Chemical Storage Project was to develop an eco-nomical absorption system for competitive solar seasonal heat accumulation using the principle of combined air humidification and de-humidification. The heating system is based on three directly integrated components. Firstly, a humid air absorber is built out of cheap plastic or ceramic elements that will work below temperatures of 50°C throughout the whole year. During the summer it is used for the dehumidification of a salt solution. During the winter, humid air is produced within a façade- or roof-greenhouse and will be absorbed by the concentrated salt solution, thereby providing usable low-temperature heat. A low-volume energy storage system, compared to pure thermal storage, is used for combined seasonal accumulation of the salt solution (thermo-chemical storage) and heat buffering for a short time (thermal storage). A low-temperature heating system is provided by the absorber, which switches between heat/humidity removal from the greenhouse and heat rejection into the building. All heat transfer processes are either dehumidification of desiccant during summer, and humid air vapor absorption during winter, and the building heat supply results from direct contact between the air and liquid desiccant.

Objective: The initial objective of the project was to create a running solar heat-supply system in one building from scratch, and to find investors for commercial follow-up pilot applications. This goal fit within the rules of the EXIST program, which funds concepts originating in universities based on existing research knowledge.

Methodology: Research included testing of the basic properties of liquid desiccants in terms of hygroscopic properties, salinity and corrosion. An energy balance for a building including a desiccant regeneration phase during summer as well as humidity absorption from a

building, a greenhouse, and a humid air solar collector was calculated. The system was installed within an existing research building at TU Berlin. Basic interactions of humidifiers (greenhouse vegetation and spraying/fogging systems in the air collector) and absorbers in the building were tested and monitored.

Outcomes: The project produced a number of basic findings related to the use of liquid desiccants, especially related to the high potential of simple and cheap desiccants like MgCL and CaCl, which cannot only be used for



Novel Watergy Climate Box (Image: TUB gte)

de-humidification but also for hygienic humidification of buildings. This allows for integrated humidity control in buildings and the use of different kinds of buildings for either “regenerative” functions (like in office buildings with few sources of humidity) or “de-humidification” functions (as in residential buildings or buildings with high-humidity levels like restaurants, swimming and sports

facilities, laundry buildings, etc.). The project showed that greenhouses using numerous plants for air humidification are especially suitable for solar humid air collection, while sprinkled or fogged air collectors without vegetation are limited in usefulness due to the vast temperature increase during solar radiation, which cannot be compensated by evaporation processes on two-dimensional surfaces.

Applications: Liquid desiccants for solar energy capture, humidity capture from waste air or supply air and related regeneration functions (for further removal of water from the desiccant) can be achieved between different kinds of buildings, greenhouses and industrial drying facilities, while huge amounts of urban and industrial waste heat in the range of 15 – 50°C, almost completely unused today, can be connected via urban desiccant networks and storage facilities. The energy density of concentrated desiccants is about three times higher compared to distance heating systems, and can be transported and stored without thermal losses.

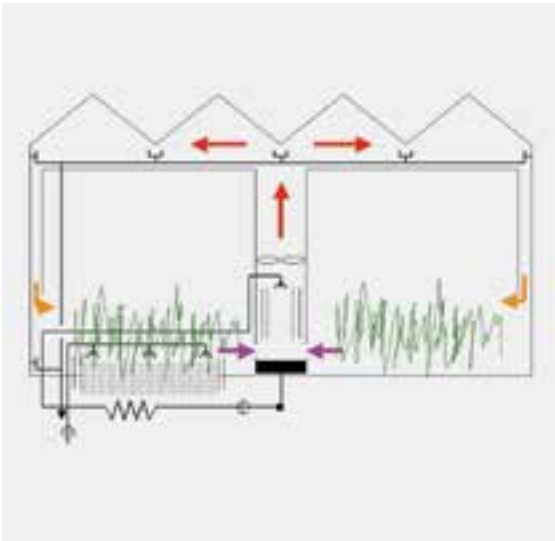
Academic Team: TU Berlin, Chair of Building Technology and Design, Prof. Claus Steffan + TU Berlin, Chair of Mechanical and Systems Engineering **Funding Institutions:** The German Ministry of Economics and Technology within the program EXIST Forschungstransfer **Timeframe:** 2008 – 2010 **Site of Investigation:** Research building prototype in Berlin-Dahlem, Germany **Contact:** TU Berlin, Chair Building of Technology and Design, Prof. Claus Steffan + Dr.Ing. Martin Buchholz, martin.buchholz@tu-berlin.de

Closed Greenhouse for Food and Water Production in Egypt

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This project, conducted by TU Berlin and Cairo University, furthers development of intelligent low-tech principles for greenhouse-integrated horticultural production and integrated water desalination in the Mediterranean and North African climates. The research includes investiga-

tion of water condensation from humid greenhouse air as a new source of fresh water, using the process of combined evaporation and condensation from liquid desiccants. The main aim of the project is to establish a new technology that creates income from increased (quantitative and qualitative) horticultural production due to CO₂ supply



and pesticide-free production methods in a closed environment, producing safe water for consumption and use.

Objectives: The project aims to develop cooling methods for closed greenhouses that can be used in hot and arid climates and provide cost-effective closed environments. The initiative also intends to elaborate upon the use of saline water (including high salinity) in the greenhouse heating/cooling system. Lastly, it aims to test North African subtropical and selected tropical food- and non-food crops in the humid and hot climate of the closed system.

Methodology: Based on the experience of the precursor project, a model for a greenhouse dehumidifier using liquid desiccants in combination with heat transfer through the desiccant into thermal storage is being produced. Based on these calculations, a greenhouse prototype will be built on an agricultural research ground in central Cairo. Within the winter/springtime in 2013 and 2014, a number of practical tests with various horticultural crops will be performed. The system will be monitored and

controlled, to achieve detailed information about the energy streams within such a system.

Outcomes: In the initial project phase, detailed planning was developed for the greenhouse (including details for condensed water collection from the roof), for the central dehumidifier/absorber element in the greenhouse, and for thermal storage, as a result of ongoing energetic calculations and estimations from existing data from earlier projects. For the storage, small-scale testing of different absorber layouts and Phase Change Material (PCM) storage materials has been conducted under laboratory conditions. Chemical properties of the chosen desiccants (a waste product from an Egyptian salina) and PCM salt hydrate have been analyzed.

Applications: The use of desiccant cooling within a closed greenhouse will provide fundamental information about closed-loop air-conditioning systems in buildings, which will allow the use of a full range of cooling power derived from water evaporation, with the possibility for water recuperation from the air to allow completely closed water cycles. Desiccants may allow heat removal at high ambient air temperatures, and thus provide the chance to create closed environments within hot/arid regions. Greenhouse vegetation does not only provide food, but works as a filter for graywater or pre-treated waste water, and can be used as a CO₂ sink within closed environments.

Academic Team: TU Berlin, Chair of Building Technology, Prof. Claus Steffan + Cairo University, Chair of Hydrology and Irrigation **Funding Institutions:** The German Ministry of Research and Science and Technology Development Fund (STDF) within the Program German Egyptian Research Fund (GERF) **Timeframe:** 2011–2014 **Site of Investigation:** Research greenhouse prototype in Cairo, Egypt **Contact:** TU Berlin, Chair Building of Technology and Design, Prof. Claus Steffan + Dr.-Ing. Martin Buchholz, martin.buchholz@tu-berlin.de

Climate KIC Projects — The ability to draw meaningful conclusions from visual information is a tool for change, as demonstrated in these climate-related projects. New technologies allow the visualization and manipulation of complex data related to energy consumption.

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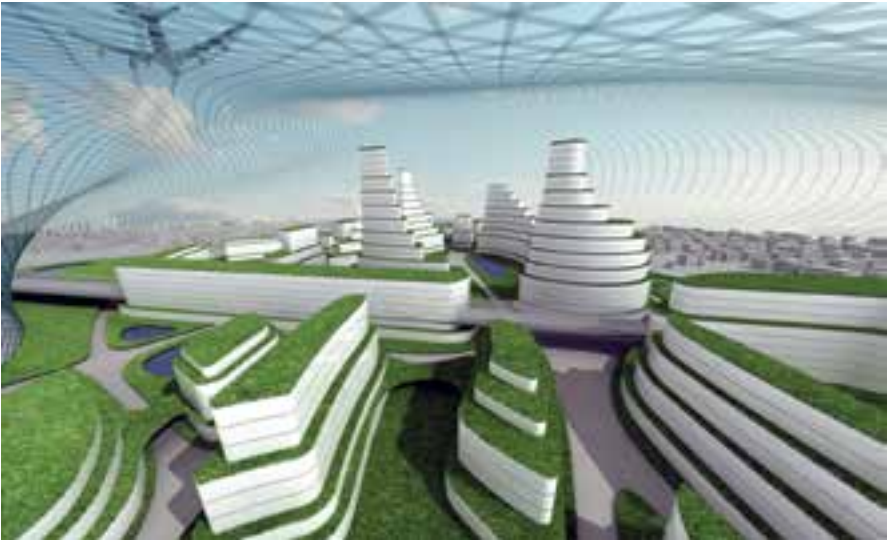
Neighborhood Demonstrators

Neighborhood Demonstrators (N-DEMO) provides a set of significant urban test-beds to demonstrate, evaluate and facilitate innovative and integrated low-carbon interventions. It will mitigate the impact of climate change and drive forward knowledge on how to create sustainable EU cities through a systemic neighborhood approach. The project is funded by Climate-KIC, an EU support program for Knowledge and Innovation Communities (KIC). Bringing together Climate-KIC academic and corporate partners and providing real-world development and demonstration opportunities for small and medium enterprises, this 30-month project will apply and assess specific innovation opportunities, including climate envelopes, geothermal demonstrations and holistic community-level low-carbon transformation. Partners for the project are the Institute for Sustainability and the Imperial College in London, the TU Berlin and the GFZ in Potsdam. The project focuses on three deliverables first data-driven modeling and visualization to support investment optimization at the neighborhood scale and to enable stakeholder engagement; developing new and marketable business models to enable large-scale, integrated delivery of low-carbon investments; demonstrators that provide

corporate, SME, and public sector partners opportunities to showcase and accelerate innovation and market progress through knowledge-related processes.

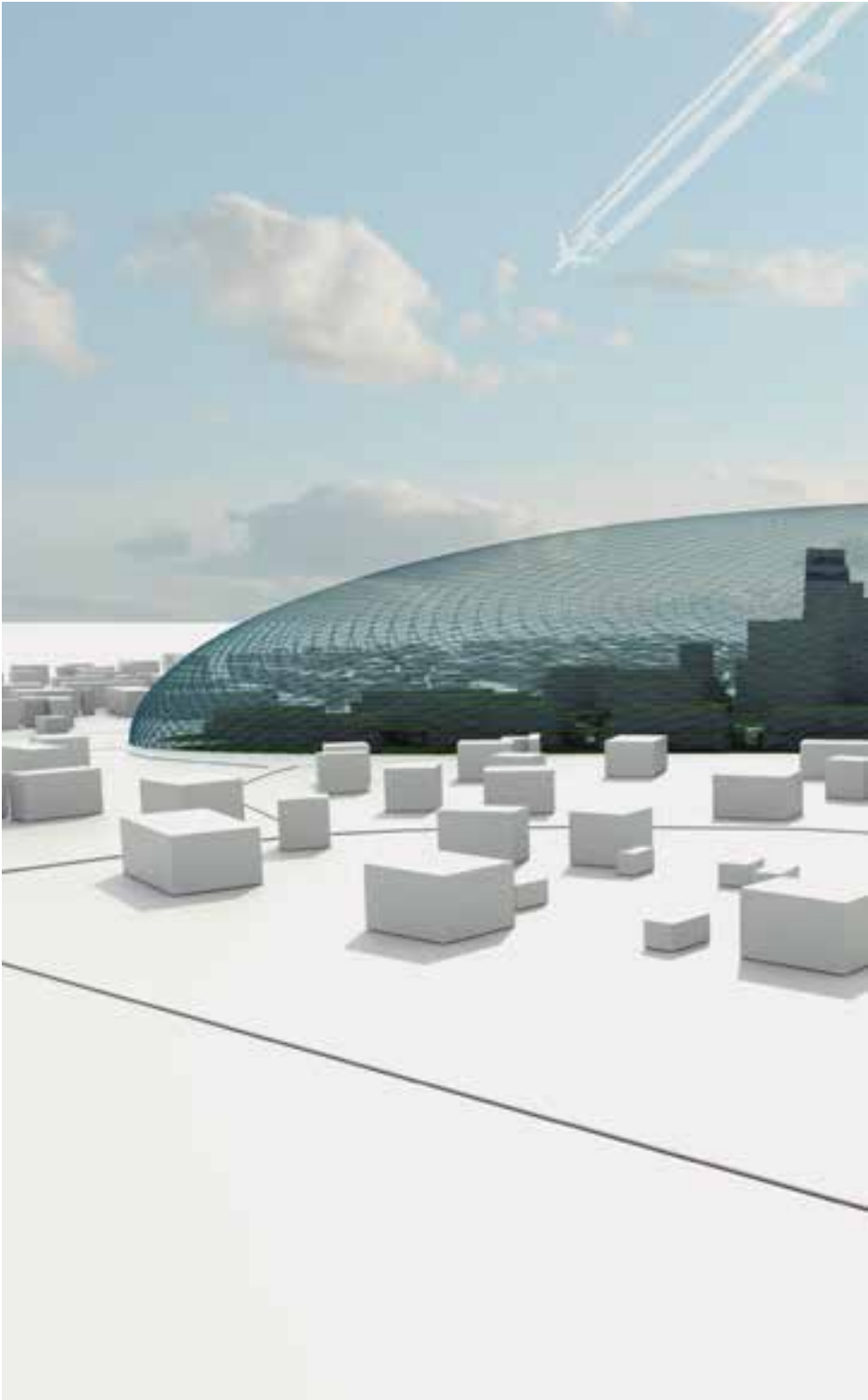
Objectives: Urban carbon reduction investments, such as retrofitting and renewable energy generation, are currently approached as isolated activities on a limited scale. Instead of piecemeal solutions, which are less attractive to investors and do not present a coherent strategy for the communities involved, Neighborhood Demonstrators aims to provide an Integrative Systems Approach (ISA) of massive scale to deliver sustainable cities. Demonstrators for holistic delivery at this scale will create a compelling case for de-risking investment and unlocking the significant private finance needed for wholesale city transformation, influence policy frameworks, and create widely replicable templates for subsequent action.

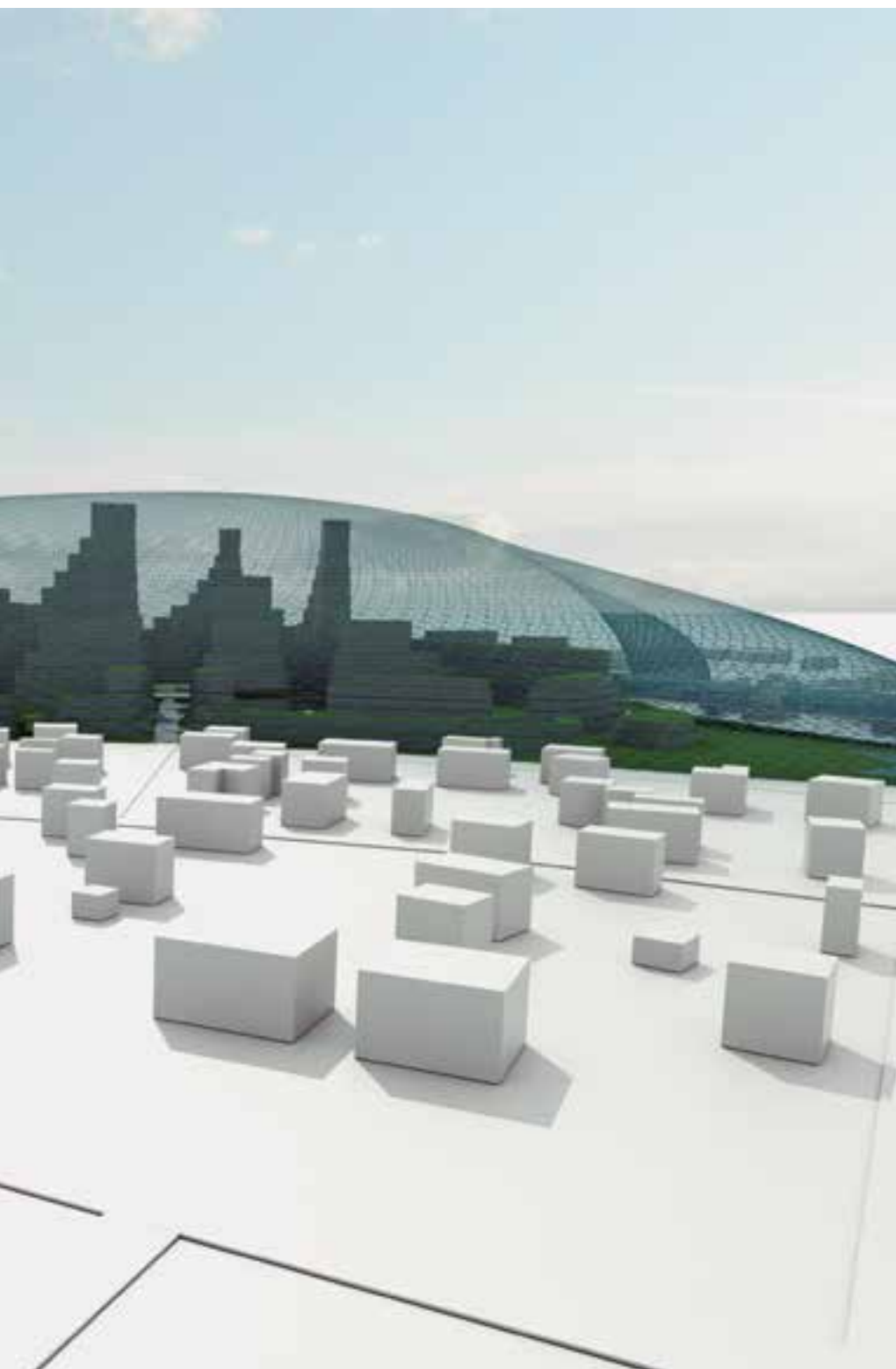
Noise-protected quarter beneath climate envelope in Blankenfeide-Mahlow (Image: TUB gte, J. Gritsch, M. Almatari)



Methodology: To reach carbon reduction targets, an estimated two trillion euros needs to be invested through 2050 across the EU. The Neighborhood Demonstrators Climate-KIC project will build on existing and planned investments of approximately six million euros during the project to bring forward new innovation. Specifically, the project provides demonstrator opportunities for progress innovation from the KIC partners through: deploying, validating and providing feedback on emerging economic

Blankenfelde-Mahlow climate and noise-protection envelope (Image: TUB gte, J. Gritsch, M. Almatar)





and geospatial modeling tools; providing data for and piloting the city-scale information systems of the ICT-KIC; providing results to EURBANLABS to inform the development of the tools needed for the massive up-scaling of sustainable communities and cities.

Outcomes: N-DEMO will create new business and product innovation opportunities. The Neighborhood Demonstrators project will uncover and quantify opportunities presented by both “demand pull” – where new needs create new product and market opportunities, and “technology push” – where emerging products and approaches can be deployed and assessed in innovative ways, effectively implementing the Climate-KIC “Innovation Triangle” approach. The project will help drive investments that Neighborhood Demonstrators planned in the London demonstration and the Blankenfelde-Mahlow and Berlin Moabit areas. These renovation activities offer the ultimate potential of saving circa 30,000 tons of CO₂ per annum. In Berlin, the geothermal reservoirs offer a reduction potential of up to 600,000 tons per annum.

Applications: The demonstrators will provide a range of innovation products, including: neighborhood-scale technical demonstrations across hundreds of domestic and non-domestic buildings to develop new product potentials, such as climate envelopes; geothermal reservoirs; integrated retrofit and low-carbon energy solutions; smart energy management systems and efficient resource management systems. The design and construction of a climate envelope prototype in Blankenfelde-Mahlow with monitoring equipment, including CO₂ and energy balance monitoring, will be essential in the dissemination of the Neighborhood Demonstrators concepts.

Academic Team: • Climate Envelopes: Prof. Claus Steffan + Prof. Klaus Zillich + Prof. Klaus Rückert + Dr. Ivana Agnolin + Dr. Martin Buchholz + Dr. Arda Karasu • German Partners: TU Berlin: Prof. Kolbe + Prof. Strunz + ZTG: Dr. Arndt + GFZ Potsdam: Prof. Huenges • International Partners: Institute for Sustainability, London (United Kingdom) + Imperial College London (United Kingdom) **Funding Institutions:** European Union EIT Climate-KIC **Timeframe:** October 2011 – March 2014 **Sites of Investigation:** London (United Kingdom) + Berlin (Germany) **Successfully completed Projects in the Field:** Climate Envelope Prototype **Contact:** ivana.agnolin@tu-berlin.de

Sense4En: Visualization of Energy Efficiency Performance and User Behavior

Despite increased efforts to create more energy efficient buildings, private households and services are responsible for approximately 39% of the total final energy consumption in the EU-27 countries. In Germany, the highest factors of consumption are space heating (73%) and domestic hot water (DHW) (12%). Without a controlled heating and ventilation system, users are in charge of keeping the balance between comfort temperature, good air quality and costs. If the ventilation is excessive, heat is wasted unnecessarily. If the ventilation is too poor, living quality worsens due to high CO₂/VOC concentrations or the emergence of mold. The main problem is that users have little to no feedback about their heating and DHW consumption except their utility bills. Sense4En addresses the user as central actor to reduce private energy consumption, aiming at a feedback system via a smartphone application, putting individuals in an active position in terms of their consumption behavior. The project team comprises scientific and industrial partners from the fields of architecture, computer science, telecommunications and energy provision.

Objectives: In addition to energy-efficient architecture, the project aims at tools for the users of buildings. Sense4En takes up the challenge to develop a user-friendly application that is more attractive for customers than the existing ones by giving easy access to real-time diagnostic feedback and a social incentive. Thereby the clients will be enabled to immediately assess their indoor air quality along with heat and DHW consumption and react accordingly. Sense4En pursues an intermediate approach between general advice concerning energy behavior and full building automation. The project targets the user as a key

figure of private energy consumption. The aim is to develop feasible tools, such as a smartphone app and feedback devices like the DHW pilot (amphiro), which combine static and dynamic data such as statistics, building simulations and metering.

Methodology: The research combines two foci and several levels of investigation. The analysis of energy demand leads to specific behavior, which becomes the target of a feedback system and devices. The hypotheses are verified through testing of user behavior in the field, in building simulations and in the laboratory. Households in Berlin are a site of investigation with a focus on space heating (heating and ventilation), whereas the field test in Zurich address domestic hot water (bathing). The results of both pilots are the basis of a smartphone application that will reflect individual energy consumption and advice towards more efficient behavior.



Outcomes: The research is in different phases. The DHW pilot (amphiro) device is fully developed and ready for the market. At present it is tested in the field with several thousand households. The heat energy pilot is in the development phase and a prototype will be tested in the field and laboratory during 2013.

Applications: The challenge of reducing energy consumption in the building sector is a global one. The full automation, and therefore optimum operation of residences will be limited to a small sector. Thus it is crucial to address the user as a key figure and develop low-tech/low-cost solutions that put the user in an active position to control energy consumption.

Academic Team: • TU Berlin: Johanna Moser, FG Steffan + Tilo Westermann, FG Möller
 • ETH Zurich: Dr. Thorsten Staake (Bits for Energy Lab) **Partners:** Vattenfall Wärme GmbH **Funding Institutions:** European Union EIT Climate-KIC **Timeframe:** 2012 – 2014 **Site of Investigation:** Berlin (Germany) + Switzerland **Website:** www.sense4en.qu.tu-berlin.de **Contact:** FG Steffan, A59, ivana.agnolin@tu-berlin.de

EURBANLAB

It is widely acknowledged that innovation in the urban environment is hampered by rigidities in traditional industrial, societal and governance structures. Especially in urban innovation projects, top-down innovation strategies have not worked: one needs to build trust between the population, public authorities, business and the academic community to produce innovations and new concepts. For “urban living labs” and cities to be more effective and successful in their transition to resilient low-carbon areas there is a need to accelerate innovation, resulting in new technologies and concepts and in new value chains across the building, financial and transportation sector. In the context of EURBANLAB, an “urban living lab” is the geographical identification of an urban area where there is ambition to transition into a “low-carbon resilient city,” and where opportunities are created to experiment with new technologies and concepts in a characterized context. It is recognized under Climate KIC that climate change innovation in cities must overcome rigidities, cutting across traditional business and sector boundaries. It is KIC’s mission to catalyze climate change innovation, to create a community for climate change innovation and to deliver integrated climate change innovation that transforms Europe’s response to climate change.

Objectives: Within this context there is a unique opportunity for EURBANLAB to strengthen this process of transforming Europe’s response to climate change by primarily focusing on innovation acceleration, new business generation and new value chain creation. Accelerating innovation doesn’t come by itself. It is believed that the development of knowledge-business ecosystems, consisting of partners from the private, public and research sector, which are closely linked to urban living labs, will play an important role as breeding grounds for innovation. EURBANLAB will facilitate this “golden triangle” to function effectively and connect urban living labs and leaders in development, investment, science and innovation.

Methodology: The main focus of EURBANLAB will be on making the innovation cycle spin (faster) and

causing a “flywheel effect” by creating promising new collaborations. Individual living labs are envisioned to function as a testing ground for business, innovators and academia, creating opportunities for pioneering with new value chain configurations and are an attractive environment for new climate change agents and entrepreneurs. EURBANLAB will add value to the process of innovation acceleration, new business generation and new value chain creation by building a learning and expert community. This will allow contextual learning and assessment to provide confidence and trust in innovative concepts and technologies and by creating a marketplace where new ideas, innovative concepts and technologies are shared and transfer is facilitated.

Outcome and Applications: EURBANLAB is expected to create value for participating urban living labs, local communities and partners by creating a European network to connect people and ideas and to enable problem owners and innovators in low-carbon, resilient cities to connect, share, learn and transfer. Through the synergy created between the interaction of the learning community, the thematic studies, contextual learning and assessments and the marketplace new business opportunities will be created. The combination of these three functions of EURBANLAB is expected to actively create a favorable environment for business where new collaborations and new combinations within or between value chains will flourish.

Academic Team: • German Partners: Prof. Claus Steffan + Prof. Klaus Zillich + Nele Vesta Zareh Partner Fair Leben e.V. • International Partners: TNO (Netherlands) + Advancity (France) + Imperial College (United Kingdom) + Fondaterra (France) + Institute for Sustainability (United Kingdom) + GDF (France) + Stadhavens Rotterdam (Netherlands) **Funding Source:** European Union EIT Climate-KIC **Timeframe:** 2011–2013 **Site of Investigation:** London (United Kingdom) + Berlin (Germany) + Rotterdam (Netherlands) + Paris Region (France) **Successfully completed Projects in the Field:** Climate Envelope Prototype **Contact:** claus.steffan@tu-berlin.de

Cities and Energy — Smart region planning designs urban situations that are sustainable, resilient and urgently needed. Small-scale prototypes, medium-scale neighborhoods and large-scale infrastructure projects are integrated into dynamic planning tools.

Smart City Chengdu

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The development of the fifth-ring motorway as a holistic low-carbon incubator may allow the city of Chengdu to shift towards a low-carbon trajectory and away from static, heavy and inflexible infrastructures. The construction of a motorway of this scale today must consider the targets set out by the state regarding climate change. In 50 years

Chengdu Biennale 2011: Smart City Incubator Model
as participatory communication tool
(image: CHORA, 2011)



Chengdu will be deep into the transition towards personal electric transportation, with the potential for intelligent guiding systems. This implies a smart infrastructure that will easily adapt over time without becoming redundant.

An adaptive, additive and expansive infrastructure will allow the stakeholders involved in the progression of the city to scale up – and as the scale increases, the infrastructure can be modified to accommodate the changes.

Objectives: A truly smart strategy addresses carbon production targets not only through technology, adaptability and policy but also through the integration of these aspects with the newly emerging lifestyle in China today, resulting from rapid growth and development. Such GDP (per capita) increases are creating a new Chinese society, one that allows its citizens to enjoy a new lifestyle that has the potential to be smarter and more efficient. Smart City Chengdu would integrate all systems and cultures through intelligent infrastructure design. The Smart City Chengdu strategy is holistic, integrating nature and city, urban and rural, high- and low-tech, inside and outside. Nature can be seen as a resource, both psychologically (recovery and leisure) and technically (biomass, water purification, etc.). By examining and referencing popular western utopian concepts, the envisioned lifestyle relies on new types of architecture. In this model, architecture leads the way by creating a cultural, social and economic identity that people can relate to.

