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**GREEN PHOTONICS**

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Metamaterials: Fundamentals and Applications IV (OP101)

Conference Chairs: Allan D. Boardman, Univ. of Salford (United Kingdom); Nader Engheta, Univ. of Pennsylvania (United States); Mikhail A. Noginov, Norfolk State Univ. (United States); Nikolay I. Zheludev, Univ. of Southampton (United Kingdom)

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The Metamaterials conference will be devoted to the growing field of artificial functional media structured at the scale smaller than the wavelength of external stimuli. Papers on electromagnetic, acoustic, phononic and thermal metamaterials for free-space and waveguide applications will be considered. Topics include but are not limited to:

- metamaterials for controlling dispersion
- metamaterials and transformation optics
- nonlinear metamaterials
- switchable metamaterials
- metamaterials and gain
- quantum metamaterials
- sensor metamaterials and environmental aspects of metamaterials research
- modeling physical phenomena with metamaterials

Critical Dates

Abstract Due Date: 7 February 2011

Author Notification: The contact author will be notified of abstract acceptances by email no later than 18 April 2011.

Manuscript Due Date: 18 July 2011

Please Note: Submissions imply the intent of at least one author to register, attend the symposium, present the paper as scheduled, whether it is an oral or poster presentation, and submit a full-length manuscript by the deadline.
Nanoscale systems have peculiar optical properties, deriving from confinement in one or more dimensions to the nanometer scale, efficient energy and charge transfer over nanoscale distances, and enhanced role of interfaces. As nanophotonic properties can be finely tailored by controlling the dimensions and bulk or surface chemistry, fabrication issues are central to the emerging applications. On the other hand, the continuous technological improvement opens the way to novel nanodevices, which exploit interaction phenomena between electromagnetic waves and materials at the forefront of scientific knowledge, ranging from superconductivity to quantum interference.

Further opportunities are presented by hybrid materials, e.g. nanostructured inorganic materials combined with organic molecules or polymers. Such hybrids can exhibit properties or combinations of properties impossible for conventional materials. Efforts to combine the advantages and to eliminate the shortcomings of vastly different materials, such as inorganic semiconductors, polymers, and biological materials, include studies of nanoparticles with chemically functionalized surfaces embedded in various matrices.

Nanophotonic processes are also exhibited in many other biological and designed biomimetic materials. A better understanding and control of all these systems and the optical processes they support will speed the delivery of new applications, particularly in the sensor area.

The objective of this conference is to convene from industry, academia, government, and other research organizations, scientists and researchers interested in the advances of nanophotonics and the optical applications of nanomaterials, to discuss developments in the processing, characterization, and simulation of nanomaterials and systems for novel photonic applications. Systems of interest will include semiconductor single crystals, hybrids and composite materials, and polymers, and coverage will range from fundamental physics to applied research and technology. The conference is oriented towards applications including optoelectronics, photovoltaics, light-emitting devices, energy harvesting materials, sensing and semiconductor characterization. Presentations on theory and fundamental principles are also welcome.

Papers are solicited in the following and related areas:

- fundamental research on the optical properties of nanocrystals
- nanoscale structure, optical property determination, and their relationship
- nanocrystalline surface and interface optics
- nanofabrication, processing, templates, and device design
- optical and optoelectronic materials based on semiconductor and other nanocrystals
- quantum dots and quantum wells
- optical, magnetic and transport properties of superconducting nanostructures
- organic and hybrid materials for nanophotonics
- optical nanosensors, functionalized nanoparticles, and detectors
- multifunctional nanocomposite optical components
- macroscopic systems exploiting nanostructured materials
- self-organized nanocrystals, nanodomains, and nanodroplets
- nanophotonic applications in biological, chemical, and environmental monitoring
- sol-gel optics
- nanotubes for solar applications
Artificially structured materials can enable unprecedented and dramatic control of electromagnetic energy, offering unique possibilities in light matter interaction. Incorporation of active components, such as gain or non-linear materials can enhance the functionality of these advanced photonic materials to a higher level. Structured materials with active components are most promising platforms opening up new possibilities in a wide range of applications including biological/chemical sensing, nanoscale thresholdless lasing, solid state lighting as well as chipscale optical computing. This vast potential for high impact applications has been a driving force in active photonic materials research. Current open directions include the fabrication and controlled introduction of active components (e.g. quantum dots) inside structured photonic materials, the characterization of dynamically tunable photonic devices, novel THz sources, as well as modeling and theoretical understanding of dynamic behavior of light in novel active photonic materials.

