

Technical Programme



SPIE
Eco-Photonics

Energy, Engineering, Education,
and the Environment

Connecting minds for global solutions

Conference dates

28–30 March 2011

Palais de la Musique et des Congrès
Strasbourg, France

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SPIE

Connecting minds. Advancing light.



SPIE 
Eco-Photonics
Energy, Engineering, Education,
and the Environment

28–30 March 2011
Palais de la Musique et des Congrès
Strasbourg, France

Welcome

On behalf of SPIE, it is our pleasure to welcome you to SPIE Eco-Photonics. This week you will have the unique opportunity to participate in the exchange of ideas about energy solutions, re-engineering, workforce education, and sustainable environmental solutions. The outstanding programme includes lectures by key people in Eco-Photonics from government, industry, and academia addressing the needs for a Greener Future and a new Green Economy, and you will have numerous opportunities to develop both your career and business by networking with leading researchers and entrepreneurs in the field. We look forward to your participation in these critical issues during the week.

Symposium Chairs



Dan Curticapean,
Univ. of Applied Sciences
Offenburg (Germany)



Patrick Meyrueis,
Ecole Nationale Supérieure de
Physique de Strasbourg (France)



SPIE supports and encourages green photonics technologies such as energy, sustainability, conservation, and environmental monitoring.

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Bernard Kress, USI Photonics Inc. (United States)

Zbigniew T. Kuznicki, Ecole Nationale Supérieure de Physique de Strasbourg (France)

Vasudevan Lakshminarayan, Univ. of Waterloo (Canada)

Klaus Löffler, TRUMPF GmbH & Co. KG (Germany)

Patrick Meyrueis, Ecole Nationale Supérieure de Physique de Strasbourg (France)

Adrian Neculae, Univ. de Vest din Timisoara (Romania)

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Alexander M. Olowinsky, Fraunhofer-Institut für Lasertechnik (Germany)

Marius H. Paulescu, Univ. de Vest din Timisoara (Romania)

Hans Poisel, Univ. of Applied Sciences Nürnberg (Germany)

Stephen M. Pompea, National Optical Astronomy Observatory (United States)

Francois Quentel, D-Lightsys (France)

Christoph Rüttimann, LASAG AG (Switzerland)

John Sadi, Lightnics (France)

Werner W. Schröder, Univ. of Applied Sciences Offenburg (Germany)

Paul Siffert, European Materials Research Society (France)

Tuan Vo-Dinh, Duke Univ. (United States)

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Feng Zhou, Indiana Univ. of Pennsylvania (United States)

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Programme At A Glance

	Monday 28 March	Tuesday 29 March	Wednesday 30 March
M O R N I N G	10.30 to 11.00 Welcome and Opening Session Welcome Address by a representative of the European Parliament	09.30 to 11.30 Plenary Session II: Sustainable Manufacturing Development and Process 09.30 Photonics research in Europe (Kaierle) 10.00 Examples of green laser applications (Lang) 10.30 Laser welding for weight saving in BIW design at PSA Peugeot Citroën (Kielwasser) 11.00 Photonics-enabled manufacturing: ICT+sensors+lasers = sustainable growth for manufacturing in Europe (Pearsall) 11.30 Panel Discussion	09.30 to 11.00 Poster Breakfast and Networking Reception 11.00 to 12.15 Session 7: Photonics in Sustainable Product Design I
	11.00 to 11.30 Plenary Session I: Sustainable Energy Engineering 11.00 Energy saving through LED in signaling functions for automotive exterior lighting (Bony)		
	Lunch Break		
A F T E R N O O N	13.30 to 15.20 Session 1: Sustainable Energy Engineering I	13.30 to 15.30 Session 3: Sustainable Energy Engineering I	13.30 to 15.30 Session 5: Sustainable Manufacturing Development and Processes I
	15.40 to 18.00 Session 2: Sustainable Energy Engineering II	16.00 to 18.20 Session 4: Education for a Sustainable Engineering Workforce	16.00 to 18.10 Session 6: Sustainable Manufacturing Development and Processes II
	18.00 to 19.30 Welcome Reception		

Venue

Palais de la Musique et des Congrès
Place Bordeaux
67082 Strasbourg
France
Tel: +33 3 8837 6767

Registration

Full symposium registration includes: admittance to the conferences, welcome reception, poster reception, coffee breaks, and Proceedings of SPIE as applicable under the specific registration plan (see registration form for details).

