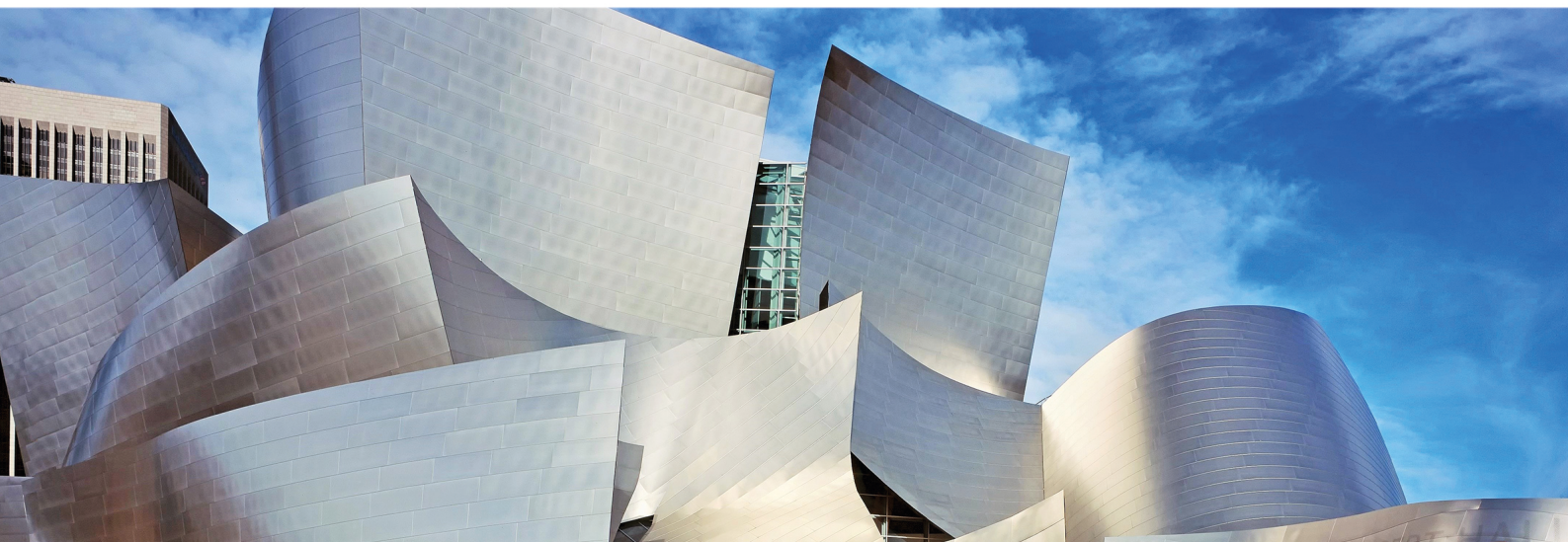




ADVANCED
BUILDING SKINS



1-2 OCTOBER 2018, BERN, SWITZERLAND



13th Conference on Advanced Building Skins

1-2 October 2018, Bern, Switzerland

ISBN 978-3-9524883-4-8

Advanced Building Skins GmbH
Hostettstr. 30
CH-6062 Wilen (Sarnen)
Switzerland

VAT: CHE-383.284.931

Tel: +41 41 508 7036
info@abs.green

© Copyright: Advanced Building Skins GmbH

The conference is supported by the Swiss Federal Office of Energy (Bundesamt für Energie)

CONTENT

A1 Forensic Engineering and Architecture: Investigations of Building Skin Failures

Understanding building skins through failures: trends in failure mechanisms and their costs

Lee Dunham, OAC Services, Inc, Seattle, USA

Investigation and repairs of hospital building skin moisture intrusion damage during full occupancy

Robert J. Bitterli, Ivy Group Consultants, Inc., St. Petersburg, USA

Susceptibilities of stucco on lath

Brett D. Newkirk, Alta Engineering Company, Florida, USA

Multifamily building envelope investigation & repair - case study

Richard A. Slider, Slider Engineering Group, Inc., West Palm Beach, USA

Service life prediction models to predict building skin failures

Christopher C White, National Institute of Standards and Technology, Gaithersburg, MD, USA