This conference aims to bring together scientists and engineers working in the emerging field of functional photonic materials, to compare methods and results, identify novel applications, and cross-fertilize among various application fields. Topics will cover functional photonic materials and devices ranging from THz to the ultraviolet regime with applications in different fields including but not limited to photonics, optoelectronics, chemical and biological sensing, solar cells etc.

Contributions from industry, government, academia, and other research organizations are solicited in areas including:

- theory and modeling of non-linear and/or gain photonic media
- novel non-linear optical phenomena, materials and devices
- advances in fabrication of photonic structures with active materials
- photonic structures for quantum information processing, cavity QED systems and compact low-threshold lasing
- fabrication of quantum dots and nanowires for active photonics
- dynamically tunable optical waveguides, Bragg gratings and PC fibers
- new second harmonic generation and optical rectification platforms-novel THz generation prototypes
- chemical sensors and biosensors based on active control of light
- photonic materials for extra-ordinary light harnessing in solar cells
- photonic bandgap optoelectronic devices
- magneto-photonic crystals and modulators
- tunable beam steering devices

Critical Dates

Abstract Due Date: 7 February 2011
Author Notification: The contact author will be notified of abstract acceptance by email no later than 18 April 2011.
Manuscript Due Date: 18 July 2011

Please Note: Submissions imply the intent of at least one author to register, attend the symposium, present the paper as scheduled, whether it is an oral or poster presentation, and submit a full-length manuscript by the deadline.
Plasmonics: Metallic Nanostructures and Their Optical Properties IX (OP104)

Conference Chair: Mark I. Stockman, Georgia State Univ. (United States)
Program Committee: Martin Aeschlimann, Technische Univ. Kaiserslautern (Germany); David J. Bergman, Tel Aviv Univ. (Israel); Harald W. Giessen, Univ. Stuttgart (Germany); Naomi J. Halas, Rice Univ. (United States); Martti Kauranen, Tampere Univ. of Technology (Finland); Satoshi Kawata, Osaka Univ. (Japan); Fritz Keilmann, Max-Planck-Institut für Quantenoptik (Germany); Dai-Sik Kim, Seoul National Univ. (Korea, Republic of); Aaron Lewis, The Hebrew Univ. of Jerusalem (Israel); Olivier J. F. Martin, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Peter J. Nordlander, Rice Univ. (United States); Lukas Novotny, Univ. of Rochester (United States); Motochi Ohtsu, The Univ. of Tokyo (Japan); John B. Pendry, Imperial College London (United Kingdom); Vahid Sandoghdar, Max-Planck Institute for Science of Light (Germany); George C. Schatz, Northwestern Univ. (United States); Tigran V. Shahbazyan, Jackson State Univ. (United States); Vladimir Shalaev, Purdue Univ. (United States); Gennady Shvets, The Univ. of Texas at Austin (United States); Din Ping Tsai, National Taiwan Univ. (Taiwan); Nikolay I. Zheludev, Univ. of Southampton (United Kingdom); Joseph Zyss, Ecole Normale Supérieure de Cachan (France)

The area of properties of metallic nanostructures and their near field properties and applications is currently undergoing an intense development. The structures and phenomena covered under this topic span broad multidisciplinary interests from fundamental physical properties to applications in nanoscale optics, physics, chemistry, and biomedicine.

Papers are solicited in the following areas:

**Plasmonic structure nanofabrication**
- nanofabrication of metal, metal-semiconductor, and semiconductor plasmonic structures and devices
- chemical fabrication (bottom up)
- lithographic and nanopatterning fabrication (top down)
- materials fabrication
- biomimetic and bio-inspired fabrication

**Plasmonic phenomena and characterization, both steady-state and ultrafast**
- spectroscopies (spectral, time-domain, combined and multidimensional)
- local probes, nano-optics, and near field phenomena
- plasmon-assisted PEEM and energy-loss spectroscopy and visualization of plasmonic phenomena
- nonlinear and coherent optical properties
- plasmonic enhanced phenomena: SERS, SEIRA, nonlinear generation, luminescence, including molecules and nanostructured metals
- novel plasmonic systems such as graphene
- Fano resonances on nanoplasmonic systems
- active plasmonics

