SOLAR ENERGY AND BUILDING PHYSICS LABORATORY

LABORATOIRE D'ENERGIE SOLAIRE ET DE PHYSIQUE DU BÂTIMENT

LESO-PB

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

Activity Report 2012

Innovations for Renewable Energy Use in the Built Environment

Solar Energy and Building Physics Laboratory (LESO-PB)
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EPFL Solar Energy and Building Physics Laboratory (LESO-PB)

ACTIVITY REPORT 2012

The Solar Energy and Building Physics Laboratory (LESO-PB) works at the forefront of research and technological development in renewable energy, building science and urban physics. It is part of the Civil Engineering Institute (IIC) of the School of Architecture, Civil and Environmental Engineering (ENAC) of the Swiss Federal Institute of Technology (EPFL) in Lausanne, Switzerland. Placed under the responsibility of Prof. Dr Jean-Louis Scartezzini and four group leaders, the laboratory counts about 40 scientists, engineers and technicians. This report presents the teaching, research and technology transfer for 2012.

LIST OF CONTENTS

RESEARCH HIGHLIGHTS

INTRODUCTION

The research activities of the Solar Energy and Building Physics Laboratory focus on the development and implementation of energy efficient and renewable energy technologies in the built environment:

Intensive use and perception of daylight
Sustainable urban development
Bio-mimetic building control
Renewables integration in the built environment
Nanotechnology for solar energy conversion
Computer modelling of complex systems

Highlights 2012

- The technology transfer of **nanocomposite thin films for coloured solar thermal collectors and photovoltaic modules** developed by the Andreas Schüler's group in collaration with the PSE sart-up Swiss INSO has been reactivated thanks to a new leadership.
- **A new device for dynamic luminance mapping and glare risk assessment in building**, based on a novel high dynamic range pixel array chip developed by the Swiss Centre for Electronics and Microtechnics (CCEM), was published in the Proceedings of the International Society for Optical Engineering (SPIE).
- The first version of **Citysim Solver**, comprehensive micro simulation software of resource flows for sustainable urban planning, was opened to public during the post year.
- Inauguration of the **Nanotechnology for Solar Energy conversion Lab** and exciting new developments in the fields of solar absorber coatings and microstructured glass for daylighting under the direction of Dr Andreas Schüler
- A research study by Münch M. et al on the **effects of prior light exposure on early evening performance, subjective sleepiness, and hormonal secretion** was published in "Behavioral Neuroscience"
- The first version of **Geronimo, software wizard for the visualization of the impact of complex fenestration systems** was put at the disposal of architects and lighting designers.

Further research activities are presented in the following pages.

2012 AWARDS AND HONOURS

Name	Award, distinction	Year
H. Sierro, C. Naef	Prix Durabilis – Conception holistique d'un éco-quartier	2012
A. Borisuit	EDCE Mobility Award – Lawrence National Berkeley Laboratory	2012

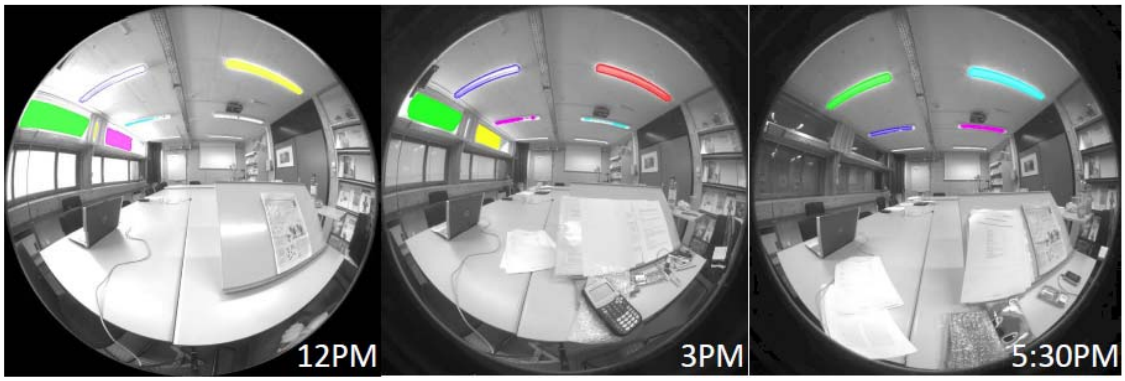
DAYLIGHTING AND PERCEPTION

Group leader: Prof. Jean-Louis Scartezzini
Research associate: Dr Mirjam Münch
Postdoctoral researcher: Dr Jérôme Kämpf
PhD students: Apiparn Borisuit, Chantal Basurto
Guest PhD student: Lenka Maierova, Czeck University Prague

The daylighting and perception research group works on advanced systems for optimal use of daylight in buildings with the aim to improve user comfort and health and reduce energy consumption.

The group has set up a sophisticated daylighting laboratory with, among other, a scanning sky simulator and an automated heliodon, which allow reproducing with very high precision all daylight conditions that exist around the world. Several anidolic (non-imaging) daylight systems have been developed and tested by the group. Furthermore, a bidirectional reflection and transmission goniophotometer based on digital imaging allows assessing the characteristics of complex fenestration systems.

Research on the impact of natural and artificial light on circadian rhythms in humans (chronobiology) is combined with technological advances in a multidisciplinary approach.



Glare sources are indicated with different colors and quantified using 'Evalglare' (Wienold & Christoffersen, 2006).

Published work relates to

- Circadian rhythms and impact of light in humans, visual comfort
- Daylighting computer design and analysis tools
- Integrated day- and electric lighting systems
- Bidirectional reflection and transmission goniophotometer
- Anidolic daylighting systems
- Scanning sky simulator and automated heliodon
- Experimental and ergonomical daylighting test modules

2012 Activities

An intense laboratory study with extreme chronotypes was completed to shed light on inter-individual lighting preferences in offices during work hours: the latter involved a fruitfull scientific collaboration with the Czech Technical University (CTU) by the way of a CRUS Sciex-NMS exchange of scientists. Another project with patients suffering from ophthalmological diseases is on the way in collaboration with Privat Docent MER Dr. A. Kawasaki of Hôpital Ophtalmique Jules Gonin, Lausanne. The impact of different wavelengths of light stimuli on EEG brains activity were tested on 16 healthy subjects in order to assess acute and short time changes of neuronal activity in response to different light stimuli.

Current Projects

Comparison of non-visual light-dependent functions in healthy subjects & patients with retinal ganglion cell loss

Funding: *Swiss National Science Foundation (SNSF) (project in collaboration with Hôpital Ophtalmique Jules-Gonin, Lausanne, PD MER Dr. med. Aki Kawasaki)*
Duration: *2011-2013*

This project aims to characterize alertness, cognitive performance and hormonal secretion in response to light exposure in patients with neuroretinal disease as well as healthy controls, and to correlate such changes to the pupil light reflex.

Circadian Light for Humans with Dementia

Funding: *Sonnweid Foundation (Switzerland), Age-Foundation (Switzerland)*
Duration: *2011-2012*

The study aims to demonstrate that the increase of circadian amplitude induced by efficient light with the right spectral composition serves not only psychological factors such as mood and well-being, but also influences important regulatory health functions in demented patients.

