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2015 SYMPOSIUM CHAIR:

Oleg V. Sulima
GE Global Research
(USA)

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- Present to experts in the field
- Publish your results internationally
- Gain experience in scientific communication
- Connect with researchers from other disciplines
- See where your work fits into global optics and photonics research
High and Low Concentrator Systems for Solar Energy Applications X (OP201)

Conferences Chairs: Adam P. Plesniak, Arzon Solar, LLC (USA); Andru J. Prescod, SunShot Initiative, U.S. Dept. of Energy (USA), ManTech International Corp. (United States)

Program Committee: Harry A. Atwater Jr., California Institute of Technology (USA); Noel C. Giebink, The Pennsylvania State Univ.; Raymond K. Kostuk, The Univ. of Arizona (USA)

Concentrating Photovoltaics (CPV) and Concentrating Solar Power (CSP) are two areas of solar energy research and development (R&D) that are rapidly evolving and attracting a high level of interest and innovation. These technologies use lenses or mirrors to concentrate sunlight from a large area onto small high-efficiency solar cells or thermal receivers.

CPV, compared to non-concentrating photovoltaics, allows the area of the solar cells to be reduced by the concentration ratio, offering a significant reduction in the cost of the photovoltaic system for which the solar cell is one of the most expensive components. The system design of CPV is highly dependent on the concentration ratio. High-concentration systems usually incorporate high-efficiency multijunction solar cells and track the sun, typically on a 2-axis tracker. The use of a tracker usually makes high-concentration CPV primarily a high-concentration system for which the high temperature operation (heat transfer fluid exit temperature ≥ 650°C) and high thermal efficiency ensures to 90%.

Non-imaging approaches to collection and their viable coupling with receivers that meet the optical and thermal requirements above.

TOPICS OF GENERAL INTEREST IN CPV AND CSP:

- Conclusions, analysis, and methods of analysis with regards to real world performance data of concentrator systems and power plants
- Manufacturability of advanced optics for low and high concentration
- Optical losses including illumination non-uniformity, chromatic aberrations, and reliability issues
- Materials development and design of primary and secondary optics
- Development, modeling, and reliability of solar cell receiver (including cell technology, mounting and superconducting bonding, heat sinking, and thermal management)
- Balance of systems (BOS) development and integration

To help reach these goals, this conference on “High and Low Concentrator Systems for Solar Energy Applications” focuses on increased efficiency/ performance, reduced manufacturing cost per unit area, lessons learned and analysis of real world performance data, and verified reliability for both CPV and CSP systems. These targets present many challenges and opportunities to researchers from academia, national laboratories and industry alike. This conference aims to showcase the latest developments and research solutions to enable CPV and CSP to achieve the cost, efficiency and performance goals. Authors are invited to contribute technical papers on research advances and innovative solutions toward these technical targets, to be considered for oral presentation and publication in the proceedings volume.

• novel cost-effective receiver materials and selective coatings enabling reliable high-temperature operation (heat transfer fluid exit temperature ≥ 650°C) and high thermal efficiencies ≥ 90%.

• Non-imaging approaches to collection and their viable coupling with receivers that meet the optical and thermal requirements above.

For readers who require lower concentration ratios and have access to high-quality optics, concentrating solar collectors promise some of the highest conversion efficiencies for solar energy, while maintaining sufficient flux. Potential technologies include: high-quality optics, ultra-low-cost collectors, material-efficient structures, snap-in-place facets, lenses/membranes, GRIN, waveguides, collector pods, passive tracking, fluidics, photo-responsive materials, etc.
Solar Hydrogen and Nanotechnology X (OP202)

Conference Chair: Shaohua Shen, Xi’an Jiaotong Univ. (China)