Proceedings of SPIE CD-ROMs purchased as part of your registration plan include shipping charges. Student author registration plans do not include *Proceedings of SPIE CD-ROM*.

SYMPOSIUM PROCEEDINGS CD-ROM:

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Registration Hours

Erasmus Entrance

Sunday 27 March15.00 to 17.00 hrs
Monday 28 March08.00 to 18.00 hrs
Tuesday 29 March.08.30 to 18.00 hrs
Wednesday 30 March08.30 to 16.00 hrs

Welcome Reception

Monday 28 March • 18.00 to 19.30
Location: Contades Est

All attendees are invited to relax, socialise, and enjoy light refreshments.

Due to limited space and numbers, guests will be admitted on a first-come, first-served basis. Please contact the onsite registration desk for tickets.

Please remember to wear your conference registration badges. Dress is casual.

Wednesday Poster Breakfast and Networking Session

Wednesday 30 March • 09.30 to 11.00
Location: Tivoli Foyer

All symposium attendees are invited to attend the Wednesday poster breakfast provided as an opportunity to enjoy networking and refreshments while reviewing poster papers. The interactive poster session is designed to promote opportunities for networking with colleagues in your field. Attendees are encouraged to review the high-quality papers that are presented in this alternate format and to interact with the poster authors.

Poster presenters may display their poster papers starting at 12.00 hrs on Tuesday in the Forum. Each poster presenter is provided a space 0.95 x 1.20m in which to display a summary of the paper. Attendees are requested to wear their conference registration badges to the poster session.

Poster authors should be at their papers from 09.30 to 10.30 hrs on Wednesday to answer questions from attendees. Poster presenters who have not set up by 09.00 on Wednesday will be considered a “no show” and their manuscript will not be published. Posters will remain on display until the end of lunch break on Wednesday for extended viewing. Any papers left on the boards following the end of the lunch break will be considered unwanted and will be discarded. SPIE assumes no responsibility for posters left up after the end of the poster session.

Plenary Sessions

MONDAY PLENARY SESSION I: Sustainable Energy Engineering

Monday 28 March • 10.30 to 11.30

Session Chairs: **Patrick P. Meyrueis**, Ecole Nationale Supérieure de Physique de Strasbourg (France); **Dan Curticeapean**, Univ. of Applied Sciences Offenburg (Germany)

10.30

Welcome and Opening Session

Welcome Address by a representative of the European Parliament

11.00

Energy saving through LED in signaling functions for automotive exterior lighting



Alexis G. Bony,
Daimler AG (Germany)

Abstract: In this work, taking as an example the new Mercedes-Benz roadster SLK (R172), we present the first single LED day-time-running lamp, with a total

power consumption below 5W per vehicle. After reviewing legal requirements, the optical and electronic concepts are discussed, as well as possible future evolutions towards design freedom or power consumption reduction. Details on the tail lamp LED functions are also discussed, and particularly the advantages from the realization of fog lamp with LEDs.

Biography: After studying applied physics engineering, Dr. Bony received his Ph.D. in Engineering from the University of Strasbourg, France, with a work on roughness evaluation for integrated optics components. He has been working since 2007 in the exterior lighting department for Mercedes-Benz cars, working on concept development and technology validation related to headlamps and tail lamps.