INTER – Individual Lighting Preferences of Office Occupants

Funding: *Scientific Exchange Prog. Switzerland-EU New Member States (Sciex-MMS), Velux Foundation (CH)*
Duration: *2011-2012*

This project aims to analyse subjective and objective visual and thermal comfort variables in young volunteers with known differences of their diurnal preference under varying (day-) lighting conditions.

Daylighting Design and Visualisation Tools

Funding: *Swiss Federal Office of Energy (SFOE)*
Duration: *2009-2012*

The project is aiming to set up a daylighting design tool for the visualisation of the light redirecting properties of complex fenestration systems, which will be complemented by an advanced ray-tracing computer simulation algorithm.

Integrated Multifunctional Glazing for Dynamical Daylighting

Funding: *Swiss Federal Office of Energy (SFOE)*
Duration: *2009-2012*

The project is aiming to set the bases for an integrated multi-functional glazing for dynamic daylighting using novel microstructures which will redirect sunlight into office rooms.

Postdoctoral Fellowship in Daylighting & Perception

Funding: *VELUX Foundation (Switzerland)*
Duration: *2008-2012*

This project is aiming to strengthen the education and research activities in the fields of building science and chronobiology. It is expected moreover to initiate innovating activities in relation to psycho-physiological aspects of daylight with an emphasis on human response factors, such as the perception of three-dimensional spaces and luminous environment.

PhD theses published in this domain at LESO-PB

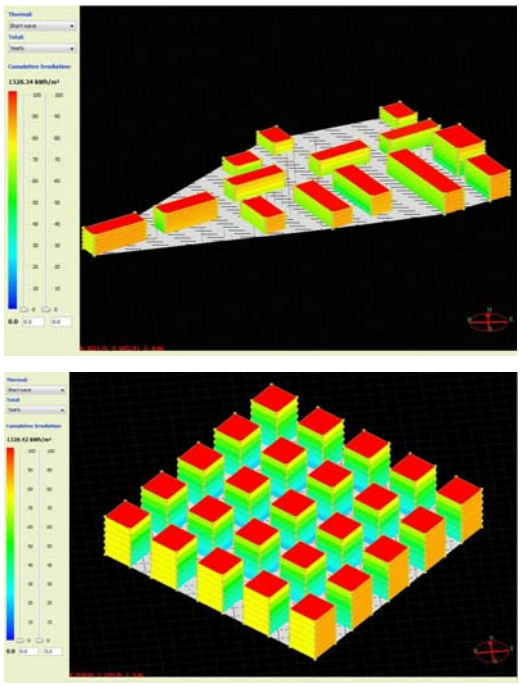
- *Energetic, visual and non-visual aspects of office lighting,* Friedrich Linhart, EPFL PhD Thesis #4587, 2010
- *Comparing physical and virtual methods for daylight performance modelling including complex fenestration systems,* Anothaï Thanachareonkit, EPFL PhD Thesis #4130, 2008
- *Bayesian optimisation of visual comfort,* David Lindelof, EPFL PhD Thesis #3918, 2007

Awards in this domain

- Marilyne Andersen, EPFL PhD Thesis #2941 (2004), Chorafas Award 2005

SUSTAINABLE URBAN DEVELOPMENT

Group leader: Dr Jérôme Kämpf
Postdoctoral researcher: Dr Wanjing Li
PhD students: Diane Perez, Urs Wilke, Govinda Upadhyay
Visiting researcher: Etienne Burdet, IEVP/LEESU-GU



Simulation of the effect of the self-obstructions on heating energy demand in the Prés-Magnin district / Martigny and in an hypothetical array of buildings.

The principal mission of this group is, through the simulation of physical processes, to better understand how to optimise the sustainability of **urban systems**, predominantly from environmental but also from social and economic perspectives.

Specific research interests include:

- Simulation and evaluation of resource fluxes (energy and matter) in urban systems
- Demand and supply side control of urban energy flows
- Urban microclimatology
- External environmental comfort and social wellbeing
- Stochastic modelling of human behaviour

Published work relates to

- Modelling and optimisation of urban energy fluxes
- Occupant behaviour and comfort
- Sustainable urban design
- Thermodynamics in the city
- Radiosity algorithms and internal illumination prediction

2012 Activities

A CCEM project "Sustainable cities and urban energy systems of the future" was initiated in 2012 to establish a link between atmospheric models and the urban energy simulation programme CitySim. This project sets-up a new collaboration between EPFL, ETHZ and EMPA in the field of "Urban Physics".

A new research proposal "IDEAS4Cities: Integration of Decentralized Energy Adaptive Systems for cities" was successfully submitted to the CCEM. This project aims at studying the adequacy between the renewable energy production and storage through the possibility of groups of buildings to function as islanded from the resource networks (electricity, gas and heat).

Current Projects

QUAD - Sustainable Districts

Funding: Research Center for Energy and Municipalities (CREM)
Duration: 2011-2013

Development of a prototype decision aid tool for architects, construction companies and city councils. This tool will allow urban design competition participants to define building specifications incorporating energy efficiency criteria.

Innovative Planning and Management Instruments of Urban Energy Systems

Funding: EPFL Energy Center
Duration: 2009-2013

In this project we will work closely with municipalities, the EPFL Energy Centre as well as the Industrial Energy Systems Laboratory at EPFL to develop a new urban energy planning tool for use by municipalities. The purpose of this tool will be to support municipalities' urban energy planning and investment decisions.

UMEM - Sustainable cities and urban energy systems of the future: Urban Multiscale Energy Modelling

Funding: Competence Center Energy and Mobility (CCEM)
Duration: 2012-2015

In this project the focus is on finding sustainable solutions for achieving energy targets on city quarter level, rather than at building scale. The urban energy retrofit scenarios profit from the enlarged economical potential of energy efficiency, energy production and energy storage by a cluster of buildings which are interconnected in a city neighbourhood and profiting from the urban energy infrastructure. The new urban energy retrofit scenarios' have to take into account the impact of the urban heat island effect and the changing urban microclimate (e.g. heat waves) due to climatic change. The new concepts have to guarantee sustainable living conditions, comfort and health for their inhabitants in the urban and building environment. The developed urban energy simulation framework will help collectivities, urban planners and stakeholders to evaluate the environmental impact of cities in a changing climate and to provide a basis for testing new urban energy retrofit scenarios.

PhD theses published at LESO-PB in this domain

- Probabilistic Bottom-up Modelling of Occupancy and Activities to Predict Electricity Demand in Residential Buildings U. Wilke, EPFL PhD Thesis #5673, 2013
- *Towards a unified model of occupants' behaviour and comfort for building energy simulation* F. Haldi, EPFL PhD Thesis #4587, 2010
- *On the Modelling and Optimization of Urban Energy Fluxes,* J. Kaempf, EPFL PhD Thesis #4548, 2009
- *Multiscale Modelling of Urban Climate,* A. Rasheed, EPFL PhD Thesis #4531, 2009
- *Simulating occupant presence and behaviour in buildings,* Jessen Page, EPFL PhD Thesis #3900, 2007

Awards in this domain

- Frédéric Haldi, Darren Robinson: Best Paper, *Journal of Building Performance Simulation*: 2011.
- Frédéric Haldi, Darren Robinson: Best Paper, *Building and Environment Journal*: 2009.
- Darren Robinson: *Ken Dale Travel Bursary, CIBSE*, 2008.
- Darren Robinson and Andrew Stone: *Napier-Shaw Medal, CIBSE*, 2007.