**Theory, simulation, and design across all subareas**
- plasmonic phenomena and effects
- ultrafast plasmonic effects and coherent control
- plasmon polaritons
- surface-enhanced Raman scattering
- plasmon-enhanced nonlinear phenomena
- luminescence enhancement and quenching
- quantum nanoplasmonics: QED effects, plasmon-assisted quantum information, spasing, and nanolasersing in plasmonic nanostructures
- microscopic theory of plasmonic properties
- plasmonic imaging, including probe ultramicroscopies, superlenses, and hyperlenses
- novel plasmonic systems such as graphene
- nanoplasmonic Fano resonances
- active plasmonics theory and design

**Metallic arrays and plasmonic band-gap materials**
- extraordinary transmission, diffractive and refractive phenomena
- plasmon polariton propagation in arrays of metal nanoparticles and metal nanoplasmonic waveguides
- low-frequency plasmons and their applications
- semiconductor plasmonics
- fundamental physics of left-handed (negative-refraction) plasmonic materials

**Plasmonics and plasmonic nanophotonics applications and devices**
- plasmonic sensors
- nanoplasmonic waveguides and resonators
- plasmonic nanocircuits; logical nanoscale elements
- plasmonic ultramicroscopies and nanoscopic spectroscopies
- plasmonics-assisted memory
- plasmonic transistors
- plasmonic nanolasers and spasers
- nanoplasmonic antennas and their applications in nanoscopes, photodetectors, solar cells, and lighting devices
- prospective graphene nanoplasmonic devices
- sensing based on Fano resonances
- modulators and switches based on active plasmonics
Optical Trapping and Optical Micromanipulation VIII
(OP105)

Conference Chairs: Kishan Dholakia, Univ. of St. Andrews (United Kingdom); Gabriel C. Spalding, Illinois Wesleyan Univ. (United States)

Program Committee: Javier Atencia, National Institute of Standards and Technology (United States); Clemens Bechinger, Univ. Stuttgart (Germany); Yann R. Chemla, Univ. of Illinois at Urbana-Champaign (United States); Arthur E. T. Chiou, National Yang-Ming Univ. (Taiwan); Roberto Di Leonardo, Univ. degli Studi di Roma La Sapienza (Italy); Jesper Glückstad, Technical Univ. of Denmark (Denmark); Min Gu, Swinburne Univ. of Technology (Australia); Sean J. Hart, U.S. Naval Research Lab. (United States); Carlos Lenz Cesar, Univ. Estadual de Campinas (Brazil); Carlos López-Mariscal, Univ. of California, Santa Cruz (United States); Masud Mansuripur, College of Optical Sciences, The Univ. of Arizona (United States); Jens-Christian D. Meiners, Univ. of Michigan (United States); H. Daniel Ou-Yang, Lehigh Univ. (United States); Thomas T. Perkins, Univ. of Colorado at Boulder (United States); Rubén Ramos-Garcia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Halina H. Rubinsztein-Dunlop, The Univ. of Queensland (Australia); Christoph F. Schmidt, Georg-August-Univ. Göttingen (Germany); Ming Hsien Wu, Hamamatsu Corp. (United States); Pavel Zemánek, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic)

This conference celebrates, quite generally, the legacy of Arthur Ashkin, whose early work on optical trapping has spawned enormous productivity and enhancement of fundamental knowledge across the sciences, highlighting our understanding of (nano-scale) molecular motors, unravelling the mechanics of DNA and cells, having great impact on studies of soft condensed matter and hydrodynamic interactions. Novel chemical synthesis is providing unusual and powerful systems for study with optical traps. Fundamental studies of the momentum of light offers tantalizing possibilities for rotational torque measurements and other studies in the near future.

Biological studies of single molecules have been extended as the range of clearly established optical force calibrations has now been extended down to the 20 fN range while optical torques have been calibrated down to 4 zepto-Newton-meters (i.e., 4 fN-microns), and new applications continue to appear, for example as optical trapping is fused with other microscopies (e.g., Raman). Integrating optical micromanipulation with microfluidics is a current ‘hot’ topic in the field. Particle dynamics on extended optical landscapes offer a uniquely valuable model thermodynamic system, and have been examined for studies of stochastic resonance, crystal nucleation, and optical binding among others.

