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Sustainable Built Environment

Regional Conference Zurich
June 13–17, 2016



Expanding Boundaries: Systems Thinking in the Built Environment

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**Sustainable Buildings
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Content

Introduction	3
Sustainable Built Environment (SBE) Regional Conference Zurich <Expanding Boundaries: Systems Thinking in the Built Environment>	
Program	5
Daily overview of all events	
Workshops	11
Keynote Speakers	15
Panel Discussion	20
<Smart humans or smart meters?>	
Poster Presentations	21
Conference Sessions	22
Detailed session schedule	
Site Visits	29
Venues	33
Conference Venue Social Events	
Visiting Zurich	35
Behind the Scenes	37
Organising Committee Advisory Board Scientific Committee	

Sustainable Built Environment (SBE)

Regional Conference Zurich, June 13-17, 2016 Expanding Boundaries: Systems Thinking in the Built Environment

Consuming over 40% of total primary energy, the built environment is in the focus of worldwide strategies and measures towards a more sustainable future. To provide resilient solutions, a simple optimisation of individual technologies will not be sufficient. In contrast, whole-system thinking reveals and exploits connections between otherwise disparate parts. Each system interacts with others on different scales (materials, buildings, cities) and domains (ecology, economy, social).

The need for such system thinking is reflected by the current shift in research from the perspective of single buildings to small urban neighborhoods and districts. The expansion of system boundaries opens up vast opportunities for interaction and synergies but also poses challenges due to an increase in complexity.

SBE16 Regional Conference Zurich acts as a platform to discuss this shift between students, researchers and professionals and to foster system thinking in the built environment. The conference takes place from June 13 to 17, 2016. It is part of the international SBE series of conferences focusing on a sustainable built environment. It is accompanied by keynote speeches, workshops and site visits to recent, cutting edge building projects in and around Zurich.

On behalf of the hosts and organisers of this event – the city of Zurich, ETH Zurich, and the Swiss Federal Office of Energy – we warmly welcome all participants!



Zurich Skyline, © GMC

We have defined a set of key conference topics to prompt paper submissions that cover different aspects and scales of systems thinking. These key topics determine the content and structure of the main conference sessions which take place on Wednesday, June 15 to Friday, June 17.

Accepted papers have been allocated to the following conference streams:

- Distributed energy systems & infrastructure
- Life-cycle oriented approaches
- Integrated approaches & tools for decision-making
- Innovative materials & components

Program

Workshops

SBE16 Zurich offers half-day, 1-day and 2-day workshops that focus on the topics of the conference. They take place on June 13-14. They aim to provide an opportunity for students, researchers and professionals for focused debates as well as hands-on experiences and explorations of new methods or technologies. The workshop results will be presented following the opening program on Wednesday.

Keynote Speakers

We have invited renowned scholars and industry leaders to discuss the topic of sustainability in the context of built environments. These lectures represent the theoretical frame of the conference.

Conference Sessions

Conference Sessions take place on June 15-17. Input lectures of 15 minutes will be followed by 5 minutes of Q/A. We kindly ask all participants to respect this schedule and to allow equal opportunities for all speakers. For information on IT requirements please see page 22.

Poster Presentations

Short Poster Presentations of 1min each are scheduled for Wednesday and Thursday following the keynote speakers.

Panel Discussion

On Friday morning, following the keynote lecture, participants are invited to gather for a panel discussion with the title <Smart humans or smart meters?>

Site Visits

We have selected a range of recent, cutting edge building projects in and around Zurich to accompany the theoretical debate with practical examples. Site visits take place on Thursday and Friday afternoon and require registration in advance. Transportation is provided.

Social Events

In addition to the formal program, we invite all participants to join our social gatherings on Tuesday and Thursday. We are looking forward to meeting you!

Opposite page: Overview of the SBE16 Zurich conference schedule, June 13 – 17, 2016.

Mon, June 13	Tue, June 14	Wed, June 15	Thu, June 16	Fri, June 17		
Workshops	Workshops	Opening Program	Keynote Chrisna du Plessis	Keynote Jens Feddern		
		Keynote Koen Steemers	Keynote Serge Salat	Panel Discussion		
Poster Presentation / Coffee Break						
		Keynote Peter Edwards	Conference Sessions	Conference Sessions		
		Presentation Workshops				
Lunch Break						
		Conference Sessions	Conference Sessions	Conference Sessions		
		Coffee Break	Site Visits	Closing Program		
		Conference Sessions				
		Conference Dinner		<table border="1"> <tr> <td data-bbox="845 1252 957 1332">Farewell Coffee</td> <td data-bbox="957 1252 1041 1332">Site Visit</td> </tr> </table>	Farewell Coffee	Site Visit
Farewell Coffee	Site Visit					

Monday, June 13

9:00 – 18:00	Workshop 1 City Energy Analyst (CEA) Toolbox	HIL E65
	Workshop 4 Sustainable Hybrid Building	HIL F25.2

Tuesday, June 14

9:00 – 18:00	Workshop 1 City Energy Analyst (CEA) Toolbox	HIL E65
	Workshop 5 Bauen für die 1t-CO ₂ -Gesellschaft	LEE 101

14:00 – 17:30	Workshop 2 Urban SOLar Visual Explorer	HIL E15.2
	Workshop 3 Management Game of a Building Material Supply Chain	HIL F25.2

15:00 – 17:30	Workshop 6 Sustainable building operation	HIL F36.1
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18:00 **Welcome Apéro**
ETH Zurich Dozentenfoyer
Rämistrasse 101, Floor K, 8092 Zurich