Chora's Chengdu Biennale 2011 installation attempts to visualize and simulate the Chengdu Smart City Incubator and its affect on energy use and carbon emissions. The Fifth Ring of Chengdu is represented by a tabular surface embellished with utopian visions in various exemplary sectors attached to the ring. These act as a metaphor for the planning and development of the Fifth Ring of Chengdu. It is illustrated as a potential incubator for smart developments and demonstrates the need for widespread and versatile applications of a low-carbon planning and construction toolbox. The toolbox of prototypes is presented in a playful manner as a vast quantity of custom dice, which carry a selection of icons relating to a complete, low-carbon, urban toolbox. Dice are thrown across the board to represent the provision of various prototypes throughout the Fifth Ring. Their location is not meaningful; the project is about reaching targets through proliferation, towards a critical mass of operational prototypes and effective policies.

Methodology: The basis of Chora's energy incubator proposal is the concept of the territory or the liminal body. In this case, the territory is composed of two or more neighborhoods meeting at a site of tension, prosperity, or sharing, for example. Above this territory is the metaspace, a complex network of connections between the

Smart City Chengdu Incubator (Image: CHORA, 2011)



communities on either side of the division through a toolkit called the Urban Gallery, an incubator where ideas are born and start-ups are tested. Ideas that succeed are stimulated; ones that fail are discarded. The key thing is that the communities share space and resources, within which there can be cross-pollination, mutual influence and development. A competitive nature exists that nonetheless allows for the accidental discovery of connections and interrelationships – which are key to incubators of any type. In order to thrive, a low-carbon plan must be sufficiently complex to address its specific territory. In this case, the territory is the boundary of the Fifth Ring that separates urban and rural lifestyles, addressed through the complexity of the programming and action of the infrastructure.

Outcome: Today, the urban utopic designs have shifted towards low-carbon planning. These utopias are exciting ideas to aspire to, however, there are many unknowns and variables preventing the immediate success of such developments. To lower carbon emissions as dramatically as China has proposed to do to is a difficult achievement to perform at once. It begins by starting with a specific project – a large-scale pilot – through which the possibility of creating a smart city can be demonstrated. This system acts as a startup and initiates the learning curve. In order for the Fifth Ring to succeed as a smart city it must satisfy four main objectives: sufficient branding, occupancy of a clearly marked space, incorporation of urban flow (traffic, energy etc.), and good management. Chora proposes to use the Fifth Ring as an international prototype that can become both the site of a large range of renewable, efficient and highly technological measures, and a core, adaptable infrastructure to eventually serve the heart



The Chengdu Wanjiawan Bus Terminal Competition, 2nd Prize
(Image: CHORA, 2012)

of the city and its high-speed traffic as it expands outwards. The Fifth Ring of Chengdu is inevitably a boundary between lifestyles. It is a liminal body between natural and urban development, thus solidifying its possibility to become a Smart City Incubator. Chora's Urban Gallery

space is a planning and support system aimed at curating information and choreographing action within this scope.

Applications: The study for the city was done in the context of the Chengdu Biennale 2011. The Smart City Chengdu Incubator acts as a manual for stakeholders of various scales to encourage their capital growth with the aid of low-carbon technologies, allowing the city to achieve its goals of carbon intensity reduction. The overall installation is a space where visitors can view prototypes. Additionally in 2011 Chora was invited to enter a competition to design the Chengdu Wanjiawan Bus Terminal in the province of Sichuan, China. The office's concept for the Chengdu Bus Terminal, which won second place, is comprised of two parts: a "Smart Platform" design, and a branding campaign for the public services provided by the Chengdu Public Transport Group Company. Chora approached the concept of the platform as a framework for a hybrid program modeled after the idea of the smart phone. Efficiency is a major feature of the proposal. In particular, good architectural design has the potential to increase the management efficiency of bus terminal operations. A mixed program including infrastructural, residential, commercial, retail and leisure components carries benefits such as higher property values, enhanced community life, and association with a public transit node. Chora's proposal contains infrastructure as civic architecture that allows for many ways of communal social and cultural interactions.

Academic Team: Chora city and energy, Urban Design and Sustainable Urban Planning, Prof. Raoul Bunschoten + M.A. Tomaz Pipan + Ying-Chi Deng Diploma AA + Dipl.-Ing. Janna Hohn **Partners:** Chora, a+p | chora **Timeframe:** 2011 **Site of Investigation:** Chengdu Fifth Ring, Sichuan Province, China **Publications:** Raoul Bunschoten with Chora and a+p | chora, Smart City Chengdu – an installation for the Chengdu Biennale, 2011 **Website:** www.chora.org + www.chora.tu-berlin.de **Contact:** Secretariat Prof. Bunschoten, A30 TU Berlin, jessica.luettker@tu-berlin.de

Taiwan Strait Smart Region and the Low Carbon Incubator

The Taiwan Strait Smart Region is a research project that will create a new vision of the Taiwan Strait by investigating the implementation of strict climate change targets and publishing its findings in a book, *The Taiwan Strait Atlas: Towards a Low Carbon Incubator Region*. Combining an atlas and a manual, the publicity of the book will organize parties and agents on both sides of the water boundary, China and Taiwan. The Taiwan Strait is a complex geopolitical region: Taiwan claims sovereignty over the area but is unrecognized by most of the world, including the UK. China sees Taiwan as one of its provinces and maintains a constant military threat there. This makes mapping the Taiwan Strait as an emergent urban region a new and unique endeavor. The function of the Taiwan Strait project is to connect the two sides apolitically, and, additionally, to encourage international collaboration and efforts in climate change. This is done through the consistent analysis of cities on either side of the strait, Xiamen and Taichung.

Objectives: The objective of the project is the creation and evaluation of a low-carbon incubator, a management apparatus, a task force, and pilot projects. The main concept for the creation of a regional incubator came about upon recognizing that the combination of tension and dynamics surrounding the natural liminal body of the Taiwan Strait forms the ideal context for this incubator. This involved mapping the regional situation of global tension and recent progress in cross-strait cooperation over the years.

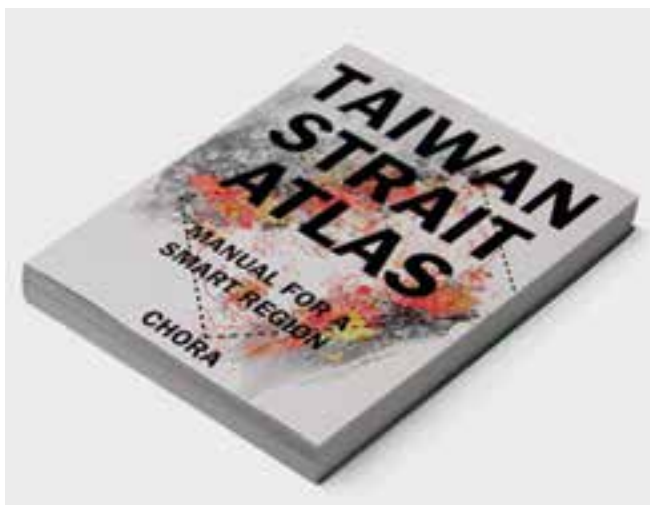
Methodology: The Urban Gallery is the potential design tool for the realization of the Taiwan Strait Smart Region: a combined info-space, design office, meeting area and management headquarters. The Urban Gallery

is a new approach to urban planning that can address the complexity and dynamic character of climate change mitigation and energy efficiency, which are the current focus areas of the initiative. The Urban Gallery is uniquely suited to provide a robust framework for handling ever-changing conditions in the urban environment. This is achieved by means of choreography, co-evolution, urban curation and cybernetics.

Outcomes: During the last year, the overall project has been presented as a potential regional incubator, naming the project Low Carbon Incubator or Smart Region. At this stage, the book was planned as a curatorial device to disseminate the Low Carbon Incubator vision and push it towards possible realization. In tandem, the design for an internet-based game for pilot projects in the region commenced, using maps from the *Atlas* as the game board.

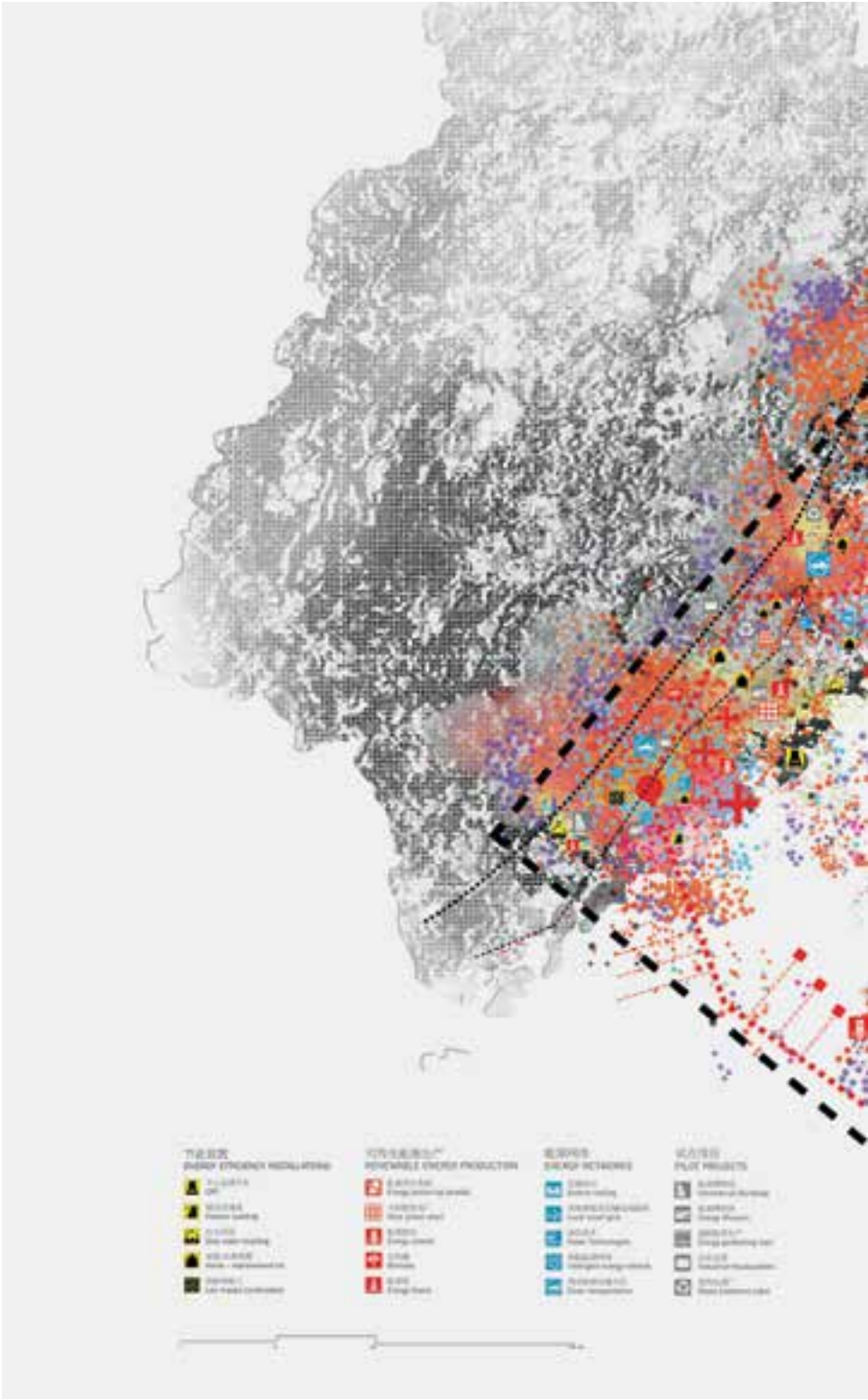
Applications: The TSSR project is now active and operating as a task force to implement actions both on a national and local scale. The initiators have begun forming consortia and other communities of stakeholders,

The book is an atlas/a design manual to realize the vision for a low-carbon smart region around the Taiwan Strait (image: TUB CHORA, Luca Mulé, 2012)



who are working to combine all possible technologies and design procedures, and are compiling a database. The project can be realized by weaving together these layers of action, both by the members of the task-force and by local actors. The work on the book *Taiwan Strait Atlas: Manual for a Smart Region* began over eight years ago.

Mapping: Taiwan Strait Smart Region (Image: CHORA, 2009)





Many people have been involved in the research, design and production of the book over this period. The book is nearly complete, but needs a final injection of funding to finish the last of the research, graphic design, translation into three languages, and printing. This amounts to a figure in the region of 200,000 euros. Instead of achieving this funding through direct corporate sponsorship, the project organizers decided to take the route of crowd funding. This is a relatively new phenomenon, in which a project profile is created online, and any person or organization around the world can donate money. This follows the spirit of the project, as motivated volunteers, who simply want to see the project happen and gain experience at the same time, have carried out most of the work and research. The concept of crowd funding works exactly the same way: people donate money to a project because they believe in it and want it to succeed. The preparations for the campaign have already begun, and the hope is to launch the project on Kickstarter at the beginning of December 2012. Several rewards have been designed for potential donators, such as t-shirts, posters, playing cards, VIP book launch invitations, and of course the book itself. Launch events will be organized in several worldwide locations to spread the word. Running parallel is a social media and networking campaign in order to direct people to the project page on the Kickstarter website, including a new Facebook page that was launched in October 2012. (www.facebook.com/contact.chora)

Academic Team: Chora city and energy, Urban Design and Sustainable Urban Planning, Prof. Raoul Bunschoten, TU Berlin + National Taiwan University + Xiamen University + Beijing Tsinghua University **Partners:** Chora + a+p chora + European Chamber of Commerce Taipei + City of Xiamen + City of Taichung **Timeframe:** 2006–2020 **Site of Investigation:** Taiwan Strait Region **Publications:** •Bunschoten, Raoul: Urban Flotsam, 010 publishing, 2010. •Bunschoten, Raoul: From matter to metaspaces – cave, ground, horizon, wind, Springer, Wien, 2006. •Bunschoten, Raoul: Public Spaces – Prototypes, Black Dog Architecture, 2002. •Bunschoten, Raoul: Metaspaces, Black Dog Publishing, 1998. •Bunschoten, Raoul: Komplexe Dynamik, GAM—Graz Architecture Magazine, 2010. •Bunschoten, Raoul: Komplexe Dynamik, Der Architekt 4, 2010. •Bunschoten, Raoul: Stirring still: The city soul and its metaspaces, Perspecta: The Yale Architecture Journal, 2003. •ANC – Architecture and Culture, Monographic issue on recent work and methodology, Korea, 2003. **Website:** www.chora.tu-berlin.de + www.chora.org **Contact:** Sekretariat Prof. Bunschoten, A30 TU Berlin, jessica.luettker@tu-berlin.de

Energy-Efficient Architecture – The study of contemporary energy regimes offers clues about how energy management and monitoring, along with novel methods of energy generation and network creation, hold the promise of better, smarter, cheaper power.

Krankenhaus Plus

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Krankenhaus Plus is a research project intended to determine the energy consumption of different functional units of hospitals. Scientifically analyzing the energy consumption of each unit is an innovative concept that will allow the development of a standardized model to assess the energy consumption of any given hospital. Currently Germany does not have a standard model. The project is headed by Prof. Christine Nickl-Weller, Professor of Architecture for Health at the University of Berlin, and is part of the federal government's Fifth Energy Research Program, within the focus of energy-optimized buildings (EnOB), which are buildings designed with minimum primary energy needs and high user comfort, while aiming at moderate investment costs and a significant reduction in operating costs.

Objectives: Krankenhaus Plus develops strategies to reduce energy consumption in newly constructed and existing hospital facilities. By analyzing the energy consumption of functional units of a hospital (see DIN 13080), synergies between the units can be identified, and a base system to assess hospital energy efficiency can be established. Alternative building cooling strategies are a particular area of investigation. The energy required by a hospital is the sum of energy needed for heat and air-conditioning plus the energy needs of services that are independent of the

Main entrance hall of the University Hospital in Frankfurt/Main: a test site for the evaluation of energy consumption in a modern clinic setting (Image: Stefan Müller-Naumann, 2007)





building. Overall a decline in heating energy needs and a simultaneous increase in electricity needs has been observed. In the field of cooling, in particular, a 260% increase in primary energy needs is expected in the period between 2000 and 2020. The control of humidity levels



Main entrance to the J. W. Goethe-University hospital in Frankfurt/Main: part of the cluster of hospitals that are evaluated regarding their energy efficiency (Image: Stefan Müller-Naumann, 2007)

in the air using concentrated saline desiccant solutions is another focal area of the initiative. Further key research aspects are building construction and thermal insulation, the use of daylight, an analysis of the hospital environment and the quality of the hospital rooms.

Methodology: Krankenhaus Plus is split into three sub-projects. Sub-project I is an energy-specific analysis of Agatharied Hospital in Bavaria. Sub-project II concentrates on the development of a new building for the University Hospital in Frankfurt/Main, to demonstrate optimal planning approaches for a functional and energy-efficient building. Sub-project II also intends to measure energy consumption and energy flows in the building over two years, pinpointing areas where energy can be saved. Sub-project III examines energy consumption of individual hospital units to identify synergies, re-routing excess energy (waste heat) to underheated areas within the

building. In addition to the case-studies in Agatharied Hospital and the University Hospital in Frankfurt/Main, cross-sectional studies are being conducted.

Outcomes: Krankenhaus Plus is still in the data-acquisition phase. By installing meters in Agatharied Hospital to accurately record the values of individual consumers in the hospital, it has already been possible to identify weaknesses in the physical system that can be used to reduce overall energy consumption. Following the analysis of the data for the combined heat and power units, it is clear that the entire power supply strategy has potential improvement. In the University Hospital in Frankfurt/Main, accurate data analysis resulted in building optimizations as early as the planning stage, which have resulted in a significant reduction in the number of thermal bridges and a new optimized use of daylight.

Applications: While hospitals have a very high rate of energy consumption due to specific building engineering requirements, they also have great potential for saving energy. Fully unlocking this potential requires an integrated overall concept that uses innovative technology. For the long-term development of a hospital, such a thorough energy retrofitting might be possible in isolated cases. However, to make savings felt at the macroeconomic level it must also be possible to maximize the energy-saving potential of the many buildings where this optimum situation does not arise. The findings of this research project will provide invaluable fundamental and detailed knowledge to use along this path.

Academic Team: Prof. Christine Nickl-Weller + Dipl.Ing. Marco Schmidt + Dipl.Ing. Maria Roos **Student assistants:** Saeed Sayadi + Bahar Gilani **Partners:** Dipl.Ing. Heiko Schiller (Schiller Engineering) + Margarethe Korolkow (IBUS – the Institute of Construction, Environmental, and Solar Research) + Dipl.Ing. Roman Jakobiak (Daylighting.de) + Dr. Gustav Hillmann, Dipl.Ing.(FH) + Krankenhaus Agatharied GmbH: Akademisches Lehrkrankenhaus der LMU München + Klinikum und Fachbereich Medizin: Johann Wolfgang Goethe-Universität, Frankfurt/Main **Funding Sources:** Federal Ministry of Economics and Technology **Timeframe:** September 2009 – October 2013 **Site of Investigation:** Agatharied, Frankfurt/Main + Berlin **Website:** www.khplus.info **Contact:** khplus@healthcare-tub.com

Cluster Energy

In autumn of 2010 the Monitoring Committee of the Baltic Sea Region Programme (2007–2013) initiated a new instrument for cooperation: cluster initiatives to be fully financed from the program's cumulated interest income. The initiatives are targeted at already approved and on-going projects. The cluster entitled "Energy Efficiency and Renewable Energy Sources" was selected to pilot the concept. The eight projects representing 16 project partners from six countries in this cluster are Longlife, SPIN, Bioenergy Promotion, Urb.Energy, Baltic Biogas Bus, REMOWE, PEA and CO₂OLBricks. They are linked with each other through their outputs in order to form a big picture of an eco-energy region. Three additional clusters, called "Sustain-able, Multi-Modal and Green Transport Corridor," "Baltic Impulse – Saving the Baltic Sea Waters" and "Innovation in SMEs" were approved in March 2012.

Objectives: The cluster projects and partners must take into consideration the EU 2020 Energy Strategy in order to contribute to an eco-region. The projects demonstrate the possibilities for cooperation in the field of energy and enhance collaborative networks to intensify cooperation between the cluster projects, making the project results visible within a larger framework or region. The aim of the project is to provide information about common interests and outcomes in the energy field and reach out to decision-makers and politicians, as well as deliver outcomes and results from the clusters in international meetings and on a common platform.

Methodology: Cluster Energy was initiated to improve the dialogue between the projects and to increase the awareness of the achievements of the BSR Programme 2007–2013. The focus lies on using renewable energies and sustainable technologies, finding resource-saving solutions in buildings and promoting energy efficiency in the urban context. With partners from Germany, Denmark, Estonia, Finland, Poland and Sweden, Cluster Energy embraces the triple-helix competencies of science, administration politics, and economy, bringing together the projects to develop strategies in energy efficiency

and resource saving. Cluster Energy forms a network in order to create an eco-region by transferring knowledge and generating synergies.

Outcomes: In Cluster Energy each project can build connections to the other projects through its outputs, its strategies and its continuation. Under the focus of sustainability and energy efficiency, Cluster Energy covers the

Discussing Cluster Energy results with EU representatives in Brussels
(Image: TUB gte)



fields of construction, building refurbishment, building heritage, waste-to-energy production, transport and infrastructure, and renewable power generation and its specific technologies. Cluster Energy strengthens potentials in the region to trigger new capabilities, business opportunities, investments and jobs. Cluster Energy draws retrospective conclusions and will evaluate projects, processes, outputs and synergies in the final phase of the funding period.

Applications: The regional labor market of the Baltic Sea can be extended by spreading knowledge using regional resources, abilities and technologies. Out of demographic development, possibilities must be created for ensuring employment and preserving qualified staff in the BSR. The proposal to develop an eco-region has a target is to establish green growth to improve economic, ecologic and

social aspects in a bordered region. Moreover, the Cluster Energy eco-region is defined by the existence of the combination of fields of competencies to foster strong economic performance of the set region: renewable energy, energy efficiency in urban context, reduction of resource use in buildings, and sustainable technologies.

Partners: Longlife (TU Berlin, TEK, Prof Dr.-Ing. Klaus Rückert + City of Roskilde) + SPIN (Swedish Environmental Research Institute; Central Mining Institute Poland; University of Tartu) + Bioenergy Promotion (Agency for Renewable Resources) + BalticBioGasBus (ATL erc GmbH) + Urb. Energy (German Association for Housing, Urban and Spatial Development; Housing Initiative for Eastern Europe) + PEA (City of Wittenberge; City of Niepolomice) + REMOWE (Mälardalen University Sweden; University of Eastern Finland; Savonia University Finland; Ostfalia University of Applied Sciences) + CO₂OLBricks (City of Hamburg, Ministry of Culture and Media, Department of Heritage Preservation) **Funding Source:** Baltic Sea Region Programme 2007–2013 **Timeframe:** 2011–2012 **Publications:** Rückert, Klaus: Cluster Energy Compendium for Green Economic Growth, Universitätsverlag der TU Berlin, Berlin, 2012. **Website:** www.energy-cluster.info **Contact:** •Prof. Dr.-Ing. Klaus Rückert, A16 TU Berlin, klaus.rueckert@tu-berlin.de or office@tek.tu-berlin.de •Dipl.-Ing. Maria-Ilona Kiefel, Project coordination and communication, office@energy-cluster.info

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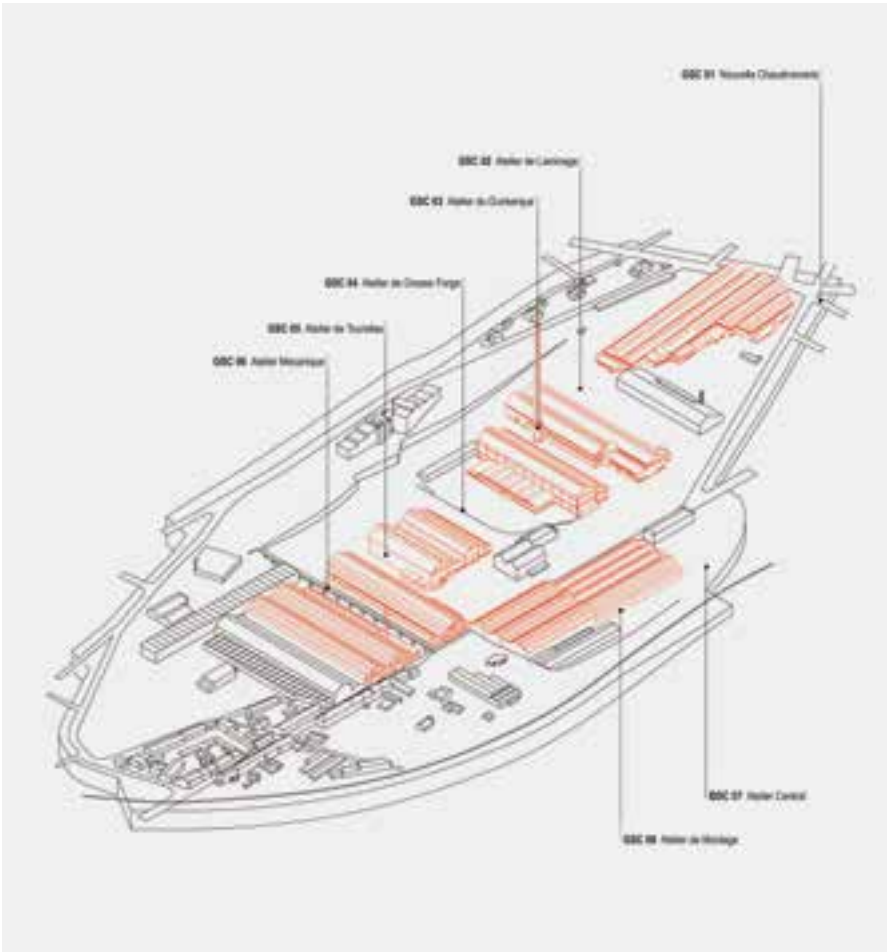
Cité du Design Saint-Étienne

In 2004 the Laboratory for Integrative Architecture, the chair of Finn Geipel and his and Guilia Andi's architecture firm LIN won a competition held by Saint-Étienne Métropole, to develop the "Cité du Design," a new institution for communication, research and education in design. The project is situated on the historical site of the National Arms Manufacture in Saint-Étienne, a former essential industrial site in the area. The project involved the renovation of several historic buildings, as well as the integration of a new building, the "Platine," next to an observation tower, two gardens and the Place d'Armes – a public esplanade. The project included two studies: The "Atlas Actif des Vallées Stéphanoises," commissioned in 2006 by the Direction Départementale de

l'Équipement Loire (DDE Loire) and the Etablissement Public Foncier Ouest Rhône-Alpes (EPORA) in Saint-Étienne, was conducted to interpret the industrial patrimony on the site and in the surrounding region. The other study addressed the development of a sustainable strategy for the Cité du Design using both a social and an ecological approach.

Objectives: The research objective of the “Atlas” study was to develop a methodology of analysis and documentation of the special industrial sites in the Stéphanoise Valley. Its goal was to visualize the existing but unnoticed

Atlas: site of Giat Industries S.A. in Saint-Chamond (GSC) (image: LIN/LIA)



landscape elements and special structures, and to point out the present potential of the former industrially used area. Instead of a concrete planning strategy, the study

Cité du Design: View over the Platine's modular facade and the Place de la Manufacture d'Armes (Image: LIN/LIA)





was designed to simply create a base for the conversion of the existing conditions and for future development, by drawing on the visible industrial heritage. As a result of the findings of the “Atlas,” the research objective of the Platine was to rethink and reinterpret the typology of the single room industrial hall, in regard to its sustainability in terms of flexibility, connectivity and climatic possibilities. Since the typology of the “Monospace” consists of an autonomous shell disconnected from the internal spatial structure, it allows for a flexible use of the interior space. This flexibility and adaptability was to be tested in terms of sustainability.

Methodology: An international and multi-disciplinary team has developed the Cité du Design. Experts in urban planning and economics, theory and history of



The modular and adaptive skin from the inside of the Platine (Image: LIN/LIA)

the city, philosophy, architecture, landscape design, ecology, climate engineering, acoustics, scenography, and lighting worked together in a distributed temporary laboratory, collaborating with the research institutes of the Massachusetts Institute of Technology (MIT), Oldenburg University, Germany and TU Berlin. The project involved

close interconnection between academia and practice, and both student and office work was integrated into the research. This parallel search for design findings re-informed the research and established the triad of research-teaching-practice.