Program Committee: Hironori Arakawa, Tokyo Univ. of Science (Japan); Jan Augustynski, Univ. of Warsaw (Poland); Michael Grätzel, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Jinhua Guo, Lawrence Berkeley National Lab. (USA); Hicham Idriss, SABIC (Saudi Arabia); Yosuke Kanai, The Univ. of North Carolina at Chapel Hill (USA); Claude Levy-Clement, Ctr. National de la Recherche Scientifique (France); Sanjay Mathur, Univ. zu Köln (Germany); Frank E. Osterloh, Univ. of California, Davis (USA); David Prendergast, Lawrence Berkeley National Lab. (USA); Yasuhiro Tachibana, RMIT Univ. (Australia); John A. Turner, National Renewable Energy Lab. (USA); Lionel Vayssieres, Xi’an Jiaotong Univ. (China); Hei Wang, National Renewable Energy Lab. (USA); Gunnar Westin, Uppsala Univ. (Sweden); Upul Wijayantha, Loughborough Univ. (United Kingdom); Univ. of California, Santa Cruz (USA)

The aim of this symposium is to offer a forum of discussion for scientists, engineers, and industrials involved in photoelectrochemical systems and nanotechnology for solar generation of hydrogen (and other renewable fuels). The technical program will address the current status and prospects of R&D activities, major achievements and latest performances, technological limitations and crucial remaining challenges, latest advances in fundamental understanding and development in semiconductor nanostructures, devices fabrication, modeling, simulation and characterization techniques, as well as assessing and establishing the role and contribution of solar hydrogen. Interested individuals from academia, national laboratories, and industries are kindly invited to contribute to this conference by submitting their abstract on the following relevant topics:

- emerging photocatalysts for artificial photosynthesis and solar water splitting
- physics and chemistry of semiconductor homo/hetero-junctions
- latest advances in synthetic techniques for large scale fabrication of photocatalysts
- new approaches to bandgap profiling and engineering
- fundamentals of hydrogen generation via photo- and electrochemical water splitting
- new devices, methods, and apparatus for solar hydrogen generation
- modeling and simulation of oxidation/reduction reactions at semiconductor surfaces
- electronic structure and energetics of photocatalyst (hetero)nanostructures
- surface and interface properties of photocatalysts/electrolyte junctions
- optical, chemical, and physical properties of photoelectrodes
- charge generation and transfer dynamics on photocatalysts and semiconductors
- corrosion, photo-corrosion and long term stability of semiconductors
- hydrogen generation via solar thermal (chemical) and photo-biological systems
- sustainable photocatalytic production of fuels
- national and international solar hydrogen energy systems, projects, and networks
- social, educational, environmental, and economic aspects of solar hydrogen.

Journal of Photonics for Energy
Zakya H. Kafafi, Editor-in-Chief

Authors are invited to submit an original manuscript to the Journal of Photonics for Energy, which is now covered by all major indexes and Journal Citation Reports.

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The Journal of Photonics for Energy is an online journal focusing on the applications of photonics for renewable energy harvesting, conversion, storage, distribution, monitoring, consumption, and efficient usage.
Thin Films for Solar and Energy Technology VII (OP203)

Conference Chairs: Louay A. Eldada, Quanergy Systems, Inc. (USA); Michael J. Heben, The Univ. of Toledo (USA)

Program Committee: Bulet Basol, EncoreSolar, Inc. (USA); Howard M. Branz, National Renewable Energy Lab. (USA); Paola Delli Veneri, ENEA (Italy); David S. Ginley, National Renewable Energy Lab. (USA); Ivan Gordon, IMEC (Belgium); William N. Shaferman, Univ. of Delaware (USA); Ayodhya N. Tiwari, EMPA (Switzerland)

With continued efficiency advancements, thin film photovoltaics (TF PV) are a compelling alternative to conventional crystalline silicon PV as they are not affected by crystalline silicon supply fluctuations, they have significantly reduced cost with low material usage, and they have the potential for further cost improvements throughout the value chain. Furthermore, TF PV can use high-performing materials that deliver high energy output per peak watt of panel rating. In addition, TF PV can be applied to a variety of rigid and flexible substrates for a variety of applications, as well as offer superior aesthetics. Papers are solicited in the areas of:

THIN FILM AND ADVANCED PV ABSORBER MATERIALS
- amorphous Si, microcrystalline Si, nanocrystalline Si, thin film poly-Si, and film crystal silicon PV
- copper indium gallium selenide (CIGS)
- cadmium telluride (CdTe)
- dye-sensitized solar cells (DSSC)
- organic PV (OPV)
- gallium arsenide (GaAs)
- novel materials (e.g., CZTS, Zn3P2).