TUESDAY PLENARY SESSION II: Sustainable Manufacturing Development and Process

Tuesday 29 March • 09.30 to 12.00

09.30

Photonics research in Europe



Stefan Kaierle,
European Laser Institute
(Germany)

Abstract: A couple of years ago it had been recognized that a systematic approach to clustering research topics in the field of photonics would be required. As a result, the European Technology Platform 'Photonics21' had been founded. Today, the platform serves as advisor for the European Commission and develops Strategic Research Agendas on a regular. The talk will cover the approach and demonstrate the future hot topics in European Photonics research.

Biography: After studying Electrical Engineering and a PhD in Mechanical Engineering at RWTH Aachen University, Stefan Kaierle joined the Fraunhofer ILT where he is heading the System Technology. He published more than 100 papers in the field of process control, laser system technology, laser materials processing and related fields.

Stefan Kaierle has been appointed to two guest professorships at Changchun University and at Beijing University of Technology (China). Currently, he is also President of the European Laser Institute ELI.

10.00

Examples of green laser applications



Michael Lang,
TRUMPF GmbH & Co. KG
(Germany)

Abstract: Advances in Laser Technology have enabled implementation of various technology improvements that contribute to saving resources.

Reduction in carbon footprint is reached through effective manufacturing technologies, contributions to energy efficient products, and enabling access to new energy sources.

On a macroscopic scale high power lasers have enabled efficient, high speed welding. On a microscopic scale, lasers are used for various applications supporting eMobility and the manufacturing of solar cells.

Advantages of lasers are contact free manufacturing and highest precision. These properties are in demand for future production processes to achieve high product quality and throughput, at reasonable energy consumption. As a consequence the number of laser applications across various industries will continue to grow.

Biography: Michael Lang has graduated in physics with a Diploma from University of Konstanz, Germany, in 1997. During his thesis he did practical experiments on non-linear optics and frequency conversion. His professional experience includes service, applications consulting and sales activities in the semiconductor industry, working with laser based manufacturing equipment. He joined TRUMPF in 2010, as a specialist for laser applications in the semiconductor sector.

10.30

Laser welding for weight saving in BIW design at PSA Peugeot Citroën



Mathieu Kielwasser,
PSA Peugeot Citroën (France)

Abstract and Biography:
Not available at this time.

11:00

Photonics-enabled manufacturing: ICT+sensors+lasers = sustainable growth for manufacturing in Europe



Thomas P. Pearsall,
European Photonics Industry Consortium (France)

Abstract: Photonics-powered production - the combination of lasers, sensors and ICT - is the key component of agile, lean and green manufacturing. The

introduction of laser technologies in manufacturing is highly disruptive, creating competitive opportunities for European manufacturing, because programmable and controllable laser processing implements a flexible, fast and reactive manufacturing platform.

Photonics-powered production unites three sectors that account for more than 30 billion euros of economic activity per year in Europe, according to statistics published by Photonics-21 and SEMI: Lasers, Sensors and Machine Vision. In addition, this creates synergies among European Technology platforms: Photonics, Manufacture and Eniac. It leverages Key Enabling Technologies of Photonics and Advanced Manufacturing.

Diode lasers are a core technology of this vision. With slope efficiencies greater than 90 percent, and steadily improving output powers, direct diode laser processing could be developed for laser processing systems that deliver up to a kilowatt of continuous machining power. For higher powers, such diode laser systems can pump fiber laser or disc laser systems. Diode laser pumping is additionally the basis for ultra-short pulse length, high peak-power lasers that can be used to manufacture glass and ceramic based products: LCD displays and thin-film solar cells, for example.

The diode-pumped laser, and in particular the fiber laser, has been developed from optical amplifiers used for optical fiber telecommunications. There are a number of small companies making such lasers all over Europe. This technology is by nature easy to scale. Thus, high performance fiber lasers can be made to fit in the hollow of your hand, while the same technology is being used to make lasers the size of football fields for nuclear fusion. This is exciting technology with a brilliant future.