BIO-MIMETIC BUILDING CONTROL

Group leader: Dr Nicolas Morel
PhD students: David Daum, Nikos Zarkadis

Self-adaptive control system

Bio-mimetic control of building services (heating, cooling, ventilation, blinds, electric lighting) can simultaneously optimize energy use and indoor comfort (thermal, visual, air quality) through the use of advanced computer methodologies such as artificial neural networks, genetic algorithms, fuzzy logic, or advanced optimization algorithms. Our laboratory investigates control algorithms allowing at the same time:

- an optimal response to changing conditions (weather, building occupancy, lighting levels, thermal characteristics)
- a progressive adaptation to (possibly changing) building characteristics and to user preferences.

Research projects normally include two steps:

- development of innovative control algorithms and evaluation with computer simulation tools
- testing under real situations and evaluation of energy and comfort performances as well as acceptance by users.

Most bio-mimetic controllers are evaluated in the LESO building, which represents a powerful tool for our group.

Published work relates to

- Self-adaptive integrated building control systems
- Blind and electric lighting control algorithms
- Advanced control of electrochromic glazing
- Genetic algorithms for adaptation to user preferences
- Fuzzy logic for implementing building physics expert knowledge into the control algorithms
- Artificial neural networks for adaptive models and various control systems (for instance thermal model of the building or weather evolution).

Activities 2012

The LESO-PB contributed to the CCEM project on renovation of historical buildings (SuRHiB) with a study on the optimal use of heating, cooling and ventilation services in such buildings.
Furthermore, a smart algorithm for the project on predictive control of electrochromic glazings (ECControl) was elaborated, and its experimental validation carried out.

A new research project was successfully submitted to the Hasler Fundation for financial support. The project Green-Mod started in January 2012; it aims at the elaboration of an information system able to optimize energy consumption in buildings while preserving human comfort. The main innovation of the project is the use of state-based stochastic modelling applied to temporal signals acquired from heterogeneous sources such as distributed sensors and user wishes and preferences.

Current Projects in Biomimetic Building Control

Advanced Control of Electrochromic Glazing

Funding: Swiss Federal Office of Energy (SFOE)

Duration: 2009-2012

Electrochromic (EC) glazings might be used as an alternative to conventional mobile solar shadings or solar protection glazings, which are not well suited to most weather conditions and as a rule not efficient enough against overheating. EC glazings have until now essentially been actuated manually by the users. Some elementary control schemes have also been proposed, but the time characteristics of these glazings have not been considered. Therefore, a predictive algorithm, like those used for controlling building services, taking into account the thermal inertia, may bring some advantages with regard to user comfort (both thermal and visual). The project includes the development of an adequate control strategy, and the experimentation of this strategy in an office room of the LESO building, with real persons.

CCEM-SuRHiB: Sustainable Renovation of Historical Buildings

Funding: Swiss Competence Center for Energy and Mobility (CCEM)

Duration: 2009-2012

Historical buildings, if normally heated, cause relatively high energy consumption. As their façades need to be conserved, the thermal insulation of such buildings is difficult and risky. The moisture balance of walls has to be carefully considered besides the energy balance. Internal insulation that could effectively reduce thermal losses would hinder the drying process of walls. A careful risk assessment and robust guidelines have to be developed. A highly insulating light weight plaster finish based on aerogel particles, which insulates like polystyrene – inside or outside - but is open for moisture diffusion, is developed and tested in this project. Furthermore, appropriate heating systems and optimal solar integration are studied by LESO-PB.

PhD theses published in this domain at LESO-PB

- *On the adaptation of building controls to the envelope and the occupants*, David Daum, EPFL PhD Thesis #4935 (2010)
- *Bayesian optimisation of visual comfort,* David Lindelöf, EPFL PhD Thesis #3918 (2007)
- *Simulating occupant presence and behaviour in buildings, Jessen Page, EPFL PhD Thesis #3900 (2007)*
- *Using Genetic Algorithms to Take into Account User Wishes in an Advanced Building Control System,* Antoine Guillemin, EPFL PhD Thesis #2778 (2003)

Awards in this domain

- Antoine Guillemin, EPFL PhD Thesis #2778 (2003), Chorafas Award 2004

BUILDING INTEGRATION OF RENEWABLE ENERGIES

Group leader:.MSc. EPFL Christian Roecker
Postdoctoral researcher: Dr Maria Cristina Munari Probst
Research assistants: Marja Edelmann, Georges Meylan

Façade integrated evacuated solar collectors (Sunny Woods, arch. Beat Kämpfen)

Many building surfaces are ideally suited for the use of solar energy, but high costs, technical and aesthetic considerations have long kept building owners and architects from using even a small part of this potential. This is why the research group "Renewables Integration into the Built Environment" addresses the issue of optimal architectural integration of photovoltaic and thermal solar systems.

Major progress has been made in photovoltaics integration in the framework of several international projects over the last years. Currently, the group focuses on the integration of solar thermal technology and is co-leading the new IEA Task 41 “Solar Energy and Architecture”.

Published work relates to

- Façade integration of solar thermal systems
- Criteria for successful architectural integration of active solar systems (PV & ST)
- Criteria and recommendations for solar installations authorisation
- Façade and roof integration systems for photovoltaics (pilot installations /development of new systems)
- Ergonomic interface for simulation software and “wizard” expert system

2012 Activities

One main activity of the group was the lead of Subtask A “Criteria for Architectural Integration” in the IEA SHCP Task “Solar Energy and Architecture” (Task 41).
Specific teaching on architectural integration of active+e solar systems continued through a dedicated ENAC Teaching Unit (UEE 04, “Intégration architecturale de l’Energie Solaire”) and participation in Architects courses. Participation for architectural integration specifications in the project Archinsolar, contribution to tile design. Architectural integration research work continued in collaboration with several Swiss institutions (SUPSI, HSLU, Swissolar).

Current Projects

Solar Energy and Architecture - IEA SHC Task 41

Funding: Swiss Federal Office of Energy (SFOE)
Duration: 2009-2013

The main goal of the Task is to help achieving high quality architecture for buildings integrating solar energy systems, mainly by improving architects' qualifications and enhancing solar thermal manufacturers' awareness of building integration issues.

Unique and Innovative Solution for Building Integration of Thin Film Silicon PV modules

ARCHINSOLAR

Funding: Competence Center Energy and Mobility CCEM-CH
Duration: 2009-2013

The Archinsolar project aims at the development of a new generation of photovoltaic elements based on thin film silicon technology (single amorphous and tandem amorphous/microcrystalline cells). Specific issues to ensure a good "integrability" of the developed products are central focus for the group.