Wednesday, June 15

8:30	Registration Registration Desk HCI is the main conference venue (see map on page 33)	HCI G
9:00	Opening Program <i>Chair: Arno Schlueter (ETH Zurich)</i> with Andreas Eckmanns (BFE), Nils Larsson (iisBE) and Wiebke Rösler Häfliger (City of Zurich)	HCI G3
9:45	Keynote Speaker: Koen Steemers (University of Cambridge)	
10:30	Poster Session 1	HCI G
10:45	Coffee Break	
11:00	Keynote Speaker: Peter Edwards (Singapore-ETH Centre)	HCI G3
11:45	Presentation of Workshop Results	
12:40	Lunch Break	
13:45 – 15:30	Conference Sessions	1.1 2.2 3.1
15:30	Coffee Break	
16:00 – 17:30	Conference Sessions	1.1 2.3 3.3

Thursday, June 16

9:00 Keynote Speaker: Chrisna du Plessis (University of Pretoria)
Chair: Guillaume Habert (ETH Zurich) HCI G3

9:45 Keynote Speaker: Serge Salat (Urban Morphology and Complex Systems Institute Paris)

10:30 Poster Session 2 HCI G

10:45 **Coffee Break**

11:00 – 12:40 Conference Sessions **1.1** **2.3** **3.3**

12:40 **Lunch Break**

13:45 – 15:30 Conference Sessions **1.2** **2.3** **4**

15:30 – 18:30 Site Visit 1 | NEST at Empa
Site Visit 2 | Campus Tour ETH Hoenggerberg
Site Visit 3 | Development of the District <Hardau>
Site Visit 4 | Building Cooperative <mehr als wohnen>
Site Visit 5 | Swiss Society of Engineers and Architects

Meeting Point: Stefano-Francini-Platz

19:00 **Conference Dinner**
g27 restaurant
Grubenstrasse 27, 8045 Zurich

Friday, June 17

9:00 Keynote Speaker: Jens Feddern (Siemens Building Technologies)
Chair: Arno Schlueter (ETH Zurich) HCI G3

9:45 **Panel Discussion** <Smart humans or smart meters?>
Chair: Niklaus Kohler (em. Prof. KIT)
with Jens Feddern (Siemens), Suren Erkman (University of Lausanne), Annette Aumann (City of Zurich)

10:30 **Coffee Break**

11:00 – 12:40 Conference Sessions **1.3** **2.1** **4**

12:40 **Lunch Break**

13:45 – 15:30 Conference Sessions **1.3** **2.1** **3.2**

15:30 **Closing Program and Award Ceremony** HCI G3
with Chi Sun Poon (Hong Kong Polytechnic University), Niklaus Kohler (em. Prof. KIT), Andreas Eckmans (BFE), Annette Aumann (City of Zurich) and Guillaume Habert, Arno Schlueter (ETH Zurich)

16:30 **Farewell Coffee**

16:30 – 19:00 Site Visit 2 | Campus Tour ETH Hoenggerberg

Workshops

1 | City Energy Analyst (CEA) Toolbox

June 13 & 14 / 9:00 – 18:00 / HIL E65

The City Energy Analyst (CEA) is a novel computational framework for the analysis of building energy systems at neighbourhood and district scales developed at ETH Zurich. Based on ArcGis, the framework serves to define energy efficiency strategies that minimize the energy intensity, carbon footprint and annualized costs of energy services in an urban area.

Interested participants are invited to take part in the first CEA Toolbox workshop, a 2-day session including theoretical input and group work.

Number of participants: 9 – 12

Duration: 2 days

Organisers: Amr Elesawy, Anja Willmann (ETH Zurich, Chair of Architecture and Building Systems) and Jimeno Fonseca (Future Cities Laboratory, Singapore-ETH Centre)

2 | Urban SOLar Visual Explorer

June 14 / 14:00 – 17:30 / HIL E15.2

The workshop proposes a multi-criteria decision-support workflow that estimates the passive, active, and daylight performance of neighbourhood variants automatically generated from a set of urban design parameters provided by the user. This tool is developed to provide practitioners with early-stage design alternatives in an interactive and iterative sequence, guiding them towards a design with improved solar and energy potential. The core of the workflow is coded and packaged as a Grasshopper plug-in for Rhino, with a customised interface for gathering the user-inputs.

Number of participants: max. 25

Duration: 3 – 3.5 hours

Organiser: Emilie Nault (Interdisciplinary Laboratory of Performance-Integrated Design (LIPID), EPFL, Switzerland)

3 | Management Game of a Building Material Supply Chain

June 14 / 14:00 – 17:00 / HIL F25.2

Building material supply chains form part of the complexity of built environments. This system dynamics management game involves a supply chain with four companies and the respective material and information flows. Participants take the role of a company with all companies having a common goal: Minimizing costs for capital in the supply chain by maintaining low stocks but managing to deliver all orders. The players will experience the pressure that emerges from other actors and from 'the system'. They will also experience decision-making and coordination problems such as the bullwhip effect.

Number of participants: 4 – 16

Duration: 3 hours

Organiser: Nici Zimmermann (Institute for Environmental Design and Engineering, University College London (UCL), The Bartlett)

4 | Sustainable Hybrid Building

June 13 / 9:00 – 19:00 / HIL F25.2

A multidisciplinary approach to mixed-use buildings in small urban districts

A hybrid building combines several programs in one fabric. It could be managed by public-private partnerships and could be accessible 24/7. The workshop will discuss the design of small to medium size hybrid buildings as one of the possible responses to the shortage of housing land, to reduce transport carbon dioxide and energy consumption in urban areas, to preserve resources and to reduce operating costs. Mixed-use, hybrid buildings foster integrated approaches to energy and resource efficiency.