THIN FILM DEPOSITION
- large area plasma processing
- linear sources (evaporation, sputtering, other)
- non-vacuum techniques
- monitoring and control.

WINDOW AND CONTACT MATERIAlS AND RELATED FORMATION
- conventional and alternative buffer layers
- transparent conductive oxides (incl. doping)
- high-performance doped layers
- metal contacts.

ADVANCED THIN FILM PV MATERIALS
- micro- and nanostructured PV materials
- nanomaterial suspension PV precursors
- metalorganic solution TF precursors
- nanotubes in PV.

LIGHT MANAGEMENT
- texturing and characterization
- light trapping
- antireflection layers (external and internal)
- optical modeling.

DEVICES AND PROPERTIES OF TF PV (EXPERIMENT AND/OR THEORY)
- novel device structures
- tandem cells
- theory and analysis of structures (e.g., influence of grain boundaries).

THIN FILM PV CIRCUITS
- circuit design, modeling, and simulation
- scribing (laser, mechanical)
- interconnects and grids
- PV integrated circuits.

THIN FILM PV TEST AND CHARACTERIZATION
- microstructure characterization
- electrically active defects and impurities
- light soaking
- novel characterization techniques.

ASSEMBLY AND PACKAGING OF TF PV MODULES
- edge deletion
- encapsulation
- sealing
- junction box attachment
- novel packaging techniques.

DEPLOYMENT OF TF PV CELLS, MODULES, AND SYSTEMS
- module design, modeling, and simulation
- system design, modeling, and simulation
- advanced manufacturing processes
- qualification and reliability testing
- standardization of PV modules
- array issues (mismatch, BOS cost, monitoring)
- energy delivery, rating, and payback time
- system performance and lifetime.

THIN FILM PV APPLICATIONS AND RELATED REQUIREMENTS
- thin film PV for solar farms
- thin film PV for industrial installations
- thin film PV for residential applications
- thin film PV for consumer electronic applications
- building-integrated PV (BIPV): considerations including geometries, colors, materials, transparencies, innovations in lighting, dynamic behavior, and ease of assembly, service, and replacement
- space applications
- new applications.

APPLICATION OF THIN FILMS IN OTHER ENERGY CONVERSION OR STORAGE TECHNOLOGIES
- thin and nanoﬁlms for batteries
- thin and nanoﬁlms for supercapacitors.

Refinement of existing schemes as well as new approaches and techniques are within the scope of this call.
Next Generation Technologies for Solar Energy Conversion VI (OP205)

Conference Chairs: Oleg V. Sulima, GE Global Research (USA); Gavin Conibeer, The Univ. of New South Wales (Australia)

Program Committee: Amanda J. Chatten, Imperial College London (United Kingdom); Andrew J. Ferguson, National Renewable Energy Lab. (USA); Alberto Salleo, Stanford Univ. (USA); Sean E. Shaheen, Univ. of Colorado at Boulder (USA); Wilfried G. J. H. M. van Sark, Utrecht Univ. (Netherlands); Xianfan Xu, Purdue Univ. (USA)

The scope of the conference will cover the following areas:
- bulk nanostructured and nanocomposite solar cells (organic, inorganic and hybrid)
- quantum well solar cells
- nanowire and nanotube-based solar cells
- quantum dot solar cells
- nanoplasmonic structures for solar cells
- nanostructures for light management and subwavelength optical phenomena
- advanced conversion mechanisms employed in the above structures, such as tandem structures, intermediate bands, hot carrier effects, and multi-exciton generation
- spectrum conversion mechanisms such as up- and down conversion
- concentrators employing advanced photonics and nanostructures
- novel materials and concepts for solar energy conversion.