LESO QSV method

Funding: Swiss Federal Office of Energy (SFOE)
Duration 2011-2013

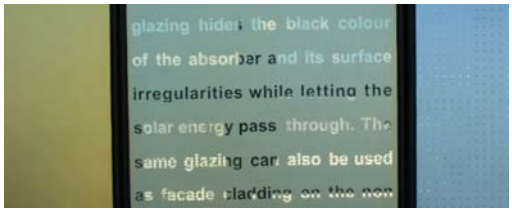
The goal of the project is to propose a method to help improving the architectural quality of the active solar installation projects. The method offers a way to assess the quality of a proposed integration, and helps define required quality levels function of site sensitivity and system visibility.

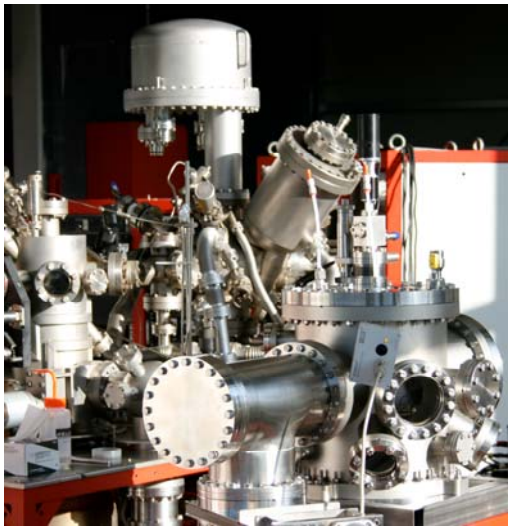
Book published in this domain at LESO-PB

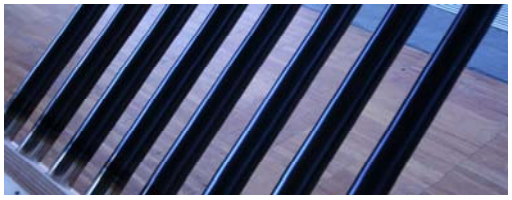
Architectural integration and design of solar thermal systems, Maria Cristina Munari Probst, Ch. Roecker, PPUR Routledge, 2011, ISBN 978-0-415-66791-3

NANOTECHNOLOGY FOR SOLAR ENERGY CONVERSION

Group leader: Dr Andreas Schueler
Postdoctoral researchers: Dr Virginie Hody Le Caër
PhD students: Martin Joly, Antonio Paone, Stefan Mertin, André Kostro







Due to their fascinating optical and electronical properties, nanometric scaled structures play an important role in solar energy conversion. The research group "Nanotechnology for Solar Energy Conversions", develops and characterizes novel nanostructured materials for solar energy applications. The nanocomposite coatings consist typically of dielectrics, semiconductors or metal nanocrystals embedded in a dielectric matrix. Applications include antireflection coatings on solar collector glazing, colored coatings with high solar transmittance for novel glazing of solar thermal façades, photoluminescent quantum dot solar concentrators for photovoltaic energy conversion and optical selective absorber coatings for thermal solar collectors and thermoelectric power generation.

The research group carries out fundamental research on novel nanocomposite materials and thin film materials and promotes the introduction of novel solar technologies through upscaling of the corresponding innovative manufacturing processes.

Published work relates to

- Colored glazed solar collectors, active solar thermal façades
- Quantum dot solar concentrators
- Highly durable selective solar absorber coatings
- Novel thermochromic solar absorber coatings for overheating protection

Activities 2012

Major highlights from our activities include:

- Laboratory for Nanotechnology for Solar Energy Conversion has been put into operation
- Large scale prototype production of novel solar glazing was initiated
- Scientific findings have given raise to several patents in the fields of
  - highly durable selective solar absorber coatings
  - colored solar glazing for photovoltaic modules / solar thermal collectors
  - novel microstructured glazing for daylighting

Current Projects

Technology Transfer of Coloured Solar Thermal Collectors

Funding: *SwissINSO Trade & Invest Ltd*

Duration: *2009-2012*

At LESO, novel nanocomposite coatings on architectural glazing for solar active thermal façades have been developed. The electronic and optical properties of the novel nanocomposite materials are thoroughly characterized. LESO-PB provides the transfer of the developed technology from science to market - including the upscaling of the processes to industrial production. The novel glazing will allow a perfect architectural integration of solar thermal collectors into the building envelope, thereby creating new possibilites for water and space heating as well as for solar cooling.

Integrated Multifunctional Glazing for Dynamical Daylighting

Funding: *Swiss Federal Office of Energy (SFOE)*

Duration: *2009-2013*

The project is aiming to set the bases for an integrated multi-functional glazing for dynamic daylighting using novel microstructures which will redirect sunlight into office rooms.

Unique and Innovative Solution for Building Integration of Thin Film Silicon PV modules

ARCHINSOLAR

Funding: *SwissElectric Research, Swiss Federal Office of Energy (SFOE), Competence Center Energy and Mobility CCEM-CH, Services Industriels de Genève*

Duration: *2009-2013*

The Archinsolar project aims at the development of a new generation of photovoltaic elements based on thin film silicon technology (single amorphous and tandem amorph/microcrystalline cells). These new elements will be ultra-reliable. They will make possible very low manufacturing costs and unique architectural integration, and be respectful of the environment, landscape, buildings and traditions.

Thermochromic coatings for overheating protection of solar thermal collectors: temperature matching and triggering

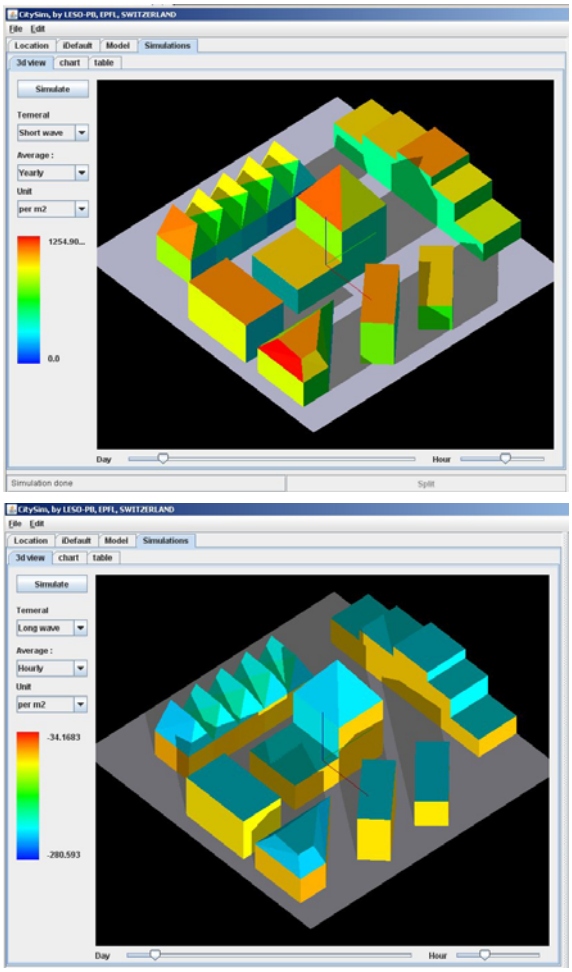
Funding: *Swiss Federal Office of Energy (SFOE)*

Duration: *2012-2013*

Overheating and the resulting stagnation of solar thermal collectors is a common problem even in central European latitudes. A promising way to protect solar thermal systems without any mechanical device (e.g. for shading or for pressure release) is to provide them with a coating which exhibits a change in optical properties at a critical temperature Tc. This project aims at the development of such coatings with thermochromic, "intelligent" properties.