Number of participants: 10 – 15

Duration: 1 day

Organisers: Paola Tosolini (Haute École du paysage, d'ingénierie et d'architecture de Genève), Jessen Page (University of Applied Arts and Sciences of Western Switzerland)

5 | Bauen für die 1t-CO₂-Gesellschaft

June 14 / 8:30–17:15 / LEE 101 (city)

(German) Im Rahmen von Input-Referaten werden in diesem Workshop gemeinsam mit den Teilnehmenden die Hürden und Chancen für ein zukunftsfähiges Bauen in einer 1t-CO₂- und 2000-Watt-Gesellschaft aus drei Perspektiven beleuchtet werden: Welche sind die Rahmenbedingungen, welches sind die Chancen und möglichen Hindernisse und wie können diese überwunden werden.

Der Workshop richtet sich an Architekten und Planer, Investoren und Bauherren, Behördenvertreter von Gemeinde, Kanton und Bund.

Teilnehmerzahl: 50 – 60

Dauer: 1 Tag

Organisator: Daniel Kellenberger (Intep - Integrale Planung GmbH, Zürich)

6 | Sustainable Building Operation

June 14 / 15:00 – 17:00 / HIL F36.1

Several guidelines, norms, certification schemes etc. are available for sustainable construction, but few are dealing with sustainable operation. The following questions shall be discussed: Which approach is useful for a description and assessment of sustainable building operation? What are the interrelations between sustainable planning and construction and sustainable operation? How should the different roles and responsibilities be distributed?

The workshop will follow the *World Café* format: impulse presentations, 3-4 tables for discussion, 1 moderator per table.

Number of participants: 10 – 40

Duration: 2 hours

Organiser: Carsten Druhmman, Stefan Jäschke (ZHAW – Zurich University of Applied Sciences, Institute of Facility Management)

Please note that workshops are subject to change. Refer to the workshop section on our homepage for updated information.

www.sbe16.ethz.ch/program/workshops

Keynote Speakers

Chrisna du Plessis

University of Pretoria, South Africa

Chrisna du Plessis is a Professor in the School for the Built Environment, University of Pretoria, South Africa. She was formerly Principal Researcher at Council for Scientific and Industrial Research (CSIR) Built Environment in Pretoria, South Africa. Her work focuses on sustainable human settlement and the application of sustainability science in the built environment.



Chrisna du Plessis is known for her work on the evaluation of policy and research strategy for sustainable building and construction in developing countries, and is currently concentrating on urban sustainability science at both theoretical and technical levels. Her main expertise is the development of trans-disciplinary research and development programs that follow a complex systems approach to the development of human settlements as sustainable social-ecological systems.

She studied architecture at the University of Pretoria, South Africa, obtained a PhD in Urban Sustainability from the University of

Salford, UK, and was awarded an honorary doctorate in technology from Chalmers University of Technology in Gothenburg.

Chrisna du Plessis represented South Africa in the Earth Charter drafting and consultation process and contributed to several national and international policy and strategy initiatives on sustainable settlements. She was lead author of the United Nations Environment Program's *Agenda 21 for Sustainable Construction in Developing Countries* and is Theme Coordinator: Sustainable Construction for the International Council on Research and Innovation in Building and Construction.

Koen Steemers

University of Cambridge, UK



Koen Steemers was recently named in *Building Design's* inaugural list of the "50 most influential people in UK sustainability". He studied Architecture at the University of Bath and subsequently joined Energy Conscious Design, (now ECD Partnership, London). His PhD work at the University of Cambridge developed new insights into the links between urban design and energy consumption. He acted as consultant on various projects; became a Director of Cambridge Architectural Research Ltd (1991) and of architectural practice CH+W Design (2015). He has been Director of the Martin Centre (2003-08) and Head of Department (2008-14).

Koen Steemers's expertise is based on being a registered architect (CH+W Design); environmental design consultant (Director of CAR Ltd); consultant to UN-HABITAT; President of PLEA (Passive & Low Energy Architecture international association); Fellow of Jesus College, Cambridge; Guest Professor at Chongqing University, China and at Kyung Hee University, Korea. He has extensive research assessment experience, including two stints on the UK Government's research reviews and as deputy Chair of the Hong Kong Research Assessment Panel 2014. He is currently on the UK Green Building Council *Healthy Homes* task group.

Koen Steemers heads a team of 14 researchers in the *Behaviour and Building Performance* (BBP) Centre. He coordinates the MPhil course in Architecture and Urban Studies and supervises PhD students. He has produced over 200 publications (with over 4000 citations), including 10 books ranging in subject matter from *Sustainable Urban and Architectural Design* (2006) to *Daylight Design of Buildings* (2002).

Serge Salat

Urban Morphology and Complex Systems Institute in Paris, France

Serge Salat is an urban planner, a scientist in the science of complexity, an art historian and an internationally recognized architect/artist. He is the founder and president of the Urban Morphology and Complex Systems Institute based in Paris.

He has been seminal in applying the science of complexity to cities. He has authored more than 20 books on art and architecture, and more than one hundred publications and communications. He has opened the way in introducing physics far away from the equilibrium, fractals, as well as network analysis and complexity science to a better understanding of cities.

Serge Salat is a practicing architect and city planner and advises international organizations such as the United Nations, the World Bank, AFD (French Agency for Development) and CDC (Caisse des Dépôts et Consignations), on strategic transitions of urbanization in particular in China, where he provides a unique integration of scientific skills, economic, financial and governance competence



with his experience as both a designer of large scale projects and advisor on national policies. He is one of the authors of the Fifth IPCC assessment report.

Born in 1956, he graduated from École Polytechnique with a master of mathematics and physics (Paris, 1979), from Institut d'Études Politiques (Paris, 1982), and from École Nationale d'Administration (Paris, 1984). He obtained a Ph.D. in Economics (Université Paris IX Dauphine, 1979–82); a Ph.D. in Architecture (École d'Architecture de Paris La Villette, 1989); and a Ph.D. in History and Civilizations (EHESS, Paris, 2010).