Biography: Following his degree work, he worked at Bell Laboratories Thomson CSF, and Corning. He is a pioneer developer of InGaAsP and the inventor of the InGaAs photodetector.

In 2003, Pearsall started EPIC, The European Photonics Industry Consortium. EPIC has 80 voting members and 400 associated members located in 18 countries of the European Union. EPIC has been a major contributor to the launch and the development of the European Technology Platform Photonics21.

11.30

Panel Discussion

Conference 8065

Monday-Wednesday 28-30 March 2011
Proceedings of SPIE Vol. 8065

SPIE Eco-Photonics 2011: Sustainable Design, Manufacturing, and Engineering Workforce Education for a Green Future

Conference Chairs: **Pierre Ambs**, Univ. de Haute Alsace (France); **Dan Curticaean**, Univ. of Applied Sciences Offenburg (Germany); **Claus Emmelmann**, Technische Univ. Hamburg-Harburg (Germany); **Wolfgang Knapp**, Cooperation Laser Franco-Allemande (France); **Zbigniew T. Kuznicki**, Ecole Nationale Supérieure de Physique de Strasbourg (France); **Patrick P. Meyrueis**, Ecole Nationale Supérieure de Physique de Strasbourg (France)

Monday 28 March

Welcome and Opening Session

Room: Tivoli Mon. 10.30 to 11.00

Session Chairs: **Patrick P. Meyrueis**, Ecole Nationale Supérieure de Physique de Strasbourg (France); **Dan Curticaean**, Univ. of Applied Sciences Offenburg (Germany)

Welcome Address by a representative of the European Parliament

PLENARY SESSION I

Room: Tivoli Mon. 11.00 to 11.30

Sustainable Energy Engineering

Session Chairs: **Patrick P. Meyrueis**, Ecole Nationale Supérieure de Physique de Strasbourg (France); **Zbigniew T. Kuznicki**, Ecole Nationale Supérieure de Physique de Strasbourg (France)

11.00: **Energy saving through LED in signaling functions for automotive exterior lighting** (*Invited Paper*), Alexis G. Bony, Khaled Hamami, Frank Tebbe, Jens Mertens, Daimler AG (Germany) [8065-100]

Lunch Break 11.30 to 13.30

SESSION 1

Room: Tivoli Mon. 13.30 to 15.20

Sustainable Energy Engineering I

Session Chairs: **Zbigniew T. Kuznicki**, Ecole Nationale Supérieure de Physique de Strasbourg (France); **Patrick P. Meyrueis**, Ecole Nationale Supérieure de Physique de Strasbourg (France)

13.30: **Monitoring the energy systems of sustainable buildings** (*Invited Paper*), Elmar Bollin, Univ. of Applied Sciences Offenburg (Germany) [8065-01]

14.00: **Design a linear irregular Fresnel lens to reduce the cost and thickness of an LED-based direct-type backlight module and improve the illuminance and uniformity of LCD plate**, Wen-Gong Chen, Yung-Ta Institute of Technology and Commerce (Taiwan) [8065-02]

14.20: **Simulation of silicon thin-film solar cells for oblique incident waves**, Christine Jandl, Kai Hertel, Christoph Pflaum, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Helmut Stiebig, Malibu GmbH & Co. KG (Germany) [8065-03]

14.40: **Monitoring applications of power generators for the increase of energy efficiency using novel fiber optical sensors**, Michael Villnow, Michael Willsch, Thomas Bosselmann, Siemens AG (Germany); Bernhard Schmauss, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [8065-04]

15.00: **Study of spectrum-splitting solar photovoltaic system**, Liang-Yao Chen, Yuan Zhao, Mingyu Shen, Yu-Xiang Zheng, Fudan Univ. (China) [8065-05]