Each year this conference draws a hundred presentations and, of course, a larger number of participants. Notably, it has sustained a truly international character. The proceedings of the conference contains a large collection of relevant papers, making a valuable contribution to the field:

Papers are solicited on (but not restricted to) the following areas:
• integrated optical traps in single molecule and polymer network studies
• enhanced sensitivity and resolution of optical force actuators
• optically initiated growth and rheology, cell and membrane mechanics
• statistical mechanics (e.g., brownian ratchets, molecular motors, phase transitions, fluctuation theorems)
• two-body, few-body and many-body interaction measurements
• near-field micromanipulation
• optical sorting / optical lab-on-a-chip / microfluidics

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Physical Chemistry of Interfaces and Nanomaterials X (OP106)

Conference Chair: Carlos Silva, Univ. de Montréal (Canada)

Co-chairs: Sergei Tretiak, Los Alamos National Lab. (United States); John B. Asbury, The Pennsylvania State Univ. (United States); Oleg V. Prezhdo, Univ. of Washington (United States)

Program Committee: Oliver L. A. Monti, The Univ. of Arizona (United States)

Interfaces play an essential role in many chemical processes, ranging from solar energy conversion to catalysis. Recent developments in nanomaterials highlight the importance of surfaces and interfaces in quantum confined systems. The detailed study of the physics at interfaces requires the development of experimental and theoretical techniques of ever increasing complexity: New forms of microscopy, non-linear spectroscopy and scanned-probe techniques continue to emerge in conjunction with sophisticated theoretical methods capable of treating correlated systems of increasing size and over timescales of fs to many ns.

The intent of this conference is to bring together an interdisciplinary group of scientists who study processes at interfaces and in nanomaterials. Sessions will be devoted to topics with an energy-related focus, catalysis at interfaces and nanostructures. Of primary interest are fundamental studies, although papers that deal with applications will also be welcome. Contributions are sought from researchers in academia, industry, and government laboratories.

Specific areas of interest include, but are not limited to:
- Development of unique probes of interfaces and nanomaterials
- Spectroscopy of single molecules and nanoparticles
- Interfacial charge and energy transfer in organic electronics and biomolecular systems
- Theory of electronic structure of interfaces and nanomaterials
- Modeling of charge transfer and relaxation dynamics in nanostructures
- Solar photoconversion on nanostructures and interfaces
- Energy and charge transport in nanostructures and interfaces
- Nano-enabled catalysis
- Role of defects in complex organic and inorganic materials
- Excitations at surfaces for catalysis

Biosensing and Nanomedicine (OP107)

Conference Chairs: Hooman Mohseni, Northwestern Univ. (United States); Manijeh Razeghi, Northwestern Univ. (United States)

Program Committee: Massoud H. Agahi, Harbor-UCLA Medical Ctr. (United States); Gert Cauwenberghs, Univ. of California, San Diego (United States); Philippe M. Fauchet, Univ. of Rochester (United States); David H. Gracias, The Johns Hopkins Univ. (United States); Kimberly S. Hamad-Schifferli, Massachusetts Institute of Technology (United States); James S. Humbert, Univ. of Maryland, College Park (United States); Giacomo Indiveri, ETH Zurich (Switzerland); Eric Lagally, The Univ. of British Columbia (Canada); Yu-Hwa Lo, Univ. of California, San Diego (United States); Ryan P. McClintock, Northwestern Univ. (United States); Omer G. Memis, Northwestern Univ. (United States); Masoud Panjehpour, Thompson Cancer Survival Ctr. (United States); Adam T. Woolley, Brigham Young Univ. (United States); John M. Zavada, National Science Foundation (United States)

There has been a tremendous progress in biosensor elements and systems recently for a wide range of commercial, medical, and homeland security applications. In parallel, nanomedicine has found tremendous applications. The robustness of multi-modal sensing schemes has led to a significant attention to integration of a plurality of different sensors into small, and preferably single-chip sensing micro-systems. The combination of nano-sensing and nanomedicine could eventually lead to a true Theranostics. A major purpose of this conference will be to bring together researchers and engineers who work on the different aspects of these intriguing areas, and thus to provide an interdisciplinary review of innovations in nanomedicine, biosensing, biomimetics, and biosensors, as well as theoretical and experimental tools that support and enable these innovations.