Outcome: The “Atlas” was developed in two phases: a schematic spatial portrait of the industrial buildings and infrastructure at two scales, in the form of a catalogue with comparable data in drawings and photos, and a portrait of the spatial context of the buildings and an analysis of the region as a whole using a standardized cartography and innovative iconographic illustrations. The “Atlas” brought the industrial heritage of the region of Saint-Étienne back to the local collective conscience. Through applying the results of the “Atlas” in the Cité du Design it was possible to preserve, integrate and reuse the abandoned industrial buildings and give the site new importance as a focal point in the city. Thus the Platine was developed as a monospace, which provides an open, continuous space on the inside and which contains various program elements in discreet zones. These zones are separated by light partition walls called “filters.” The interior climate of each zone can be adjusted individually. The Platine’s modular and adaptive skin is reactive to different programmatic needs: the natural and artificial lighting are adaptive, it can insulate, produce energy or be acoustically responsive. Panels can be replaced or modified to adapt to changing requirements over time. A geothermal energy system was implemented. With its flexibility and the ability to precisely regulate the interior climate through the responsiveness of the envelope, the Platine tends toward energy independence.

Applications: The format of the “Atlas” as a tool of analysis was for easy application to other projects. Its data and illustrations are precise and easy to understand, even for people without previous knowledge of the subjects within it. Transferability is an important objective for the Cité du Design, as the project deals with central topics concerning the energy efficiency of buildings, not just in technological but especially in typological aspects. Additionally there is ongoing research regarding the skin of the Platine: 120 square meters of its surface are set

aside for installing experimental panels, which may evolve or be replaced following technological advances. Currently photosynthesis panels are proposed.

Academic Team: • LIA: Prof. Finn Geipel + Heiko Walth (coordination and execution) + Richard Woditsch + John Klepel + Philip Rieseberg Partners • LIN: Prof. Finn Geipel + Giulia Andi + Philip König + Stefan Jeske (Project Managers) + Muriel Poncet + Jan-Oliver Kunze + Judith Stichtenoth + Francois Maisonnasse + Marielle Gilibert + Heiko Walth • Initial Design Wilhelm Klauser, Berlin (Germany) • LUA: Massachusetts Institute of Technology, Cambridge (USA) • TETRA, Urban Eco-nomy, Hervé Huntzinger, Paris (France) • Landscape Ecology Working Group, Michael Kleyer, Carl v. Ossietzky Universität Oldenburg (Germany) **Outside Consultants:** • Benjamin Wallerand + Maurice Guitton, Lyon, Assistants to the execution of construction (France) • Dominique Berger + Cabinet Berger, Saint-Étienne, Local architect (France) • Werner Sobek + Thomas Winterstetter, WSI, Stuttgart/New York, Structure (Germany, USA) • Frédérique Binignat + Christian Desquiers, BETOM Ingénierie, Corbas, Engineering (France) • Matthias Schuler + Arnaud Billard, Transsolar, Stuttgart/New York, Climate engineering (Germany, USA) • Richard Denayrou + Emily Morin, Altia Acoustique, Paris, Acoustics (France) • Gérard Fleury, Architecture & Technique, Paris, Scenography (France) • Pierre Dumond + Alain Baland, Cyprium, Lyon, Economy (France) • Andy Sedgwick + Jeff Shaw, Ove Arup, London, Lighting (Great Britain) • Clément Willemin + Frank Poirier, BASE, Paris, Landscape architecture (France) • Andreas Schneider, IIDJ, Tokyo, Communication design (Japan) • Joseph Hanimann, Paris, Philosophy (France) **Funding Sources:** • Atlas DDE Loire: Direction Départementale de l'Équipement Loire, Saint-Etienne + EPORA: Etablissement Public Foncier Ouest Rhône-Alpes, Saint-Etienne • Cité du Design, Saint-Etienne Metropole **Timeframe:** • Atlas Phase 1: May 2006 – March 2007 + Phase 2: 2008 • Cité du Design Platine Competition: March – June 2004, realization 2006 to 2009 **Site of Investigation:** Saint-Étienne, Loire, France **Successfully Completed Projects in the Field:** • Studies: ATLAS (Atlas Actif des Vallées Stéphanoises) • Projects: SCD (Cité du Design) **Publications:** • Geipel, Finn; Klauser, Bill; Walth, Heiko; Woditsch, Richard; Klepel, John; Rieseberg, Philip: Atlas – Atlas Actif des Vallées Stéphanoises. LIA (Laboratory for Integrative Architecture), Berlin 2006 • Andi, Giulia; Geipel, Finn; Équipe LIN: Cité du Design, Saint-Étienne, 01 Observations. Jean Michel Place, Paris 2006 • Andi, Giulia; Geipel, Finn; Équipe LIN: Cité du Design, Saint-Étienne, 02 Projections. Jean Michel Place, Paris 2006 **Websites:** www.citedudesign.com + www.lia.tu-berlin.de + www.lin-a.com **Contact:** Sekretariat Prof. Geipel, A20 TU Berlin: a20@tu-berlin.de

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Heritage

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The history
and
legacy of

the
human habitat

Qasr al-Mushatta – Architectural heritage research aids the complex process by which rapidly vanishing historical structures are preserved as part of the cultural pantheon, with international support and institutional codification through organizations like UNESCO.

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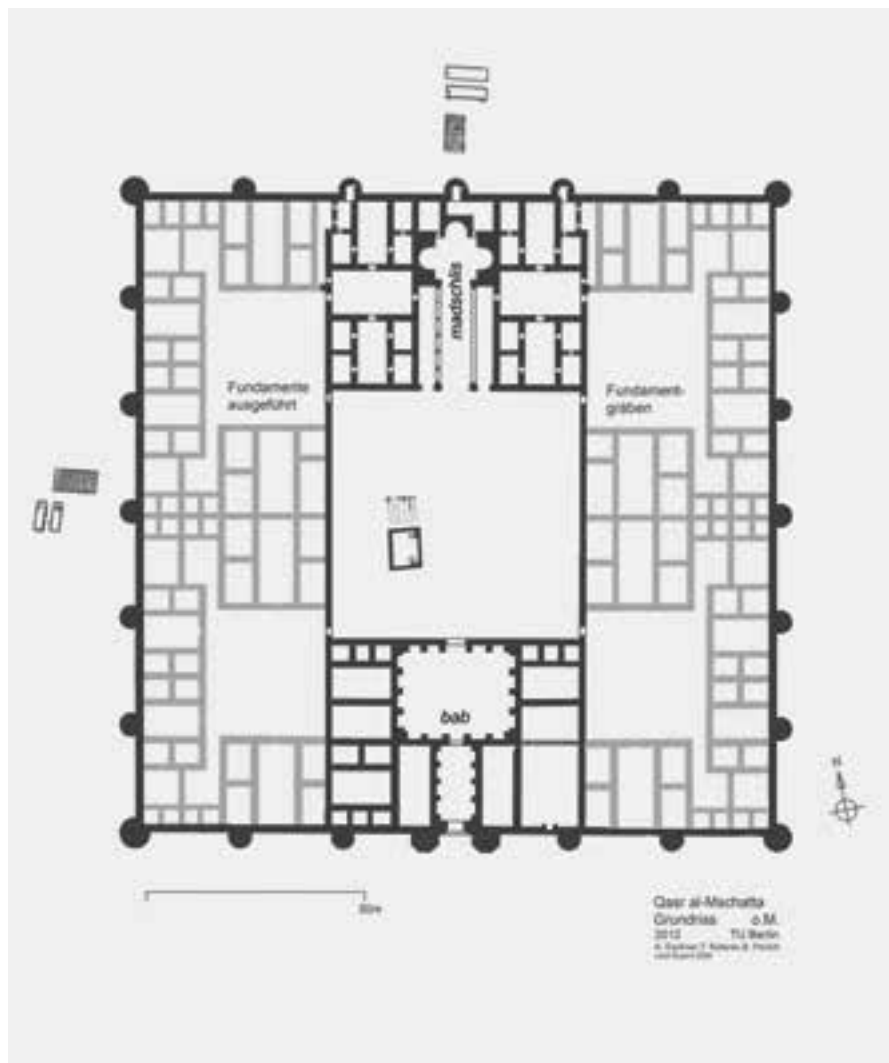
Qasr al-Mushatta – An Umayyad palace in Jordan

Qasr al-Mushatta is an Umayyad palace in Jordan. According to the existing research, construction was begun in 743 AD by Walid II in the desert some 30 kilometers south of the former roman town of Philadelphia (known as Amman today). A severe earthquake destroyed the palace in the middle of the 9th century, and for the ensuing centuries it remained abandoned. It was only in the late 19th century when travelers again took notice of the richly decorated “desert castle” during to the construction of the Baghdad and Hejaz railway. In 1903 the Ottoman sultan Abdülhamid II donated two thirds of the richly decorated main gate to the German emperor Wilhelm II for inclusion to the newly built Pergamon Museum in Berlin. Since then, the richly decorated façade is one of the signature pieces in the collection of the Museum of Islamic Art on the Museum Island in Berlin.

Objectives: This project aims to revise the scientific knowledge about one of the most important early Islamic architectural monuments to end up in a scientific publication, safeguard the existing fabric and improve the

visibility of the site in order to contribute to the UNESCO World Heritage Site application of the Hashemite Kingdom of Jordan, and finally to make the site another tourist landmark in the country.

Virtual reconstruction of the ground plan based on the archaeological research (Image: Chair for History of Architecture and Urbanism)



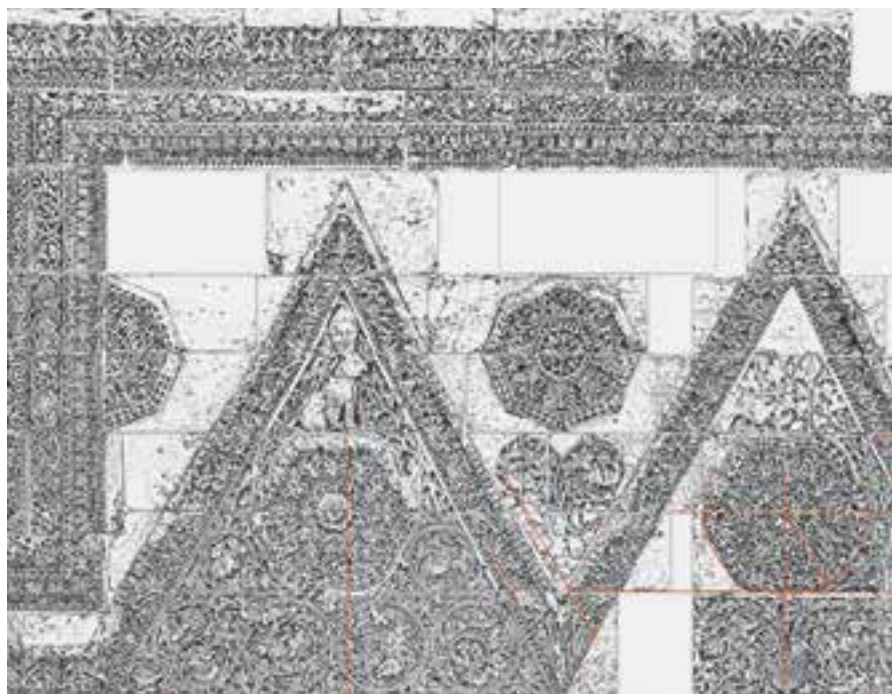
Methodology: A comprehensive research and restoration project was begun in 2009. The entire ruin was documented in plan drawings at various scales as well as in photos and research was conducted by all respective specialists such as architects, building archaeologists, archaeologists, geophysicists, restorers, civil engineers, art historians, epigraphists and many more.

Aerial view of Qasr al-Mushatta, Jordan, before the start of the project (Image: Chair for History of Architecture and Urbanism)





Outcome: The conclusion from the evidence presented by the research was that the dating of the site and the perception of the original design of the palace had to be revised completely. Contrary to prior belief, the palace was not left as a half-finished ruin in 749 but was completed and used for at least 100 years until the earthquake of 854 AD. After only six months of research a restoration project began with the repair of the highly endangered historic brickwork. The wall tops were covered with a sacrifice-layer of newly produced bricks similar in format and material to the historic samples. The historic brick



The elevation of the main gate superimposed on a construction drawing (Image: Chair for History of Architecture and Urbanism)

vaulting of the rooms were stabilized and repaired. In 2010 the façade of the palace with its three arches was rebuilt. More than 80 percent of the stones were still on the site. The geometry of the arches was designed according to old line drawings scratched in the historic limestone masonry in the 8th century. In 2011 the western surrounding wall was repaired and raised in order to improve the visibility of the ruin. In 2012 the arch of the audience hall, also destroyed by the earthquake in the 9th century, was rebuilt from the existing historic stones.

Future: In 2013 a site management project will improve the site for visitors and a gap in the main gate, the original section of which is in Berlin's Pergamon Museum, will be closed using contemporary forms.

The main gate of Qasr al-Mushatta at the Pergamon Museum, Berlin (Image: Chair for History of Architecture and Urbanism)



Team: Dr. Ghazi Bisheh + Dipl.-Rest. Kristina Brakebusch + Prof. Dr.-Ing. Johannes Cramer + Eastern Atlas + Kati Eschner BA + Dr. Ute Franke + Holger Grönwald MA + Prof. Dr. Claus-Peter Haase + Catreena al-Hamarneh + Dipl.-Rest. Karen Keller + Tobias Horn + Dr. Mohammad el-Khalili + Dr. Katharina Meinecke + Thomas Osius + Ahmad Othman + Dr.-Ing. Barbara Perlich + Dr.-Ing. Tobias Rütenik + Dr.-Ing. Birte Rogacki-Thiemann + Prof. Dr. Günther Schauerte + Dipl.-Ing. Moritz Taschner MA + Dipl.-Ing. Uwe Seiler + Prof. Dr. Stefan Weber + Dr.-Ing. Christoph Ziegert + Olga Zenker BA + students of TU Berlin + Abu Ahmad with relatives **Cooperation:** German-Jordanian University Amman + Department of Antiquities of the Hashemite Kingdom of Jordan + Berlin National Museums + German Protestant Institute for the Archaeology of the Holy Land **Funding Sources:** Federal Foreign Office + German Research Foundation + Berlin Institute of Technology **Publications:** see: baugeschichte.a.tu-berlin.de/bg/forschung/projekte/islam/mushatta2.html

Vernacular Architecture – Vernacular architecture is architecture without architects. Research into local or traditional building practices identifies exemplary architectural solutions applicable to the present day, and wholly appropriate in context.

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Vernacular Architecture: Local Identity – Global Challenge

Most of the existing architecture worldwide is vernacular architecture – it is built without architects. Following this observation, a better understanding of this will help architects to design new projects according to the needs of local people and thus contribute to a local identity, which might be a counterbalance to a globalized environment. These projects study specific problems all over the world. Many of them include student participation in documentation and analysis.

A – Workshop in Leh, Ladakh, India: The fieldwork was guided by the main question: how does vernacular ecological building culture work, based on the example of the Farkethand Gongma settlement in the valley of Industal in Ladakh? The aim of the fieldwork was to document circular flows of traditional resources and the characteristics of construction in context. In addition, building measurements were conducted. The research project is

concerned with capturing and documenting vernacular Tibetan building traditions.

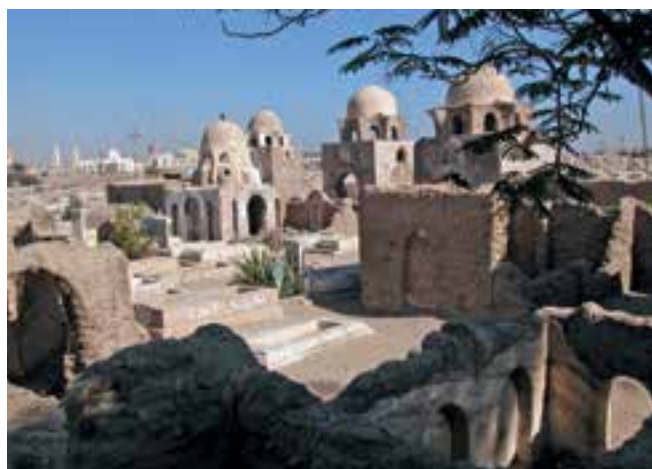
A – Traditional house in Ladakh, India



B – German Architecture in Chile: The German colonization of southern Chile, which began in the 1850s, led to the construction of a vast architectural heritage, which is recognized as “German” architecture. The research of this colonization focused on the extensive documentation of this built heritage. The question that this work attempts to answer is: what are the specific influences of German architecture in the architecture developed by German immigrants in southern Chile? As the attempt is made to identify the contemporary relevance of these influences, it is possible to also ask how this is reflected today in what is considered the national built heritage.

C – Ernst Boerschmann’s research in China: Prof. Ernst Boerschmann (1887-1949) was an architectural historian at the TU Berlin, who documented and researched the traditional Chinese architecture in the beginning of the 20th century. He published only three volumes of his encyclopaedic publication, which presents a wide range of traditional architecture, much of which has vanished by today. The project aims to describe the importance of this forgotten scientist and make his work useful for present-day restoration activities in China.

D – Fatimid necropolis, Assuan: The Fatimid necropolis of Assuan has been actively used since the 7th century. It is one of the oldest Islamic cemeteries in the world. Since 2006 a team of architects, building archaeologists, archaeologists, ethnologist and urban designers have been studying the site, which comprises thousands of ordinary graves and numerous mausoleums of Islamic saints. The project aims to document the entire site, preserve the endangered mausoleums and create a site management plan, which will support the creation of a protection area in order to hinder the continuous loss of monuments.



D – View of the Fatimid Cemetery in Assuan.

E – Wooden houses in the historic city centre, Istanbul: The old town of Istanbul consisted of thousands of wooden

houses until the beginning of the 20th century. Due to massive urban renewal most of these houses have disappeared today. The project aims to document the remaining traditional architecture in measured drawings, understand the transformation of the traditional town into a modern metropolis and make the results of the research useful for future restoration activities.

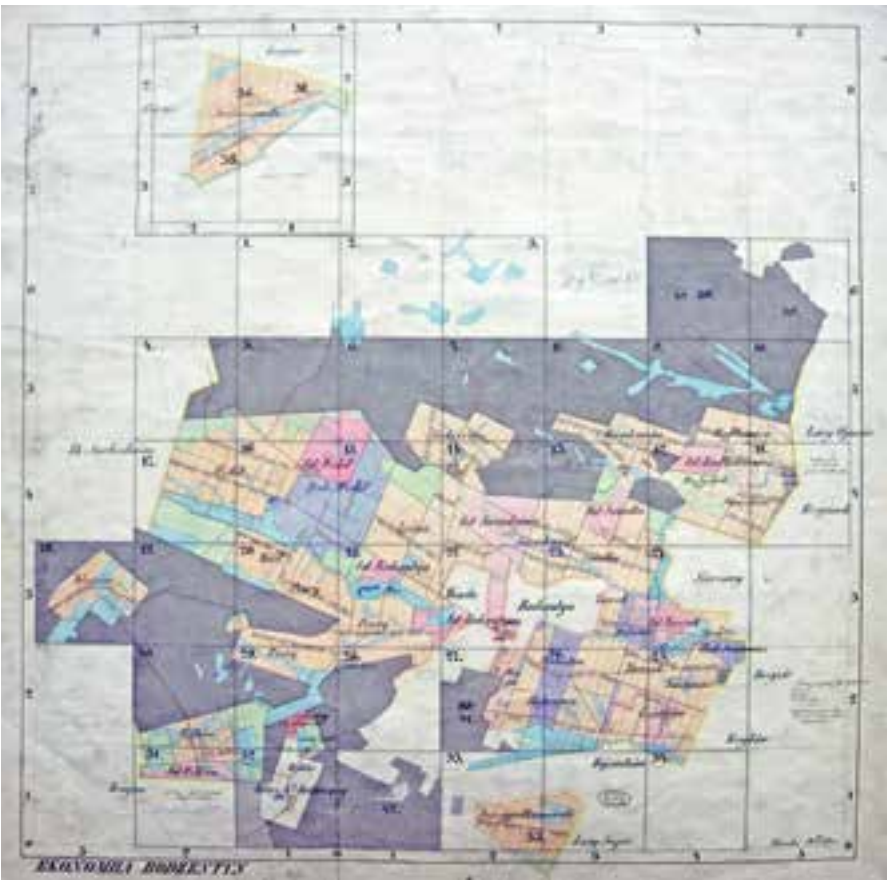
E – Measured drawing in elevation of a wooden house in Istanbul.



F – Wooden Houses in the Swietokrzyski-region, Poland:

The small wooden houses of farmers have characterized the region of the Holy Cross Mountains in southern Poland for centuries. These houses have disappeared in the course of modernization and restructuring of the villages as well as the landscape. The research project documented the changes of the cultural landscape over the past 200 years, together with the different types of traditional houses. It aims to give an overview of the variety of

typologies, in terms of ground plan as well as decoration. The refurbishment of the houses in the past 50 years is of particular importance.



F – Historic map documenting the changes in the cultural landscape in the Holy Cross Mountains in Poland.

G – Historic city centre, Damascus: Since 1975, the historic city centre of Damascus has been studied with the methods of building archaeology. The aim was to analyze the development and the changes of the city structure and the built environment. Documented in phase plans – reaching from antiquity until today – this material visualizes and explains the history of the city.

H – Urban research in the Near East: Based on the research conducted in Damascus, further studies on urban history have been developed: a 1999 – 2000 archaeological

research project on the ancient bazaar of the goldsmiths “Suq as-Sagha” in Damascus; a 2001 – 2003 research project in a historic city-quarter of Beirut “Zokak al-Blat;” and since 2006 a broad-based study on the ancient city of Tripoli/Lebanon.

I – Vernacular Architecture Lebanon/Syria: Most research on vernacular architecture in the region is so far either typological, serving the ideological purposes of nation building or, at best, documentary. These PhD-projects observe how trends in the built environment and lifestyles change and how high styles become vernacularized (and vice versa). One also learns how modernization is adopted or adapted by its recipients, showing how tradition is subject to constant change.

I – Sheikh Hlail, Syria. Village with mud-brick domes and so-called beehive houses. Project: Musab Shamma (image: Martin Gussone, 2007)



J – Ottoman Houses in the Near East: In two PhD-projects urban Ottoman houses in the region of “Greater Syria” (Bilad ash-Sham) have been examined in field-surveys with the methods of building archaeology and oral history. The Courtyard Houses, dating back to the 17th – 19th centuries were studied by Ariane Ahmad, while Anne Mollenhauer analysed a new layout house with a central inner hall and without courtyard, which appeared in late 19th century.

A – Workshop in Leh, Ladakh, India: **Project Manager:** Prof. Peter Herrle **Funding:** TU Berlin

B – German Architecture in Chile: **Project Manager:** Renato D'Alençon + Francisco Prado **Funding:** DAAD + FONDART

C – Ernst Boerschmann's research in China: **Team:** Dr. Eduard Kögel + Prof. Dr.-Ing. Peter Herrle **Funding:** German research Foundation **Publications:** see www.architektur.tu-berlin.de/fileadmin/f6/Studieng_nge/IfA/Forschungstag/Boerschmann.pdf

D – Fatimid necropolis, Assuan: **Team:** Prof. Dr. Sc. tec. Philipp Speiser + others **Funding:** German Archaeological Institute + Federal Foreign Office + TU Berlin **Publications:** see baugeschichte.a.tu-berlin.de/bg/forschung/projekte/islam/assuan.html + www.dainst.org/de/project/assuannekropole?ft=all

E – Wooden houses in the historic city centre, Istanbul: **Project Team:** Prof. Dr.-Ing. Wolfgang Müller-Wiener + Prof. Dr.-Ing. Johannes Cramer **Funding:** Volkswagen Foundation **Publications:** Prof. Dr.-Ing. Wolfgang Müller-Wiener, Prof. Dr.-Ing. Johannes Cramer: Istanbul-Zeyrek – Studien zur Erhaltung eines traditionellen Wohngebiets, in: Mitteilungen des Deutschen Orient-Instituts Nr. 17, Hamburg 1982

F – Wooden Houses in the Swietokrzyski-region, Poland: **Project Manager:** Dr.-Ing. des. Bernadeta Schäfer M. Sc. **Funding:** Scholarship of the Cusanuswerk **Publications:** Schäfer, B. Holzarchitektur des 20. Jahrhunderts in der Swietokrzyski Region in Polen, Berlin, 2012.

G – Historic city centre, Damascus: **Project Manager:** Prof. Dr.-Ing. Dorothee Sack **Funding:** DAI **Publications:** Sack, D. Damaskus. Entwicklung und Struktur einer orientalisch-islamischen Stadt, Damaszener Forschungen 1, Mainz 1989. **Website:** www.hbf-msd.tu-berlin.de/menue/forschung/projekte/damaskus_historisches_zentrum/

H – Urban research in the Near East: **Project Managers:** Prof. Dr.-Ing. Dorothee Sack in collaboration with Prof. Dr. Hans Gebhardt (University of Heidelberg) for Zokak al-Blat/Beirut + Prof. Dr. Gudrun Krämer (FU Berlin) + Prof. Dr.-Ing. Ulrike Wulf-Rheidt (DAI) + Dr. Stefan Weber (Museum für Islamische Kunst Berlin/Orient Institute Beirut) for Tripoli, Lebanon **Funding:** German Archaeological Institute (DAI) + German Research Foundation DFG **Publications:** see www.hbf-msd.tu-berlin.de/menue/forschung/projekte/stadtforschung_im_mittleren_osten/

I – Vernacular Architecture Lebanon/Syria: **Project Manager:** Arch. Musab Shamma M. Sc., Syria + Arch. Youssef el-Khoury, Lebanon **Funding:** DAAD (2006–2009) + Scholarships of the Syrian State **Publications:** Khoury, Y. From Architecture without Architects until Today, 1st Euro-Mediterranean Regional Conference, 2007.

J – Ottoman Houses in the Near East: **Project Manager:** Dr.-Ing. Ariane Ahmad + Dr. Anne Mollenhauer **Funding:** Scholarships of the Syrian State + Friedrich Ebert-Stiftung **Publications:** see www.hbf-msd.tu-berlin.de/menue/forschung/projekte/ottoman_houses_osmanische_wohnhaeuser/

Local Heritage Preservation – Heritage and urban development can form a generative symbiosis. Respective research generates awareness for past models and modes of design in order to inform future building.

DARCH! Dar es Salaam Centre for Architectural Heritage

23

Dar es Salaam, Tanzania's largest city and economic capital is a mega-city in the making. Dar es Salaam is struggling with the effects of rapid urbanization. In the context of weak regulatory frameworks, competing economic interests threaten the city's rich and delicate social balance and cultural and ethnic mix, as well as its unique architectural heritage which combines Islamic, European colonial, Indian and Bantu African structures. DARCH! promotes a rediscovery of Dar es Salaam's heterogeneous built heritage as a potential catalyst for more inclusive and sensitive approaches to urban transformation. The centre develops research expertise, planning concepts and pilot projects which foster ownership, identification and responsibility for the built environment among the local population, to ultimately increase the quality of life for urban dwellers.

DARCH! is a joint initiative by the Habitat Unit (TU Berlin) and the Architects Association of Tanzania (AAT) in collaboration with the Department of Architecture at Ardhi University, Dar es Salaam. Other partners include

The post-independence development in Dar es Salaam included some remarkable modernist and brutalist structures. Karakoo Market Hall in Dar es Salaam, 1974. Architect Bada Amuli was the first African to start his own planning practice in East Africa (Image: Benedikt Redmann)





the East African architecture magazine ANZA and the British Council. During the implementation period the project is financed by the European Development Fund. After a three year period it will support itself through consultations and advisory work in the region and other revenue from its activities.

Objective: The continuing destruction of Dar es Salaam's unique architectural heritage is rooted in the misconception that "heritage preservation" stands in contradiction to economic and societal development. DARCH!



Most of the historical building stock of Dar es Salaam's former Asian quarter is in decrepit shape. Ruparelia House on Morogoro Rd, Dar es Salaam, 1955 (Image: Anoeck de Smet)

seeks to demonstrate strategies and approaches towards built heritage that are integrated, socially inclusive, sensitive and development-friendly at the same time. It demonstrates how "heritage preservation" must not be

(mis)understood as a mere question of protection or façade reconstruction. Instead, “heritage” should be conceived of as a living asset, subject to continual transformation and as a potential driver for economic, social, cultural and political innovation and reinvention.