COMPUTER MODELLING OF COMPLEX SYSTEMS

Group leader: Dr Jérôme Kaempf
PhD student: Urs Wilke



City Sim Model

By itself, building physics is concerned with rather elementary physics laws. But the construction, operation and demolishment of a building are connected with many different aspects, and their interactions makes the complete system complex. The complexity is even increased when dealing with a whole district or a city instead of only one building.

This research domain includes two different aspects:

- modelling of building behaviour where non-deterministic aspects must be considered, such as user behaviour (occupancy, individual preferences relative to comfort, etc) or the stochastic nature of weather conditions;
- modelling of large groups of elementary buildings, where the complexity arises from the numerous interactions between the individual objects (buildings).

This domain is closely linked with the domain Sustainable Urban Development: notably, both domains cover the study of similar objects (urban districts or a whole city), and they are concerned with the modelling of similar phenomena (eco-systemic modelling, interaction with the environment).

Published work relates to

- Urban sustainable planning tools with 3D models (Suntool)

Activities 2012

A link was established between the SNSF project partner's multi-agent modelling tool MATSim and our urban energy flow modelling tool CitySim. The first case study was carried out on a small neighbourhood of Zurich city. Its scope is due to be extended.

Current Projects

An Investigation of Strategies leading to a 2000W City using Bottom-up Models of Urban Energy Flows

Funding: *Swiss National Science Foundation (SNSF)*

Duration: *2009-2012*

In this project we will develop a detailed spatially explicit model of the dynamic flows of energy and matter within a city due to transportation, the operation of buildings and the activities accommodated by them. This will involve the further development and integration of CitySim -- the most fully developed model available for explicit simulation of building-related energy flows in urban settlements --and MATSIM --a detailed transport micro-simulation model. The resulting platform should allow the simulation of all key physical urban resource flows. Once integrated, calibrated and validated, it will be applied to the city of Zürich to produce new guidance for its development up until 2050, with a view to achieving a 2000W/capita city.

EDUCATION AND TEACHING

COURSES AND STUDENT NUMBERS 2012/2013

Bachelor/Master Programmes

Course title	Lecturer	Students	Students numbers
Building Physics I	Prof. J.-L. Scartezzini	AR BA SEM1	348
Building Physics II	Dr A. Schueler	AR BA SEM2	293
Building Physics III	Dr J. Kaempf	AR BA SEM3	134
Building Physics IV	Dr J. Kaempf	AR BA SEM4	133
Building Physics V	Prof. J.-L. Scartezzini	AR BA SEM5	111
Building Physics VI	Prof. J.-L. Scartezzini, MSc J.-C. Hadorn	AR BA SEM6	104
Indoor Environment Quality	Prof. C.-A. Roulet Dr M.C. Munari Probst MSc C. Roecker	AR MA SEM1	98
Energy within Buildings	Dr N. Morel Prof. tit. E. Gnansounou	GC MA SEM 1+3	60
Sustainable Urban Development, Infrastructures	Prof. J.-L. Scartezzini Dr J. Kaempf	AR/GC/SIE BA SEM6 (ENAC Learning Units)	22
Building Integration of Renewable Energy	MSc C. Roecker Dr M.C. Munari Probst	AR/GC BA SEM6 (ENAC Learning Units)	20
Monitoring within ENAC	Dr N. Morel	AR/GC/SIE BA SEM4 (ENAC Weeks)	25

PhD Theses 2012

Title	Name	Advisers	End	# EPFL-Thesis
Urban Multiscale Energy Modelling	G.Upadhyay	Prof. J.-L. Scartezzini Dr J. Kämpf	2016	N/A
Solar Architecture Facades	R. Xu	Prof. J.-L. Scartezzini Prof. S. Wittkopf (NUS/HSLU Luzern)	2016	N/A
Multifunctional microstructured glazing for seasonal thermal control and daylighting	A. Kostro	Prof. J.-L. Scartezzini Dr A. Schueler	2014	N/A
Automatic control of electrochromic Windows	N. Zarkadis	Prof. J.-L. Scartezzini Dr N. Morel	2014	N/A
Optimization of daylight in educational buildings in prevailing clear sky conditions and its consequent influence on energy efficiency	C. Basurto Davilla	Prof. J.-L. Scartezzini Dr J. Kaempf	2014	N/A
Nano-structured Multilayer Coatings on Architectural Glazing for active Solar Energy Facades	S. Mertin	Prof. J.-L. Scartezzini Dr A. Schueler	2013	N/A
Thermochromic VO2 Films for “Smart” Solar Energy Applications	A. Paone	Prof. J.-L. Scartezzini Dr A. Schueler	2013	N/A
A Bottom-up Model of City Metabolism	U. Wilke	Prof. J.-L. Scartezzini Dr F. Haldi	2013	5673
The impact of Light on Comfort including Non-Image-Forming Effects	A. Borisuit	Prof. J.-L. Scartezzini Dr M. Münch	2013	N/A
Urban resource Flow Modelling: from the Neighbourhood to the City	D. Perez	Prof. J.-L. Scartezzini Dr J. Kaempf	2013	N/A
Heat and Corrosion resistant Nano-composite selective Solar Absorber Coatings by Sol-Gel Processing	M. Joly	Prof. J.-L. Scartezzini Dr A. Schueler	2012	5541

PhD External Committees

Involvement	Name	University	Adviser	Year
Co-supervisor PhD thesis	L. Maierova	Czeck Univ. Prague	Dr M. Münch	2011-2013
Co-supervisor PhD thesis	G. Caruso	University of Pisa	Dr J. Kaempf	2011-2012

Outside Teaching

Title	Institution	Year
Light and Rhythms, Lecture within optional Bachelor course "Sleep and circadian rhythms" led by MER Dr P. Franken – Dr M. Münch	Lausanne University	2012

Master Theses 2012

Title	Student/Institution	Year	Programme
Architecture de montagne et écologie: un bâtiment public à Verbier (VS)	L. Berset (EPFL) S. Martin (EPFL)	2011-2012	MSc Architecture
Un bâtiment de logements comme réponse économique et sociale, à Mégève (F)	M. Chardon (EPFL)	2011-2012	MSc Architecture
Restructuration d'un site industriel	G. Cochand (EPFL) P. Gautschi (EPFL)	2011-2012	MSc Architecture
Centre sportif sur le site de la Tronchennaz à Villeneuve	M. Ruck (EPFL)	2011-2012	MSc Architecture
Masterplan EPFL Research Center in Ras al Khainah (UAE)	S. Coccolo (Politecnico di Torino)	2011-2012	M Architecture
Solar Photovoltaic Installation in Chaurikharka Secondary School & Energy Study for Lukla Primary School, Nepal	J. Waehlti (EPFL)	2011-2012	MSc Sciences et Ingénierie de l'Environnement
Management énergétique d'un quartier de la Chaux-de-Fonds à l'aide de la plateforme MEU	C. Vauthey (EPFL)	2011-2012	MSc Scienes et Ingénierie de l'Environnement.
Bottom-Up Modelling for Stochstic Prediction of Residential and Workplace Occupancy (semester project)	G. Virard (EPFL)	2011-2012	Master in Energy Management and Sustainability