A2 Parametric Design and Digital Fabrication

Parametric design of a sustainable office tower in Milan

Gregg Jones, Pelli Clarke Pelli Architects, New Haven, Connecticut, USA

Loop, feedback, iterate – collaboration and modelling in advanced façade design

Kenn Clausen, 3XN Architects and GXN Innovation, Copenhagen, Denmark

Uncanny enclosures: parametric modeling for malleable materials

Robert E. Perry, Gensler, San Francisco, USA

Optioneering: one single model

Stefano Rossi, Maffei Engineering GmbH, Zürich, Switzerland

Automated overcladding for city-wide retrofit

Christopher Jofeh, Arup, Cardiff, United Kingdom

From inspiration to realization: parametrics as a conduit for integrated façade design (Shunfeng Campus)

Yun Hsueh, Gensler, Shanghai, China

A3 Additive Manufacturing and 3D Print of the Building Skin

The 're-fabrication' of knitted textile and its architectural potential

Annie Shaw, Manchester School of Art, Manchester, UK

Desert tectonics

Giulia Grassi, Politecnico di Milano, Italy

3D printed active urban surfaces

Andrea Redi, AiR Architecture Initiates Regeneration, Austria

CONTENT

A review of bio-reactive envelopes and their future developments for 3D/4D printing technologies

Francesca Contrada, Institut de Recherche en Constructibilité, ESTP, Cachan, France

A4 The Impact of Climate Change on Building Envelope Design

Urban climate – impact on energy consumption and thermal comfort of buildings

Urs Grossenbacher, INES Energieplanung GmbH, Bern, Switzerland

Climate change and its influence on glazed curtain wall design

Daniel Arztmann, Schüco International KG Bielefeld, Germany

A 500,000m² skin for the form-found roof of the New International Airport for Mexico City

Zak Kostura, Arup, New York, USA

Early-stage environmental modeling: tools and strategies for climate based design

Barbara Gherri, University of Parma, Italy

A5 Double Skin and Cavity Façades to Reduce Building Energy Consumption

The closed-cavity-façade - a new trend?

Valentin Balog, Drees & Sommer Schweiz AG, Basel, Switzerland

A6 Advanced Building Skin Design

Demystifying high performing building enclosures

Mark K. Lee, GBBN Architects, Cincinnati, USA

Advanced façade engineering for mega-tall towers and free-form cold-bent façades – case studies

Benjamin Beer, Meinhardt Façade Technology, Dubai, UAE

Merging aesthetics and energy performance

David Frey, Woods Bagot, San Francisco, USA

A7 Design Methods for Sustainable, High-performance Building Façades

Façade design of the first triple-certified green building in China

Stephen Katz, Gensler, Chicago, USA

Thermal skin design for extreme cold climate

Joseph Ferraro, Ferraro Choi and Associates, Ltd., Hawaii, USA

Developing a flexible unitized façade system due to required re-engineering

Willi-Richard Brombacher, Facade Engineering + Consultancy, Nuremberg, Germany

Digital workflows for specialty curtain wall systems

Kais Al-Rawi, Walter P Moore, Los Angeles, USA

CONTENT

B1 Biomimetics for Energy Efficient Building Envelopes

Biomimicry: a source for advanced building skin design

Thomas Button, Passero Associates, New York, USA

Environmental adaptation of buildings through morphological differentiation

Lidia Badarnah, BioGen Architecture Ltd, Penarth, UK

Bio-inspired passive kinetic solar shading device for a responsive architectural envelope

Natasha Chayaamor-Heil, ENSAPLV, Paris, France

Social wasp nests as source of bioinspired design of building skins

K. E. Anders Ohlsson, Umeå University, Sweden

B2 Eco-materials for the Building Skin

An innovative low environmental impact building envelope

Mike Lawrence, University of Bath, UK

Towards more sustainable schools incorporating new solar control devices assembled during workshops recycling waste materials

Oriol Pons, Poly-Technical University of Catalonia (UPC), Barcelona, Spain

Use of recycled industrial waste for the development of energy-efficient and sustainable façade panels

Raúl Briones Llorente, University of Burgos, Spain

Chances in plastics and composites in building skins - case studies

Navarro Muedra, Arsenio, AIMPLAS, Paterna, Spain

B3 Green Walls and Roofs

Green roofs for cooling in different climates

Pablo La Roche, Callison RTKL, Los Angeles, USA

Green façade and air quality - measurements and kinetic study

H.J.H Brouwers, Eindhoven University of Technology, The Netherlands

Influence of green facades on building surface temperature in South Italy

Evelia Schettini, University of Bari, Italy

Infill green wall as a heat sink for indoor thermal comfort

Yun-Shang Chiou, National Taiwan University of Science and Technology, Taipei, Taiwan

Warehouse Gradischegg, Austria: low-tech building with green walls

Gilbert Sommer, Universität Innsbruck, Austria

Energy balance in green facades

Giuliano Vox, University of Bari, Italy

CONTENT

B4 Kinetic Architecture

Responsive bio-filtration system: merging bioremediation and computation to design dynamic architectural systems that improve air quality and reduce energy consumption