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Reliability of Photovoltaic Cells, Modules, Components, and Systems VIII (OP206)

Conference Chairs: Neelkanth G. Dhere, Univ. of Central Florida (USA)
Conference Co-Chairs: John H. Wohlgemuth, National Renewable Energy Lab. (USA); Rebecca Jones-Albertus, U.S. Dept. of Energy (USA)
Program Committee: David S. Albin, National Renewable Energy Lab. (USA); Glenn Alers, Univ. of California, Santa Cruz (USA); Ward I. Bower, Sandia National Labs. (USA); Leila R. O. Cruz, Instituto Militar de Engenharia (Brazil); Takuya Doi, National Institute of Advanced Industrial Science and Technology (Japan); Fernando Fabero, Ctr. de Investigaciones Energéticas y Medioambientales y Tecnológicas (Spain); Vivek S. Gade, Jabil Circuit, Inc. (USA); William J. Gambogi Jr., DuPont (USA); Werner Herrmann, TÜV Rheinland Group (Germany); Stephen J. Hogan, Spire Corp. (USA); Aravinda Kar, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Michael Köhl, Fraunhofer-Institut für Solare Energiesysteme (Germany); Ralf Leutz, Concentrator Optics GmbH (Germany); Xavier Mathew, Ctr. de Investigación en Energía (Mexico); Robert McConnell, Arzon Solar, LLC (USA); Yoichi Murakami, Japan Electrical Safety & Environment Technology Labs. (Japan); F. J. John Pern, Sunshine Sci-Tech LLC (USA); Laure-Emmanuelle Perret-Aebi, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Shirish Pethe, Applied Materials, Inc. (USA); Marianne Rodgers, Univ. of Central Florida (USA); Ivan Sinicco, Oerlikon Solar Ltd. (Switzerland); Oleg V. Sulima, GE Global Research (USA); Bolko von Roedern, von Roedern & Associates LLC (USA)

This conference is building on previous successful annual conferences. It centers on the science and technology of reliability of photovoltaic (PV) cells, modules, components, and systems with emphasis on attaining a long service lifetime and providing a basis for product warranties. The aim of this meeting is to bring together material scientists, chemists, physicists, engineers, and technologists to discuss and review PV module and system reliability. This year, the scope includes fuel cells, batteries, and other storage options. Papers are also being solicited in the area of smart grids as they relate to PV.

The scope of the conference will cover the reliability of photovoltaic cells and modules, encapsulants, front and back sheets, transparent conductive oxides, non-destructive analytical tools such as optical spectroscopy (reflectance/transmittance, Raman, FTIR, fluorescence, microscopy), electrical testing (I-V, impedance spectroscopy), destructive analysis for assessment of thermal properties, chemical composition, permeation and diffusion, mechanical properties, modern imaging methods (like electroluminescence, photoluminescence and thermography), accelerated stress testing, degradation modes and mechanisms, global distribution of degradation factors based on satellite weather data and other sources, quality assurance, standards, lifetime predictions, concentrator optics and receivers, smart grids, and BOS components such as inverters, connectors and fuses.

- photovoltaic cells and modules
- encapsulants, front and back sheets
- nondestructive and destructive analytical tools
- modern imaging methods
- PV system field experience
- field degradation and correlation with accelerated stress testing
- quality assurance, standards, modeling and lifetime predictions
- laser processing of energy materials
- smart grids, BOS components such as inverters, connectors, fuses
- concentrator optics and receivers.

IMPORTANT DATES

Abstracts Due: 26 JANUARY 2015

Author Notification: 6 APRIL 2015
The contact author will be notified of abstract acceptance by email.