STUDENTS FROM FOREIGN UNIVERSITIES, INTERNS AND GRANT HOLDERS

LESO-PB Research Group	Student/Institution	Year	Programme
Study of Passive Solar Energy in Social Housing in Bogota, Colombia	A. Cifuentes	2011-2012	Confederation grant holder
Nanostructured Materials for Renewable Energies	N. Jolissaint	2011-2012	Intern BNF
Variation Calculus Method for the Optimization of Building Form	G. Caruso, University of Pisa	2011-2012	PhD Student
Influence of Daylight on the Indoor Environment Quality	L. Maierova, Czeck Univ. Prague	2011-2012	PhD Student Sciex-NMS
Sustainable Urban Development and Modelling	E. Burdet, EIVP - Paris	2012	PhD Student
Sustainable Urban Development and Modelling	S. Coccolo	2012	Master Intern
Sustainable Urban Development and Modelling	N. Gharbi, Ecole centrale de Lyon	2011-2012	Masters Intern
IT Support	R. Mas, ETML	2011	Trainee
IT Support	M. Delafontaine (ETML)	2012-2013	Trainee
IT Support	T. Gruaz	2012	Civil Service

PUBLICATIONS 2012

REFEREED SCIENTIFIC JOURNALS

M. Pomplun, E. Silva, J. Ronda, S.W. Cain, M.Münch, C. Czeisler, J.F. Duffy. The effects of circadian phase, time awake, and imposed sleep restriction on performing complex visual tasks: evidence form comparative visual search, in *Journal of vision*, 12(7): 14.doi:10.1167/12.7.14., Print July 2012.

S. Chellappa, M. Münch, K. Blatter, V. Knoblauch, C. Cajochen. Age effects on spectral electroencephalogram activity prior, in *Journal of Sleep Research*, 21, 3, pp.247-256, 2012.

M. Münch, F. Linhart, A. Borisuit, S. Jaeggi, J.-L. Scartezzini. Effects of prior light exposure on early evening performance, subjective sleepiness, and hormonal secretion in the evening, in *Behavioural Neuroscience*, vol. 126, No 1, p.196-203, 2012.

M. Münch, L. Léon, S. Crippa, A. Kawasaki. Circadian and wake-dependent effects on the pupil light reflex in response to narrow-bandwidth light pulses, in *Investigative Ophthalmology and Visual Science*, 53(8):4546-55, Print August 2012.

M. Münch, A. Kawasaki. Intrinsically photosensitive retinal ganglion cells: classification, function and clinical implications, in *Current Opinion in Neurology*, December 15 [Epub ahead of print], 2012.

M. Münch, V. Bromundt. Light and chronobiology: Implications for health and disease, in *Dialogues in Clinical Neuroscience* 14(4), pp. 448-453, 2012.

S. Frey, A. Birchler-Pedross, M. Hofstettler, P. Brunner, T. Götz, M. Münch, K. Blatter, V. Knoblauch, A. Wirz-Justice, C. Cajochen. Challenging the sleep homoeostat: sleep in depression is not premature aging, in *Sleep Medicine*, May 18, 2012.

S. Frey, A. Birchler-Pedross, M. Hofstettler, P. Brunner, T. Götz, M. Münch, K. Blatter, V. Knoblauch, A. Wirz-Justice, C. Cajochen. Young women with major depression live on higher homeostatic sleep pressure than healthy controls, in *Chronobiology International 2012*, Vol 29(3), pp. 278-294, 2012.

U. Wilke, F. Haldi, J.-L. Scartezzini, D. Robinson. A bottom-up stochastic model to predict building occupants' time-dependent activities, in *Building and Environment,* Vol. 60, pp. 254-264, 2013.

D. Perez, D. Robinson. Urban energy flow modelling: A data-aware approach, in *Communications in Computer and Information Science,* 242 CCIS, pp. 200-220, 2012.

D. Robinson, F. Haldi. Modelling Occupants' Presence and Behaviour – Part II, in *Journal of Building Performance Simulation*, Vol. 5, (1), pp.1-3, 2012.

CONFERENCE PROCEEDINGS

A. Borisuit, M. Münch, L. Deschamps, J. Kämpf, J.-L. Scartezzini. A new device for dynamic luminance mapping and glare risk assessment in buildings, in *Proceedings of SPIE – The International Society for Optical Engineering,* 2012.

M. Münch. Effects of sleepiness and circadian timing on pupil responses to narrow-bandwidth light pulses. Poster Presenter at the *Annual Meeting of the Swiss Society of Sleep Research, Sleep Medicine and Chronobioloy*, Zurich, April 11-12, 2012.

Conference Proceedings [cont'd

M. Münch. Short term changes in EEG brain states in response to different wavelengths of light during daytime, *Annual Meeting Society for Light Treatment and Biological Rhythms*, Geneva, Switzerland, June, 2012.

A. Kostro, M. Geiger, N. Jolissaint, M.A. Gonzalez Lazo, J.-L. Scartezzini, Y. Leterrier, A. Schüler. Embedded microstructures for daylighting and seasonal thermal control, in *Proceedings of SPIE – The International Society for Optical Engineering,* 2012.

M.C. Munari Probst, C. Roecker. Criteria for Architectural Integration of Active Solar Systems, in *Proc. of IEA Task 41, Subtask A, SHC 2012 Conference,* San Francisco, USA, July 9th – 11th, 2012.

D. Perez, C. Vautey, J. Kämpf. Urban energy flow microsimulation in a heating dominated continental climate. *Proc. of SIMUL 2012, The Fourth International Conference on Advances in System Simulation*, Portugal, November 18-23, 2012.

S. Coccolo, J. Kämpf, J.L. Scartezzini, R. Bedrone. Designing in the desert. A bioclimatic approach at the urban scale, *UAE - Swiss Research day*, Abu Dhabi, Dubai, 11-12 November 2012.

Basurto C., Kämpf J., Scartezzini J-L. Verification of the Computer Modelled Daylight Propagation through Complex Fenestration Systems, *11th Annual International Radiance Workshop*, Cophenhagen, Denmark, 12-14 September 2012.

EXTENDED CONFERENCE ABSTRACTS

S. Frey, A. Birchler-Pedross, M. Hofstetter, P. Brunner, T. Götz, M. Münch, K.Blatte, V. Knoblauch, A. Wirz-Justice, C. Cajochen C. et al. *European Psychiatriy*, 27 Suppl. Meeting Abstract: O-13, 2012.

L. Maierova, A. Borisuit, J.L. Scartezzini, M. Münch. The impact of different lighting conditions on extreme chronotypes: effects on physical comfort and alertness, *Experience Light 2012* (Eindhoven, the Netherlands), November 2012.

A. Borisuit, L. Maierova, J.L. Scartezzini, M. Münch. Light preference and mood in extreme chronotypes in response to different office lighting conditions: preliminary results, *Experience Light 2012* (Eindhoven, the Netherlands) November 2012.