The conference includes, but is not limited to, the following topics:
- Nano-structured bio-sensing
- Nano-photonic and plasmonic bio-sensing
- Nano drug delivery
- Molecular imaging and therapy
- Bio-inspired components and systems
- Bio-inspired sensory processing
- Implantable electronics

Conference chairs are pursuing CME accreditation for this conference. Check spie.org/OP107 for the latest information.
Spintronics IV (OP108)

Conference Chairs: Henri-Jean M. Drouhin, Ecole Polytechnique (France); Jean-Eric Wegrowe, Ecole Polytechnique (France); Manijeh Razeghi, Northwestern Univ. (United States)

Program Committee: Jack Bass, Michigan State Univ. (United States); Vincent Cros, Unité Mixte de Physique CNRS/Thales (France); Michel I. Dyakonov, Univ. Montpellier 2 (France); Michael E. Flatté, The Univ. of Iowa (United States); Henri Jaffrès, Unité Mixte de Physique CNRS/Thales (France); Andrew D. Kent, New York Univ. (United States); Mathias Klaui, Univ. Konstanz (Germany); Yuri A. Mamaev, St. Petersburg State Polytechnical Univ. (Russian Federation); Ryan P. McClintock, Northwestern Univ. (United States); Laurens W. Molenkamp, Julius-Maximilians-Univ. Würzburg (Germany); Yoshichika Otani, RIKEN (Japan); Nitin Samarth, The Pennsylvania State Univ. (United States); Alain Schuhl, Commissariat à l’Énergie Atomique (France); Jing Shi, Univ. of California, Riverside (United States); Donald J. Silversmith, Defense Threat Reduction Agency (United States); Luc Thomas, IBM Almaden Research Ctr. (United States); Evgeny Tsymbal, Univ. of Nebraska-Lincoln (United States); Olaf M. J. van ‘t Erve, U.S. Naval Research Lab. (United States); Joerg Wunderlich, Hitachi Cambridge Lab. (United Kingdom)

For a few years, the spin degree of freedom has been directly used as an information support in nanometer-scale devices. Today applications mostly concern the huge market of hard-drive read heads, whereas tomorrow applications refer to permanent magnetic memories (MRAMs). Long term developments are presently being considered for spin-transfer devices, spin-based logic, or quantum computing. A new physics has emerged, making use of the fascinating developments of new materials.

The purpose of the conference is to provide a broad overview of the state-of-the-art and perspectives, bringing together experts from different communities: fundamental physics (experimental and theoretical), materials science and chemistry, biology, fabrication processes and industrial developments, etc. Contributions for this conference are encouraged in the following areas:

• semiconductor spin physics, quantum wells and quantum dots
• magnetic nanostructures and spin-injection
• current-induced magnetization reversal, micromagnetism
• new materials (oxides, organics, ...)
• new structures and applications (magnetoresistive devices, MRAMs, spin transistors, crystalline tunnel barriers, ...).

Critical Dates

Abstract Due Date: 7 February 2011

Author Notification: The contact author will be notified of abstract acceptance by email no later than 18 April 2011.

Manuscript Due Date: 18 July 2011

Please Note: Submissions imply the intent of at least one author to register, attend the symposium, present the paper as scheduled, whether it is an oral or poster presentation, and submit a full-length manuscript by the deadline.
As the scaling down of silicon-based devices is reaching physical and technological limits, other materials are actively being studied in order to keep the miniaturisation pace. Among these, single walled carbon nanotubes (SWNTs) have so far attracted a huge attention. SWNTs are one-dimensional molecular structures that can be synthesised routinely with diameters in the nanometer range. They exhibit unique electronic properties that make them highly promising for device fabrication beyond the CMOS era. Exceptional SWNT-based field-effect transistor (FET) characteristics have already been published, that outperform by far those of state-of-the-art Si MOSFETs. Optoelectronic devices (LEDs and photodetectors) have also been demonstrated.

However, major problems are slowing down the development of nanotube electronics and optoelectronics, such as the non-uniformity of the SWNT material after synthesis (mixtures of metallic and semiconductor specimens are invariably obtained), the difficulty of making ohmic contacts (particularly to SWNTs with diameters of 1nm or below which are technologically relevant) and above all the formidable challenge of organising SWNTs in dense arrays, compatible with modern ULSI device densities. Actually, in order to circumvent the organisation problem, materials and device scientists are more and more using nanotube mats (2D random networks) for device fabrication, with of course degraded characteristics. Such devices can be used for chemical or biological applications. On the other hand, multi walled carbon nanotubes (MWNTs) have extensively been studied for field emission applications over the past few years, and field-emitted current values around 100 μA/tube are now routinely reached in cold cathodes. Also, electron emission can be modulated at microwave frequencies, which opens up new prospects for electron tubes.