Coffee Break 15.20 to 15.40

SESSION 2

Room: Tivoli Mon. 15.40 to 18.00

Sustainable Energy Engineering II

Session Chairs: **Zbigniew T. Kuznicki**, Ecole Nationale Supérieure de Physique de Strasbourg (France); **Patrick P. Meyrueis**, Ecole Nationale Supérieure de Physique de Strasbourg (France)

15.40: **Current collection from different Si devices based on nanoscale Si-layered systems containing a new metamaterial for photovoltaics**, Mikael Hosatte, Ecole Nationale Supérieure de Physique de Strasbourg (France); Marek Basta, Univ. de Strasbourg (France); Patrick P. Meyrueis, Zbigniew T. Kuznicki, Ecole Nationale Supérieure de Physique de Strasbourg (France) [8065-06]

16.00: **Optimising optical efficiency in diamond turned Fresnel mould masters**, John L. Allsop, Paul R. Shore, Arjen Mateboer, Cranfield Univ. (United Kingdom) [8065-07]

16.20: **Enhanced light trapping in realistic thin film solar cells using one-dimensional gratings**, Ali Naqavi, Karin Söderström, Franz-Josef Haug, Vincent Paeder, Toralf Scharf, Hans Peter Herzig, Christophe Ballif, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8065-08]

16.40: **Transparent conductive oxides for nano-SIS solar cells**, Kevin Füchsel, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Astrid Bingel, Friedrich-Schiller-Univ. Jena (Germany); Norbert Kaiser, Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8065-09]

17.00: **Microalgae photonics**, Timmy Floume, Imperial College London (United Kingdom); Julien Sylvestre, PhotoFuel SAS (France) [8065-10]

17.20: **A silicon based metamaterial for the light-to-electricity conversion** (*Invited Paper*), Zbigniew T. Kuznicki, Ecole Nationale Supérieure de Physique de Strasbourg (France) [8065-11]

Welcome and Networking Reception

Location: Contades Est. . Mon. 18.00 to 19.30

Tuesday 29 March

Plenary Session II

Room: Tivoli Tues. 09.30 to 11.30

Sustainable Manufacturing Development and Process

Session Chairs: **Wolfgang Knapp**, Cooperation Laser Franco-Allemande (France); **Claus Emmelmann**,

Technische Univ. Hamburg-Harburg (Germany)

09.30: **Photonics research in Europe**, Stefan Kaieler, European Laser Institute (Germany) [8065-101]

10.00: **Examples of green laser applications**, Michael Lang, TRUMPF Laser- und Systemtechnik GmbH (Germany); Klaus Löffler, TRUMPF GmbH & Co. KG (Germany) [8065-102]

10.30: **Laser welding for weight saving in BIW design at PSA Peugeot Citroën**, Mathieu Kielwasser, PSA Peugeot Citroën (France) [8065-105]

11.00: **Photonics-enabled manufacturing: ICT+sensors+laser = sustainable growth for manufacturing in Europe**, Thomas P. Pearsall, European Photonics Industry Consortium (France) [8065-104]

Panel Discussion

Room: Tivoli Tues. 11.30 to 12.00

Lunch Break 12.00 to 13.30

SESSION 3

Room: Tivoli Tues. 13.30 to 15.30

Sustainable Energy Engineering III

Session Chairs: **Patrick P. Meyruéis**, Ecole Nationale Supérieure de Physique de Strasbourg (France); **Zbigniew T. Kuznicki**, Ecole Nationale Supérieure de Physique de Strasbourg (France)

13.30: Carbon dioxide a raw material for sustainable development (*Invited Paper*), Jacques Amouroux, Ecole Nationale Supérieure de Chimie de Paris (France); Paul Siffert, European Materials Research Society (France); Koichi Hashimoto, Tohoku Univ. (Japan); Philipp G. Rutberg, Institute of Electrophysics (Russian Federation) [8065-12]

14.00: Minimum energy per bit in high bit rate optical communications and quantum communications (*Invited Paper*), Philippe B. Gallion, Telecom ParisTech (France) [8065-13]