Manuscript Due Date: 13 JULY 2015

Please Note: Submissions imply the intent of at least one author to register, attend the symposium, present the paper as scheduled, where it is an oral or poster presentation, and submit a full manuscript by the deadline.
Organic Photovoltaics XVI (OP213)

Conference Chairs: Zakya H. Kafafi, Lehigh Univ. (USA)

Conference Co-Chairs: Paul A. Lane, U.S. Naval Research Lab. (USA); Ifor D. W. Samuel, Univ. of St. Andrews (United Kingdom)

Program Committee: Natalie Banerji, Univ. de Fribourg (Switzerland); Pierre M. Beaujuge, King Abdullah Univ. of Science and Technology (Saudi Arabia); Christoph J. Brabec, Friedrich-Alexander-Univers. Erlangen-Nürnberg (Germany); Paul L. Burn, The Univ. of Queensland (Australia); Antonio F. Facchetti, Polym. Corp. (USA); René A. J. Janssen, Technische Univ. Eindhoven (Netherlands); Bernard Kippelen, Georgia Institute of Technology (USA); David G. Lidzey, The Univ. of Sheffield (United Kingdom); Thuc-Quyen Nguyen, Univ. of California, Santa Barbara (USA); Ana F. Nogueira, Univ. of Campinas (Brazil); Dana C. Olson, National Renewable Energy Lab. (USA); Barry P. Rand, Princeton Univ. (USA); Sean E. Shaheen, Univ. of Colorado at Boulder (USA); Natalie Stingelin, Imperial College London (United Kingdom); He Yan, Hong Kong Univ. of Science and Technology (Hong Kong, China); Yang Yang, Univ. of California, Los Angeles (USA)

This conference celebrated its 15th anniversary in 2014 and will be expanding its scope in 2015. The science and technology of next-generation organic photovoltaics (OPVs) and hybrid organic/inorganic photovoltaics (HOPVs) will be the subject of presentations and manuscripts submitted for publication in its proceedings volume. The focus is still on high-performance light-harvesting and carrier transporting materials, highly efficient and stable OPVs and HOPVs, device physics including interfaces, film structure (morphology), photophysics of carrier generation, and transport. The conference will also cover new techniques for fabrication, encapsulation, and printing of solar cells on large-area flexible substrates. The aim of this meeting is to bring together scientists, engineers, and technologists from multiple disciplines to report on and discuss the fundamental issues that affect device operation, including efficiency and long-term stability. The “state-of-the-art” performance of OPVs and HOPVs, and next-generation solar cells, and their applications in future technologies will be the main core of this conference.

The scope of the conference will cover but is not limited to the following areas:

- molecular, macromolecular, and polymeric OPVs
- hybrid organic/inorganic photovoltaics HOPVs
- perovskite-based solar cells
- solid-state dye-sensitized solar cells
- tandem and multi-absorber solar cells
- plasmonic and nanophotonic structures
- light manipulation/management approaches
- new hole transport materials
- new electron transport materials
- new electrode materials and nanostructures
- new flexible substrate materials
- physics of exciton diffusion, charge carrier transport, and combination
- organic/inorganic interfaces in OPVs
- film structure and morphology in OPVs
- novel contact (e.g. metal oxide) layers and nanostructures
- new techniques for fabrication, encapsulation, and printing of solar cells
- large-area processing and fabrication of solar modules
- stability, lifetime, and reliability of modules
- future prospects for organic and hybrid organic-inorganic solar cell technology

HIGHLIGHTS:

- Keynote Speaker: Steve Forrest, Univ. of Michigan, “To live and let die: The role of excitons in the life of organic devices”
- A special session on Hybrid Organic-Inorganic Photovoltaics (HOPVs)
- A special session on Perovskite-based Solar Cells
- A special session on Light management, Nanophotonics and Plasmonics in OPVs
- A joint session with Physical Chemistry of Interfaces and Nanomaterials

MANUSCRIPTS FOR THE CONFERENCE PROCEEDINGS WILL BE PEER-REVIEWED.

BEST STUDENT PAPER AWARDS

Awards will be given to the three best student papers in the Symposium on Organic Photonics + Electronics. The papers will be peer-reviewed and judged on their scientific merit, their technical and broader impact, and their overall quality by a committee of expert scientists in the field. The three winners will be announced and presented with their awards during the plenary session of the Symposium on Organic Photonics + Electronics. Self-nominate when you submit your abstract; see requirements.
Nonimaging Optics: Efficient Design for Illumination and Solar Concentration XII (OP221)