Peter Edwards

Singapore-ETH Centre for Global Environmental Sustainability



Peter Edwards has always had a strong interest in the application of science and technology for better policy. He was a founder and first executive secretary of the Institute for Ecology and Environmental Management, a professional organization for environmental practitioners. At ETH he was faculty coordinator and member of the executive board of the Alliance for Global Sustainability, a research partnership between several leading universities.

Peter Edwards took the natural science tripos at Cambridge University, specializing in botany, and graduated in 1970. In 1973 he obtained his Ph.D. degree, also from Cambridge, for a thesis entitled *Nutrient cycling in a New Guinea montane forest*. He was a lecturer/senior lecturer in ecology at the University of Southampton, England, from 1973-1993. Since 1993 he has been professor of plant ecology at the Swiss Federal Institute of Technology (ETH), where he has also served as chairman of the Department of Environmental Systems Science.

He is author of around 300 refereed scientific papers and author/editor of several books covering a wide range of environmental topics including ecosystem processes, insect-plant interactions, environmental management and biodiversity. His recent research has focused particularly on large-scale processes in terrestrial ecosystems, including interactions between large herbivores and vegetation, the dynamics of vegetation on the flood plains of large rivers, and the role of biodiversity in agricultural landscapes.

Jens Feddern

Siemens Building Technologies, Switzerland

Jens Feddern is heading the Center of Competence Building Performance and Sustainability for South and West Europe. This organisation is acting as a service provider with the specific knowledge and experiences in the different regions and is assuring the proper risk management especially for energy efficiency and modernization projects.



He holds a degree in electrical engineering and executive master in business studies. Jens Feddern has been working for Siemens since about 16 years in various functions in product development, business development and global account management with a specific track record of more than 10 years in the life science industry.

Panel Discussion

Smart humans or smart meters?

The role of human and technology for a future sustainable built environment

Chair:

Niklaus Kohler (em. Prof. KIT)

Participants:

Annette Aumann (City of Zurich)

Suren Erkman (University of Lausanne)

Jens Feddern (Siemens)

Eike Roswag-Klinge (Ziegert | Roswag | Seiler Architekten Ingenieure)

This discussion brings representatives of science, industry, planning and public administration to the table. While they share the concern for a sustainable future of the built environment, speakers – based on their respective field – will present varying views on how to achieve it. Following the overall topic of the conference, system synergies despite different approaches as well as the influence of the human factor shall be discussed.

Questions that arise in this context:

- Can the optimisation of technological systems pave the way to sustainability?
- What is the relevance and impact of public policies and guidelines?
- Which potential or risk does the increasing digitalisation and infomatisation of both building construction and operation bear?
- And finally, what about the human? Is the individual user controlling or controlled by a technologically intricate and therefore sustainable built environment?

Poster Presentations

Posters will be displayed in the conference foyer – HCI building, level G – for the entire duration of the conference. We invite all poster authors to give a short presentation of 1 minute according to the following schedule:

Poster Session 1 June 15 / 10:30–10:45

Annette Hafner – Ruhr-University Bochum

Paolo Civiero – Sapienza University of Rome

Karina Krause – Ruhr-University Bochum

Nazanin Eisazadeh – KU Leuven

Alexandra Saur – Lucerne University of Applied Sciences and Arts

Lavinia Chiara Tagliabue – Politecnico di Milano

Daia Zwicky – HEIA Fribourg

Aoife Anne-marie Houlihan Wiberg – Zero Emissions Research Centre

Sergi Aguacil – EPFL

Mehmet Aksözen – ETH Zurich

Poster Session 2 June 16 / 10:30–10:45

Lisa Wastiels – Belgian Building Research Institute

Catherine De Wolf – Massachusetts Institute of Technology

Herbert Claus Leindecker – University of Applied Sciences Upper Austria

Christian Steininger – Vasko + Partner Ingenieure

Ferdinand Oswald – Graz University of Technology

Junjing Yang – National University of Singapore

Azza Kamal – The University of Texas at San Antonio

Eric Teitelbaum – Princeton University

Florian Gschösser – University of Innsbruck

Viola John – ETH Zurich

Cappai Francesco – Ecole de technologie supérieure

Conference Sessions

Conference Sessions are divided into four topics as defined below. Presenters will give a 15 minute presentation, followed by 5 minutes of discussion. Presentations (Microsoft ppt, pdf) have to be uploaded to the server before the session (HCI F2).

1 Distributed energy systems & infrastructure

- 1.1 Urban scale energy systems (and tools)
- 1.2 Smart living labs and campuses
- 1.3 Building performance and human interaction

2 Life-cycle oriented approaches

- 2.1 Building stock (life-cycle) analysis
- 2.2 Building and infrastructure renovation and retrofitting
- 2.3 Life-cycle assessment of materials and processes

3 Integrated approaches & tools for decision-making

- 3.1 Engaging stakeholders and local communities
- 3.2 Indices and scoring systems
- 3.3 Design support

4 Innovative materials & components

1.1 Urban scale energy systems (and tools)

HCI J3

Chair: Andreas Eckmans – BFE

Stephan Maier – Graz University of Technology

“Optimal energy technology networks in spatial energy planning in Austrian city quarters”

Anja Willmann – ETH Zurich

“Energy and the City: Investigating spatial and architectural consequences of a shift in energy systems on district level”

Raphael Wu – ETH Zurich

“Optimal Energy System Transformation of a Neighbourhood”

Thomas Schluck – Lucerne University of Applied Sciences and Arts

“Matching renewable energy production and consumption by market regulated demand site management (DSM)”

Christoph Waibel – Empa

“Holistic Optimization of Urban Morphology and District Energy Systems”