Recently, graphene (an unrolled, flat carbon nanotube) and few-layer graphene materials have appeared and are thoroughly studied for transistor (in the form of narrow ribbons) and conductive thin film applications. The discovery of graphene in 2004 has been rewarded by the 2010 Nobel Prize in Physics. One of the interests of graphene, a zero gap semiconductor, is the fact that carriers exhibit very high mobilities, even at room temperature. Moreover, graphene can be processed and “carved” using the well know paradigm and tools developed by the semiconductor industry, which is a huge advantage over CNTs.
Optofluidics II (OP110)

Conference Chairs: Javier Atencia, National Institute of Standards and Technology (United States); Carlos López-Mariscal, U.S. Naval Research Lab. (United States)

Program Committee: Daniel R. Burnham, Univ. of St. Andrews (United Kingdom); David W. Marr, Colorado School of Mines (United States); Graham F. Milne, Univ. of Washington (United States); Roberto Rusconi, Harvard Univ. (United States); Alex V. Terray, U.S. Naval Research Lab. (United States); Andreas E. Vasdekis, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Changhuei Yang, California Institute of Technology (United States)

Optofluidics refers to a class of adaptive optical circuits that integrate optical and fluidic devices. The introduction of liquids in the optical structure enables flexible fine-tuning and even reconfiguration of circuits such that they may perform tasks optimally in a changing environment. This conference will address all types of optical systems that are constructed using fluids. Specific topics to be covered include but are not limited to:

- optical sorting
- micro and nano-scale fluidic transport using optical techniques
- optical and electrophoretic adaptive structures
- integration of optical manipulation into microfluidic devices
- optical devices using colloidal systems or nanoparticle assemblies
- nanofluidics for nanophotonic devices (e.g. photonic crystals)
- integration of optical fibers with fluids
- optofluidic waveguides and lasers
- electrowetting based optical devices
- adaptive optics using fluids
- optofluidic sensing techniques

The conference will feature contributed oral and poster papers and a series of critical review and keynote lectures invited at the discretion of the program committee. The meeting will begin with an Inaugural Lecture on one of the key subtopics of the conference (to be announced). Original unpublished contributions are solicited for oral and poster presentations. All abstracts will be reviewed for competitive selection with respect to novelty and scientific quality.

Critical Dates

Abstract Due Date: 7 February 2011

Author Notification: The contact author will be notified of abstract acceptance by email no later than 18 April 2011.

Manuscript Due Date: 18 July 2011

Please Note: Submissions imply the intent of at least one author to register, attend the symposium, present the paper as scheduled, whether it is an oral or poster presentation, and submit a full-length manuscript by the deadline.
NanoEngineering

Nanoengineering: Fabrication, Properties, Optics, and Devices VIII (OP111)

Conference Chairs: Elizabeth A. Dobisz, Hitachi Global Storage Technologies, Inc. (United States); Louay A. Eldada, HelioVolt Corp. (United States)

Program Committee: Andre-Jean Attias, Univ. Pierre et Marie Curie (France); Gregory J. Exarhos, Pacific Northwest National Lab. (United States); Cynthia Hanson, Space and Naval Warfare Systems Ctr. Pacific (United States); Ghassan E. Jabbour, Arizona State Univ. (United States); Robert Magnusson, The Univ. of Texas at Arlington (United States); Jun Tanida, Osaka Univ. (Japan); Richard Tiberio, Stanford Univ. (United States); Chee Wei Wong, Columbia Univ. (United States)

Over the past couple of years, mature technologies such as logic, memory, and data storage have been rapidly thrust into the sub-100 nm regime. Existing processes of record have been extended well beyond the ranges deemed feasible or reliable and paradigm changes in design and process are emerging. New technologies such as sensors, systems on a chip, biotechnology, photonics, photovoltaics, molecular electronics and optics are emerging. The upcoming synthesized nanomaterials, nanotubes and nanowires, offer extremely attractive physical features and great opportunities. Continuing improvements in the design and fabrication of miniature optical elements have driven the development of micro/nano/quantum-scale optical and optoelectronic elements in ever more diverse application areas.