Methodology: DARCH! operates on three levels: It is a think tank, initiating and carrying out research, documentation, as well as planning and design work, focusing on feasible and context-specific strategies for heritage development. Particular emphasis will be put on the consultation and direct involvement of local stakeholders such as national and municipal public bodies, property owners and investors, but also religious communities and the general public. Second, DARCH! also pursues an educational program, offering advanced training for professionals and students and fostering North-South and South-South academic exchanges and collaborations. Third, Public events and community outreach programs involve the general public of Dar es Salaam.

Outcomes: A unique historical building in Dar es Salaam’s city centre is currently being restored. It will house the think tank facilities and accommodate exhibitions and public events, as well as workshops and training programs for professionals. To take conservation activities to the next level of scale the centre has started collaborating with the Tanzanian Housing Corporation, which holds many historical buildings in trust. Strategies involving investors and communities are intended to open up new development perspectives. Through research results and consultation services, the centre also aims at influencing local policies. The future masterplan for Dar es Salaam is of key interest; so is a broadened conception of urban heritage in ministerial and municipal bodies.

Applications: The urban architectural heritage of sub-Saharan Africa is a widely neglected topic in the international discourse. At the same time local academics and decision-makers alike are reluctant to accept cultural ownership of the early built environment which is mostly perceived against the backdrop of the continent's colonial past. The East African region therefore lacks local instruments to provide the necessary expertise and advice to develop specific and sustainable strategies for their heritage

assets. Given the tremendous urban growth and transformation in the region, it is imperative to research the future development potential in the urban heritage of cities like Dar es Salaam.



Dramatic corner block on Mosque Street, Dar es Salaam, showing Art-Deco influence (early 1950's) (Image: Anoek de Smet)

Academic Team: Habitat Unit/TU Berlin: Prof. Dr. Philipp Misselwitz + Dipl. Arch. ETH Annika Seifert **Partners Outside:** Architects Association of Tanzania: Arch. Kaisi Kalambo, Arch. Comfort Badaru + Ardhi University Dar es Salaam: Dr. Livin Masha, Arch. Simon Mpyanga + British Council Tanzania + ANZA. East Africa's first magazine for architecture and urbanism **Consultants:** African Architecture Matters/ArchiAfrika (Utrecht) **Funding Sources:** European Development Fund (10th EDF Support to Culture in Tanzania) **Timeframe:** 2013–2016 **Site of Investigation:** Dar es Salaam, Tanzania + urban centres in the wider East African context **Publications:** • Misselwitz, Philipp; Klix, Gunter; Seifert, Annika: Dar es Salaam – Atlas; Städtebau-Institut Universität Stuttgart, 2010 • Seifert, Annika; Klix, Gunter: Hitzearchitektur. Lernen von der afrikanischen Moderne; gta Verlag, Zürich, 2012 • Seifert, Annika (ed.): Global City – Local Identity? Notes on emerging East African metropolises; Mkuki na Nyota Publishers, Dar es Salaam, 2013. **Website:** www.habitat-unit.de **Contact:** Prof. Dr. Philipp Misselwitz, Chair for International Urbanism and Design – Habitat Unit, Technische Universität Berlin, School VI Planning Building Environment, Department of Architecture, Straße des 17. Juni 135, 10623 Berlin, Tel: +49 (0)30 314 21908

Berlin Brandenburg — The urban environment of Berlin and Brandenburg is rich in examples of significant architectural types and typologies. These structures offer insight into the past, and clues for the preservation of a regional heritage.

Preserving the Monuments of Berlin and Brandenburg

24

Berlin is the former capital of the Margraviate of Brandenburg and the Free State of Prussia. The city itself as well as the cultural landscape is rich in historic architecture. The remains of this architecture are the focus of many research projects conducted at the School of Architecture at the TU Berlin, very often as a contribution to preparatory investigations carried out before professional consolidation and restoration works. Comprehensive documentations including detailed measurements and subsequent analysis of historic buildings with the methods of building archaeology not only help us to understand their history but also form the basis for scholarly and successful heritage conservation.

Research & Education: In cooperation with the Landesdenkmalamt Berlin (LDA), the Untere Denkmalschutzbehörde, the Staatliche Museen Berlin (SMB) and the Stiftung Preußische Schlösser und Gärten Berlin und Brandenburg (SPSG) many research projects about historic architecture have been conducted. In these projects, students of the School of Architecture following the

bachelor and master courses in architecture or the master course in heritage conservation are integrated, conducting studies or even master theses. In this way, the vivid connection between the study programs and long-lasting scientific research is maintained, along with the direct integration of teaching and research in the study program.

Results: The continuous collaboration between cultural institutions in Berlin and Brandenburg with the heritage departments of the School of Architecture establishes that the historic dimensions of architecture are valuable elements that should be integrated in planning processes.

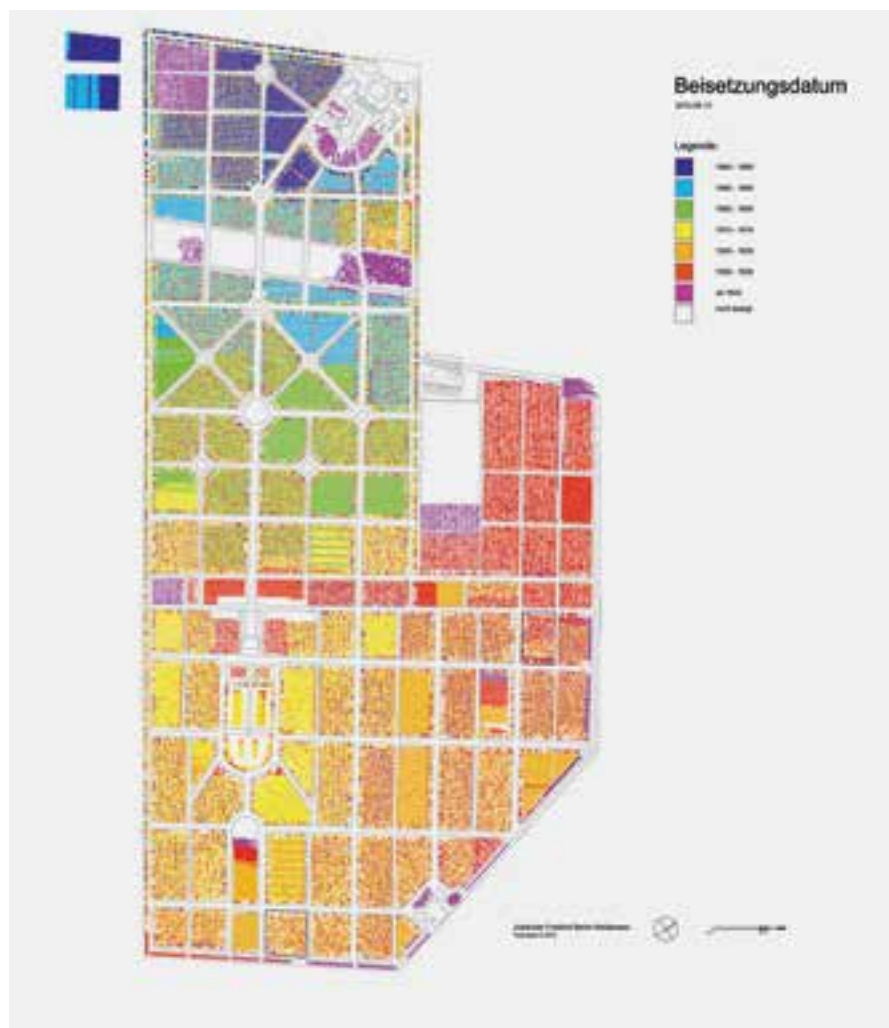
A – Berlin, Pergamon Museum: In preparation of the future general refurbishment of the Pergamon Museum as the core of Berlin's Museum Island, a comprehensive documentation of the whole building was undertaken. The aim was to focus on the still-existing historic fabric as well as interiors, as part of the first installation of monumental historic architectural remains shown in the context of a museum.

B – Berlin, Altes Museum: The architectural and historical research at the Altes Museum was commissioned as part of the preparatory investigation into the overhaul of the building. It has been carried out as a pilot project to demonstrate the research methods of building archaeology supporting the planning process. As part of the search for the original parts of the building still extant, the piled foundation, cellar and basement floor as well as the rotunda and portico were examined and compared to Schinkel's original project.

C – Berlin, Jewish Cemetery: The Jewish cemetery in Berlin Weißensee, which is still in use, has more than 115,000 graves is one of the largest Jewish cemeteries in the whole of Europe. From 2007 to 2012 an in-depth survey was made to document and inventory every grave on the 40 hectare site. 170 single items of information have

been collected, per burial, and linked in databases and interactive maps. A strong foundation for interdisciplinary, statistical analysis has been set up, as well as the preparatory work for the inclusion of the cemetery as a UNESCO World Heritage site.

C – Jewish Cemetery Berlin-Weißensee, phasing of the graves.



D – Babelsberg, Former Court Nursery: The former court nursery of Babelsberg Palace and two partly ruined laurel houses were studied by the students of the Master Program in Heritage Conservation as part of this project. The project started with detailed measurements, written and photographic documentation and archive inquiries,

followed by damage assessments, a conservation plan and feasibility studies. The study project was the basis for the subsequent restoration of the laurel houses as a depository for architectural components, planned by architect Ursula Hüffer, visiting lecturer of the MSD.



D – Former Court Nursery, Potsdam-Babelsberg: Architectural survey, 2007 (Image: Gitte Bleker)

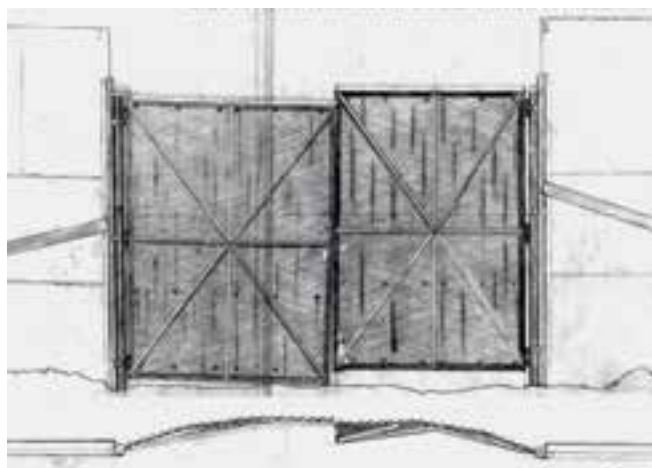
E – Schlepzig, Oberlaubenhaus: In 2011 three students of the Master Program in Heritage Conservation chose a farmstead from the late 18th century for their master thesis. The study, which was recommended by the lower conservation authority of the District Administration Dahme-Spreewald, comprised accurate measuring and comprehensive constructional and historical research. The research led to a conservation plan on the basis of which the students drew up feasibility studies for the building. A traditional craft and adventure farm with the production and sale of homemade farm products was recommended.

F – Berlin, Charlottenburg Palace: Between 2004 and 2009, the Charlottenburg Palace was investigated in three research projects. The research focused on the question of how the building developed prior to heavy war

damage in 1943, and what was lost in the reconstruction work that followed. The analysis of the construction and history, which included the New Wing – der Neue Flügel, built by Knobelsdorff, as well as the basement and the façade of the entire palace, was taken as the scientific basis for ongoing renovation work.

G – Berlin Wall: The Berlin Wall is one of the most famous witnesses of the Cold War. After German Reunification, most of it was demolished within a few months, and today only little remains of this highly political monument. This project documented remaining pieces of the wall through inventories, building archaeology methods, measured drawings and archaeological study, and by evaluating historical documents. The growth and decay of the Berlin Wall was reconstructed in drawings and virtual images. The results were used to form a Berlin Wall memorial at Bernauer Straße and published in a book.

G – Measured drawing of a gate in the Berlin Wall



H – Berlin, Taut Pavillon: The first study project of the postgraduate course in Heritage Conservation (1998 – 99) was an experiment school pavilion built in 1928 by Bruno Taut. The students did comprehensive building research and a damage assessment, on which they based the development of a conservation plan. As part of their final thesis, two students prepared the restoration of the

building, which was financed by the Planning Department of Berlin, Senate. Other partners were the architecture office BASD, the Fachgemeinschaft Bau and the IG Bau. In recognition of their exemplary work, all project participants were awarded the Ferdinand von Quast Medal.

I – Wittstock/Dosse, Neues Schloss Freyenstein: The Neues Schloss in Freyenstein is an important and characteristic building of noblemen in Brandenburg. Its roots go back to medieval times. The site has been refurbished extensively numerous times, mostly during the Renaissance period. The architectural history of the castle has been studied using techniques of building archaeology and in the framework of student work. The results will be used for future refurbishment for a new and modern use for the site.



I – Freyenstein, Neues Schloss

J – Lehnin, Zisterzienserabtei, School and guesthouse: The Lehnin monastery is one of the important medieval Cistercian abbeys in Brandenburg. The architecture has never been studied in detail until now. The project analyses some of the commercial buildings with the tools of building archaeology and aims to describe the growth of the monastery over the 800 years of its existence.

K – Berlin, Field Station Teufelsberg: The Field Station Berlin, situated on top of Teufelsberg, was used from 1961 to 1992 by American and British forces to monitor the activities of the former Eastern Bloc. The aim of this master thesis in 2010 was to create a comprehensive documentation of the abandoned and damaged building, including a complete set of measurements, photographs and a detailed room log. With inquiries into historical archives and interviews it was possible to reconstruct the history of the site.

K – Berlin, Field Station, Teufelsberg, view from the south, 2010 (Image: Robert Haesecke-Diesing)



L – Berlin, Schönhausen Palace: Architectural and historical research was undertaken at Schönhausen Palace from 2005 to 2009 as preparation and support for the renovation and restoration as Palace Museum, which was opened in 2009. The historical and architectural research and the ongoing construction works were documented in a digital data pool.

A – Berlin, Pergamon Museum: **Project Manager:** Prof. Dr.-Ing. Johannes Cramer + Prof. Dr.-Ing. Dorothee Sack **Funding:** Bundesamt für Bauwesen und Raumordnung (BBR) **Publications:** Internal report for the BBR 2000 **Website:** www.hbf-msd.tu-berlin.de/menue/forschung/projekte/berlin_museumsinsel_pergamon_museum

B – Berlin, Altes Museum: **Project Team:** Markus Fischer + Martin Gussone + Hanna Liebich + Manuele Fior + Dina Sperl + Katharina Steudtner + Prof. Dr. Elgin von Gaisberg + Prof. Dr.-Ing. Dorothee Sack **Funding:** Prof. Dr.-Ing. Johannes Cramer + Bundesamt für Bauwesen und Raumordnung (BBR) **Publications:** see www.hbf-msd.tu-berlin.de/menue/forschung/projekte/berlin_museumsinsel_altes_museum/

C – Berlin, Jewish Cemetery: **Project Team:** Dipl.-Ing. Isabelle Arnold + Dr.-Ing. Tobias Rütenik + others **Funding:** LAD, Senatsverwaltung für Stadtentwicklung **Further reading:** <http://baugeschichte.a.tu-berlin.de/bg/forschung/projekte/20jahrhundert/JFW.html>

D – Babelsberg, Former Court Nursery: **Project Team:** Prof. Dr.-Ing. Dorothee Sack + FG Historische Bauforschung + students **Funding:** Stiftung Preußische Schlösser und Gärten Berlin und Brandenburg (SPSG) **Publications:** see www.hbf-msd.tu-berlin.de/menue/publikationen/msd-jahrbuch/ (Jahrbuch MSD 2007 – 09) + www.hbf-msd.tu-berlin.de/menue/masterstudium_denkmalpflege/jahrgangprojekte/

E – Schlepzig, Oberlaubenhaus: **Project Team:** Dipl.-Ing. Thieu Binh Hoang M. Sc. + Dipl.-Ing. Michael Knuth M. Sc. + Dipl.-Ing. Thomas Krause M. Sc. (Master Thesis, Heritage Conservation) **Publications:** see www.hbf-msd.tu-berlin.de/menue/masterstudium_denkmalpflege/abschlussarbeiten/ + www.hbf-msd.tu-berlin.de/menue/publikationen/msd-jahrbuch/ (Jahrbuch MSD 2010 – 12)

F – Berlin, Charlottenburg Palace: **Project Manager:** Prof. Dr.-Ing. Dorothee Sack + Prof. Dr.-Elgin von Gaisberg **Team:** Antonia Brauchle + Isabelle Frase + Tobias Horn + Marianne Ricci + Anja Stöcklein + Franziska Streit **Funding:** Stiftung Preußische Schlösser und Gärten Berlin und Brandenburg (SPSG) **Publications:** see www.hbf-msd.tu-berlin.de/menue/forschung/projekte/berlin_schloss_charlottenburg/

G – Berlin Wall: **Project Manager:** Prof. Dr.-Ing. Johannes Cramer + Dr.-Ing. Tobias Rütenik + Dr. Sc. tec. Philipp Speiser + Dr. Gabri van Tussenbroek + Dr. Peter Boeger **Funding:** Berlin Administration for Town Planning, TU Berlin **Further reading:** baugeschichte.a.tu-berlin.de/bg/forschung/projekte/20jahrhundert/berliner_mauer.html

H – Berlin, Taut Pavillon: **Project Team:** Prof. Dr.-Ing. Dorothee Sack + FG Historische Bauforschung + students **Funding:** Landesdenkmalamt Berlin (LDA) **Publications:** see www.hbf-msd.tu-berlin.de/menue/publikationen/msd-jahrbuch/ (Jahrbuch 5 Jahre ASD) + www.hbf-msd.tu-berlin.de/menue/masterstudium_denkmalpflege/jahrgangprojekte/

I – Wittstock/Dosse, Neues Schloss Freyenstein: **Project Team:** Prof. Dr.-Ing. Stefan Breitling + students **Further reading:** <http://baugeschichte.a.tu-berlin.de/bg/forschung/projekte/mittelalter/freyenstein.html>

J – Lehnin, Zisterzienserabtei, School and guesthouse: **Project Team:** Dr.-Ing. Tobias Rütenik + Prof. Dr.-Ing. Stefan Breitling + students **Further reading:** <http://baugeschichte.a.tu-berlin.de/bg/forschung/projekte/mittelalter/lehnin.html>

K – Berlin, Field Station Teufelsberg: **Project Team:** Dipl.-Ing. Katharina Beckmann M. Sc. + Ing. David Derksen M. Sc. + Dipl.-Ing. Robert Haesecke-Diesing + Mag. Phil. Florian Leitner M. Sc. (Master Thesis, Heritage Conservation) **Publications:** www.hbf-msd.tu-berlin.de/menue/masterstudium_denkmalpflege/abschlussarbeiten/ + www.hbf-msd.tu-berlin.de/menue/publikationen/msd-jahrbuch/ (Jahrbuch MSD 2009 – 11)

L – Berlin, Schönhof Palace: **Project Manager:** Prof. Dr.Elgin von Gaisberg **Team:** Antonia Brauchle + Dina Sperl + Monika Thiel + Haiko Türk **Funding:** Stiftung Preußische Schlösser und Gärten Berlin und Brandenburg (SPSG) **Publications:** see www.hbf-msd.tu-berlin.de/menue/forschung/projekte/berlin_schloss_schoenhof/

Resafa – Understanding the settlements of the past offers the reward of knowledge with the benefit of contextual hindsight. The research at Resafa offers a rich pastiche of information about historical urban forms.

Resafa – Pilgrimage City and Caliphal Residence

25

Resafa was a very important city for pilgrims through the veneration of Saint Sergius since late antiquity in the 5th/6th centuries. In the early Islamic period the Umayyad Caliph Hisham b. 'Abd al-Malik (r. 105/724–125/743) built his new residence in its surroundings. The settlement was abandoned after the collapse of trading activities across the Euphrates River following the Mongol invasion in the last third of the 13th century and it was not inhabited again. Resafa was rediscovered at the end of the 17th century, and since the beginning of the 20th century the surviving building structures have been surveyed and documented. Systematic archaeological excavations have been conducted in Resafa since the early 1950s.

Objective: In the project phase, which started in 2006, the city and its surroundings were considered from the perspective of a coherent settlement area. Previous research results have been brought together and supplemented with new research. After 60 years of excavation work and research on individual monuments, the focus of research has shifted towards a holistic view of Resafa as an interrelated entity. Assessments, targeted archaeological surveys, an in-depth investigation of the city wall and the compilation of results gained from the investigation of the city

provide a detailed picture of the development of the city and its surroundings.

Methodology: The whole project is made up of five subprojects with further particular projects: TP 1 Archaeological Map; TP 2 Archaeology and Prospections; TP 3 City Wall; TP 4 Conservation and Restoration Measures; TP 5 Site Management. Due to the political situation in Syria the ongoing activities are focused on the work-up of the results of the project phase since 2006 for the final publication. The results of the different subprojects will be combined to integrate the more detailed studies in an



Aerial photograph of Resafa, view from northeast, 1999 (Image: Manfred Stephan)

overview, to achieve a coherent account of the history and the development of the settlement and building activities from its beginnings to its prosperous splendor as pilgrimage city and caliphal residence and its subsequent decay due to the abandonment of Resafa following the Mongol

invasion, up to recent transformations and the modern adoption of the site as a historical monument and tourist destination.

Outcomes

TP 1 The Archaeological Map: This map includes plans of chronological layers. Encompassing the city and its surroundings, the project illustrates the development and change of city structures, along with the development of the settlement itself from its beginning to its abandonment, as well as recent transformations.

TP 2 Archaeology and Prospections: The research in the surroundings of the walled city is focused on the investigation of the residence of the Caliph Hisham. The aim is to clarify the settlement structures, the architectonic structure and the historical placement of the compound. The re-examination of previous surveys now allows for a finer chronological differentiation of find-sites and further statements about the settlement history. Essential tools for interpreting the results of the geophysical prospection are digital terrain models and geometrically corrected aerial views; the basic and preliminary work conducted from 1997 to 2001 is joined together and supplemented through additional measurements and surface findings. Archaeological surveys in selected find-sites provide the material to compare the results of the geophysical prospections conducted from 1997 to 2001 with archaeological remains. The excavations are accompanied by the analysis of the pottery, small finds and coins found in the dig. Alongside the clarification of the material remains from the residence of caliph Hisham b. 'Abd al-Malik, the archaeological research focuses on the reconstruction of historical environmental conditions and questions about water management.

TP 3 City Wall: The city wall is the subject of investigation with methods of building archaeology to clarify questions about its development and construction techniques. The differentiated documentation of the remains illustrates the traces left by construction, change and repair works, thus enabling the dating of individual building measures. In the course of the investigation, substantial

New city plan of Resafa based on recent geo-referencing of all existing building plans, enhanced by new measurements in selected areas (Image: Martin Gussone + Günter Hell with Nicole Erbe and Ibrahim Salman, 2012)





insights into the organization of a late antique construction site and the actual construction sequence were gained. By considering the historical circumstances, it is possible to draw important conclusions about the building process from the beginning to the completion of the city wall.

TP 4 Conservation and Restoration Measures: To develop restoration and conservation concepts, several preliminary investigations are necessary. In particular the “need for action” and an assignment of priorities at Basilica A and the Tetraconch Church (Zentralbau/Central Building) had to be assessed. At first, temporary supports for three especially endangered areas in Basilica A were designed and realized in consultation with the Direction



Resafa, Basilica A (5th cent.), wide arcades with later addition of smaller arcades, view to the east, 2006 (Image: Martin Gussone)

Générale des Antiquités et des Musées de la Syrie (DGAMS). Initial ideas for the permanent protection of Basilica A were developed. Afterwards the proposed measures were finalized and implemented according to the means available. The subproject was extended to the Tetraconch Church, in order to set the ground for the partial anastilosis demanded by Syrian authorities. The results gained thus far serve to secure the remains and, furthermore, to increase existing knowledge about the history of the buildings.

TP 5 Site Management: The importance of Resafa as a historical monument required the development of a plan for site management for the whole area. Access to the site for tourists, the number of which has increased

noticeably in recent years, is provided via designated paths and a newly developed guidance system for visitors includes information boards and a short guide. A comprehensive archaeological guide and a planned visitors center with an exhibition about Resafa will heighten the understanding of the complex and explain the archaeological findings.

Architectural documentation at the Tetraconch church (6th cent.), view to the east, 2009 (Image: Dorothee Sack)



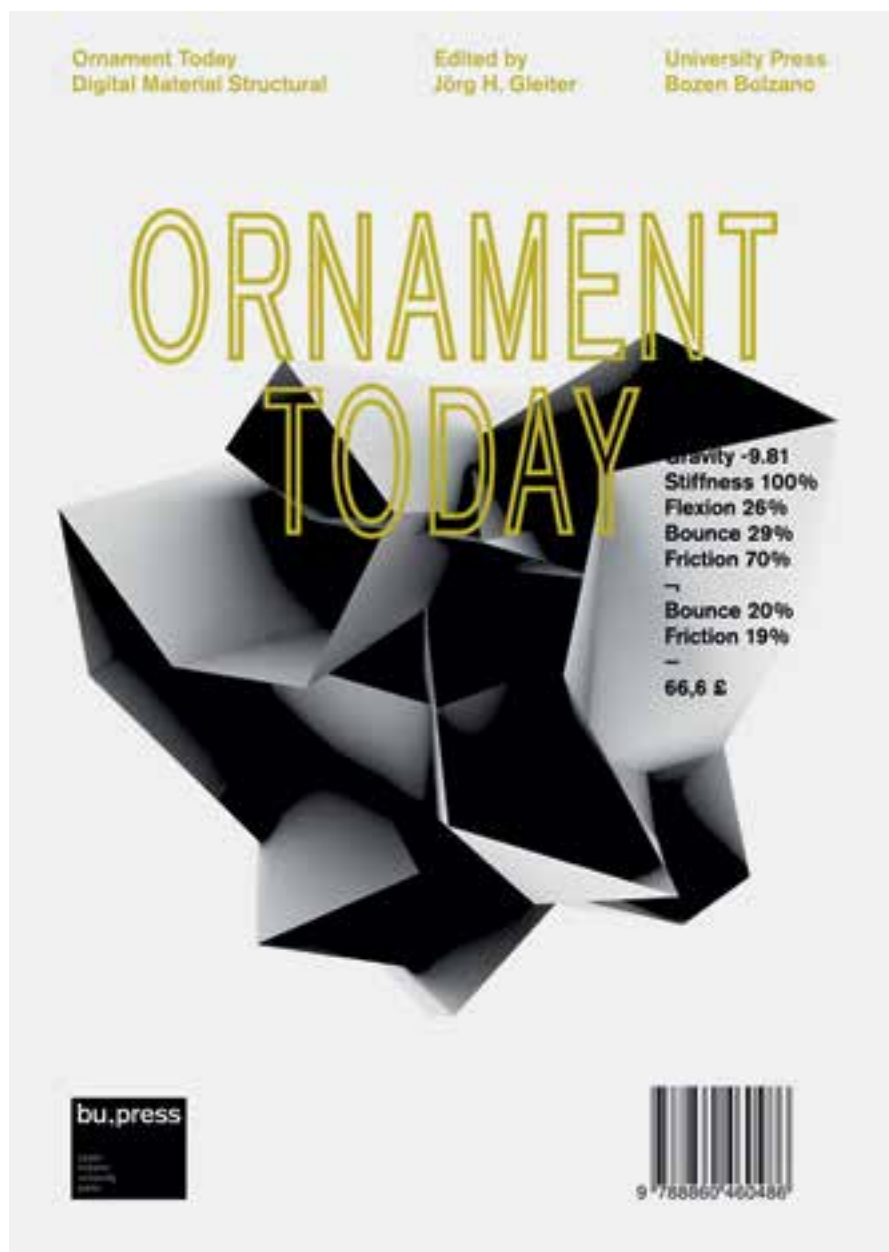
Academic Team: • D. Sack (director) + K. Brenndörfer + B. Beckers + M. Gussone + C. Hof + T. Horn + I. Oberhollenzer + Ch. Konrad + D. Kurapkat + A. Mollenhauer + A. Salman + M. Müller-Wiener + A. Schuhmann + U. Siegel. • During campaigns the team is enlarged by further scientific members from cooperating institutes and local workforces. Within the framework of the Resafa project several internships and master theses have been realized, seven doctoral dissertations and three post-doctoral qualifying projects are emerging. **Cooperations:** German Archaeological Institute (DAI) + Direction Générale des Antiquités et des Musées de la Syrie (DGAMS), Damascus/ Raqqa + Universität der Bundeswehr München, Geodetic Laboratory + Freie Universität Berlin, Institute of Geographical Sciences + Becker Archaeological Prospection, Beuerberg + University of Applied Science Karlsruhe, Institute of Geomatics (IfG) **Funding:** German Archaeological Institute (DAI) + German Research Foundation (DFG) + Fritz Thyssen Foundation + Excellence cluster TOPOI + Federal Foreign Office + Cultural Preservation Programme + Berlin Institute of Technology (TU Berlin) + several PhD scholarships and private sponsors **Publications:** The results of research in Resafa are published in the monographic series "RESAFA" (DAI) since 1984. Further articles are to be found in several journals, including: Archäologischer Anzeiger, Damaszener Mitteilungen, Zeitschrift für Orient-Archäologie and Chronique Archéologique en Syrie. Preliminary reports on recent research are accessible in "Jahrbuch MSD" **Contact:** msd@tu-berlin.de

Architectural Theory – Fundamental changes in technology, materials and the process of production are challenging architectural theory. Based on the theory of science and epistemology, it will regain its power as a tool of assessment and substructure for future work.