14.30: Solar trough system based on microstructured reflective Mylar sheets incorporating both photovoltaic and thermal conversions, Vic Hejmadi, USI Photonics Inc. (United States); Afredo Gilliberto, USI Photonics Inc. (United Arab Emirates); Meimei Shin, Bernard Kress, USI Photonics Inc. (United States) [8065-55]

14.50: Enhancement of spectral response of visible light absorption of TiO₂ synthesis by femtosecond laser ablation, Abdul Salam N. Mahmood, Ryerson Univ. (Canada) [8065-15]

15.10: Optical properties of crystalline and amorphous Si:P for device fabrication and structural modeling, Marek Basta, Univ. de Strasbourg (France); Zbigniew T. Kuznicki, Ecole Nationale Supérieure de Physique de Strasbourg (France) [8065-16]

Coffee Break 15.30 to 16.00

SESSION 5

Room: President Tues. 13.30 to 15.30

Sustainable Manufacturing Development and Processes I

Session Chairs: **Claus Emmelmann**, Technische Univ. Hamburg-Harburg (Germany); **Wolfgang Knapp**, Cooperation Laser Franco-Allemande (France)

13.30: Eco efficiency of laser welding applications (*Invited Paper*), Stefan Kaieler, Fraunhofer-Institut für Lasertechnik (Germany) [8065-17]

13.50: Glue-free assembly of glass fiber reinforced thermoplastics using laser light (*Invited Paper*), Wolfgang Knapp, Cooperation Laser Franco-Allemande (France) [8065-18]

14.10: Improvement of mechanical properties and life extension of high reliability structural components by laser shock processing (*Invited Paper*), José L. Ocaña, Univ. Politécnica de Madrid (Spain) [8065-19]

14.30: Wavefront analysis and optimization from conventional liquid crystal displays for low-cost holographic optical tweezers and digital holographic microscopy, Andreas Weber, Valentín Ortega Clavero, Werner W. Schröder, Univ. of Applied Sciences Offenburg (Germany) [8065-20]

14.50: Spot welding of highly reflective materials used for electrical contacts (*Invited Paper*), Christoph Rüttimann, LASAG AG (Switzerland) [8065-21]

15.10: Thermal management in laser applications: basic technology and energy efficiency, Bernd Buerner, Sascha Paulus, Edgar Timm, Riedel Kältetechnik Glen Dimplex Deutschland GmbH (Germany) [8065-22]

Coffee Break 15.30 to 16.00

SYMPOSIUM PROCEEDINGS CD-ROM:

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SESSION 4

SESSION 6

Room: Tivoli Tues. 16.00 to 18.20

Room: President Tues. 16.00 to 18.10

Education for a Sustainable Engineering Workforce

Sustainable Manufacturing Development and Processes II

Session Chair: Dan Curticapean, Univ. of Applied Sciences Offenburg (Germany)

Session Chairs: Wolfgang Knapp, Cooperation Laser Franco-Allemande (France); Claus Emmelmann, Technische Univ. Hamburg-Harburg (Germany)

16.00: Photonics education for a green future: connecting the dots of the Arizona STEM education experiment (*Invited Paper*), Stephen M. Pompea, National Optical Astronomy Observatory (United States); Leonard W. Fine, Science Foundation Arizona (United States); Pierre Meystre, College of Optical Sciences, The Univ. of Arizona (United States)[8065-23]

16.00: Energy efficiency in thermal joining processes (*Invited Paper*), Johannes Wilden, Bilge Kaya, Technische Univ. Berlin (Germany) [8065-34]

16.30: The outreach activities to promote photonics education for school students (*Invited Paper*), Feng Zhou, Indiana Univ. of Pennsylvania (United States); Daniel M. Hull, OP-TEC National Ctr. for Optics and Photonics Education (United States). [8065-24]