- Application areas include telecommunications, datacommunications, consumer electronics, microwave photonics, optical computing, neural networks, optical storage, new forms of data storage, information display, optical imaging, printing, optical sensing, optical scanning, renewable energy harvest and storage, medical diagnosis, chemical/biological sensing, new nanomechanic applications, and new medical devices and prosthetic methods.

- The newly upcoming nanotechnologies present new opportunities and challenges in materials processing, device design and integration. Drivers for commercial deployment include functionality, space, performance, reliability, cost, as well as energy independence and climate change mitigation.

Papers are solicited in the areas of:

Innovative patterning and materials engineering nanolithography
- imprinting and embossing techniques
- fabrication, processing, and replication techniques
- directed self assembling techniques
- engineered nano- and micro-structured materials
- synthesis of nanotubes and nanowires

Innovative nanopositioning and feedback
- proximal probe manipulation techniques
- nanomotors and actuators
- nano-alignment techniques, tolerance
- tribology nanotechnologies

Devices and properties of nanostructures (experiment and/or theory)
- nanoelectronic and nanomagnetic devices and structures
- waveguiding nanodevices and nanostructures
- nano-MEMS devices and structures
- photovoltaic cells and structures
- biological devices and structures
- molecular devices and structures
- atomic devices and structures
- quantum devices and structures
- nanosensors
- nanotubes

Energy harvest and storage nanotechnologies
- nanostructured materials for efficient light trapping, photon absorption, charge generation, charge transport, and current collection in photovoltaic cells and modules
- nanocomposites, nano-inkcoatings, and nanolubricants for power-generating wind turbines
- nanotechnologies for secondary batteries and ultracapacitors, including powder-based, carbon-nanotube-based, and graphene-based electrodes

Nano- and micro- optics
- physics, theory, design, modeling, and numerical simulation of optical nano- and micro-structures
- diffractive and refractive micro-structures for beam shaping and manipulation
- photonic microcircuits in silica, polymer, silicon, compound semiconductors, ferroelectrics, magnetics, metals, and biomaterials
- 1D, 2D, and 3D photonic crystals
- quantum dots, wells, and wires
- guided-wave and free-space optical interconnects
- optical alignment, tolerance, and coupling
- characterization (optical, electrical, structural, etc.)
- integration with guided-wave systems
- integration with photonic devices including VCSELs, modulators, and detectors
- nano- and micro-optic-based optical components, modules, subsystems, and systems for communications, information processing, computing, storage, photovoltaic power generation, information display, imaging, printing, scanning, and sensing

Commercialization of nano- and micro-structure-based devices, modules, and systems
- manufacturing
- assembly
- packaging
- reliability
- qualification refinement of existing schemes as well as new approaches and alignment techniques and tolerance studies
- novel concepts are within the scope of this solicitation
Nanobiosystems: Processing, Characterization, and Applications IV (OP112)

Conference Chairs: Norihisa Kobayashi, Chiba Univ. (Japan); Fahima Ouchen, Air Force Research Lab. (United States); Ileana Rau, Polytechnical Univ. of Bucharest (Romania)

Program Committee: Carrie M. Bartsch, Air Force Research Lab. (United States); Liming Dai, Case Western Reserve Univ. (United States); Ananth Dodabalapur, The Univ. of Texas at Austin (United States); James G. Grote, Air Force Research Lab. (United States); Emily M. Heckman, Air Force Research Lab. (United States); Kuniharu Ijiro, Hokkaido Univ. (Japan); Jung-Il Jin, Korea Univ. (Korea, Republic of); François Kajzar, Univ. d’Angers (France); Sang Nyon Kim, Air Force Research Lab. (United States); Oksana Krupka, Univ. d’Angers (France); Charles Y. C. Lee, Air Force Office of Scientific Research (United States); Misoon Mah, Asian Office of Aerospace Research and Development (Japan); Naoya Ogata, Chitose Institute of Science and Technology (Japan); Bruce H. Robinson, Univ. of Washington (United States); Anna Samoc, The Australian National Univ. (Australia); Marek J. Samoc, Wroclaw Univ. of Technology (Poland); Niyazi S. Sariciftci, Johannes Kepler Univ. Linz (Austria); Kristi M. Singh, Air Force Research Lab. (United States); Andrew J. Steckl, Univ. of Cincinnati (United States); Morley O. Stone, Air Force Research Lab. (United States); Perry P. Yaney, Univ. of Dayton (United States)

The area known as biotronics or bioelectronics is an interdisciplinary research field that includes elements from biology, chemistry, engineering and the physical sciences and can be broadened further to include nanotechnology and nanoscience. The convergence of these fields has led to exciting developments in the integration of biomaterials and bioprocesses to photonic and electronic applications. These have included biomaterials to replace organic and inorganic materials in photonic or electronic devices and biomimetic devices to improve upon existing technologies. Such developments may go a step further to include novel devices and applications that take advantage of these interdisciplinary technologies.