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Digital/Material: Architectural Theory as Theory of the Concrete

Today architecture finds itself in an unprecedented situation: in the machine-age the new technologies predominantly interfered with architecture on the construction site thus transforming architecture from the outside. Today in the second digital age – with BIM (building information modelling), CAD-CAM (computer aided design-computer aided manufacturing) and computational design – the new technologies interact instantaneously with the epistemic, the knowledge structure of architecture, thus transforming it from within. Since the research methods of architectural theory are mainly based on methodologies derived from philosophy and the humanities, architectural theory exerts a mainly external perspective on architecture. Hence, architectural theory is less and less able to cope with architecture's particular situation in the digital age. Apparently it is more and more unable to do justice to the immanent transformation processes within the epistemic knowledge structure of architecture.



As the architectural design processes in the second digital-age intimately intermingle with its materialisation processes, there is a need to refocus architectural theory on the epistemic – on the knowledge structure of architecture. Thus architectural theory must ascertain anew its scientific foundations and methodologies, and re-establish and reposition itself within the field of science.

Objective: The chair of architectural theory pursues an architectural theory as a Theory of the Concrete. Contrary to the formerly predominantly iconic method shaped after the model of art history the theory of the concrete aims at an indexical concept of architecture. Hence the main interest of such a theory of the concrete lies less in the metaphysical and epic perspective than in the concrete materiality and its situational crystallizations. In reference to the theory of science (geology), the idea of the “concrete” is conceived of as the unity of the idea and its materialisation. Contrary to the history of style it is based on the notion of the epistemic object. Epistemic objects (Maison Dom-ino, columns, curtain wall etc.) are objects in which the dynamic knowledge processes in architecture emerge and become visible in an exemplary manner.

Methodology: With today's exhaustion of the elder theoretical concepts (linguistics, structuralism, media theory), on which architectural theory based its methodology, the research initiative of the chair of architectural theory aims at the reconceptualization of architectural theory on the basis of epistemology and the theory of science. The change of perspective towards an architectural epistemology aims at an architectural theory on eye level with the theory of science. It further aims at opening up current architectural practice to an all encompassing analysis and at making anew the architectural practice visible as the central cultural technique through which man creates an unique environment fit for his needs.

Outcomes: In early 2013 the research initiative at the chair of architectural theory officially was kicked off with the international symposium “Effect and Affect. Architecture and the Digital-Sublime” (www.digitalsublime.de).

Applications: The research initiative at the chair of architectural theory will serve as a foundation for the analysis of the transformation processes of contemporary architecture within today's digital cultural force field. A discursive continuum is established that is capable of reunifying the various and – due to the digitalization processes – ever more diverging architectural practices and that brings to mind architecture's major contribution to the constitution of a living environment fit for the needs of mankind.

Academic Team: Prof. Dr.-Ing. habil. Jörg H. Gleiter + Dipl.-Ing. Jan Bovelet MA
Publications: • Jörg H. Gleiter (ed.), Ornament Today. Digital. Material. Structural, Bozen Bolzano University Press 2012 • Jörg H. Gleiter, Columns and Trusses. Epistemic Objects and Their Transformation, in: Before Steel. The Introduction of Structural Iron and its Consequences, eds. M. Rinke and J. Schwartz, Sulde/Zürich: Niggli 2010 • Jörg H. Gleiter (ed.), Symptom Design. Vom Zeigen und Sich-Zeigen der Dinge, ArchitekturDenken Vol.6, Bielefeld, 2013 (forthcoming) **Website:** www.architekturtheorie.tu-berlin.de **Contact:** Prof. Dr.-Ing. habil. Jörg H. Gleiter, Chair of Architectural Theory, Sekr. A65, room 920, Straße des 17. Juni 152, 10623 Berlin, Tel: +49 (0)30 314 21960, joerg.gleiter@tu-berlin.de

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Research by Design

The aesthetics
and
ethics of
construction

Material in Architecture – The research and development of materials in the context of architecture is vast and varied. Starting from the smallest unit, building components are generative of sustainable modes of design and practice.

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Infra-light-weight Concrete

This project explores the potential of the newly developed material infra-lightweight concrete with insulating aggregates for construction and aims to promote the marketability of this building material. Infra-lightweight concrete and other lightweight concretes have been used experimentally, mostly in single-family housing. However, even though the advantages of the material are obvious, there has not yet been broad application of it as a building material. There is a lack of planning guidelines and rules, and the potential range of reasonable applications of the material has not been researched. Therefore, planners, developers and contractors are unwilling to risk the experimenting or potentially higher construction costs. With the collective research competence of architects and engineers, this research project aims to close this lack of reliable planning guidelines and knowledge and thus to foster the application of infra-lightweight concrete.

Objectives: Thermal insulation, recyclability, conservation take on an increasingly important role in today's building construction. But especially polystyrene-based insulation systems are increasingly criticized, since their multi-layered composite skins are often highly problematic when it comes to maintenance, refurbishment and recycling in long-term lifecycles. Infra-lightweight concrete is

both insulating and load bearing at the same time, it meets the two core requirements for building envelopes monolithically. Thus, it has the following advantages: • A monolithic building envelope simplifies the planning and construction process as well as reconstruction and maintenance. • The lifecycle of the building skin is prolonged considerably. • The high portion of recycled material (e.g. recovered glass) contributes to resource savings. • Infra-lightweight concrete is 100% recyclable. • Linear isothermal gradients avoid continuous physical defects. • High permeability improves humidity conditions inside the building. • Consistent surface temperature of the material produces a pleasant interior climate. • The low weight of the material enables the production and transport of very large prefabricated building components. • The material offers a high surface quality for inside and outside.

Methodology: The potential range of applications for infra-lightweight concrete will be evaluated through a number of experimental designs for different building types. This will include a variety of different programs, construction methods and techniques. Eligible building designs will go through construction development. Building components will be tested as prototypes with regard to bearing capacities, thermal properties, usability and

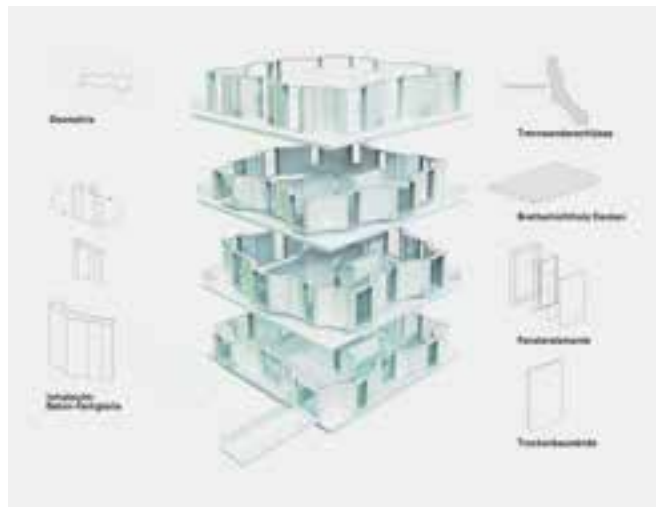
Winning scheme for the "Smart Material Houses Competition", Hamburg
(Image: Barkow Leibinger, 2012)



durability. The results of this research will be published as a new infra-lightweight concrete manual for the use of planners, producers and clients.

Outcomes: Prof. Regine Leibinger and Prof. Mike Schlaich have already gathered a wider range of experience

with infra-lightweight concrete. An experimental design for the “Smart Material Houses” competition proposed a multi-story apartment building made of large infra-lightweight concrete prefabricated wall elements in combination with wood ceilings. This proposal won several prizes (1st prize: “Smart Material Houses,” Hamburg, 2010; 2nd prize: “Global Holcim Innovation Award,” 2012). A single-family house was realized by Prof. Mike Schlaich in 2007. The material itself is continuously being developed further at his chair in the Department of Structural Engineering at the TU Berlin.



Winning scheme for the “Smart Material Houses Competition”, Hamburg, Construction Diagram (Image: Barkow Leibinger, 2012)

Academic Team: TU Berlin: Prof. Regine Leibinger + Prof. Mike Schlaich + Dipl.-Ing. Jan-Oliver Kunze + Dipl.-Ing. Alexander Hückler + Dipl.-Ing. Matthias Graf von Ballestrem + Dipl.-Ing. Bogdan Strugar **Outside Consultants:** Prof. Frank Barkow, Barkow Leibinger, architect and co-author of “Smart Material Houses” IBA Hamburg, 2010 + Dr.-Ing. André Weber, Schöck Bauteile GmbH + Prof. Dr. Dietmar Stephan, Fachgebiet Baustoffe und Bauchemie, TU Berlin + Dipl.-Ing. Maik Dostmann, Liapor GmbH **Funding Sources:** Application for Support (pending) at Initiative “Zukunft Bau” of the German Federal Ministry of Transport, Building and Urban Development **Location:** TU Berlin **Timeframe:** 2013 – 2015 **Successfully Completed Projects in the Field:** 1st prize: Smart Material Houses, Hamburg, 2010 + 2nd prize: Global Holcim Innovation Award, 2012 Holcim Awards **Publications** (selection) • Machen! – Die Deutschen Gewinner der Holcim Awards 2011/2012, Holcim Foundation for Sustainable Construction, Berlin/Zürich 2012. • Smart Material Houses/ 1.Rang, Tragende Wärmedämmung, in: Arch+ 198/199, Mai 2010. • Schlaich, Mike; El Zareef, Mohamed: Infraleichtbeton, in: zement + beton 4, 2010. • Bonnen, Clemens; Schlaich, Mike: Monolithische Bauweise mit Infraleichtbeton, Beton- und Stahlbetonbau 103, 2008, Heft 3. **Website:** www.fgl.tu-berlin.de **Contact:** FG Baukonstruktion und Entwerfen, Prof. Regine Leibinger, Sekretariat A43, Straße des 17. Juni 152, D-10625 Berlin, Tel: +49 (0)30 31421925

Sommerwerkstatt Wiesenburg

Sommerwerkstatt Wiesenburg (Summer Workshop Wiesenburg) was a festival for the pupils and residents of Wedding, a district in northwestern Berlin. It took place in June 2012 in the ruins of the so-called “Wiesenburg.” The Wiesenburg complex was founded by a group of philanthropists in 1869 as a shelter for homeless people and will become public property in 2013. The intention behind the Sommerwerkstatt Wiesenburg was to openly discuss the future of this fascinating area, largely unknown to the public, while encouraging the residents to access and explore it, through the creation of pavilion structures. The program of the workshop resulted from the collaboration between Max Dengler and Sönke Hartmann, the Herbert Hoover High School, the Humboldt

“Werkraum” - a workspace under a temporary roof (Image: Marc Benjamin Drewes)



Primary School and the chair of Donatella Fioretti, TU Berlin. Several non-profit organizations like Enak-Enak, Kiezkieken, Begrünung in Modulen, Kotti-Shop, were invited to organize workshops for the residents and pupils on constructions developed, designed and actually built by students from the first year design course.

Objectives: The workshop’s main goal was to introduce the students to the complexity of the architectural design and building’s process, engaging different stakeholders

under a tight schedule and a limited budget. This “learning-by-doing” approach confronted the students with real restraints, forcing them to imagine new constructive solutions and materials. It also served to combine academic education with their own everyday experience rather than follow predefined recipes.



“Cocoon” – a space for contemplating (Image: Nicholas Schüller)

Methodology: The students developed their skill in understanding the user’s reasons and desires, traducing them in a plan with a defined budget and schedule. The projects were financed by sponsors who the students themselves found, while improvising and developing necessary material and construction techniques. Subsequently the students coordinated the transport of materials and the construction site, finally building the pavilions

entirely on their own. The restricted budget encouraged the use of available, but not entirely suitable materials through modification and alteration. This experience introduced the students to a more considered and economical use of existing resources and to the concept of sustainable architecture. The students also had their first insights in the complex logistical relationships between the designing, planning and execution of structures, all within the social and spatial context of one of Berlin's most dynamic neighborhoods.

Outcome: The following pavilions were built on the workshop's grounds: "Werkraum" (workroom): a workshop and showroom for up to 15 persons, addressing aspects of the relationship between urbanity, structure, space and artistic intervention. "Grüner Lernraum" (green learning room): a structure for open-air lessons, which also offered support for gardening and farming. "Küche" (kitchen): a space for collective cooking with a capacity of up to 15 people. "Schrein" (shrine): a space for at least 6 people to sit and eat together, also useable as a storage room. "Lesezimmer" (reading chamber): a private, yet public, place to retreat. "Lichtspiele" (lightgames): a room with a permanent light installation and space to screen short films for up to 30 people. "Rastplatz" (resting place): the central meeting area of the workshops, with an open program.

Applications: The Chair of Donatella Fioretti intends to develop this "learning-by-doing" approach and further intensify the collaboration with the local agencies in the years to come. The acquired experience will enable the students and the Chair to engage in the process of space production with a better understanding of the role of the architect in the ongoing urban and social processes of the city.

Academic Team: Chair of Prof. Donatella Fioretti: Donatella Fioretti + Christoph Rokitta + Marc Benjamin Drewes + Simon Mahringer **Partners:** Max Dengler + Sönke Hartmann + Herbert-Hoover-Oberschule + Humboldthain-Grundschule Workshop **Partners:** Florian Bach + Marcello Busato + kiezkieken e.V + Enak-Enak e.V + Kotti-Shop **Funding Source:** Neighborhood Fond "Soziale Stadt" **Intermediation:** Neighborhood Management Pankstraße **Timeframe:** • Planning and Realisation Summer Semester 2012 • Festival 29 – 30 June 2012 **Publication:** in progress **Website:** www.a.tu-berlin.de/fioretti/ **Contact:** Sekretariat A21, elke.neumann@tu-berlin.de

Architektur- sommer Rügen

Over the course of a design studio at the Fachgebiet Baukonstruktion und Entwerfen (Chair for Building Construction and Design) led by Prof. Regine Leibinger, 60 students designed temporary wooden structures for a summer exhibition of Parkverein Rügen e.V., located on the island of Rügen in northern Germany. The studio was set up as a material research project and aimed to test new experimental construction methods.

Objectives: Wood is a well-known, traditional construction material. Since it is a renewable and recyclable resource, it is currently in wide a period of revival. At the



"Rhizom" at Architektursommer Rügen (Image: Reiner Beeltz, 2010)

same time, new digital technologies promise the automated production of complex building components. In direct contact with the material and the available methods of production research was conducted about new methods of timber-based construction.

Methodology: The starting points of the project were materials, design tools and the site. With the help of prototypes, students were testing new design approaches directly on the materials. The data collected from these

tests were in turn programmed into parametric CAD models as specific material examples/tests. This process resulted in a total of 25 different projects that took a specific position in the landscape and engaged in an exciting dialogue with the traditional landscape, parks, and villas of Rügen.

Outcomes: With the support of numerous sponsors it was possible to realize three selected projects in Üselitz, Liddow and Boldewitz. The “Schleife” emerged as an endless loop that was made from continuously bent rods connected with copper sleeves. The bending and bearing properties of the material were therefore tested in 1:1 scale prototypes. For the pavilion “Faserstrom,” rectangular wooden strips were joined when bent to become arch supports. Again, the bending properties of the strips were tested in 1:1 scale and then programmed into the parametric model. The last pavilion “Rhizom” originated from an algorithm derived from the growth of reed roots. It resulted in a three-dimensional platform in the reed-belt of a small lake. As part of the production process, the data from the CAD model was passed directly to the CNC-mill and joinery.

Applications: The project as a whole was successful in showing the potentials of the implementation of material properties and production methods as tools of the design process.

Academic Team: • TU Berlin, Fachgebiet Baukonstruktion und Entwerfen (Chair for Building Construction and Design): Prof. Regine Leibinger + Dipl.-Ing. Matthias Graf von Ballestrem + Dipl.-Ing. Martin Schmitt + Dipl.-Ing. Cornelius Nailis
•Students: Clemens Klein + Thomas Pearce + Leo Stuckardt + Reiner Beelitz + Julia de Orovio Soler + Mathis Baumann + Julius Blencke + Stefan Liczkowski + Andreas Woyke + Gilberto Pedrosa + Serena Vaccari **Partner:** Parkverein Rügen e.V.
Timeframe: October 2009 – August 2010 **Location:** TU Berlin + Boldewitz + Üselitz + Liddow **Cooperations** Institut für Bauingenieurwesen + Fachgebiet Entwerfen und Konstruieren – Massivbau, Prof. Dr. Mike Schlaich + Dipl.-Ing. Christian Hartz + Dr.-Ing. Anette Bögle **Funding Sources:** Abbundzentrum Leipzig GmbH + Berliner Schrauben + Bitan GmbH + FSB + Hundegger + Kulturstiftung Rügen + Kreissparkasse Rügen + Land Mecklenburg Vorpommern + kme Tube Systems + Leisten Beyer GmbH + Tischlerei Sonnemann + Vorschub + Würth + VFFA – Verein der Freunde und Förderer des Studiengangs Architektur **Publications:** • Naturnah. Temporäre Pavillons für den Architektursommer Rügen, Baumeister, Jg. 107, Nr. 7, 2010. • Dokumente 2009/2010 Rügen, 2011, Berlin. • Architektursommer Rügen, DBZ 6, 2010. **Website:** www.fgl.tu-berlin.de **Contact:** Fachgebiet Baukonstruktion und Entwerfen, Prof. Regine Leibinger, Sekretariat A43, Straße des 17. Juni 152, D-10625 Berlin, Tel: +49 (0)30 31421925

The "Faserstrom" pavilion at Architektursommer Rügen. Design: Clemens Klein + Thomas Pearce + Leo Stuckardt + Mathis Baumann (Image: Clemens Klein, 2010)





Modeling – Through the use of computer aided drawing and design tools it is possible to render the un-built and to design forms that were previously impossible without digital means. Both offer new paths for exploration.

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A Visual Language for Parametric Modeling

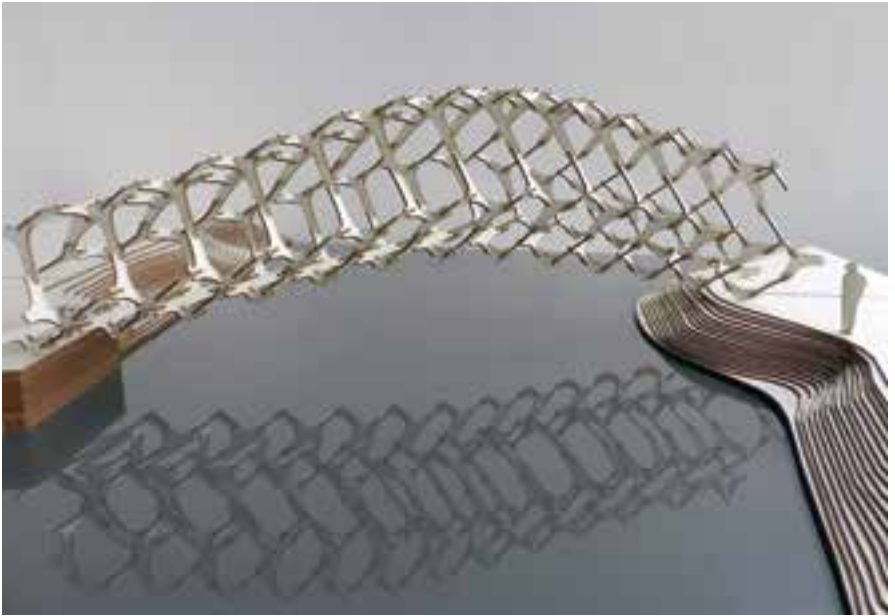
Parametric modeling is the integration of programming techniques into the design process. This means both the use of specific software and the development of new concepts. With parametric modeling the design team can manage highly complex design tasks with high precision, generate design variations in real time, review projects with extraordinary flexibility and speed, and directly trigger industrial production routines towards custom manufacturing. In 2011 both Regine Leibinger and Daniel Lordick started courses at the TU Berlin Institute of Architecture which had a specific focus on parametric modeling. One was called “Natur und Artefakt” and the other “Bridging the Gap.” The courses continued and linked previous work done separately at TU Berlin (Leibinger) and TU Dresden (Lordick). The aim was to explore the potentials of parametric modelling in a research-by-design mode, for mid-scale projects and at the same time to establish an appropriate culture of communication and presentation – a visual language for parametric modeling.

Objectives: Architecture is traditionally represented using floor plans, elevations and sections. This set of

orthogonal projections as claimed by Leon Battista Alberti (1404 –1472) and scientifically elaborated by Gaspard Monge (1746 – 1818) is appropriate for static and box-like shapes but does not satisfy the needs of more sophisticated shapes and especially fails in the representation of dynamically-changing designs. The aim was to rethink the visual representation of architecture, to broaden the repertoire of drawing tools and finally to match with the specific requirements of parametric modeling and the communication about it. The guiding principle was to develop and evaluate new techniques for graphics within vivid design projects.

Methodology: Within the course structure a specific program was established, which started from the analysis of the formation and structure of biological objects, continued with the interpretation of the objects with physical

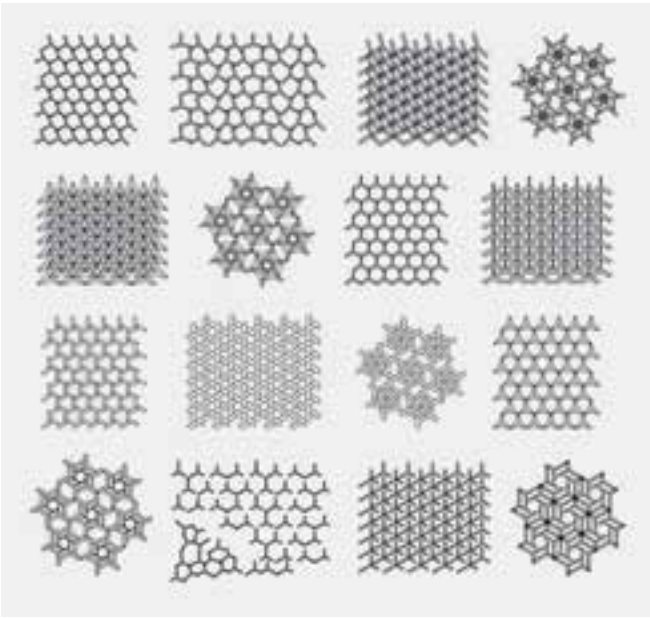
Model of a pedestrian bridge in Tiergarten. Design: Julien Schmidtke + Konstantin Greune (Image: Julien Schmidtke, 2012)



models, and finally transformed the models into code, individually written from scratch. By using biology as a model we introduced the concepts of morphogenesis and self-organization into design – a bottom-up approach. Simultaneously the students had to explore suitable strategies for the presentation of their projects that were able to reveal their progress during the semester and the

potential range of variations. On each project they used flow charts, screen shots of the visual programming software, sequences, and design-space diagrams.

Outcomes: The representation of a parametric model should show evidence of its major advantages: flexibility and adaptability. The students presented a wide range of possibilities for conveying those central issues in parametric architecture. The outcome was restricted to an assigned poster layout, enabling an easy comparison across projects to compare the diagrammatic concepts. The results showed a good integration of parametric sequences and design-space depictions in the final posters. The use of flow charts was more challenging and only few projects used them to their full potential. In general the students appreciated the new communication tools for their work-in-progress and adapted well to the broadened visual vocabulary.



Variations of connection patterns (Image: Julien Schmidke + Konstantin Greune, 2012)

Applications: The ability to read floor plans or to understand perspective drawings is a long-trained cultural achievement. Obviously we do not yet have a corresponding common visual language for parametric modeling or programming in general. This research project is a contribution to the evolution of such a language. In teaching

and reviewing the projects of the students it became evident that we have to proceed into this direction to enhance our ability to cooperate, evaluate and thus draw the full innovative potential from our new software tools. This is because parametric design is meaningful if – and only if – the process of its development is emphasized and properly represented.

Academic Team: TU Berlin + FG Lordick + FG Leibinger **Partners:** EKT Massivbau + Prof. Mike Schlaich + Dipl.-Ing. Lorenz Lachauer + ETH Zurich + Gusenburger & Neumann Landschaftsarchitekten **Outside Consultants:** Design to Production, Zurich + Fabian Scheurer + Prof. Rainer Groh, TU Dresden **Funding Sources:** DAAD (German Academic Exchange Service): Academic Reconstruction in South Eastern Europe + DGfGG (Deutsche Gesellschaft für Geometrie und Grafik – German Society for Geometry and Graphics) **Timeframe:** 2011–2014 **Site of Investigation:** Tiergarten Berlin, Neuer See **Successfully Completed Projects in the Field:** • GEFFA (Geometry Education for Future Architects) Summer School in Rijeka (Croatia), September 2012 • Beyond Rendering Berlin 2012, Conference of the DGfGG at the TU Berlin, May 2012 **Publications:** • Lordick, Daniel: Die Entkoppelung von Entwurf und Darstellung, Competition, Ausgabe 2, Oktober 2012, 78–80 • Lordick, Daniel: A Language for Parametric Design. ICGG 2012, Montreal • Lordick, Daniel; Spliid Høgsbro, Caroline: Bridging the Gap (forthcoming) **Web-site:** www.a.tu-berlin.de/architekturdarstellung + www.brb2012.de **Contact:** Prof. Dr.-Ing. Daniel Lordick: daniel.lordick@tu-berlin.de

Model Building

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Model building was introduced in 1986 for students of architecture at the Technische Universität of Berlin. No other European university offers model building as an independent subject. Burkhard Lüdtke supervises this subject with the motto: “Search – Find – Present.” A new task is formulated for students each semester, with the emphasis not on the faithful representation of architecture but on the creative context of aesthetic presentation. The focus is on the design model – the model as a picture, the three-dimensional composition and the sensual use of shape, color and material. This approach, in addition to the successful completion of various externally funded projects and collaborations, has led the Model + Design department to gain an excellent reputation in recent years, reaching well beyond the boundaries of Germany.

Rendering of a didactic model of Karl Friedrich Schinkel's Altes Museum (Image: Burkhard Lüdtke, Modell+Design)





Objectives: Abstraction is the dominant theme in model representation. The challenge is finding the balance between design reduction and the transmission of an idea. Between the idea and the presentation lies the composition. This is where we search, find and finally present.



Tactile model of the Reichstag (permanent exhibition at German Parliament building)
(Image: Burkhard Lütke, Modell+Design)

Workability and aesthetic properties of a material are essential design components. The choice of material is crucial in model design. The properties of a material are important for illustrating the concept. The same applies to the processing technique, which may be invisible or deliberately visible. In addition to traditional model construction we use computerized techniques such as CNC and laser technology, sintering and 3D-printing.

Methodology: The seminars have a workshop character. They are an oasis in a theory-oriented university system where students find out that a creative idea can be fully understood only once it has been realized. In addition to an artisan approach using traditional materials and techniques, the experimental use of atypical model materials and methods constitutes an important part of the teaching. This may lead to a sophisticated three-dimensional interpretation of an architectural idea. The desire to experiment brings about a creative approach to the endless possibilities for compositions involving body, surface and line – the three basic elements of spatial design – by using different materials, colors and textures.

Outcome: Through the cooperative work of the model building chair and students, a hairdryer for Lufthansa

was designed, and Berlin's largest mural relief created for Hugo Boss. Stage sets were built for Max Raabe, a staff restaurant designed for VW and Berlin presented at the Expo 2010 in Shanghai. Since 2004, the research focus has been on the development of forms of representation for the perception of three-dimensionality by the blind and visually impaired which has resulted in projects for the German Bundesregierung and the Berlin Senate. A tactile design is the only option for the blind and visually impaired to understand architectural form and dimension and city structures.