Ahu Aydogan, City College of New York, USA

An affective kinetic building façade system: mood swing

Joseph T. Kider Jr., University of Central Florida, USA

Impact of kinetic shading elements on noise levels in street canyons

Monika Rychtáriková, KU Leuven, Gent, Belgium

Daylight performance of an adaptive façade shading system integrated on a multi-storey office building

Maria Matheou, University of Cyprus, Nicosia, Cyprus

Combining solar control technologies for optimal performance

Wim Stevels, Eastman Chemical, Gent, Belgium

B5 Responsive and Adaptive Building Skins

ARO Tower | an integrated building envelope

John Cetra, CetraRuddy Architecture, New York, USA

The relevance of adaptable façade systems: an evaluation through scenario planning

Charlotte Cambier, Vrije Universiteit Brussel, Belgium

Future façades of hospital buildings: a user-centered approach to identify a new scope of functionality and design features

Viktoria P Krastel, Technical University Munich, Germany

Effect of shading control on the energy savings of an adaptable ventilation mode double skin façade

Adrienn Gelesz, ABUD Engineering Ltd, Budapest, Hungary

Analogue process and parametric digital analysis for climate adapted building envelopes

Ralph Roesling, CalPoly, CA, USA

B6 Aerogel Insulation Materials for the Building Envelope

Experimental investigations of miscellaneous aerogel systems intended for application in building envelopes

Bjørn Petter Jelle, Norwegian University of Science and Technology, Trondheim, Norway

Experimental and numerical study on the performance of various filled hollow bricks

Marina Stipetic, University of Stuttgart, Germany

Thermal performances of an innovative super-insulating material based on silica aerogel

Kevin Nocentini, PSL Research University, Sophia Antipolis, France

CONTENT

B7 New Forms of Concrete for Advanced Building Envelopes

Carbon-reinforcements for slender architectural facades actual projects and application potential

Christian Kulas, solidian GmbH, Albstadt, Germany

Façades made of concrete – new technologies and concepts

Florian Mähl, OSD Office For Structural Design, Frankfurt am Main, Germany

Lichen growth on concrete elements for sustainable facade design

Jean d'Ursel, Technical University of Denmark, Lyngby, Denmark

C1 Public Policies and Funding

Funding for home ownership for low-income demographics – the Field of Dreams EcoCommunity in Utah

Jörg Rügemeier, University of Utah, USA

Public research as a support for technological innovation in the architectural envelope sector

Martino Milardi, Università Mediterranea di Reggio di Calabria, Italy

C2 Models, Policies and Products for Building Retrofit

One-stop-shop as an innovation, and preparedness to adopt it: a study on house renovation stakeholders in Sweden

Georgios Pardalis, Linnaeus University, Växjö, Sweden

Decision-making methodology to encourage roof extension in renovation programs

Stéphane Herbin, Tremplin Carnot MECD, Paris, France

Evaluating existing market for deep energy renovation in Sweden and Denmark

Brijesh Mainali, Linnaeus University, Växjö, Sweden

PLUG-N-HARVEST: a modular facade system with integrated building technology for retrofitting

Verena Dannapfel, RWTH Aachen University, Germany

Prefabricated wooden modular elements for nZEB renovation

Peep Pihelo, Tallinn University of Technology, Estonia

C3 Retrofitting the Building Envelope

Retrofitting the building envelope of SME industrial buildings: hygrothermal risk assesment

Joseph Barbara, KU Leuven, Gent, Belgium

Transformative modernization - the Brodhead Center for Campus Life at Duke University: a case study

David Cook, Grimshaw, New York, USA

Energy-saving potential using adaptive building envelopes for building refurbishment

Tobias Henzler, University of Stuttgart, Germany

CONTENT

Retrofitting of corrugated asbestos roofing panels with new metal roofing systems

Michael E. Clark RCI, Inc., USA

Integrated smart envelope module for high-rise residential building retrofit

Brian Baewon Koh, Sun & Light Co., Ltd., Seoul, Republic of Korea

Conference on advanced building skins

Wahid Manawi, Amtech Solutions Inc., Dallas, Texas, USA

C4 Integrating Solar Technologies into the Building Envelope

Innovative construction technologies for the EXPO 2017 in Astana/Kazakhstan

Thomas A. Winterstetter, Werner Sobek, Stuttgart, Germany

Best practices for the architectural design of building-integrated photovoltaics in Europe