2.2 Building and infrastructure renovation and retrofitting

HCI J6

Chair: Mehmet Aksözen – ETH Zurich

Eero Nippala – Tampere University of Applied Sciences

“Deep renovations within smart asset management”

Karen Allacker – KU Leuven

“A multi-criteria approach for the assessment of housing renovation strategies”

Angela Greco – TU Delft

“Business case study for the zero energy refurbishment of commercial buildings”

Alexander Passer – Graz University of Technology

“Impact of building refurbishment strategies on the energetic payback”

Sébastien Lasvaux – University of Applied Sciences of Western Switzerland

“Economic and environmental assessment of building renovation: application to residential buildings heated with electricity in Switzerland”

3.1 Engaging stakeholders and local communities

HCI J7

Chair: Guillaume Habert – ETH Zurich

Aoife Brophy Haney – ETH Zurich

“What a MES(S)!: A Bibliometric Analysis of the Evolution of Research on Multi-Energy Systems”

Giulia Barbano – iiSBE Italia

“Engaging stakeholders through Local Project Committees”

Helmuth Kreiner – Graz University of Technology

“Management of user and stakeholder interests in multi criteria assessments”

Emanuele Facchinetti – Lucerne University of Applied Sciences and Arts

“Business model innovation for Local Energy Management: a systematic methodology”

Sébastien Cajot – EIFER and **Nils Schüler** – EPFL

“Establishing links for the planning of sustainable districts”

1.1 Urban scale energy systems (and tools)

HCI J3

Chair: Forest Meggers – Princeton University

David Grosspietsch – ETH Zurich

"Matching renewable energy production and local consumption: A review of decentralized energy systems"

Surabhi Mehrotra – IIT Bombay

"Built from determinants of urban land surface temperature: a case of Mumbai"

Jérôme Kämpf – EPFL

"Integration of outdoor human comfort in a Building Energy Simulation database using CityGML Energy ADE"

Jérôme Kämpf – EPFL

"Multi scale modelling to assess human comfort in urban canyons"

Jimeno Fonseca – ETH Zurich

"Assessing performance and resilience of future energy systems at neighborhood scale"

2.3 Life-cycle assessment of materials and processes

HCI J6

Chair: Karen Allacker – KU Leuven

Florian Gschösser – University of Innsbruck

"Environmental effects of an alpine summit tunnel"

José Silvestre – University of Lisbon

"Selection of environmental datasets as generic data: application to insulation materials within a national context"

Laetitia Delem – BBRI

"€coffice-LCC and LCA as part of the integrated design approach for a high performance-low cost office building"

Meta Lehmann – econcept AG

"Sustainable stepwise building renovation"

Viola John – ETH Zurich

"Environment and economy - An alliance of mutual benefits in residential building"

3.3 Design Support

HCI J7

Chair: Daniel Kellenberger – Intep

Claudiane Ouellet-Plamondon – ETS

"The impact of housing type on living expenses, ecological footprint and sustainability"

Charlotte Roux – Mines ParisTech

"Life cycle assessment as a design aid tool for urban projects"

Ayu Miyamoto – KU Leuven

"Support tool for energy efficient design: from a simple tool in the early design phase to dynamic simulations in a later design stage"

Elke Meex – Hasselt University

"Analysis of the material-related design decision process in Flemish architectural practice"

Dimitra Ioannidou – ETH Zurich

"Economic Flow Analysis of Construction Projects to support Sustainable Decision-making"

1.1 Urban scale energy systems (and tools)

HCI J3

Chair: Jérôme Kämpf – EPFL

Flora Szkordilis – Hungarian Urban Knowledge Centre

“Facilitating Climate Adaptive Urban Design – Developing a System of Planning Criteria in Hungary”

Paul Michael Falk – Darmstadt University of Technology

“Comparison of district heating systems and distributed geothermal network for optimal exergetic performance”

Eric Teitelbaum and **Forrest Meggers** – Princeton University

“Campus as a Lab: Building- and system-level air movement investigations”

Georgios Mavromatidis – ETH Zurich

“Uncertainty and sensitivity analysis for the optimal design of distributed urban energy systems”

Dan Assouline – EPFL

“Does roof shape matter? Solar PV integration on roofs”

2.3 Life-cycle assessment of materials and processes

HCI J6

Chair: Peter Richner – Empa

Ardavan Yazdanbakhsh – City College of New York

“LCA study on concretes made with recycled and natural coarse aggregates”

Snezana Marinkovic – University of Belgrade

“Life cycle analysis of fly ash concrete with recycled concrete aggregate”

Jiangbo Wu – Chongqing University

“Eco-efficiency of Construction and Demolition Waste Recycling in Chongqing, China”

Amnon Katz – Technion-Israel Institute of Technology

“Efficiency of using recycled fine aggregate for a new concrete”

Philip Van den Heede – Ghent University

“The cost and environmental impact of service life extending self-healing engineered materials for sustainable steel reinforced concrete”

3.3 Design Support

HCI J7

Chair: Annick Lalive d’Epinay – City of Zurich

Emilie Nault – EPFL

“Urban planning and solar potential: assessing users’ interaction with a novel decision-support workflow for early-stage design”

Carsten K. Druhm – ZHAW

“Increase the efficiency in sustainable construction using BIM ”

Daren Thomas – ETH Zurich

“The City Energy Analyst Toolbox V0.1”

Alexander Hollberg – Bauhaus-University Weimar

“A Method for Evaluating the Environmental Life Cycle Potential of Building Geometry”

Angela Greco – TU Delft

“Economic Factors for Successful Net Zero Energy Refurbishment of Dutch Terraced Houses”

1.2 Smart living labs and campuses

HCI J3

Chair: Christian Schaffner – ETH Zurich

Arianna Brambilla – EPFL

“LCA as key factor for implementation of inertia in a low carbon performance driven design: the case of the smart living building in Fribourg, Switzerland”