Applications: Exhibitions 2012: Tactile Dome Tour, a visualization of the tour of the Reichstag dome for the blind and visually impaired. Beyond the Horizon Exhibition by Excellence Cluster TOPOI and Staatliche Museum zu Berlin – Pergamon Museum, in which three scientific models were specially created to illustrate space and knowledge in ancient cultures. SCHINKEL – History & Poetry Exhibition by Staatliche Museen zu Berlin – Kupferstichkabinett: a model of the Alte Museum was produced. Design for All Exhibition by the German Bundestag, Paul-Löbe-Haus, opening of the event “People with Disabilities in the German Bundestag.” Showing all work related to Design for All in the exhibition.

Academic Team: TU Berlin: Burkhard Lüdtke + Annette Müller + Robert Niemann + Tilo Freudenberg, Tutors: Martin Herrmann + Sarah Haase + Carolin Gaube
Partners, Outside Consultants and Funding Sources: Deutscher Bundestag + Bundesministerium für Arbeit und Soziales + Senatsverwaltung für Stadtentwicklung und Umwelt + DBSV + ABSV + VW Sachsen + Staatliche Museen zu Berlin
Successfully Completed Projects in the Field: • Tactile models of the Reichstag building and its surroundings • Tactile and speaking model of Berlin using advanced material development and RFID-technology • Tactile visualization of the tour of the Reichstag dome • “Close your eyes and see” – the tactile and auditory Berlin presentation at the EXPO, Shanghai • Lighthouse – model + design, a maritime touring exhibition • VW Sachsen – design of the staff restaurant
Publications:
 • Lüdtke, Burkhard: MODELL architektur DESIGN, Die Lehre vom Architekturmodellbau, I ART Verlag Berlin, 2002 • Senatsverwaltung für Stadtentwicklung Berlin, Berlin – Design for all, Öffentlich zugängliche Gebäude • Senatsverwaltung für Stadtentwicklung Berlin, Berlin – Design for all, Öffentlicher Freiraum, 2011
Website: www.modellunddesign.de **Contact:** info@modellunddesign.de, Tel: +49 (0)30 314 21819

Technical Architectural Representation

The chair of Technische Architektur Darstellung (Technical Architectural Representation) has been directed by Prof. Dr.-Ing. Mathias Hirche since 2001. It was started in 1981, and it has evolved from a focus on audiovisual model simulation to modern and contemporary representation through a variety of media. Today, photorealistic renderings offer the possibility to generate strikingly realistic illustrations from a single 3D design file. As a result, it is possible to produce different variations with assorted views of the same object with relatively little effort. Animation and camera movements through 3D objects make the evaluation and presentation of a proposed idea almost lifelike and overcome the limits of any two-dimensional drawing. However, similar to the visual arts, each element of architectural representation conveys a



Urban planning study (Image: Sebastian Alwik)

specific statement. A fast sketch can immediately illustrate the subtle atmosphere of a building in a specific environment. In contrast, renderings often initially display an obvious and even sterile room situation: they must be re-worked to add mood to the representation. The individ-

uality of each designer is sometimes lost in the progress and it leaves little room for interpretation by the viewer.

Objective: The advantages of this technology are unmistakable. In a fast-paced world with ever-increasing demands on innovation and design it offers an understandable method, not only for architects but also for non-designers, to present and communicate a vision of architecture in advance of realization. Decision-makers often have to evaluate abstract building plans, which aren't always easy to interpret. Therefore, with rendering, the designer has access to a powerful communication tool. Detailed and complex objects and surfaces, which are only possible because of modern preparation procedures, can be tested and even geometrically evaluated with the implementation of CAD software. The impact of illumination and shadows in addition to daylight and artificial light scenarios can also be investigated.

Methodology: From a purely technical point of view, computer rendering is the science of creating pictures from algorithms that display real-life scenes as accurately as possible. A photorealistic presentation is carried out in three steps: first, a 3D model must be prepared with a suitable program such as SketchUp, AutoCAD or Rhino. This is typically done with preexisting 2D CAD (Computer Aided Design) drawings. The rendering process itself takes place after developing the objects. Various natural and artificial light-sources are then utilized to make the environment appear as realistic as possible. Afterwards, the textured 3D objects are transformed into 2D graphics with the appropriate program (Mental Ray, V-Ray etc). The graphics can be saved in various data formats.

Outcomes: Rendered images usually tend to be slightly too perfect. With Adobe Photoshop or related programs the generated pictures can be manipulated in a way to make them closer to real life, which is often imperfect. Additional objects can be added, often ones that are too time intensive and complex to construct with a 3D program. Additionally, render-errors can be corrected. Aspects of human interpretation, which do not necessarily conform to mathematical laws, are compensated for, to fulfill normative visual viewing habits. For this purpose, organic shapes are especially effective. The potential for

manipulation is limitless and it is possible to insert those models in real-life pictures. The difficulty there is to match the real-life perspective with the virtual camera's perspective.

Applications: It is clear, that for a photorealistic representation, a much more detailed design concept is necessary than what is offered by only design plans or hand sketches. Consequently, proposals and decisions have to be made relatively early in the overall process. On the other hand, with the help of full spectrum 2D/3D software such as Building Information Modelling (BIM), this precise planning can offer added information about costs, facility descriptions and appearance, as well as enable the integration of other planning parties at an early stage.



Interior space perspective (Image: Olaf Bunk)

Academic Team: Prof. Dr.-Ing. Mathias Hirche + WM Dr.-Ing. Stefan Gräbener + WM Peter Fischer **Publications:** •Hirche, Mathias: Architekturdarstellung und ihre Wirkung auf Planungslaien, TU Berlin, 1986 •Gräbener, Stefan: Aspekte im Werk Hans Dieter Schaals in Hinsicht auf das Bühnenbild, TU Berlin, 2008 **Website:** www.a.tu-berlin.de/TAD/ **Contact:** carmen.preuss@mailbox.tu-berlin.de

Art as Research – Today the image is both the subject and instrument of scientific research. Artistic media are tools for researching the perception of cities, space and architecture. In concert with scientific methods this media can contribute to interdisciplinary projects and their presentation to the public.

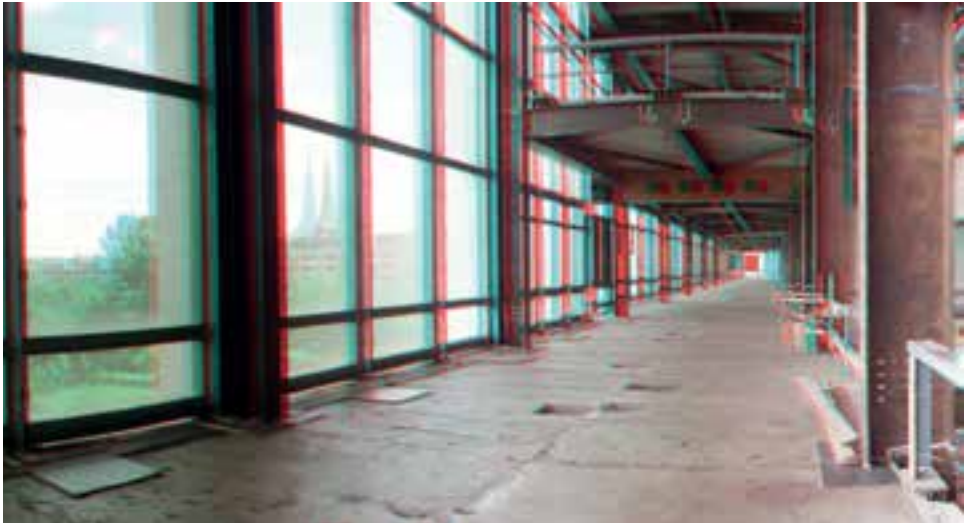
Weltraumpalast

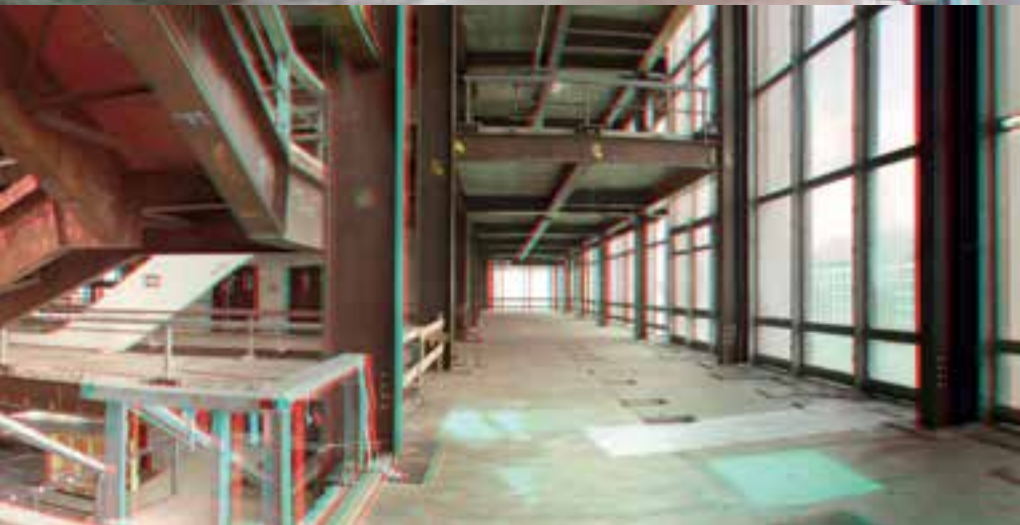
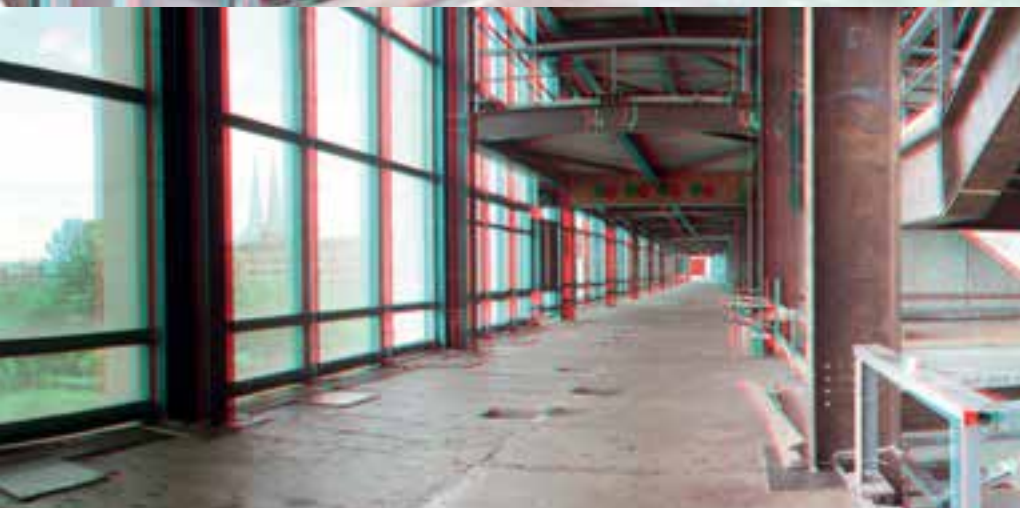
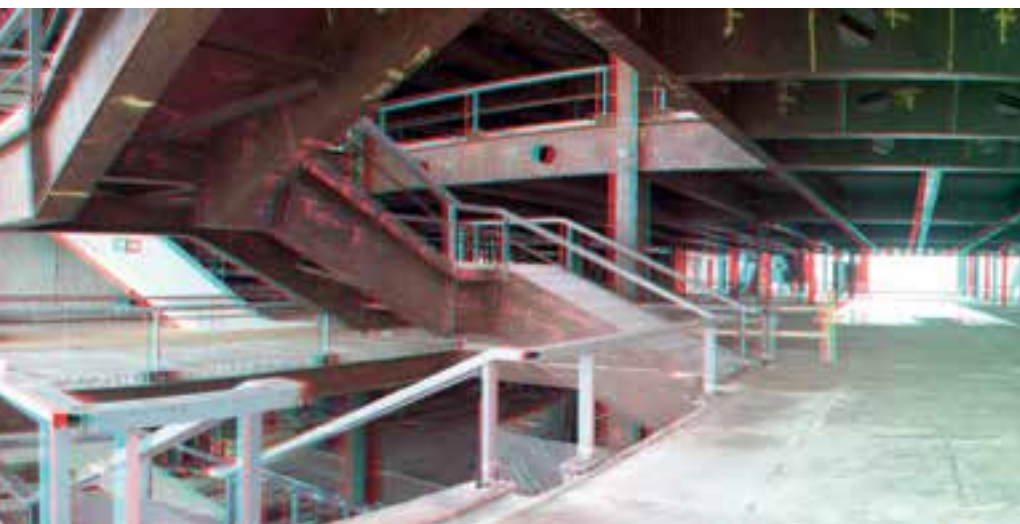
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Weltraumpalast is an artistic exploration into the potential of high-end stereoscopic spatial imaging technology. In 2004, in cooperation with the German Aerospace Center in Berlin-Adlershof, unparalleled images of the interior of Palast der Republik were taken and rendered as animated and interactive three-dimensional panoramic images.

Methodology: In collaboration with scientists from the Department for Optical Information Systems of the German Aerospace Center the interior of Palast der Republik was scanned and measured using an Eyescan M3 panoramic camera, a spin-off of the camera developed for the Mars mission. From the data collected in the space a three-dimensional image of the inside of Palast der Republik was calculated. It represents the building in its bare and empty state as it was before its destruction in 2004. The three-dimensional image is based on a defined sequential array of images, a technique derived from space technology, and can be used to calculate precise 360° stereo images. Parallel to Weltraumpalast an interrelated art project was realized that deals with the public and urban image of Palast der Republik. In “Berliner Tapete” (Berlin Wallpaper), the picture of the building’s façade was turned into a repeating pattern for

Weltraumpalast (Image: Stefanie Bürkle / VG Bild-Kunst Bonn)





wallpaper. If the visible surface of Palast der Republik can decorate living rooms and offices, what is left of the building itself? Does its image consist of memories, open for personal identification, or does its imaging support a trivial retrospective view? The wallpaper project questioned a space that has been no more than a remaining skin and steel structure since 2005, a spatial volume in the city center that has not been accessible to citizens for fifteen years, who are now left with an urban vacuum in the form of a green field. Recording the topography of the building's inside was the logical counterpart to the replication of the charged image of the building's outer skin.

Outcomes: During a Seminar at ZHdK Zürich, Prof. Dr. Stefanie Bürkle was able to make use of the technology in an experimental artistic laboratory. For a short period the Palast der Republik was revived as a projection using ten video projectors. Even after the volume and façade of Palast der Republik were erased from the cityscape and are starting to vanish from public recollection, the digitized space and the Berliner Tapete wallpaper remain accessible. There is a plan in place to realize a three-dimensional video installation offering a virtual visit to Palast der Republik in collaboration with the German Aerospace Center Berlin-Adlershof. Weltraumpalast was presented to the public at the three-dimensional dome cinema of Fraunhofer Institute (FIRST) and received the first prize in the “Kunst und Wissenschaft” competition held by Berliner Wirtschaftsgespräche e.V. in 2010.

Academic Team: Prof. Dr. Stefanie Bürkle + German Aerospace Center Berlin Adlershof + Dr. rer. nat. Martin Scheele + Dr.-Ing. Anko Börner **Collaborators:** German Aerospace Center **Funding Institutions:** IGafa + WISTA-MG / APG
Exhibition Partners: Fraunhofer FIRST Institute **Website:** www.dlr.de + www.adlershof.de + www.igafa.de + www.berlinertapete.de

ReAL Experience – Semantic Topology

Color is a significant factor in determining the impression of a room. In a similar way to sound or smell, color directly influences the atmosphere of a room and consequently our perceptions and moods within it. Colors surround

Wall with color tests at the Institute of Architecture, TU Berlin
(Image: Chair of Visual Arts)



us every day yet it remains a dominant influence upon how a space is experienced, especially when large monochrome surfaces are present. Over the course of two semesters, bachelor students at the Institute of Architecture had the opportunity to experience this phenomenon. For one year, the color of the back wall of Babette, a bar on Karl Marx Allee in Berlin-Mitte, was changed every week. The applied colors were taken from the RAL color system, the most prevalent color system used for industrial applications.

The first challenge for the architecture students was to reproduce the colors using pigments and acrylic binder. The same color tones were applied to a wall of the foyer at the Institute of Architecture of TU Berlin – but while at Babette, each coat of color covered the previous one,

the colors at the TU were applied side-by-side, resulting in an abstract wall design. Through this parallel application of color, the ReAL Experience linked these sites of Eastern and Western modernism, both built in 1966, for the duration of the project.



Painted wall at Babette, Berlin (Images: Chair of Visual Arts)

Methodology: The students' individual color perceptions and spatial impressions were documented by a questionnaire specifically developed for the project. The questions referred to subjective color perception and gained a rather abstract judgment of how color affects a space. The students were also asked to respond to fourteen colors according to associations with personal memories, objects, spaces, words and animals.

Outcomes: The project produced results consisting of about 2,100 individual statements relating to color perception and spatial impressions. As part of the Long Night of Science 2010, the Chair of Fine Art scientifically documented the information gathered and presented it

as a work of art. All of the 150 students' 2,100 individual color and spatial responses were compiled to form a "semantic topology" displayed as a large animated graphic. It consisted of a multi-dimensional interactive chart with over 10,000 terms in which each colored dot was assigned individual coordinates, along with five designated terms.

Academic Team: Prof. Dr. Stefanie Bürkle + 150 Bachelor Students of Architecture
Timeframe: 2009–2010 **Support:** RAL GmbH, Institute of Architecture **Website:**
www.kunst.tu-berlin.de

Placemaking

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Migration, or the movement of people in space, is also the movement of spaces themselves. Berlin contains many spaces of migration – Berlin itself, far from being static, is constituted by a multitude of changing spaces. Since the fall of the Berlin Wall, these numerous movements and changes have only intensified, as migration inscribes its traces in the urban landscape. The rural and urban spaces where migrants come from are imported with them, forming the basis of new areas in the city. In turn, these new places are shaped as residents of one space within the city seek to differentiate themselves from those of another. Yet the questions raised in Berlin do not only concern migrant assimilation and integration; they also concern the changes in how Germans understand their city's culture under these once foreign influences. A series of research projects on the subject of "Placemaking" presents the spaces brought and created by migrants in the context of their movements between the countries of arrival and origin.

Two projects were carried out successively, covering two different perspectives on spatial migration. "Migration of Spaces" focused on the way that traces of migration can be recognized using Berlin as the site of investigation. "Migrating Architecture" examines the situation of

migrants who have returned to their countries of origin, asking whether influences from their migratory movements are traceable, and seeking the ways these influences may become visually present in their home countries.

Part 1: Migration of Spaces

Introduction: “Migration of Spaces – Placemaking in Focus of the Fall of the Wall and Migration” was carried out by an interdisciplinary team of scientists under the direction of Prof. Dr. Stefanie Bürkle.

Objective: Though immigrant groups draw much of their identities from preserved images of their native homes, these images are idealized in multiple ways, and often cease to reflect the current state of their native countries, a development migrants tend to overlook. The focus of this project was on the already-existing spatial understanding and experience of these migrants, most of whom are second-generation. The survey monitored the spaces created by migrants along with their perceptions of urban space compared to the perception of German citizens.



Installation view, Art Space at the Schering Foundation (image: Stefanie Bürkle / VG Bild-Kunst Bonn)

How did migrants perceive the fall of the Berlin Wall and their own possibilities within the new spaces Berlin suddenly had to offer?

Methodology: Through photography, video and interviews on location, the project investigated and documented the spaces and places imported and created between the new country and the country of origin of the different

migrant groups. The research concentrated on the visible traces of migration in urban space and migrants' perceptions of the city. The subjects were asked the following questions: What is your experience of the wall? How do

Exhibition View, Berlinische Galerie, Berlin
2009 (Image: Stefanie Bürkle / VG Bild-Kunst
Bonn)



you think its influence on space is perceived and shaped by migrants? How does the wall function as a spatial border in the experiences of Berlin's migrants? How have the activities of migrant groups brought about a territorial fixation on the former border zone along the wall? Is there a threshold from East to West and from West to East? What is the relationship between migrant territory and the wall? Are there differences in the way each of the groups perceive their spatial territories – such as Turkish spaces of migration in Kreuzberg, Vietnamese migration of spaces in Lichtenberg, Russian migration of spaces in Marzahn, Arab migrations of spaces in Wedding?

Outcomes: The research and realization were conducted from 2008 to 2009. Using different media the project investigated remodeling of the city towards a new Berlin and the tendencies of migrants to preserve certain spaces in regard to resulting conflicts of Making Space and Placemaking. As each part of the work was completed it was posted on the project website, creating a public sketchbook of the project as a work in progress. The website included a forum in which the public had the chance to discuss themes relating to the website and to share their own experiences. A comprehensive publication on the project was released in 2009 and the results were presented as an exhibition at the State Museum for Modern

Art, Photography and Architecture, Berlinische Galerie, and the Project Space for Art at the Schering Foundation in Berlin.

Part 2: Migrating Architecture

Introduction: There is an acute discussion taking place today about the integration of foreign migrants in Germany, yet much less attention is paid to the situation of migrants returning to their countries of origin. In this context, the ongoing research project “Migrating Architecture” examines spatial aspects of re-migration.

Objective: This artistic research project studies the implications of migrants’ biographies in Germany upon building projects in their country of origin. The focus is directed towards architectures of everyday life, particularly in the sector of private residential houses. In a variety of examples, the principles of configuration and design, spatial organization and options for inhabitation were analyzed in order to determine the typologies of these houses. New housing types are expressions of the networks



Residential building near Denizli, Turkey
(Image: Chair of Visual Arts)

and living patterns of migrants and are representations of the mechanisms of cultural transfer between countries. The correlation of social phenomena and physical space are investigated in their mutual context.

Methodology: Using scientific methods of reading visual material and qualitative surveys, the project applies

an innovative approach to research using city space and architecture as the basis for understanding migration and integration and how they are inscribed upon the urban environment. Methods of image science and the sociology of space are mutually stimulated in this study. Using artistic media and mapping, the houses and city spaces are documented, while a survey of qualitative interviews creates the corresponding context. The results will be presented to a wider academic and public audience in a concluding exhibition.

Unfinished building near Nazilli, Turkey
(Image: Chair of Visual Arts)



Academic Team: Prof. Dr. Stefanie Bürkle + Joana Breidenbach + Cagla Ilk + Verda Sindiran + Jordana Maurer + Oleksandra Bienert + Hanna Hilbrandt + Hang H + Patricia Folwarczny + Urszula Wozniak + Than-Thuy Luong + Nicole Erbe **Time-frame:** 2007 – 2009 + 2012 – 2015 **Partners:** Universities: Yildiz Technical University Istanbul + Izmir Institute of Technology + Kadir Has University Istanbul Exhibition **Partners:** Haus der Kulturen der Welt + Berlinische Galerie **Funding Institutions:** Schering Foundation + Capital Cultural Fund Berlin + Volkswagen Foundation + Deutsche Forschungsgemeinschaft **Website:** www.placemaking.de + www.kunst.tu-berlin.de

Prefabrication – The prefabrication of architectural components provides efficient and economic design solutions. This rapidly growing field of research promises new methods and applications of architectural production.

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READY: Concrete Prefab as Mass Customization for Multistory Housing

In the summer of 2012 the architectural design studio of Prof. Ute Frank functioned as a case study unit for the research project READY undertaken by Anca Timofticuc, Helga Blocksdorf and Marius Mensing. The project is a response to the increasing demand for innovative scenarios and models for residential housing in the context of condensed, inner-city living, which have been hardly explored and developed. Today many people feel the desire to return to the city as a place of residence. The density of the growing residential areas in the city is increasingly appreciated and considered very livable. On the other hand, there are the hard economic facts to consider. The cost of living increases with the centrality of a city since the rental prices depend largely on the property prices. Other factors increase the construction and rental costs such as the regulations for energy-efficient construction. They result in a redistribution of the costs for utilities, construction and building services.

Objective: The new Senate Department of Berlin has distinguished itself politically with an urban develop-

ment program that aims to realize 30,000 affordable apartments in Berlin within the next few years. READY provides 20 possible solutions for the programmatic and economic aspects of this program. The goal is to find prototypical ideas for “individualized mass production” to the project revisits and reviews the ideas and development

25 potential sites for 20 test projects (Image: Ute Frank)



potentials of economical methods in the construction process. From all the possibilities of prefabrication of single units and modules, READY studies the aspects relevant to modern living and its individual typologies, with economic efficiency and flexibility through modular components.

Methodology: The area for the research project consists of 25 properties, each different in size, location and land-use zoning. They also differ in their morphological characteristics and their specific social microcosms.

Multi-story pre-fab housing design, Silbersteinstraße 151, 12051 Berlin
(Image: Timoteo Goldschmidt + Pawel Goldstein + Konstantinos Papadakis)





Together they create an impressive picture of heterogeneity and diversification – for Berlin a typical normality of the unusual. The specific design ideas can be compared and analyzed in practical tests to examine their individualized potential for systematization. This challenge can reveal hidden structures and the potential for architectural intervention in areas not initially intended for standardization.

Outcomes: Over the years, the residential housing sector has developed different typologies and directives for the universal demand for light, air and space. READY captures the latest typologies and uses them as the basis for individualized housing models – the single-family house on the story, the maisonette, the standardized apartment, the loft, for example. The precedents are the factories at the end of the 19th century with their characteristic stories that provide neutral spatial structures and the Unité d'Habitation from the mid-20th-century, encapsulating ideas for a not typological, but instead production-based modularization. READY develops new prototypes with that aim. A catalogue was assembled of all imaginable and plan-able combinations on each test site that could combine identity-forming, urban and climate-active components with affordable production techniques through prefabrication.

Academic Team: Anca Timofticuc + Helga Blocksdorf + Marius Mensing + Prof. Ute Frank + Prof. Dr.-Ing. Volker Schmid **Partners:** Prof.em.Dr. Rudolf Schäfer (TU Berlin, Real Estate Management) + Prof. Claus Steffan (TU Berlin, FG Gebäude-technik und Entwerfen) + Dipl.-Kfm. Wolfgang Wörle (P&P Green Buildings AG) + Prof. Dr.-Ing. Andrej Albert (Hochschule Bochum, Institut für Beton- und Fertigteilbau, R&P Ruffert Ingenieurgesellschaft mbH) + Dr.-Ing. Markus Aldejohann (R&P Ruffert Ingenieurgesellschaft mbH) + Dr.-Ing. Joseph Dörmann (TU Dortmund, Institut für Transportlogistik, Fraunhofer-Institut für Materialfluss und Logistik IML) + Prof. Dr.-Ing. Uwe Clausen + Dr.-Ing. Gerald Ebel + Dr.-Ing. Axel Brinkop (Brinkop Consulting) + Prof. Dr.-Ing. Bernd Kochendörfer (TU Berlin, FG Bauwirtschaft und Baubetrieb) **Funding Sources:** Ministry of Transport, Building and Urban Development + Ministry of Education and Research + Ministry of Economics and Technology + VolkswagenStiftung **Timeframe:** 2012–2014 **Site of Investigation:** Selected sites in Berlin **Publication:** Ready Summer 12 A13, TU Berlin, 2013 **Website:** www.adreizehn.de **Contact:** Anca Timofticuc, at@mmat.de + Marius Mensing, mm@mmat.de + Helga Blocksdorf, post@foersterblocksdorf.com

Design-Build – Designing and building are the two poles of architecture. These projects connect the design process and construction into one unified teaching methodology, as a model for future practice and research.

Die Baupiloten

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The Baupiloten advocates our common understanding of spatial atmospheres as the premise for alternative participatory design strategies with an emphasis on inventive

Low-threshold participation "Kleb Deinen Klez"
(Stick your Hood) at Kottbusser Tor, Berlin, 2007
(Image: Fachgebiet Hofmann)



design that is driven by both a social and ecological agenda. Established in 2003, as a collaboration between the Technische Universität Berlin and Susanne Hofmann Architects, it allows architectural students to be involved in real architectural projects from conception through to completion. Specializing in educational buildings, the Baupiloten have realised a number of projects including the transformation of the Erika-Mann Primary School, Taka-Tuka Kindergarten and the TU Cafeteria. Their

Cost-efficient upcycling and façade renovation: day-care center Taka-Tuka-Land, Berlin, 2007 (Image: Jan Bitter)





current research project supported by the Deutsche Bundesstiftung Umwelt and Berlin Senate, is an experimental timber pavilion designed by the architecture and structural students in collaboration with the pupils and teachers of a Montessori secondary school. Through a complex series of small interlinked gathering spaces the sophisticated structure provides a new informal meeting point within the school's grounds.