M. Münch, L. Maierova L., A. Borisuit, J.L. Scartezzini. Indoor lighting conditions and their impact on visual and non-visual functions, A*nnual meeting Society for Light Treatment and Biological Rhythms*, Geneva (Switzerland) June 2012.

A. Borisuit, L. Maierova, J.L. Scartezzini, M. Münch . Altered subjective alertness and visual comfort in extreme chronotypes in response to different office lighting conditions: preliminary results, *Annual meeting Society for Light Treatment and Biological Rhythms*, Geneva (Switzerland) June 2012.

M. Münch, G. Plomp G., E. Thunell, J.L. Scartezzini, M.H. Herzog. Short term changes in EEG brain states in response to different wavelengths of light during daytime, *Annual meeting Society for Light Treatment and Biological Rhythms*, Geneva (Switzerland) June 2012.

Extended Abstracts [cont'd]

C. Cajochen, M. Münch, S. Altanay-Ekici, A. Wirz-Justice, S. Frey. Evidence for a circalunar rhythm in human sleep structure, melatonin and cortisol levels, *Annual meeting European Sleep Research Society*, Paris, (France), September 2012.

C. Cajochen, A.U. Viola, C. Schmidt , M. Münch. Effects of age and light on human alertness. *32nd Myron B Laver International Postgraduate Course*: The Risk of Fatigue (Basel, March 30-31), 2012.

M. Pomplun, E.J. Silva, J.M. Ronda, S.W. Cain, M. Münch, J.F. Duffy. Circadian phase and time awake influence performance on complex visual tasks, Associated Professional Sleep Societies (APSS), *The 26th Annual Meeting, 2012* Boston (MA, USA), Sleep 2012 (Suppl) 35: A100, 2012.

M. Münch, L. Léon, S. Crippa, A. Kawasaki. Effects of sleepiness and circadian timing on pupil responses to narrow-bandwidth light pulses, *Annual Meeting of the Swiss Society of Sleep Research, Sleep Medicine and Chronobiology*, Zürich, April 11-12, 2012.

A. Kawasaki, L. Léon, S. Crippa, M. Münch. Sleepiness and circadian timing have a differential effect on pupil responses mediated by inner retinal versus outer retinal photoreception, *North American Neuro-Ophthalmology Society* (NANOS), San Antonio, Texas (USA), February 11-16, 2012.

OTHER PUBLICATIONS, REVIEWS, PATENTS, REPORTS

M.C. Munari Probst, C. Roeker. Manual Solar Energy Systems in Architecture, Integration criteria and guidelines, *Deliverable T.41 A.2 of IEA SHC 41 Solar Energy and Architecture*, September 2012.

A. Schüler, A. Kostro, Ecole Polytechnique Fédérale de Lausanne: Demande de brevet européen "provisoire" No EP 12179596.7, déposée le 7 août 2012. "Two Components Embedded System for Strong Angular Dependent Transmittance and Light Redirection".

M. Joly, A. Schüler, Ecole Polytechnique Fédérale de Lausanne: Demande internationale de brevet de type "provisoire" No PCT/IB2012/05993, déposée le 20 septembre 2012. "Procédé de fabrication d'éléments de capteurs solaires et éléments obtenus au moyen de ce procédé.

V. Hody Le Caer, A. Schüler, Ecole Polytechnique Fédérale de Lausanne: Demande internationale de brevet type "provisoire" No PCT/IB2012/055000, déposée le 20 septembre 2012. "Laminated glazing with coloured reflection and high solar transmittance suitable for solar energy systems".

A. Schüler, M. Joly, V. Hody Le Caer, Ecole Polytechnique Fédérale de Lausanne: Demande internationale de brevet de type provisoire No PCT/IB2012/054998, déposée le 20 septembre 2012. "Interference filter with angular independent orange colour of reflection and high solar transmittance, suitable for roof-integration of solar energy systems".

BOOKS, PHD THESES

M. Joly, J.-L. Scartezzini and A. Schüler (Dirs.). Développement et optimisation de revêtements minces nanostructurés pour capteurs solaires thermiques et modules photovoltaïques, *EPFL Thesis No 5541*, Lausanne, 2012.

C.-A. Roulet. Eco-Confort – Pour une maison saine et à basse consommation d'énergie, *Presses Polytechniques et Universitaires Romandes*, ISBN 978-2-88074.903-3, 2012.

D. Perez and D. Robinson, Urban Energy Flow Modelling : A Data-Aware Approach, *Digital Urban Modeling and Simulation*, pages 200–220, 201

INVITED PRESENTATIONS

Scartezzini J.-L., Solar Energy Integration in Urban Site (in French), *Invited Lecture,* CREM Public Conference, January 25th 2012, Lausanne (Switzerland).

Scartezzini J.-L., State of the Union in Daylighting at EPFL. *Invited Lecture,* VELUX Foundation Board of Trusties, June 5th 2012, Lausanne (Switzerland).

Scartezzini J.-L., Towards Net-Zero Buildings: Hic et Nunc., *Keynote Presentation*, 2nd International High Performance Buildings Conference, Purdue University, July 16-19, 2012, West Lafayette (Indiana, USA).

Scartezzini J.-L., Green City: New Field for Renewable Energy, *Invited Lecture*, 20th Conference Forum Engelberg, September 5 – 7, 2012, Engelberg (Switzerland).

Scartezzini J.-L., Greenlighting: High Performance Integrated Lighting Systems, *Invited Lecture*, ASHRAE Hellenic Chapter, October 13th 2012, Athens (Greece).

Scartezzini J.-L., Toward Net-Zero Energy Buildings: Hic et Nunc., *Invited Lecture*, Czech Technical University, November 12th 2012, Prague (Czech Republic).

Kämpf J., 2ème matinée de la recherche Avenues – Robertval sur l'optimisation des échanges radiatifs en milieu urbain, *Invited Lecture*, Université Technologique de Compiègne, June 2012 (France).

Munari Probst M.C., Solar Energy and Architecture, *Invited Lecture*, Meeting Task 41 – Innovation and Development, Lisbon, March 30th, 2012 (Portugal).

Munari Probst M.C., Une nouvelle ère pour le solaire en architecture, *Invited Lecture*, Congrès des architectes, Montréal, Mai 31st – June 1st, 2012 (Canada).

Munari Probst M.C., LESO-QSV – Acceptabilité urbaine des systèmes solaire actifs, *Invited Lecture*, SIPAL – Service immeubles, patrimoine et logistique, Lausanne, 5 novembre, 2012 (Switzerland).

Munari Probst M.C., Solar Energy and Architecture, *Invited Lecture,* Solar City Copenhagen Arkitektenes Hus, Copenhagen, November 15th, 2012 (Danemark).

Munari Probst M.C., Solar Energy Use and Architecture – IDEAS – Integrated Design, Architecture and Sustainability, *Invited Lecture, EPFL,* Doctoral School, Lausanne, November 14th, 2012 (Switzerland).

Münch M.,When chronobiology meets architecture and building science, *Invited Lecture*, Czech University of Prague, 2012 (Czech Republic).