Dominique Deramaix, Stambruges, Belgium

Development and demonstration of a cost-effective, industrially produced PV– façade system for retrofitting residential high-rise buildings “PV- HoWoSan”

Andrea Schneider, Fraunhofer Institute for Energy Economics and Energy System Technology, Kassel, Germany

A comparison between photovoltaic integration onto roofs and façades of existing public high-rise residential buildings in Singapore

Siu-Kit Lau, National University of Singapore, Singapore

Development of BIPV courseware for students and professionals

Maria Hadjipanayi, University of Cyprus, Nicosia, Cyprus

Customized, aesthetically appealing photovoltaic modules at reasonable price for the BIPV mass market

Nils Neugebohrn, DLR Institute of Networked Energy Systems, Oldenburg, Germany

Simulation and evaluation of design options for BIPV

Huixuan Sun, Solar Energy Research Institute of Singapore, Singapore

Where can 1 billion pv modules be installed in Germany?

Claudio Ferrara, Fraunhofer Institute for Solar Energy Systems ISE, Freiburg, Germany

Light modulation roof for optimizing solar energy utilization on illumination and photovoltaic generation

Cheng-Huan Chen, National Chiao Tung University, Taiwan

Zero emission methodology for active house city areas of the future

Peder Vejsig Pedersen, Kuben Management Copenhagen, Denmark

C5 New Technologies and Products in BIPV

Lightweight transparent composite technology for advanced BIPV architectural solutions

Jose M. Vega de Seoane, Solar Energy, San Sebastian, Spain

CONTENT

Highly efficient coloured BIPV modules with anti-glare properties

Johannes Eisenlohr, Fraunhofer Institute for Solar Energy Systems ISE, Freiburg, Germany

Beyond BIPV: multifunctional energy converters utilizing the unique optical properties of nanoabsorber photovoltaics

Kai Gehrke, DLR Institute of Networked Energy Systems, Oldenburg, Germany

Solar squared: transforming glass bricks into a BIPV product

Hasan Baig, University of Exeter, United Kingdom

Façade-integrated PVT with radiant cooling panels for increased energy and space efficiency

Mohannad Bayoumi, King Abdulaziz University Jeddah, Saudi Arabia

C6 Optimizing BIPV Design: Models, Tests and Simulation

Experimental validation of a BIPV curtain wall model for building energy simulations

Juliana Gonçalves, KU Leuven, Belgium

Shading device with extensible louvres for BIPV and daylight control

Emanuele Piccoli, Politecnico di Milano, Italy

Towards the implementation of a BIM-based approach in BIPV sector

Pierluigi Bonomo, SUPSI, Canobbio, Switzerland

PVSITES software tools for BIM-based design and simulation of BIPV systems

Philippe Alamy, CADCAMation SA, Onex, Switzerland

Performance of PV blind and PV roll screen during the intermediate season

Jiyoung Seo, Sejong University Seoul, Korea

Assessing the impact of partial shading on the performance of façade-integrated PVs

Konstantinos Spiliotis, KU Leuven, Heverlee, Belgium

Design strategies of PCM integration in BiPV façade systems

Jakub Curpek, Slovak University of Technology, Bratislava, Slovakia

An integrated approach for the BIPV optimization since early design: a case study analysis

Jennifer Adami, Institute for Renewable Energy, EURAC Research, Bolzano, Italy

A flexible performance test bench for BIPV modules

Crabbé Quentin, Université Libre de Bruxelles, Belgium

C7 Façade Integrated Day- and LED-Lighting Based on Micro-Optical Components

Optimized optical microstructures for daylight redirection and efficient LED-based planar light guides

Michael Jakubowsky, Institute for research and transfer, Dortmund, Germany

System integration: a construction kit for façade integration and integrated use with electric lighting (TALED)

Helmut Mueller, Green Building R&D GmbH, Duesseldorf, Germany

CONTENT

D1 Optimierung der Gebäudehülle mit nachhaltigen Fassaden

Optimierung passiver und aktiver Elemente der Gebäudehülle eines Bürogebäudes

Stefan van Velsen, 3-Plan Haustechnik AG, Winterthur, Schweiz

BIM-Methode und Simulation zur Fassadenoptimierung im Kontext des sommerlichen Wärmeschutzes und Innenraumklimas

Loux Johann, Gruner Roschi AG, Bern, Schweiz

AutomationCentre Festo – exhaust air façade for protection against summer overheating in a fully glazed multi-storey building

Michael Wengert, Pfeil & Koch ingenieurgesellschaft GmbH & Co. KG, Stuttgart, Germany