Lavinia Chiara Tagliabue – Politecnico di Milano

“Tuning energy performance simulation on behavioural variability with inverse modelling: the case of Smart Campus Building”

Sameer Abu-Eisheh – An-Najah National University

“Strategic Planning for the Transformation of a University Campus towards Smart, Eco and Green Sustainable Built Environment: A Case Study from Palestine”

Endrit Hoxha – EPFL

“Introduction of a dynamic interpretation of building LCA results: the case of the smart living (lab) building in Fribourg, Switzerland”

Peter Richner – Empa

“NEST - Exploring the Future of Buildings”

2.3 Life-cycle assessment of materials and processes

HCI J6

Chair: Amnon Katz –Technion University

Alessandro P. Fantilli – Politecnico di Torino

“Eco-mechanical performances of UHP-FRCC: material vs. structural scale analysis”

Sofia Sanchez – Universidad Central de las Villas

“Low carbon cement: a sustainable way to meet growing demand in Cuba”

Lara Jaiillon – City University of Hong Kong

“Life cycle assessment of precast and cast-in-situ construction”

Ravindra Gettu – IIT Madras

“Process mapping and preliminary assessment of energy consumption in Indian cement plants”

Alessandro Arrigoni – Politecnico di Milano

“The environmental relevance of the construction and end-of-life phases of a building: a temporary structure LCA case study”

4

Innovative materials & components

HCI J7

Chair: Alexander Passer –TU Graz

Daniel Friedrich – Lucerne University of Applied Sciences and Arts

“Bio-based plastics-composites for sustainable building skins: life expectancy of cladding derived from wind suction tests”

Marvin King – Lucerne University of Applied Sciences and Arts

“Holistic observations on the sustainability of high-rise building façades”

Giuliana Iannaccone – Politecnico di Milano

“Integrated approaches for large scale energy retrofitting of existing residential building through innovative external insulation prefabricated panels”

Aurelie Favier – EPFL

“Limestone calcined clay cement for a sustainable development”

Matthias Pätzold – Technical University of Munich

“Design-engineering-based and material based improvement of precast concrete-facade-elements”

1.3 Building performance and human interaction

HCI J3

Chair: Zoltan Nagy – ETH Zurich

Zoltan Nagy – ETH Zurich

"What should a building be controlled for? Ask the occupants!"

Lavinia Chiara Tagliabue – Politecnico di Milano

"Prediction of Users' Behaviour Patterns Impact on Energy Performance of a Social Housing in Cremona, Italy"

Olivia Guerra-Santin – TU Delft

"Towards sustainable occupant behavior and organizational change"

Nadine Haufe – Vienna University of Technology

"Modeling of user type specific load profiles for the residential energy consumption on a well monitored Building based on a lifestyle oriented approach"

Junjing Yang – National University of Singapore

"A methodology for energy audit for commercial buildings using machine learning tools"

2.1 Building stock (life-cycle) analysis

HCI J6

Chair: Suzanne Kytzia – HSR

Adélaïde Mailhac – CSTB

"LCA enhancement perspectives to facilitate scaling up from building to territory"

Adélaïde Mailhac – CSTB

"LCA applicability at district scale demonstrated throughout a case study: shortcomings and perspectives for future improvements"

Fritz Kleemann – Vienna University of Technology

"Combining GIS data sets and material intensities to estimate Vienna's building stock"

Alessio Mastrucci – Luxembourg Institute of Science and Technology

"A GIS-based approach for the energy analysis and Life Cycle Assessment of urban housing stocks"

Stefan Schneider – University of Geneva

"Geo-dependent heat demand model of the Swiss building stock"

4 Innovative materials & components

HCI J7

Chair: Claudiane Ouellet-Plamondon – ETS

Ken Zumstein and **Laurent Cattarinussi** – ETH Zurich

"Life cycle assessment of a post-tensioned timber frame in comparison to a reinforced concrete frame for tall buildings"

Gnanli Landrou – ETH Zurich

"A new route for self compacting clay concrete"

Alessandro Arrigoni – Politecnico di Milano

"Improving Rammed Earth buildings sustainability through Life Cycle Assessment (LCA)"

Andrea Klinge, Eike Roswag-Klinge – Ziegert | Roswag | Seiler Architekten Ingenieure

"Naturally ventilated earth timber constructions"

Sharon Zingg – ETH Zurich

"Environmental assessment of radical innovation in concrete structures"

1.3 Building performance and human interaction

HCI J3

Chair: Arno Schlueter – ETH Zurich

António José de Figueiredo – University of Aveiro

“Overheating reduction of a cold formed steel-framed building using a hybrid evolutionary algorithm to optimize different PCM solutions”

Hongshan Guo – Princeton University

“Model Predictive Control for Geothermal Borehole Depth in Distributed Energy Systems”

Coosje Hammink – Hogeschool van Arnhem en Nijmegen

“Integrating Persuasive Technology in Prototypes of Facades to Stimulate Behavioural Change”

Ali Motamed – EPFL

“Toward an integrated platform for energy efficient lighting control of non-residential buildings”

Luca Baldini – Empa

“Dynamic energy weighting factors to promote the integration of renewables into buildings”

2.1 Building stock (life-cycle) analysis

HCI J6

Chair: Sébastien Lasvaux – HES-SO

Yudiesky Cancio Diaz – Universidad Central de las Villas

“Economic and ecological assessment of Cuban housing solutions using alternative cement”

Ahmed Mokhtar – American University of Sharjah

“A Sustainable Development Approach for Affordable Housing in Egypt”

Isolda Agusti Juan – ETH Zurich

“Environmental implications and opportunities of digital fabrication”

Vanessa Gomes – University of Campinas

“A novel perspective on the avoided burden approach applied to steel-cement making joint system”