Münch M., Indoor lighting conditions and the impact on visual and non-visual functions, *Keynote Presentation,* Annual Meeting of the Society for Light Treatment and Biological Rhythms (SLTBR) Geneva, June 24-27, 2012 (Switzerland).

Münch M., Disorders of the circadian Rhythm, *Invited Lecture*, Annual meeting of the Swiss Society for Sleep Research, Sleep Medicine and Chronobiology:(together with Dr V. Bromundt), Psychiatric University Clinics, Basel, April, 2012 (Switzerland).

M. Münch, Lichtwirkungen-aus chronobiologischer Sicht, *Invited Lecture*, Care Center "Sonnweid", Wetzikon, January, 2012 (Switzerland).

Morel N., Automatisation dans le bâtiment,, *Invited Lecture*, Journée de l'Association des installateurs électriques suisses Lausanne, October 3rd, 2012 (Switzerland).

Invited Presentations [cont'd]

Schüler A., Couches minces optiques composées de matériaux nanocomposites pour applications dans le domaine de l'énergie solaire, *Invited Lecture*, Colloque "Nanotechnologies: une vision sur les énergies", entretiens Jacques Cartier, INSA Lyon, November 19th, 2012 (Switzerland).

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MEDIA

Scartezzini J.-L. , Roulet C.-A., Vigliotti F., New Energy Needs, The Times of India, July 23rd, 2012.

Scartezzini J.-L., Capteurs solaires à couches minces et lumière naturelle, TJ France3, June 21st, 2012.

Münch M., La lumière stimule notre cerveau, EPFL News, May 15th, 2012.

Kämpf J., Geronimo – Nouveau logiciel pour concepteurs d'éclairage, EPFL News, April 4th, 2012.

Scartezzini J.-L., Le Label Minergie est-il exportable dans les déserts, EPFL News, January 23rd, 2012.

Scartezzini J.-L., Schüler A., Münch M., Kämpf J., Roecker C., Le bâtiment qui se nourrit de chaleur et de lumière, FLASH Lab Story, November 14th, 2012.

Scartezzini J.-L., Tageslicht dom, Hochparterre, June / July, 2012.

Munari Probst M.C., Interview and portrait "Hoch Parterre No 1/2/2012, Tour de Suisse – Tour de Sol".

LESO LUNCHTIME LECTURES

Title	Lecturer	Date
Installation et dimensionnement de panneaux photovoltaïques dans les écoles du Népal	Julien Waehlti (EPFL)	09.03.2012
LEDs and sustainable lighting: Living between technology and perception	Thomas Schielke (Arclighting)	15.03.2012
A bioclimatic approach to design and optimize a hypothetical Masterplan for the new EPFL Research Centre in Ras al Khaimah	Silvia Coccolo (Politecnico di Torino)	30.03.2012
Maîtrise de la surchauffe et de la lumière avec DIAL Plus	Bernard Paule (Estia SA)	01.06.2012
Développement de vitrages micro-structurés pour l'éclairage naturel et le contrôle thermique saisonnier	André Kostro (EPFL)	5.10.2012
Net Zero Energy Buildings: Up-to-Date Issues	Prof. Milorad Bojic (University of Kragujevac) Visiting Prof. INSA Lyon)	09.11.2012
Daylight propagation through complex fenestration systems – Verification using computer virtual models	Chantal Basurto (EPFL)	07.12.2012

REPRESENTATION

EPFL INTERNAL

Name	Board, committee etc.	Start	End
Prof. J.-L. Scartezzini	Member of EPFL Excellence Fellowship Committee	2012	-
Prof. J.-L. Scartezzini	Member of SAR Academic Committee	2012	-
Prof. J.-L. Scartezzini	Chairman of CISBAT 2011 Editorial Committee	2011	2012
Prof. J.-L. Scartezzini	EPFL Doctoral Programme in Energy (EDEY), Member of Doctoral Committee	2010	-
Prof. J.-L. Scartezzini	Member of Working Group on Excellence in Doctoral Education	2008	-
Dr A. Schueler	Member of SAR Teaching Committee	2012	-
Dr. A. Schueler	Coordinator for Security COSEC for LESO-PB	2011	-
Dr. A. Schueler	Coordination of technical services EPFL, validation of security for new Nanosolar Laboratory	2011	2012
MSc C. Roecker	Member of ESOPP Scientific and Piloting Committees	2010	-
Dr M. Joly	Coordinator Bike to Work contest	2010	-

EPFL EXTERNAL

Name	Organisation, Function	Start	End
Prof. J.-L. Scartezzini	Solar Energy International Journal, Associate Editor	2000	-
Prof. J.-L. Scartezzini	IPCC Working Group III – Mitigation, Scoping Meeting for Renewable Energy, Expert Reviewer	2008	-
Prof. J.-L. Scartezzini	Qatar National Research Fund (QNRF), National Priorities Research Program (NRRP), Peer Reviewer	2007	-
Prof. J.-L. Scartezzini	SIA Regards 2013 – National award for sustainable and promising achievements, Swiss Society for Engineers and Architects (SIA), Zurich, Member of Jury Panel	2012	2013
Prof. J.-L. Scartezzini	Swiss Competence Centre for Energy and Mobility (CCEM-CH), Research Committee Chair	2005	-
Prof. J.-L. Scartezzini	International Council for Research and Innovation in Building and Construction, EPFL Representative	2004	-
Prof. J.-L. Scartezzini	European Renewable Energy Research Centres Agency (EUREC), College of Members, EPFL Representative	2004	-
Prof. J.-L. Scartezzini	Canadian Foundation for Innovation (CFI), Expert Reviewer	2010	-
Prof. J.-L. Scartezzini	Canadian Natural Science and Engineering Research Council (NSREC), Expert Reviewer	2012	-
Prof. J.-L. Scartezzini	Italian National Agency for the Evaluation of Universities and Research Institutes (ANVUR), Expert Reviewer	2012	-
Prof. J.-L. Scartezzini	Energy and Buildings, CISBAT 2011 Special Issue, Guest Editor	2011	2012

EPFL external representation [cont'd]

Prof. J.-L. Scartezzini	CLIMA 2013 International Conference (Prague), Member of Scientific Committee	2012	2013
Dr M.C. Munari Probst	IEA Task 41 Solar Energy and Architecture, Subtask A co-leader	2009	2012
Dr M.C. Munari Probst	Swissolar Association (Bern), Member of Architecture Group	2010	-
Dr M. Münch	Annual meeting The Swiss Society for sleep Research Sleep Medicine and Chronobiolgy, Zurich, Co-chair Session	2012	2012
Dr M. Münch	Annual Meeting of the Society for Light Treatment and Biological Rhythms, Geneva, June 24-27, Chair Symposium III.	2012	2012
Dr M. Münch	Lighting Research and Technology, Journal of Sleep Research, Ad hoc Reviewer	2012	-
MSc C. Roecker	IEA Task 41 Solar Energy and Architecture, Subtask A co-leader	2009	2012
MSc C. Roecker	French National Research Agency (ANR), Member of Evaluation Committee	2011	2012
Dr J. Kämpf	IEA – Task 50 "Advanced Lighting Solutions for Retrofitting Buildings, Subtask co-leader	2012	2014

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