Conference Chairs: Roland Winston, Univ. of California, Merced (USA); Jeffrey M. Gordon, Ben-Gurion Univ. of the Negev (Israel)
Program Committee: Pablo Benitez, Univ. Politécnica de Madrid (Spain), Light Prescriptions Innovators LLC (United States); William J. Cassarly, Synopsys, Inc. (USA); Daniel Feuermann, Ben-Gurion Univ. of the Negev (Israel); Juan Carlos Miñano, Univ. Politécnica de Madrid (Spain), Light Prescriptions Innovators LLC (United States); Narkis E. Shatz, SAIC (USA)

Many important optical subsystems are concerned with power transfer and brightness rather than with image fidelity. Nonimaging optics is a design approach that departs from the methods of traditional optical design to develop techniques for maximizing the collecting power of concentrator and illuminator systems.

Nonimaging devices substantially outperform conventional imaging lenses and mirrors in these applications, approaching the theoretical (thermodynamic) limit. Nonimaging design methods usually involve solving ordinary or partial differential equations, calculating the flow lines of the ray bundles, coupling the edge rays of extended sources and targets or optimizing a multi-parameter merit function computed by ray-tracing techniques. While geometrically based, the design fundamentals have been extended to the diffraction limited and even sub-wavelength domain. Therefore applicability exists in near-field optical microscopy and nanometer scale optics.

This conference will address the theory of nonimaging optics and its application to the design and experimental realization of illumination and concentration systems, tailored freeform optics, display backlighting, condenser optics, high-flux solar and infrared concentration, daylighting, LED optical systems, laser pumping, and luminaires.

The revival of considerable work in solar energy concentration for both photovoltaic and thermal applications, much of which includes nonimaging optics, prompts re-incorporating these fields into this conference.

The use of nonimaging optics promises higher efficiency, relaxed physical tolerances, improved optical uniformity, and reduced manufacturing costs. We encourage submissions ranging from fundamentals to critical design issues and practical applications.

Paper submissions are also solicited in the following and related areas:
- radiative transfer near the étendue limit
- concentrator optics
- illumination and irradiation optics
- solar photovoltaic and solar thermal concentration
- fiber-optic and light-pipe optical systems
- radiometry
- daylighting
- characterization of light-transfer devices
- freeform optics
- optical furnaces and radiative heating
- infrared detection
- LED applications
- laser pumping
- condenser optics.

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REGISTRATION
SPIE Optics + Photonics registration will be available April 2015.
All participants, including invited speakers, contribut ed speakers, session chairs, co-chairs, and committee members, must pay a registration fee. Authors, coauthors, program committee members, and session chairs are accorded a reduced symposium registration fee.
Fee information for conferences, courses, a registration form, and technical and general information will be available on the SPIE website in April 2015.

HOTEL INFORMATION
Opening of the hotel reservation process for SPIE Optics + Photonics is scheduled for April 2015. SPIE will arrange special discounted hotel rates for SPIE conference attendees.
The website will be kept current with any updates.

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- Abstracts should contain enough detail to clearly convey the approach and the results of the research.
- Commercial papers, papers with no new research/development content, and papers where supporting data or a technical description cannot be given for proprietary reasons will not be accepted for presentation in this conference.
- Please do not submit the same, or similar, abstracts to multiple conferences.

**REVIEW, NOTIFICATION, AND PROGRAM PLACEMENT INFORMATION**
- To ensure a high-quality conference, all submissions will be assessed by the Conference Chair/Editor for technical merit and suitability of content.
- Conference Chair/Editors reserve the right to reject for presentation any paper that does not meet content or presentation expectations.
- The contact author will receive notification of acceptance and presentation details by e-mail the week of 6 April 2015.
- Final placement in an oral or poster session is subject to the Chairs’ discretion.

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—Anthony Pinder, President, Mindrum Precision Inc.

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Photovoltaics, thin film solar technology, concentrators, reliability, solar hydrogen, next generation cell technology

OPTICAL ENGINEERING + APPLICATIONS
Optical design and engineering, optomechanics and optical fabrication, photonic devices and applications, X-ray, gamma-ray, and particle technologies, image and signal processing, astronomical optics and instrumentation, remote sensing, space optical systems