Composite anchors to reduce thermal bridges in façades

Werner Venter, Schöck Bauteile GmbH, Baden-Baden, Germany

Gewerkeübergreifende Fassadenvorfertigung im Holz-Systembau

Michael Kamenik, Cree GmbH, Dornbirn, Austria

D2 Natural Ventilation and Thermal Behavior of the Building Envelope

The Italianate Villa: natural ventilation in the service of family and home during the 1800s

Theodore Sawruk, University of Hartford, West Hartford, Connecticut, USA

Reconstruction of the use of space of historical buildings from the simulation-based thermal analysis of the building façade

Wolfgang Stumpf, Danube University, Krems, Austria

Loose in the south: air flow and the evolution of a subtropical passive house strategy

Corey Saft, University of Louisiana at Lafayette, USA

Historically proven, sustainable updated

Jason Hegenauer, University of Hartford, West Hartford, Connecticut, USA

Modeling and simulation of parametric wind-catcher designs for natural ventilation in sustainable building skin architecture

Arash Zarmehr, University of Central Florida, Orlando, USA

D3 Active Façades for Ventilation, Heating and Cooling

Heating with pv façade in a passive house

Georgios Dermentzis, University of Innsbruck, Austria

Living in light – a transformation concept of existing buildings

Jakob Klint, Kuben Management, Copenhagen, Denmark

Characterization of advanced daylighting systems and combined lighting and thermal simulation

David Geisler-Moroder, Bartenbach GmbH, Aldrans, Austria

CONTENT

Solar thermal facade systems – an interdisciplinary approach

Paul-Rouven Denz, Priedemann Facade Experts, Grossbeeren / Berlin, Germany

Heating with façade integrated heat pumps results of the Austrian FFG project “SaLüH!”

Fabian Ochs, University of Innsbruck, Austria

D4 Performance of the Building Envelope

Re-positioning for Passivhaus: high-rise office applications in urban areas

Michael Pulaski, Thornton Tomasetti, Portland, Maine, USA

The building envelope as integrated part of the building energy concept

Aulikki Sonntag, Drees & Sommer, Basel, Switzerland

Modelling of high-performance facades – case studies

Edmund S. Meyer, Stellenbosch University, South Africa

Highly performing low emission sputtered coatings stable in air for energy saving glazing units

Anna Castaldo, ENEA, Naples, Italy

High performance aluminum framing systems using composite barrier technology

Todd Frederick, FrēMarq Innovations, Wausau, USA

Structural sealant glazing (SSG) with improved performance

Flavien Sauser, Bern University of Applied Sciences, Biel, Switzerland

In situ measurement results for air permeability and sound insulation of historical windows

Christoph Geyer, Bern University of Applied Sciences, Biel, Switzerland

D5 Models, Tools and Simulations for Sustainable Buildings

Artificial intelligence for computationally driven building envelopes

Mark A. Cichy, DIALOG, Toronto, Canada

EU reference house study for renovation: how to reduce h&c energy demand while providing the highest comfort in building renovation

Marc Bosmans, Eurima, Brussels, Belgium

Building guidelines to provide as-designed solutions for energy-efficient envelopes

Benedetta Marradi, University of Pisa and AICE Consulting, Pisa, Italy

Detailed experimental validation of a transient 3D thermal model with solar processor

Jelle Langmans, PHYSIBEL, Gent, Belgium

A simple 2R1C numerical model for solar buildings with PCM enhanced envelopes

António Samagaio, University of Aveiro, Portugal

CONTENT

D6 Dynamic Glazing for Sustainable Building Skins

Fluid flow glazing facades – future potential in building industries

Daniel Pfanner, Bollinger + Grohmann, Frankfurt, Germany

Improving building performance through the use of dynamic façade technology

Eloise Sok-Paupardin, Saint Gobain, Courbevoie, France

Energy performance evaluation of a whole-building electrochromic window retrofit in an commercial office building

Christopher Meek, University of Washington, USA

Modeling 6-pane transparent façade system to optimize daylight and thermal performance

Friderik Knez, ZAG, Ljubljana, Slovenia

Thermal shock in glasses: the role of building physics analyses

Luciano Laffranchini, Ai Engineering srl, Turin, Italy

D7 Architectural Membranes for High-performance Building Skins

Film technologies for advancing building skin features: from functional films to tailor made laminates

Sebastian Zehentmaier, Dyneon GmbH, Burgkirchen, Germany

Cloud arch: EPS composite for ultra-lightweight long span sustainable structure

Shinya Okuda, National University of Singapore