16.30: Robust, precise, high resolution Fourier transform Raman spectrometer, Valentin Ortega Clavero, Univ. of Applied Sciences Offenburg (Germany) and Univ. of Strasbourg (France); Werner W. Schröder, Univ. of Applied Sciences Offenburg (Germany); Patrick P. Meyrueis, Univ. of Strasbourg (France); Andreas Weber, Univ. of Applied Sciences Offenburg (Germany). [8065-30]

16.50: Enabling virtual reality on mobile devices: enhancing students learning experience (*Invited Paper*), Markus Feisst, The Univ. of Nottingham (United Kingdom). [8065-25]

16.50: Optical glass and the EU directive RoHS, Peter Hartmann, SCHOTT AG (Germany) [8065-31]

17.10: National education program for energy efficient illumination engineering (*Invited Paper*), Constance E. Walker, Stephen M. Pompea, National Optical Astronomy Observatory (United States) [8065-26]

17.10: Communication of the multi laser tracker system used as position feedback sensor, Trung T. Nguyen, Thanh Q. Nguyen, Arvid Amthor, Christoph Ament, Technische Univ. Ilmenau (Germany) . [8065-32]

17.30: New aspects of using eyetracking in education of optics and photonics, Ute Rohbock, Martha Jagoda, Univ. of Applied Sciences Offenburg (Germany) [8065-27]

17.30: Holographic microscope using conventional low-cost liquid crystal in transmissive setup, Andreas Weber, Werner W. Schröder, Valentin Ortega Clavero, Univ. of Applied Sciences Offenburg (Germany) [8065-33]

17.50: Interactive lecture demonstrations, active learning and the ALOP Project (*Invited Paper*), Vasudevan Lakshminarayan, Univ. of Waterloo (Canada) [8065-28]

17.50: Virtual reality to simulate large lighting with high efficiency LED, Thierry Blandet, Ecole Nationale Supérieure de Physique de Strasbourg (France); Gilles Coutelier, Pixium (France) [8065-54]



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Wednesday 30 March

POSTER BREAKFAST

Room: Tivoli Wed. 09.30 to 11.00

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Organic photovoltaic device characterized by high open circuit voltage with aluminum doped zinc oxide as transparent electrode, Pavlo Y. Stakhira, Vladyslav V. Cherpak, Dmytro M. Volyniuk, Lviv Polytechnic National Univ. (Ukraine); Grzegorz Luka, Bartłomiej S. Witkowski, Marek Godlewski, Elżbieta Guziwicz, Institute of Physics (Poland); Zenon Y. Hotra, Lviv Polytechnic National Univ. (Ukraine); Jurate Simokaitiene, Juozas V. Grazulevicius, Kaunas Univ. of Technology (Lithuania); Natalia Kostiv, Lviv Polytechnic National Univ. (Ukraine). [8065-46]

Zinc oxide films grown by atomic layer deposition for reflective coating applications, Grzegorz Luka, Bartłomiej S. Witkowski, Tomasz A. Krajewski, Institute of Physics (Poland); Andrzej Witowski, Univ. of Warsaw (Poland); Rafal Jakiela, Elżbieta Guziwicz, Marek Godlewski, Institute of Physics (Poland) [8065-47]

Optimization of Pd surface plasmon resonance sensor for hydrogen detection, Cedric Perrotton, Nicolas Javahiry, Ecole Nationale Supérieure de Physique de Strasbourg (France); Martin Slaman, Vrije Univ. Amsterdam (Netherlands); Bernard Dam, Technische Univ. Delft (Netherlands); Patrick P. Meyrueis, Ecole Nationale Supérieure de Physique de Strasbourg (France). [8065-48]

The design of a wireless battery-less bi-flash installation with high power leds, Jan Cappelle, Wim De Geest, KaHo Sint-Lieven Hogeschool (Belgium); Naten van Hemelrijck, Linea Trovata (Belgium); Peter Hanselaer, KaHo Sint-Lieven Hogeschool (Belgium) [8065-49]