Objectives: Initiated in the context of a growing call within the German architectural profession for students to be more prepared for professional life, the aim of the studio is to combine education, practice and research. Under expert guidance the students negotiate the diverse facets of the profession by developing an initial concept through to its 1:1 realisation. They are involved in every phase from mediating the diverse concerns of stakeholders, liaising with statutory authorities, managing tight budgetary constraints to production of detailed construction drawings. Confronted with complex social issues they consider the possibilities of architecture as a catalyst and investigate the potential of participation as a tool for re-integration in socio-economically disadvantaged areas.

Methodology: The Baupiloten is continually investigating how to imaginatively engage and participate with the future users of buildings to enable individuals, communities, designers and specialists to respond to major challenges. Users' diverse requisites and desires are explored through tailored workshops which draw on our mutual knowledge of atmospheric spatial effects as an alternative means of communication. Circumventing more established modes of representation, the atmospheric dialogue enables users to express complex, often unconscious, ideas that are difficult to articulate. These findings are extensively analysed and creatively incorporated into the design process forging a project-specific common ground.

Outcome: The Baupiloten have designed and implemented a number of educational projects both locally and internationally. Students are highly motivated by the hands-on practical reality of the project, develop critical core skills and are able to experience the spatial consequences of the design. As part of the inherently collabo-

rative and multi-disciplinary process they develop invaluable interpersonal and social aptitude. The direct involvement of school pupils, parents, teachers and local authorities in the design process enables often marginalised or unconsidered individuals to influence the development of their built environment. The creation of a diverse stakeholder

Building in a protected monument: Cafeteria Wetterleuchten, TU Berlin, 2007 (Image: Jan Bitter)



network forges new links within the community, connects resources, socially engages private companies and the project provides a new focal point within the neighbourhood.

Applications: Ongoing experimentation, implementation and evaluation in real contexts through the combined fields of research, teaching and architectural practice informs a continually evolving alternative methodology for how to engage users, communities and decision-makers in the production of our built environment. Considering the specific qualities of different localities, the transferability of “atmosphere” as a common ground for discussion and spatial ideas, has been rigorously explored in contexts as diverse as Germany, USA, Sweden, New Zealand, Italy and Egypt. It opens up the possibility to engage with new user groups, who might otherwise not be heard, and learn about their spatial requisites and desires as a premise for a socially robust architecture.

Academic Team: Prof. Dr.-Ing. Susanne Hofmann + Dipl.-Arch. Kirstie Smeaton + Dipl.-Arch. Marlen Weiser + Dipl.-Ing. Martin Janekovic + Dipl.-Ing. Nils Ruf **Partners:** Prof. Volker Schmid (FG Entwerfen und Konstruieren – Verbundstrukturen, Institut für Bauingenieurwesen) + Jan Bredemeyer, Prof. Vogdt (FG Bauphysik) + Eddy Widjaja, Prof. Rückert (FG Tragwerksplanung) **Outside Consultants:** W&Z Heizungstechnik GmbH + Andreas Kuelich, Ingenieurbüro für Tragwerksplanung + hhpberlin, Ingenieure für Brandschutz GmbH **Funding Institutions:** Senatsverwaltung für Bildung, Jugend und Wissenschaft + Deutsche Bundesstiftung Umwelt (DBU) **Timeframe:** 2010 – 2013 **Site of Investigation:** Montessori Gemeinschaftsschule, Berlin-Steglitz **Successfully Completed Projects in the Field:** • “Building Blocks”, Berlin 2012, Budget 2,000 Euro + fabrication costs • “Learn-Move-Play-Ground”, Cairo 2012, Budget: 60,000 Euro (DAAD, cooperation German University of Cairo) • “Bau von Lernlandschaften Carlo-Schmid-Oberschule”, Berlin, 2009, Budget: 70,000 Euro • Modernization “Erika-Mann-Grundschule II”, Berlin, 2006/08, Budget: 150,000 Euro • Conversion “Carl-Bolle-Grundschule”, Berlin, 2006/08, Budget: 50,000 Euro • Interior Design “Galilei-Grundschule” + “Liebmann-Schule”, Berlin, 2006/08, Budget: 200,000 Euro • Cafeteria “Wet-terleuchten” and “Lüfterzentrale” TU Berlin, Berlin, 2005/08, Budget: 900,000 Euro • Conversion and facade renovation “Kita Taka-Tuka-Land”, Berlin, 2005/07, Budget: 115,000 Euro • Conversion “Kindertagesstätte Traumbaum”, Berlin, 2004/05, Budget: 47,000 Euro • Building of an arena, stands and stage, Chemnitz, 2003/05, Budget: 70,000 Euro • Modernization “Erika-Mann-Grundschule I”, Berlin, 2003, Budget: 140,000 Euro • Modernization lecture hall “JFK-Institut” FU Berlin, Berlin, 2001/02, Budget: 75,000 Euro **Publications (selection):** • Susanne Hofmann: Atmosphäre als partizipative Strategie im Entwurfsprozess, in: archplus 178, 2006 • Susanne Hofmann: Experimentelle Architekturausbildung am Beispiel Baupiloten, in: Henckel, D.; v. Kuczkowski, K.; Lau, P.; Pahl-Weber, E. • Stellmacher, F. (Hrsg.), Planen-Bauen-Umwelt. Ein Handbuch, Wiesbaden 2010 **Website:** www.baupiloten.com **Contact:** Die Baupiloten, Sekretariat A01, post@baupiloten.com

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Studierende bauen in... Kigoma

The village of Mwamgongo is located directly at lake Tanganyika in the Kigoma Region of Tanzania. In 2011, Zitto Kabwe, a member of parliament for the region of Kigoma North, initiated the project Kigoma+ in Mwamgongo on the northern border of Gombe Stream National Park. He was disaffected because the government does not fulfill their obligation to help the people in rural areas around national parks to make a living. A team of students from Berlin and Dar es Salaam are developing planning methods to achieve a balance of different interests as part of

Kigoma+. For the villagers, this is an opportunity to be heard by the authorities and influential organizations.

Objectives: Kigoma+ uses participatory planning for an anticipatory architectural design model for ecologically responsible tourism, and integrates sustainable rural development, mainly using local resources, with the protection of biodiversity in the village Mwamgongo, near the Gombe Stream National Park in Tanzania

Methodology: Two groups of students from TU Berlin and University of Dar es Salaam organized participatory planning workshops in 2011 and 2012 in Mwamgongo (Studierende bauen in... Kigoma). These workshops in-

Lodge in Mwamgongo under construction (Image: Studierende bauen in... Kigoma)



volved the local government and all of the interested people of the village Mwamgongo. The planning workshops are based on specific pilot projects for a meeting house and eco-tourism lodges, which students began to realize in tandem with the workshops. The research is linked to the ongoing realization and evaluation process, initiated by the pilot projects of the students.

Outcomes: The people of Mwamgongo, Tanzania are deeply concerned that their hopes for participation in technological progress and economic development will be futile due to the strict requirements for the protection of

flora and fauna in the adjacent national park. At the same time, tourism is rapidly becoming increasingly important to the Tanzanian economy. The national parks are significant sources of revenue. Until recently the local population near Gombe had no role in it, but wished to participate actively and benefit from the economic growth. Many of them have slipped into poverty after the 1990s fishing ban with towed nets in the coastal area. The village has no electric supply, however some petrol generators and a few solar panels are in use. There is no functioning sewage disposal. Wastewater is disposed of directly into the Lake Tanganjika or into the river or it is



Planning round-table with the villagers (Image: Studierende bauen In... Kigoma)

sewaged into small pits in the ground. Therefore areas of the lake near estuaries and settlements are already contaminated by Schistosomiasis (snail fever, bilharziosis). Lake Tanganjika can still be saved, if the sewage issues are addressed. Kigoma+ tries to create a comprehensive and replicable solution, which is exactly what is needed.

Applications: The pilot projects have a four year duration, lasting until 2015. Research projects and closely linked implementation projects will be developed. In cooperation with the NGO SISI KWA SISI, (founded in the south of Tanzania and already successfully active in tourism), the pilot project shall initiate the educational

process, so that all tourism-related services can be rendered by the inhabitants of the village. The sustainable development of new economical cycles in rural areas is a global challenge.

Academic Team: TU Berlin Chair of Prof. Rainer Mertes (Project Manager Barbara Mohren) **Partners:** University of Dar es Salaam (Project Manager Dr. John Makunza) **Outside Consultants:** AEE Institute for sustainable technologies, Project Manager Martin Regelsberger + UFU Berlin- Independent Institute for Environmental Issues, Project Manager Dr. Dino Laufer + IPRO Dresden + "Department for Ecology and Environment" in cooperation with the "Lake Tanganyika Catchment Reforestation and Education" (TACARE), Project Manager Dr. Kerstin Hartsch **Funding Institutions:** German State Authorities + Environmental NGO REEEP + Private funding **Timeframe:** 2010 – 2015 **Site of Investigation:** Mwanagongo, Kigoma Region, Tanzania **Publications:** Project Booklet 2011 and 2012 **Website:** www.kigomaplus.com **Contact:** Sekretariat Prof. Mertes, A08 TU Berlin, sekretariat@architekturpraxis.tu-berlin.de

Bühnenbild _Szenischer Raum

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A degree in stage design was established at the TU Berlin in 2000, and redefined in 2007 by expanding into the field of interactive spatial composition and scenography. The two-year Master of Art degree program is tailored towards artistically inclined graduates in disciplines including architecture, design, fine arts, and brand communication. The course combines two approaches to dramatic composition: stage design for theater, opera, dance and musicals, and interactive spatial settings for exhibitions and performances – including contact and communication hotspots within companies.

Objectives : One fundamental feature of this post-graduate course is the collaboration with external associates who form part of the teaching body. In conjunction with these partners, competitions are held with built results and 1:1 project actualizations, enabling qualitative, practical and structured training. Among the finalists in each category of the competitions, one concept is selected for

realization. The three projects presented here exemplify this practical approach.

Outcomes: Each December, the French city of Lyon shines with the Fête des Lumières (Festival of Lights), which attracts up to 3.5 million visitors from around the world. On this occasion in 2011 as part of the “Labo #5” program over 40 students from TU Berlin and I.A.E.



Your Biography: Exhibition design for DASA Arbeitswelt-ausstellung Dortmund 2012 (Image: Yvon Philipp)

Université Lyon jointly developed scenographic installations for five empty shops, each of which was designed to tell a story through the medium of light. One project provided a shelter for lights; another turned the space into a audience-responsive organism. At TU Berlin this kind of interdisciplinary collaboration is continued and developed across departments together with the students and tutors of the architecture chair (FG Gebäudetechnik und Entwerfen/Prof. Steffan) and the lighting technique chair (FG Lichttechnik/ Fakultät IV, Prof. Völker). The DASA Dortmund exhibition “Dein Lebenslauf – Your Biography” addressed people’s entrance into the job market. Seven interactive areas brought up profound issues like the pursuit of happiness, the need for security, and life’s irritations, through a range of spatial configurations. The exhibition’s architecture resulted from a three-month internal competition at TU Berlin during the 2011 summer term, supervised by tutor and mentor Johann Jörg. Six

different concepts for the exhibition were developed and discussed, and the design by Jana Barthel and Elena Koch was ultimately realized. For the third time running, following “Münchhausen Junior” and “Camelot,” the Friedrichstadtpalast Berlin invited the department to design a stage, this time for the children’s show “Snow Queen.” In an updated take on Hans Christian Andersen’s tale, the production created audio-visual experiences combining bold, colorful images with modern music. The stage design for “Snow Queen” was developed in a semester-long

Installation at the Festival of Lights, Distributeur de Miracles, Lyon 2011
(Image: Raphael Kirsch)



competition in 2009. Under Prof. Kerstin Laube’s supervision, twelve students presented their concepts. After two months of work, the jury selected Kaspar Haessig’s proposal, whose series of 12 designs includes: the “City of Nora Warriors”, a rosebush bunker, a floating underwater world, the “Origami Kingdom”, the “Land of Milk and Honey” and the “Snow Queen’s Ice Palace”. The premiere received a thundering ovation from an audience of some 3,700 people.

Applications: The students in the stage design program benefit from close mentoring through seminars, workshops and one-on-one colloquia. Social competencies,

particularly communication skills and team-work, are nurtured throughout the course, in addition to the more typical design skills. The aim is to encourage creativity, originality and individual resourcefulness. The department considers studying and teaching with this practical, hands-on method to be the ideal approach to contemporary training in stage design and scenography.

Academic Team: Prof. Kerstin Laube + Franziska Ritter **Partners:** Universität der Künste Berlin + Hochschule für Schauspielkunst Ernst Busch + Hochschule für Musik Hanns Eisler + Beuth Hochschule Berlin + Friedrichstadtpalast Berlin + Landesbühnen Sachsen + DASA Dortmund, Pergamon Museum + BeBerlin + Triad Berlin + Berliner Dom **Website:** www.tu-buehnenbild.de **Contact:** kontakt@tu-buehnenbild.de

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Mexiko Projekt

The Design-Build-Studio Mexiko Projekt is a research and education model focused on planning and constructing small scale buildings, from design to the process of construction by the students themselves. The work is based on a specific client's commission, and it engages in interdisciplinary collaboration with landscape architects and construction engineers, amongst others. The Mexiko Projekt takes place through the realisation of non-for-profit projects, where "low-cost" under "high tech" considerations, vernacular design, sustainability and economically efficient buildings intertwine with cultural acceptance issues, aesthetics and appropriateness, participation and education. FG Prof. Ingrid Goetz initiated the Mexiko Projekt in 1997. Since 2006, CoCoon, Sector for Contextual Construction is continuing the work under the coordination of Dipl.-Ing. Ursula Hartig, highlighting and completing it with the Symposium: "Design-Build-Studio, New Ways in Architectural Education" in November 2012. Since 1997, 460 European and 85 Mexican students took part in this Design-Build-Studio, carrying out 43 projects.

Objective: The quality of the architectural oeuvre cannot be experienced unless it is manifested in the tangible space. The academic field generally focuses on details of this process, losing the view of the project as a whole. The Design-Build-Studio enables the penetration of the complexity of architectural production, to reflect it and give it new values. The focus is put on “architecture of social engagement” with a double goal: on the one hand, to improve the living conditions of indigenous communities. On the other hand, apart from the high gains in professional and scientific knowledge it is to make the students sensitive to the responsibility of the social and cultural implications of their work.

Stage for a music school in Ocotlán de Morelos, 2008 (Image: Mexico Projekt)



Methodology: The methodology consists of a continuing research trajectory about the economic, social, cultural, architectural, technologic, climatic and geographic context on a local and national level. The research is completed in close dialogue with the clients, as they assert their needs and visions. In preparatory seminars, abstract ideas are transformed into workable solutions. The design decisions and building techniques are developed according to the acceptance of the client’s cultural background and needs, along with the budget, schedule and the technical capacity of the project. In the building process, the theoretical design decisions are reflected, evaluated and modified according to the discovered reality. The development of each built project is periodically monitored.

Outcomes: People in the marginalized communities that have been part of Design-Build-Studio Mexiko Projekt have actively engaged in improving their life conditions have benefited from the successful realization of 43 projects. The support is not only given by the building as a product but in sharing the spirit and dynamics



Plastering a multi-layered wall (Image: Mexiko Projekt)

of the building process. More than 550 participants successfully collaborated in the projects, assuming the responsibility as a whole group and accomplishing the goal to delivering a usable space, and finally allowing this cultural encounter with the Mexican people to have a deep impact upon them. A positive outcome is expected of the first encounter of stakeholders at the November 2012 Symposium: “Design-Build-Studios: New Ways of Architectural Education” organized by CoCoon.

Applications: The Design-Build-Studio became an exemplary way to combine the synergetic potentials of teaching, research and practice, with international, interdisciplinary academic collaboration and development cooperation. This was undertaken in ways that are far from being exhausted, and which could be explored even further. The Design-Build-Studio should be integrated as part of the regular curriculum. As a result of the “Design-Build-Studios: New Ways of Architectural Education” symposium a publication is being developed, as well as an exchange platform for Design-Build-Studio stakeholders in order to make the event sustainable.

Academic Team • Directory: Prof. Ingrid Goetz + Dipl.-Ing Susanne Dussel + Dipl.-Ing. Axel Huhn + Dr. Ing. Frank Hassenewert + Dipl.-Ing. Ursula Hartig + Dipl.-Ing. Nina Pawlicki • Civil Engineering: Fachgebiet Baukonstruktion am Institut für Bauingenieurwesen Prof. C. Scheer + Dipl. Ing. Gernot Rambow + Fachgebiet Tragwerksentwurf und -konstruktion Prof. Klaus Rückert + Dr. Ing. Jeanette Gasparini + Dr. Ing. Christof Ziegert + Dr. Ing. Uwe Haupt + Dipl.-Ing. Bernhard Sill + Dipl.-Ing. Daniel Weinhold + Dipl.-Ing. Gregor Grunwald • Landscapeplanning: Fachgebiet für Landschaftsbau/Objektbau Prof. Heinz Hallmann + Prof. Cordula Loidl-Reisch + Dr. Ing. Caroline Rolka + Abteilung technische Architekturdarstellung, Prof. Mathias Hirche and Team + BA Hons. DIP Hons. Simon Colwill **Outside Consultants:** Wolfgang Schäfer (Deutsche BetonMarketing) + Förderverein für Handwerk und Denkmalpflege e.V. + Schloss Trebsen + ZRS Ingenieure und Architekten Dr. Ing. Christof Ziegert + ASA Partners Netzwerk Nistra + Universidad Nacional Autónoma de México + VFFA + Fundación Cultural Rodolfo Morales + NGO Centro de Apoyo al Movimiento Popular Oaxaqueño + NGO Bioplaneta + Cooperativa de Mujeres Treig + Cooperativa de Mujeres UMCAMIX y NAXIL, BARCA + Guiu Lite Luch Nanabane Congregación de las Esclavas de la Inmaculada Niña + Cooperativa de Mujeres • Communities of Santa Maria Zaniza + Talea + Teojomulco + El Venado + Río Humo + Etlá + San Jacinto + Montoya + Zaachila **Funding Sources:** DAAD + Adveniat + Kindermissionswerk + Sto-Stiftung + Marie-Schlei Verein + Lateinamerikazentrum + Freunde der TU + Hilfswerk der Deutschen Lions + Auswärtiges Amt + Fundación Cultural Rodolfo Morales + Deutsche Botschaft Mexiko + private sponsoring and donations **Timeframe:** 1997–2012, each year 3 months of design + 2 months of building + 3 months of documentation **Successfully Completed Projects in the Field:** • México State of Oaxaca + Santa María Zaniza + Río Humo + Talea + El Venado + Teojomulco + Playa de Ventanilla + Colonia Guerrero Oaxaca + San Jacinto Ocotlán + Santa Ana Zegache + San Antonino + Etlá + Etlá Nativitas + Colonia Montoya-Oaxaca + Ocotlán de Morelos + San Martín Itunyoso + Guadalupe Miramar + Zaachila + San Jerónimo Tecóatl • Ecuador Riobamba + Puertorico **Publications:** • Project documentation 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2006 Dokumentation zur Ausstellung “Hechando una Mano”, 8 Jahre Planen und Bauen in Mexiko, 2007, 2008 **Website:** www.a.tu-berlin.de/CoCoon + www.a.tu-berlin.de/mexiko **Contact:** CoCoon@designbuild-studio.de + Ursula.Hartig@tu-berlin.de

Urban Climate Models — Wind is a crucial interlinking parameter in the relationship between city, architecture and climate. For the collaboration between architects, climatologists, landscape architects and aerodynamic engineers, research on wind is a first step in developing a climatological logic for urbanism.

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51,9°N Climate-City-Building

51,9°N is an international and trans-disciplinary collaboration of scientists and students from the Netherlands and Germany. Architects and urbanists affiliated with the Technical University of Berlin, the Rotterdam Academy of Architecture and Urban Design and the Münster School of Architecture conduct research in close collaboration with climatologists, aerodynamic engineers and landscape architects on the phenomenon of wind on architectural environments and urban agglomerations. Within architecture and related fields, the focus of the current debate on building sustainable and energy-efficient responses to climate change is shifting to an increasingly global competition of outstanding high-tech applications. Irrespective of the global race for energy saving, the demand for meaningful energy alternatives arises, and the solution lies in dealing in an intelligent way with specific, regional conditions.

Objectives: The research by design project 51,9°N focuses on the relational interaction between climate, architecture and the city and on the impact climate change has on our built environment. The objective is to develop architectural typologies and sustainable urban patterns

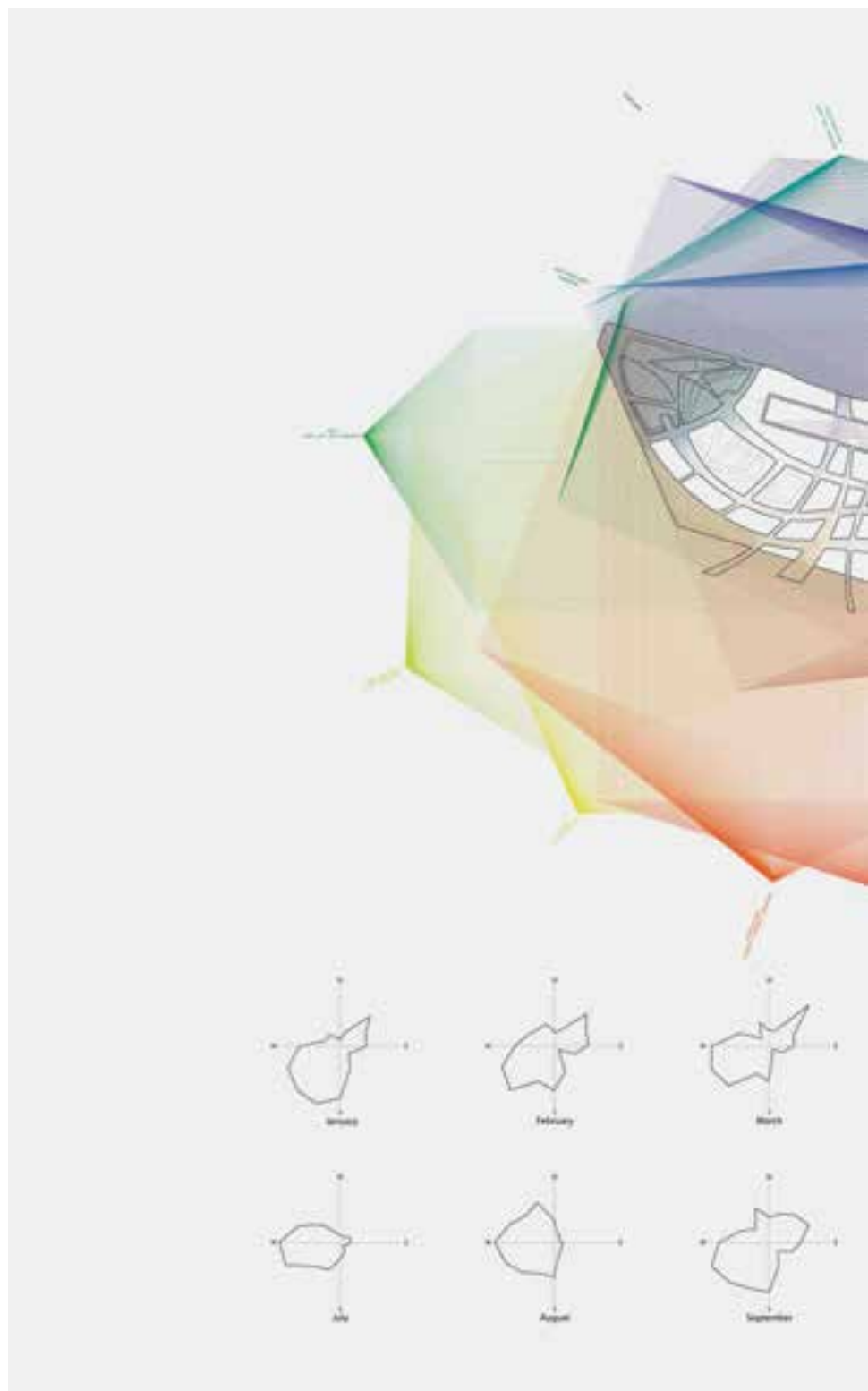
through a climatological “logic” that identifies mutual dependencies and visualizes intelligent principles within the fragile constellation of climate, city and architecture. The focus of the initial research lies on the climatic influences of wind on built structures; the impact it may have on architecture and urban configurations and the potentials that are generated out of the climatological restraints.

Methodology: The climatic conditions at latitude 51,9°N provide the conceptual basis of the research. The German city of Münster and the Dutch agglomeration of Rotterdam are both located on the same latitude and offer a testing field, where climatic influences at urban and architectural scales can be studied, compared, and evaluated. The comparative research is done in three steps: first, a general study of the conditional phenomenon of wind; second, analytical research on, and simulation of,

Studying building morphology with physical models (Image: Sven Pfeiffer, 2011)



the impact of wind on architectural archetypes and urban conditions such as porosity, direction, flow, typology; and third, the application of the research results in specific design scenarios at test locations in Rotterdam and Münster in the form of case studies. The research and design process is continuously screened and assessed by means





of wind-tunnel testing and computer simulations. The close collaboration with climatologists and aerodynamic engineers is a crucial contribution to the assessment of the results.

Outcomes: The research aims for the climatological optimization of our built environment: namely, architecture in an urban setting. By developing design guidelines and strategic tools for architectural and urban planning, it contributes to bridge the gap between the disciplines of spatial design, climatology and aerodynamic engineering. The qualified design patterns of the research directly relate to the experience and awareness of climate in architecture, urgencies on particulate matter, inner urban airflow, building ventilation and indoor climate, for example, and their reciprocal dependencies on architecture and building processes. Parts of the project were awarded with the Dutch Iktinos-prize in 2011. The ongoing research will be published as a printed book.



"51.9°N Climate - City - Building" Manual (Image: Ralf Pasel, 2012)

Applications: The relevance of the topic is anchored in the field of fundamental research, regarding the correlation of climatic parameters and traditional building processes. The design strategies developed as part of 51,9°N

contribute to the awareness of the issues addressed in the project and the strategies can be pre-assigned and applied to planning frameworks at a communal and also at a European level.