Jovan Pantelic – ETH Zurich

“Air dehumidification with novel liquid desiccant system”

3.2 Indices and scoring systems

HCI J7

Chair: José Silvestre – University of Lisbon

Karen Allacker – KU Leuven

“Which additional impact categories are ready for uptake in the CEN standards EN 15804 and EN 15978? Evaluation framework and intermediate results”

Daniela Pasini – Politecnico di Milano

“Integrated process for the evaluation and optimization of buildings performance”

Damien Trigaux – KU Leuven

“Critical analysis of sustainability scoring tools for neighbourhoods, based on a life cycle approach”

Olivia Guerra-Santin – TU Delft

“Building Occupancy Certification: development on an approach to assess building occupancy”

Manuela Prieler – FH Salzburg

“Renovation in Austria – analysis of the energy performance certificates between the years 2006 and 2015 of the county Salzburg”

Site Visits

1 | NEST at Empa

June 16 / 15:30 – 18:30

NEST (Next Evolution in Sustainable Building Technologies) is a dynamic, modular research and demonstration platform for advanced and innovative building technologies on the Empa-Eawag campus in Dübendorf, Switzerland. The project provides a basic infrastructure and access to an advanced geothermal system. This 'backbone' can accept up to fifteen modular buildings thus offering a unique setting for academic groups and innovative companies to implement their research. The official inauguration of the NEST backbone is expected in May 2016. Bus transport is provided.



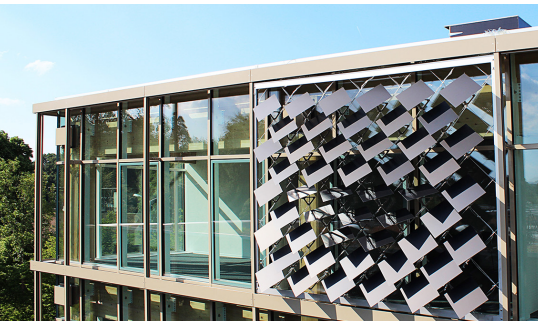
Guide: Reto Largo

Number of participants: 10 – 30

Duration: 3 hours

2 | Campus Tour – ETH Hoenggerberg

June 16 / 15:30 – 18:00 & June 17 / 16:30 – 19:00



developed at the Chair of Architecture and Building Systems. The campus tour also includes the *Arch_Tec_Lab* – the new home of the Institute of Technology in Architecture, where a robotically assembled roof has been designed by Gramazio Kohler Research Group. Finally, a low exergy heating system is demonstrated in the renovated *HPZ building*.

Over the years, the ETH Zurich campus Hoenggerberg has become the playground for ground breaking experiments in building technologies. The recently inaugurated *House of Natural Resources* (HoNR) is a 2D post-tensioned timber structure allowing earthquake resistance and extremely fast construction. Its facade features adaptive photovoltaic panels that showcase soft robotic technology

Guides: Arno Schlueter / Matthias Kohler / Chair of Andrea Frangi

Number of participants: max. 25

Duration: 2.5 hours

3 | Development of the District 'Hardau'

June 16 / 15:30 – 18:30

A city district of Zurich with former bad reputation has been enhanced with new public buildings, a housing development, a park area and art projects. We will visit new buildings with high requirements on sustainability and innovation: a secondary school, a school extension for apprentices, a sports center, a new multifunctional stadium and a residential building realised by a building cooperative.

Guides: Annette Aumann / Annick Lalive d'Épinay / Silvio Brunner

Number of participants: max. 25

Duration: 3 hours



5 | Swiss Society of Engineers and Architects (SIA)

June 16 / 15:30 – 18:30

This tour takes you to the offices of the Swiss Society of Engineers and Architects (SIA). It provides insight into SIA's area of activity as well as the Swiss public procurement sector. A current project by the City of Zurich will also be presented.

Guides: Denis Raschpichler / Susanne

Kytzia / City of Zurich representative

Number of participants: max. 25

Duration: max. 2.5 hours

4 | Cooperative 'mehr als wohnen'

June 16 / 15:30 – 18:00

'mehr als wohnen' ('more than housing') is a Zurich neighbourhood – home to approximately 1,200 residents since 2015. Besides residential space, the project offers a broad variety of infrastructure, workshops and business spaces like a guesthouse, reception space, restaurants, kindergarten, music rehearsal studios and a bakery.

'mehr als wohnen' was initiated by Zurich cooperatives. It is based on the ecological principles of the '2000Watt society' and aiming for housing affordability, social diversity and employment generation. Sustainable development is at the core of the project. The cooperative relies for instance on the use of low energy technology and residents commit to renouncing the use of private cars.

During the architectural competition residents and neighbours were allowed to interact with the jury, engaging in a process of dialogue and several participatory sessions that aimed to establish the future principles of cohabitation in the neighbourhood. Since the architectural competition, there was a joint effort to bring together future residents, neighbours and public entities through regular events and share information about the progress of the project.

Guide: Andreas Hofer

Number of participants: max. 20

Duration: 2.5 hours

The central meeting point for all guided tours is located at Stefano-Franscini-Platz. Please follow the signage posters.