Perfection of sustainable processes of grinding and polishing of optical details, Yuriy D. Filatov, V. Bakul Institute for Superhard Materials NASU (Ukraine); Olexandr Y. Filatov, National Academy of Sciences of Ukraine (Ukraine); Guy Monteil, Ecole Nationale Supérieure Mécanique et des Microtechniques de Besancon (France); Uwe Heisel, Michael G. Storchak, Univ. Stuttgart (Germany) [8065-50]

Improving the performance of the NIST gonio-colorimeter for measurements of bidirectional reflectance distribution function, Vyacheslav Podobedov, C. Cameron Miller, Maria E. Nadal, National Institute of Standards and Technology (United States) [8065-51]

Nanolayers of a PV metamaterial buried within a single crystal Si; SEM and reflectivity observations, Marek Basta, Univ. de Strasbourg (France); Bartłomiej S. Witkowski, Marek Godlewski, Institute of Physics (Poland); Zbigniew T. Kuznicki, Ecole Nationale Supérieure de Physique de Strasbourg (France) [8065-52]

Characterization method of multi-interface, multi-layer, heavily doped Si:P nanostructures using electromagnetic propagation, Zbigniew T. Kuznicki, Ecole Nationale Supérieure de Physique de Strasbourg (France); Marek Basta, Univ. de Strasbourg (France) [8065-53]

SESSION 7

Room: Tivoli Wed. 11.00 to 12.00

Photonics in Sustainable Product Design I

Session Chair: **Pierre Ambs**,
Univ. de Haute Alsace (France)

11.00: **The role of photonics in sustainable product design** (*Invited Paper*), Berit Wessler, OSRAM Opto Semiconductors GmbH (Germany) [8065-35]

11.30: **Improving the energy efficiency of telecommunication networks** (*Invited Paper*), Christoph Lange, Deutsche Telekom AG (Germany); Andreas Gladisch, Deutsche Telekom Labs. (Germany) [8065-36]

Lunch Break 12.00 to 13.30

SESSION 8

Room: Tivoli Wed. 13.30 to 15.40

Photonics in Sustainable Product Design I

Session Chair: **Pierre Ambs**,
Univ. de Haute Alsace (France)

13.30: **Fully controlled helicopter for 3D-reconstruction of buildings and survey applications**, Raimund Lehmann, Stefan Staiger, Werner W. Schröder, Hochschule Offenburg (Germany) [8065-37]

13.50: **Mobile display backlight light guide plates based on slanted grating arrays**, Jyrki S. Kimmel, Tapani Levola, Nokia Research Ctr. (Finland) . [8065-38]

14.10: **Realtime implementation of square 16-QAM transmission system**, Ali M. Al-Bermani, Christian Wördehoff, Sebastian Hoffmann, Univ. Paderborn (Germany); Ulrich Rückert, Univ. Bielefeld (Germany); Reinhold Noé, Univ. Paderborn (Germany) . . [8065-39]

14.30: **Clean photonics for environmental monitoring: not only the wavelengths are green** (*Invited Paper*), Hans Zappe, Albert-Ludwigs-Univ. Freiburg (Germany) [8065-41]

15.00: **The european ICT-BOOM project: silicon photonic TB/s routers for improved energy efficiency in optical networks**, Annachiara Pagano, Emilio Riccardi, TelecomitaliaLAB (Italy); Christos Stamatiadis, Konstantinos Vyrosokinos, National Technical Univ. of Athens (Greece); Leontios Stampoulidis, CONSTELEX Technology Enablers (Greece); Hercules Avramopoulos, National Technical Univ. of Athens (Greece) [8065-42]

15.20: **D3-display: the 'no power' (green) electrowetting display**, Michael Jentsch, adt Deutschland GmbH (Germany) [8065-43]

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