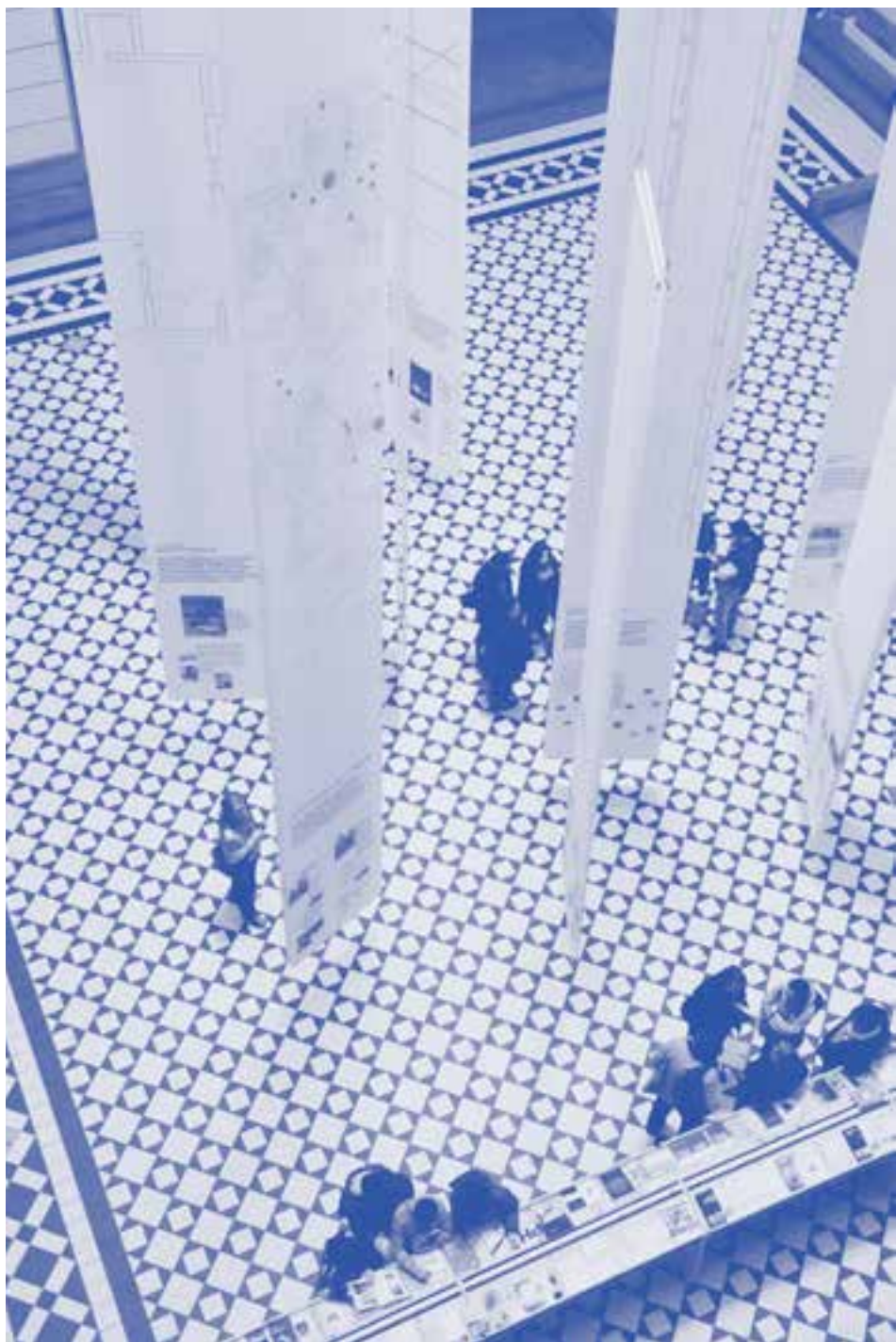
Academic Team: Prof. Ralf Pasel, TU Berlin, Institute for Architecture, Chair for Architectural Design and Construction + Visit. Prof. Mareike Krautheim, Rotterdam Academy of Architecture and Urban Design (RavB) + Prof. J. Schultz-Granberg, Münster School of Architecture (msa), Chair for Urbanism + Prof. i. Vertr. S. Pfeiffer, Münster School of Architecture (msa), Chair for Digital Design and Construction
Partners: Univ.-Prof. Otto Klemm, Westfälische Wilhelms Universität Münster (WWU) + Climatology Working Group + Prof. Dr.-Ing. Hans-Arno Jantzen, University of Applied Sciences Münster, Fluid Mechanics and Aerodynamics **Outside Consultants:** Peter Mensinga, ARUP Netherlands + Christophe Barlieb, CDMB.
Sites of Investigation: Port area of the City of Rotterdam, The Netherlands + Stadthafen Stadt Münster, Germany **Timeframe:** 2011–ongoing **Publication:** Krautheim, Mareike; Pasel, Ralf; Pfeiffer, Sven; Schultz-Granberg, Joachim: 51,9°N wind city climate, Rotterdam 2011 **Website:** www.urbanwindworks.wordpress.com

Exhibition

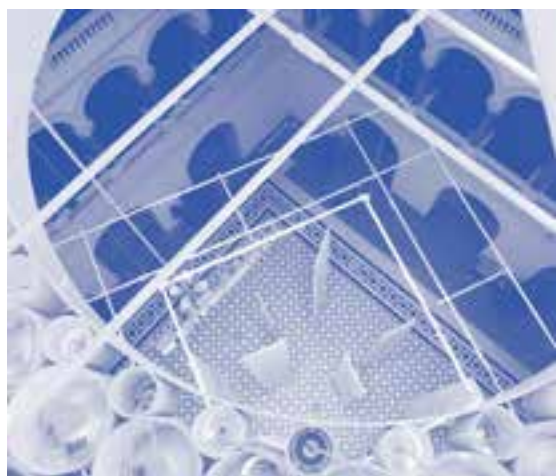
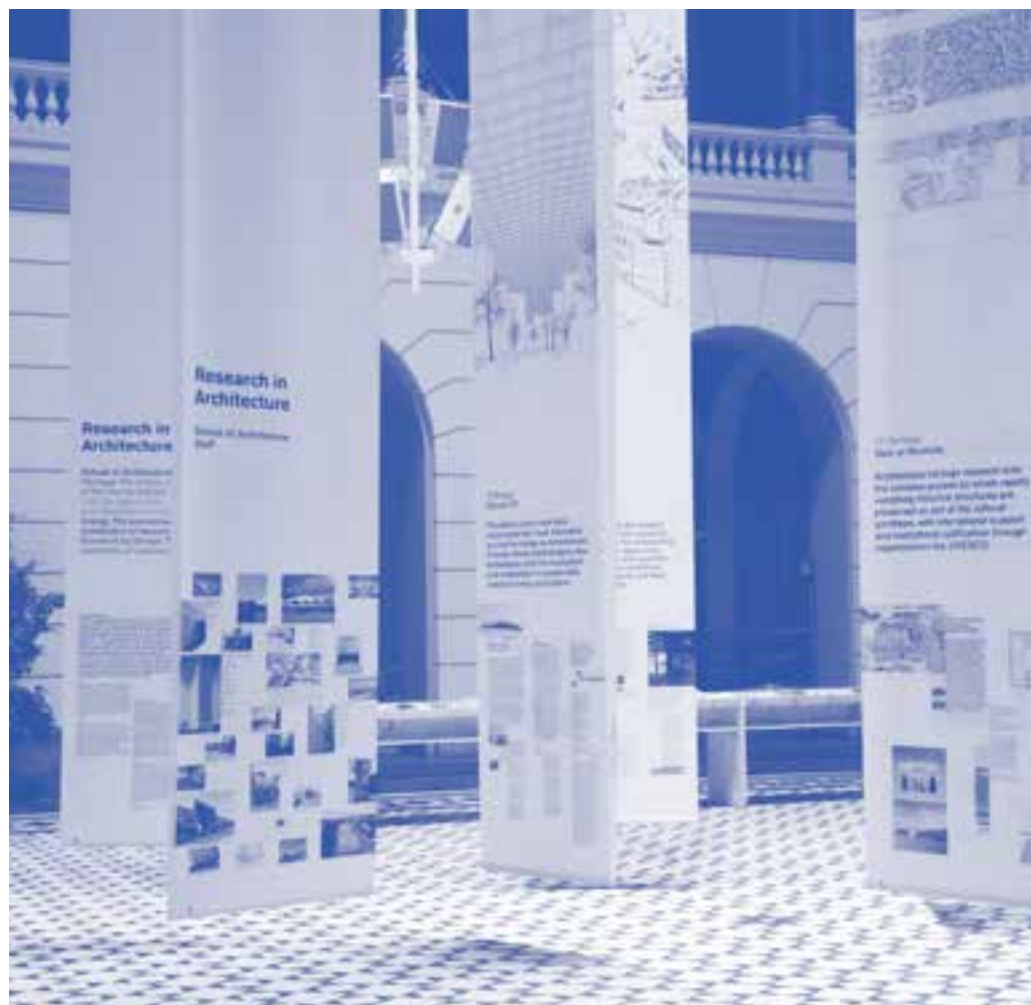


Research

in
Architecture



The Research in Architecture exhibition took place from 10 January - 23 January 2013 in the atrium of the main building at the Technische Universität Berlin.











Ceremonies at the opening of the exhibition led by Prof. Dr.-Ing. Jörg Steinbach



Academic Reach

The School of Architecture is continually increasing its academic reach. Stimulating international cooperations along with successful research projects and dissertations exemplify its ambition to contribute significantly to the international scientific discourse.

Internationality: The School of Architecture at the Technische Universität Berlin is part of an international academic network. About a third of the students come from abroad. All continents and numerous cultures are represented. More than 50 international cooperation agreements with universities have been established worldwide. They encompass student exchange programs, dual masters degrees and research collaborations. The academic reach is also reflected in the international academic careers of alumni of the School of Architecture all over the world. The ADIP design chair is reserved for visiting international professors: for a two-year term, the School of Architecture invites highly regarded contemporary practice and research professionals to challenge and enrich the curriculum.

Research in Numbers: Research has become a particular focus of the School of Architecture at TU Berlin. The number of supervised PhD-theses has doubled, from less than 15 to more than 30 per year, in the past five years. Contrary to most of the other TU9-Universities, the requirement for the masters degree thesis in architecture can be fulfilled with a research project. These research-based theses in architecture and urban design are considered to be equivalent to more typical design-based theses and prepare masters students for a research-oriented career. Funded research has reached the level of some 25 million euro in the past five years, providing support for more than 50 different projects. At present the School of Architecture leads in the acquisition of DFG-projects among the TU9-Universities.

ADIP

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Architecture Design

and Innovation Program

Visiting Guest Professors

Boštjan Vuga (2011 – current)

Mark Lee (2009 – 2011)

Jean-Philippe Vassal (2007 – 2009)

Francis Soler (2005 – 2007)

Jean-Mark Ibos (2002 – 2005)

Andrew Holmes (2000 – 2002)

Diane Lewis (1998 – 2000)

Renzo Vallebuona (1994 – 1996)

The chair for Architecture Design and Innovation serves as a periodically changing laboratory for new ideas and changing input by guest professors at the School of Architecture. Providing a platform for visiting architects of high stature from around the world, ADIP seeks to explore architectural design from an innovative and international perspective. This enriches the experience of the faculty, the students, and the community at large through the resultant influx of guests and voices exploring issues of contemporary and future architectural design through active teaching.

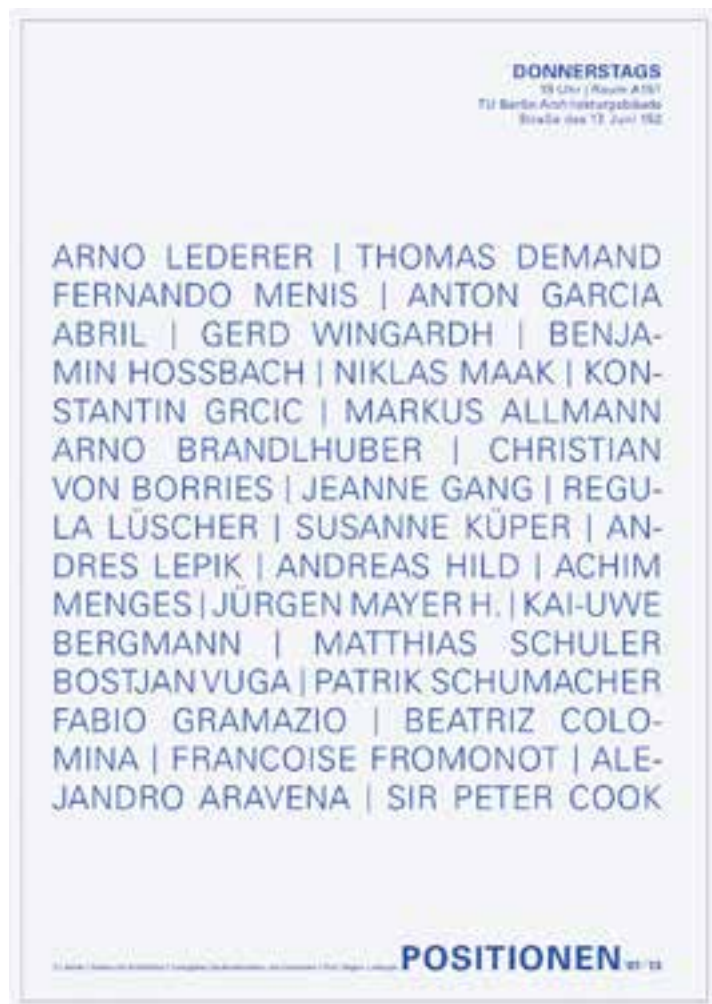


The specific research and teaching fields of the professorship are open to be defined by each guest professor – thus allowing him or her to explore architectural design from innovative and international perspectives and to enrich the debate culture of the department. Currently Guest Professor Boštjan Vuga is exploring the catalytic and generative strength of individual architectural objects that impact the change and function of the broader urban tissue.

Positionen

—

Lecture Series



The School of Architecture, represented by Prof. Regine Leibinger is hosting a lecture series called “Positionen.” The name is the program: guests are kindly asked to take a “stand” – a position. So far many well-known architects from all over Europe and even the US have participated, such as Andreas Hild, Jürgen Mayer H., Fabio Gramazio, Arno Brandlhuber and Jeanne Gang. The concept of the series is deliberately interdisciplinary: meaning other professionals – artists (Thomas Demand), journalists (Niklas Maak, FAZ) or designers (Konstantin Grcic) – are also well-received guests in the lecture series.

The School

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Chairs

Affiliated Masters
Programs

Teaching and
Research Units

Chairs

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Chair for Architectural Presentation FG Architekturdarstellung Visiting Prof. Daniel Lordick

The research topics of the Chair for Architectural Presentation (CAP) deal with architectural geometry, parametric design principles, computer aided manufacturing, and visualization. Within this field CAP aims to broaden the technical possibilities of computational tools through implementation and integration. It explores the application of digital prototyping processes, and it investigates the potential of new concepts for the communication of spatial information. In all of its research and teaching projects CAP emphasizes the cultural dimension of architectural presentation.

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Chair for Building Archaeology FG Historische Bauforschung Prof. Dr.-Ing. Dorothée Sack

The Chair for Building Archaeology is focused on research about historic buildings and sites from different times and regions stretching from Berlin-Brandenburg to the Middle East. Some of the research projects are integrated in the study program of the post graduate, three-term Master Program in Heritage Conservation.

CODE – Chair for Architectural
Construction and Design
FG Baukonstruktion und Entwerfen
Prof. Dipl.-Ing. Ralf Pasel

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The activities of the Chair for Architectural Design and Construction focus on the development of sustainable environments and intelligent design strategies throughout all scales of architecture – from urban planning down to the minute details of material junctions. Based on the integral correlation between design and construction, our research and design praxis ranges from free, strategic and/or rule-based design approaches, through experiments with 3-dimensional modeling, elaborate material studies and varying construction methods, up to prototyping at a 1:1 scale.

CHORA City & Energy – Chair for Urban
Design and Sustainable Urban Planning
FG Städtebau und
nachhaltige Stadtentwicklung
Prof. Raoul Bunschoten

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CHORA City & Energy is the name of the Institute of Sustainable Urban Planning and Urban Design and is part of the CHORA Cloud, based in London, Berlin, Beijing and Shanghai. CHORA C&E conducts research on the culture, planning, design and management of the city in the context of Climate Change. The current focus is the Smart City in Europe and China and the foundation of the TU Berlin Urban Lab: Platform for the Smart City.

04
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adreizehn – Chair for Building Construction and Design FG Baukonstruktion und Entwerfen Prof. Ute Frank

The chair adreizehn is running a disciplinary combination of architectural design and building construction. Teaching and research activities are focused on the interaction between aesthetic programs and technical solutions, including actual social, ecological and economic needs. The design studios are laboratories for the production of architectural scale projects using various and divergent disciplinary parameters. Student work as well as research studies simultaneously investigate methods of architectural design and their generative potential for technical design innovations.

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Chair for Architectural Design FG Baukonstruktion und Entwerfen Prof. Regine Leibinger

The chair for architectural design focuses on material in architecture. The aim of teaching and research is the systematic elaboration, collection and mediation of knowledge about the materiality of space and its construction. On the basis of architectural design we explore the design potentials of materials and make new demands on their performance. In cooperation with industry, this approach provides the opportunity to expand what is technically feasible. Currently, the chair is researching the potentials of monolithic structures made with infra-lightweight concrete for multi-story housing.

Chair for Design and Construction

FG Entwerfen und Konstruieren

Wohnungsbau und Kulturbauten

Prof. Dr.-Ing. Susanne Hofmann

07

The second year design and construction studio focuses on current urban development issues in Berlin. The students develop and negotiate architectural proposals in cooperation with local stakeholders and potential users. Supported by a team of experts, the students develop specific design strategies in relation to their own research. An integral part of the studio is reflecting on the impact of their proposals within the neighborhood, from the urban to architectural scale.

Chair of Visual Arts

FG Bildende Kunst

Prof. Dr. Phil. Stefanie Bürkle

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The Chair of Visual Arts is focused on intersections between art and architecture. Throughout analyzing artistic strategies as well as exercising spatial artistic practices we communicate artistic knowledge and understanding of contemporary art to the evolving architects in bachelor and master studies. Concerning the approach to interdisciplinary projects of art and science, the integrative use of artistic media and scientific methods is an important tool and methodology in teaching and research.

03
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LIA – Laboratory for Integrative Architecture FG Entwerfen und Gebäudekunde Prof. Finn Geipel

The Laboratory for Integrative Architecture – LIA, was founded by Finn Geipel in 2000 at the Technische Universität Berlin as a chair for integrative research on architectural typologies. One of the major interests lies in the analysis of building typologies with focus on their flexibility and their sustainable development in architecture and urbanism. Knowledge won from this research is then implemented in practice. LIA closely cooperates with partners from other disciplines such as engineers, economists, landscape planners and urbanists.

08

Chair for Planning and Construction Economics/Real Estate FG Planungs- und Bauökonomie/ Immobilienwirtschaft Prof. Dr. rer. pol. Kristin Wellner

The Chair for Planning and Construction Economics/Real Estate deals with the transfer of design into applicable usage. Architecture has to be measured by real terms i.e. by different materials, spaces, building costs and economic objectives. Bringing all these different values and requirements into a common understanding, accompanied by sustainable development is the aim of the chair in teaching and in research.

ADIP – Architecture Design Innovation Program FG Entwerfen/Dauergastprofessur Visiting Prof. Boštjan Vuga

Notable figures related to the world of architecture, art and design come for a 2-year visiting faculty position at the ADIP chair. The specific research and teaching fields are open for definition by each Guest Professor – thus allowing the exploration of architectural design from innovative and international perspectives. ADIP also serves to enrich the debate culture of the School of Architecture. Currently Guest Professor Boštjan Vuga is exploring the catalytic and generative strength of individual architectural objects that impact the change and function of the broader urban tissue.

Chair for the Design of Hospitals and Health Care Buildings FG Entwerfen von Krankenhäusern und Bauten des Gesundheitswesens Prof. Christine Nickl-Weller

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It is the chair's goal to represent the complex contents of health care buildings in research and teaching. These include senior living, patient care buildings and even academic buildings as well as the promotion of health issues in city and regional planning. The aim of the research project Krankenhaus+ is to compile and demonstrate energy efficiency strategies for existing hospital buildings, partial renovations and new constructions.

CUD – Chair for Urban Design and Urbanization FG Städtebau und Urbanisierung Prof. Jörg Stollmann

The Chair for Urban Design is focused on a socially just and climate conscious urban design for people, plants, animals, fungi and crystals. CUD research and design projects explore the urban landscape with its complex history, actual use, ecology and economy, and contemporary modes of urban governance. Currently, a methodology of community-based design is developed through teaching and research. In 2010, CUD founded the Akademie einer neuen Gropiusstadt (Academy of a New Gropiusstadt).

Chair for Design, Construction and Climate-optimized Building FG Konstruktives Entwerfen und klimagerechtes Bauen Visiting Prof. Mathias Heinz

The Chair for Design, Construction and Climate-optimized Building promotes a truly integrative concept of design. Structural and technological innovation can be achieved only on the basis of an understanding of a project's environmental conditions: the site's specific climate and the efficient use of resources in the building. During the guest professorship of Prof. Mathias Heinz, the chair will focus on inner-city multistory housing projects. The parameters of resource-efficient building are explored in the case of four classic shell construction materials: wood, brick, steel and concrete.

Chair for Building Technology	04
and Architectural Design	10
FG Gebäudetechnik und Entwerfen	11
Prof. Claus Steffan	12

Technological development is one of the main factors for innovation in architecture. The Chair for Building Technology and Architectural Design forms – in the fields of teaching and research – an interface between the various engineering disciplines and positions the role of the architect as a team coordinator during an integrated design process. Graduates in architecture must have the technical expertise to understand the engineering disciplines, basic and specialist engineers to develop integrated and sustainable design concepts.

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Chair for Modeling and Design	31
FG Modell+Design	
Dipl.-Des. Burkhard Lüdtke	

The emphasis of the Chair for Modeling and Design teachings is not on the faithful representation of architecture but on the creative context of aesthetic presentation – the model as a picture, a three-dimensional composition of shape, color and material. The focus of the design research is on the perception of three-dimensionality by blind people. New materials for tactile objects have been developed through this research, establishing a methodology of integrating specific knowledge and experience of future users, which ensures a high acceptance by all end-users.

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TAD – Chair for Technical Representation of Architecture FG Technische Architekturdarstellung Prof. Dr.-Ing. Mathias P. Hirche

The chair is focused on all kinds of digital representation: Computer Aided Architectural Design (CAAD), photorealistic and artistic renderings, audio/visual simulation, along with photographic and video-techniques. Rendering, modeling and representation are keys to communicating and understanding architecture.

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Habitat Unit – Chair for International Urbanism and Design FG Internationale Urbanistik und Entwerfen Prof. Dr. Philipp Misselwitz

The Habitat Unit is a globally networked research and teaching centre developing new approaches, research and application-oriented tools relevant for global urbanization and urban change processes. The Habitat Unit is committed to an inclusive and rights based approach to urban policy, urban management as well as development-oriented and actor-driven planning. Based at the School of Architecture at the Technische Universität Berlin, the Habitat Unit promotes an extended understanding of urban and architectural design, which integrates spatial, material and cultural sensitivities with new models of participation, co-production and urban governance. The Habitat Unit collaborates closely with a range of leading universities worldwide, advises national and global organizations active in development-oriented planning and represents the TU Berlin as official partner in the Habitat Partner Universities Initiative established by the United Nations Center for Human Settlements (UN HABITAT).

Chair for History of	21
Architecture and Urbanism	22
FG Bau- und Stadtbaugeschichte	24
Prof. Dr. Johannes Cramer	

Sound knowledge and holistic competencies in the history of architecture and urbanism are inevitable requirements for every architect. Architectural heritage is an inspiring source for modern architecture. Research is focused on the importance of the built environment for future building strategies and it provides tools for converting existing architecture for modern and future uses. A special focus of the chair is on the research and restoration of the heritage of the Arab world.

Chair for Architectural Theory	26
FG Architekturtheorie	
Prof. Dr.-Ing. habil. Joerg H. Gleiter	

The mission of the Chair for Architectural Theory is grounded in the notion that in modern societies architecture is no longer conceivable without critical reflection – just as in the way that in modern societies culture without critical reflection turns into the kind of barbarism against which culture is opposed to from the outset. Thus architectural theory is defined as the critical reflection of the concepts and construction processes of architecture as well as the critical reflection of architecture's cultural function in the dynamically changing cultural force field. Research in architectural theory aims at questioning, re-conceptualizing and confirming the ideas and models of how man builds for himself an environment apt to fit his human needs.

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Chair for Structural Design and Construction

FG Tragwerksentwurf und -konstruktion

Prof. Dr.-Ing. Klaus Rückert

The development of higher standards and innovative solutions for sustainable, energy efficient and resource saving building and construction is essential for the future. Through research and teaching, integrated interdisciplinary projects are pursued, which engage factors from energy generation to urbanization. Materials, technology and human processes are points of engagement in this trajectory.

05
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Chair for Architectural Design and Construction

FG Entwerfen und Baukonstruktion – Konzepte und Phänomene

Prof. Donatella Fioretti

Buildings are not only complex practical devices made to facilitate and organize human activity: they also structure human relations, interactions, perceptions and behaviors. Form, construction, use of material and spatial quality are closely related to basic existential needs. The 1:1 Lab introduces first year students to the complexity of architectural design and construction through working with real stakeholders on real projects. The research project “Monolithisch Bauen” (Monolithic construction) with the Bauhaus University in Weimar analyzes and develops building technologies that combine contemporary sustainability requirements with the simplicity of the traditional massive “single material” structures. The Chair for Architectural Design and Construction is a partner in the Akademie einer neuen Gropiusstadt (Academy of a New Gropiusstadt).

Chair for Planning and Building Economy FG Planungs- und Bauökonomie Prof. Rainer Mertes

From idea to realization, a variety of stakeholders are involved in the building and construction process, and architects must be more than simply designers. The curriculum of the chair provides food for thought about the complexity of architectural activities and the range of professional fields architects engage with. The “Studierende bauen in...” module has introduced students to the actual process of designing and building by involving them in challenging projects internationally, from Afghanistan to Tanzania.

Affiliated Masters Programs

04

Real Estate Management Masters Program

Prof. Dr. rer. pol. Rudolf Schäfer

The four-term part-time Real Estate Management Program follows three themes: economics, ecology and socio-cultural contexts to arrive at an interdisciplinary approach to real estate management. From site selection and project management to the boundaries of facilities management, the course addresses the life cycle and holistic range of development activities.

Urban Management Masters Program

Dr.-Ing. Bettina Hamann

The Urban Management Program offers two courses: a three-term masters degree program in urban management for graduates from various disciplines, and short courses on specific aspects of urban management for senior local and central government staff. The courses offer a wide range of expertise in various disciplines. Many of the teachers and researchers at the TU Berlin have longstanding experience as consultants to international and/or bi-lateral development organizations. Experts from other institutions and the private sector with an international reputation in their respective fields are also involved in order to offer country-specific knowledge and allow for international comparisons.

Urban Design
Masters Program
Prof. Undine Giseke (ILAUP)
Prof. Dr. Philipp Misselwitz

The Urban Design Program is offered as two distinctive two-year courses: an Urban Design Masters Degree Program and an Urban Design Dual Degree Program in cooperation with Tongji University, Shanghai. It comprises studio and research modules offered by the Departments of Architecture, Urban- and Regional Planning, Landscape Architecture and Environmental Planning as well as Sociology. As the first masters degree program in Germany to focus on urban design, it allows for knowledge and skills in both national and international fields of research and practice and is closely connected to the international research community.

Heritage Conservation
Master Program
Prof. Dr.-Ing. Dorothee Sack

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The three-term Heritage Conservation Program is aimed at professionals from the fields of architecture, art history, archeology, building engineering and landscape planning with experience in heritage conservation. In interdisciplinary teams, students develop practice-oriented schemes for the conservation and use of monuments and design and construction in existing contexts. Via the combination of theoretical and practical skills, the students obtain the know-how for a career in the multifaceted profession of heritage conservation.

Stage Design and Scenography Bühnenbild_Szenischer Raum Masters Program Prof. Kerstin Laube

The two-year Stage Design Program aims at artistically inclined graduates in the disciplines of architecture, design, fine arts, and brand communication. The course combines stage design for theater, opera, dance and musicals, with interactive spatial settings for exhibitions and performances – including contact and communication hotspots within companies. In close co-operation with external partners, practice-oriented projects include workshops, design commissions and 1:1 realizations.

Teaching and Research Units

CoCoon: Sector for Contextual Construction CoCoon Team, headed by Dipl.-Ing. Ursula Hartig

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CoCoon:Sector for Contextual Construction, was created in April 2005 as an academic sector for teaching, research and practice in an intercultural and interdisciplinary context. Research: CoCoon conducts research regarding vernacular architecture and its contextual, social and sustainability implications. CoCoon investigates praxis related forms of architectural education, bridging the gap between theory and reality. Teaching + practice: CoCoon offers seminars related to design, planning and calculation of buildings and environments in a vernacular, and peri-urban context including the realization on-site. Networking: CoCoon believes in the positive outcomes of practice-related intercultural student projects and offers a cooperation base for the execution of projects, seminars, knowledge exchange, people, and contacts.

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U-Lab – Urban Research Laboratory

Dr. Paola Alfaro d’Alençon
Dipl.-Ing. Bettina Bauerfeind
Dr. Daniela Konrad

Based on the model of dialogue formats, the “Urban Research and Design Laboratory,” funded in 2010, encourages exchanges between teaching, research and practice, responding to the demands of interdisciplinary project work as well as case study-based and activity-oriented functioning in the education of future city planners, urban designers and architects. Through close cooperation with all stakeholders involved in sensitive areas and arranged in complex planning processes, the U-Lab contributes to approaches such as participatory design and the use of cooperative working formats. U-Lab is currently additionally funded by the Wüstenrot Stiftung and the EU-EM-Commission.

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Die Baupiloten

Prof. Dr.-Ing. Susanne Hofmann

The initiative “Die Baupiloten” enables architectural students to be involved in real architectural projects from conception through to completion. It advocates alternative participatory design strategies with an emphasis on inventive design that is driven by both a social and ecological agenda. Ongoing experimentation, implementation and evaluation in real contexts though the combined fields of research, teaching and architectural practice informs a continually evolving alternative methodology for how to engage users, communities and decision-makers in the production of our built environment.

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