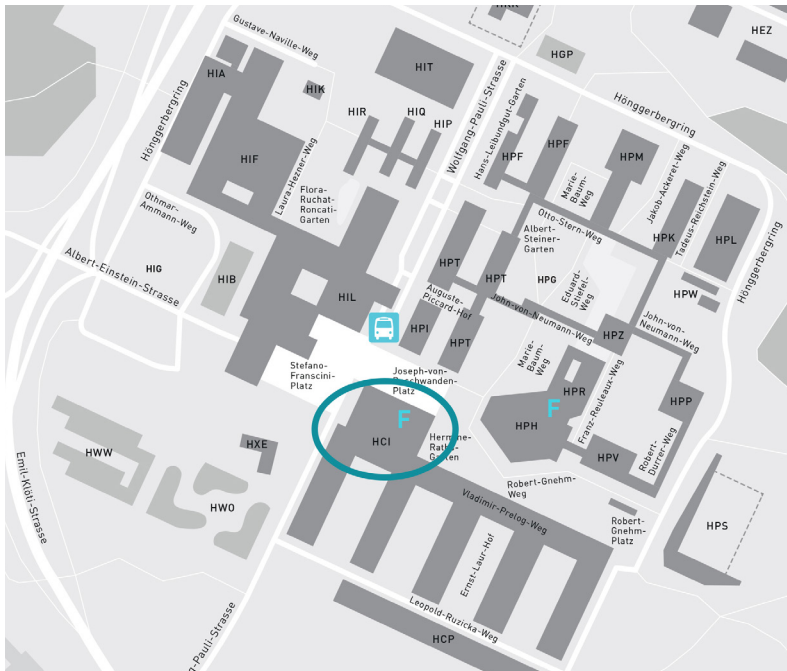
Venues

Conference Venue

The conference is held on the ETH Zurich Hoenggerberg campus, located on the outskirts of the city of Zurich. The campus can be easily reached by public transport using bus routes 80 and 69 or by using the ETH Link shuttle bus which connects the

ETH city campus and the central station with the Hoenggerberg campus.

The main venue of the conference is the HCI Building. You will find food courts in both HCI and HPH buildings. Please refer to the site map below and follow the signage posters during the days of the event.





Welcome Apéro – June 14 / 18:00

We invite all participants to a Welcome Apéro in the ETH Dozentenfoyer located in the main building on the City Centre campus. Please join us for a first get-together overlooking the city of Zurich.

Gala Dinner – June 16 / 19:00

The Conference Dinner will take place at g27 restaurant. It is included in the 3-day conference package but dinner bookings can also be made at the registration desk.

Venue Addresses

ETH Zurich HCI Building
Vladimir-Prelog-Weg 10
8093 Zurich

ETH Zurich Dozentenfoyer
Rämistrasse 101, level K (use lift to level J)
8092 Zurich

g27 Restaurant
Grubenstrasse 27
8045 Zurich

Visiting Zurich

Sightseeing in Zurich

The most important sights such as the Old Town, Bahnhofstrasse, Grossmünster church and Lake Zurich are all based in Zurich's town center. They can all be reached within a three-hour walk or can be accessed by public transport. Culture lovers will enjoy a visit to the museum, Opera House, Schauspielhaus (municipal theater) or Tonhalle (concert hall). Nature fans can take a trip to Zurich's very own Uetliberg "mountain", visit the zoo or take a boat to Rapperswil.

Food & Drinks – Restaurants, Bars and Nightlife in Zurich

Zurich provides international cuisine with a high quality standard. There are many restaurants rich in tradition on Bahnhofstrasse, but also fashionable ones in Zurich-West. There is a great variety to choose from in Niederdorf: from veal (Schnitzel) to pasta, sushi, falafel and tapas all the way to fondue. "Zürcher Geschnätzeltet" (sliced veal Zurich style) with "Rösti" (shredded fried potatoes) is a classic.



Zurich Niederdorf – Old Town

Tours in Zurich

Discover Zurich and the region on a tour. Your guide will explain the city's history and provide insider tips. Here are some examples of guided city walks offered by Zurich Tourism:

- Dada City Tour
- Stories of the Old Town
- Milieu & Design
- Money, Money, Money
- Archaeological Surprises
- Zurich's Architecture



Lake Zurich

Culture in Zurich – Museums, Music, Plays & More

Zurich is rich in cultural highlights. It is one of the leading art trading cities in the world with more than 50 museums and over 100 galleries. The Opera House, Tonhalle Orchestra (concert hall orchestra) as well as the Schauspielhaus Zurich (municipal theater) provide culture of the highest standards.

Public Transport

The easy way to get around Zurich: use the vast public transport net with trams, buses and trains. In the city centre you will find a bus or tram stop at app. every 300 meters. At the stops you will find a zone map, timetables, information on the next connections, and a ticket machine. You can purchase tickets for 1 hour or Day Cards for various zones (city – Zone 110, airport – Zone 121).

Please be advised that the 3-day conference package includes a ZVV ticket providing you with unlimited access to public transport in the city centre (Zone 110) from June 15 to 17. These tickets are printed on the back of your name tag which you will receive upon registration.

For further information please refer to the website of Zürcher Verkehrsverbund (ZVV) or Zürich Tourismus:

www.zvv.ch/zvv/en/home.html
www.zuerich.com

Organising Committee and Scientific Advisors

Conference Organisation

ETH Zurich, Department of Civil, Environmental and Geomatic Engineering
Chair of Sustainable Construction
Guillaume Habert, Annette Walzer
www.sc.ibi.ethz.ch



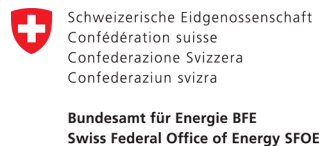
ETH Zurich, Department of Architecture
Chair of Architecture & Building Systems
Arno Schlueter, Uta Gelbke
www.systems.arch.ethz.ch



City of Zürich, Building Department
Sustainable Building Section
Annette Aumann
www.stadt-zuerich.ch/ahb



Swiss Federal Office of Energy (SFOE)
Head of Research for Buildings
Andreas Eckmanns
www.bfe.admin.ch/forschungsgebaeude



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For further information and
 recent updates please visit
www.sbe16.ethz.ch

Contact

ETH Zurich
Uta Gelbke
HPZ Building, G 24
John-von-Neumann Weg 9
CH-8093 Zurich

www.sbe16.ethz.ch

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