The objective of this conference is to bring together researchers and experts from a variety of fields including biology, physics, chemistry, optics, photonics, nanotechnology, engineering and materials science, who have an interest in the exploitation of biological materials and designs in optical, photonic and electronic devices. Sessions will cover topics in bio-based and bio-derived materials and their application to photonics and electronic devices as well as bio-inspired and biomimetic technology.

Papers are solicited in, but not limited to, the following areas:

• biomaterials and devices for photonics and electronics applications including LEDs, LETs, lasers, optical storage, optical switches, modulating devices, electronic components, sensors and BioFETs
• biomaterials for information processing and information storage
• biomaterials for IR applications
• biopolymers
• DNA photonics
• nonlinear optical processes in bio-materials
• biologically synthesized nanomaterials
• bio-based sensors
• biomimetic and bio-inspired technology including biomimetic optical devices and biomimetic robotics.

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Nanostructured Thin Films IV (OP113)

Conference Chairs: Raúl J. Martin-Palma, Univ. Autónoma de Madrid (Spain); Yi-Jun Jen, National Taipei Univ. of Technology (Taiwan); Tom G. Mackay, The Univ. of Edinburgh (United Kingdom)

Program Committee: Hatice Altug, Boston Univ. (United States); Didier Felbacq, Univ. Montpellier 2 (France); Akhlesh Lakhtakia, The Pennsylvania State Univ. (United States); H. Angus Macleod, Thin Film Center, Inc. (United States); Olivier J. F. Martin, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Michael J. Sailor, Univ. of California, San Diego (United States); Motofumi Suzuki, Kyoto Univ. (Japan); Yiping Zhao, The Univ. of Georgia (United States)

Nanoscience and nanotechnology have attracted enormous research and public interest for just about two decades. These terms cover all aspects of the production of materials, devices and systems by manipulating matter at the nanoscale. Encompassing nanoscale science, engineering, and technology, nanotechnology involves imaging, measuring, modeling, and manipulating matter at this length scale.

Nanostructured thin films display unique phenomena, thus enabling the improvement of traditional applications or the development of novel applications. The fabrication, characterization, modeling, and manipulation of nanostructured thin films are essential to further scientific progress.

This conference welcomes contributions from industry, academia and government research organizations. Topics of interest cover any relevant aspects of nanostructured thin films, from modeling, fabrication, and characterization to practical applications.

Topics include, but are not limited to:
- Fabrication techniques
- Characterization
- Homogenization studies and modeling
- Hybrid nanostructures
- Multifunction at the nanoscale
- Plasmonics
- Organic and inorganic nanostructured thin films
- Carbon-based nanostructures
- Functional nanostructures
- Sculptured thin films
- Nanostructured porous thin films
- Sensing
- Functionalization of nanostructures
- Biomedical applications
- Bioinspired and biomimetic thin films
- Structural evolution

Confirmed Invited Speakers: Hatice Altug, Boston University; Daniel Gall, Rensselaer Polytechnic Institute; Krzysztof Kempa, Boston College; Akhlesh Lakhtakia, The Pennsylvania State Univ.; N. Asger Mortensen, Technical University of Denmark (Denmark); Carsten Rockstuhl, The Friedrich-Schiller Univ. of Jena (Germany); Joseph V. Ryan, Pacific Northwest National Laboratory; Olaf Stenzel, Fraunhofer-Institut für Angewandte Optik und Feinmechanik IOF (Germany); Olivier J.F. Martin, EPFL (Switzerland); Sidney J. L. Ribeiro, Univ. Estadual Paulista (Brazil)

The conference will comprise several invited talks, contributed talks and posters. Authors of selected papers from the conference will be invited to submit expanded papers to a Special Section of SPIE’s online Journal of Nanophotonics.

Awards will be presented for the Best Presentation and Best Student Presentation. Please refer to the conference website for additional information about the sponsors and awards.

Critical Dates

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7 February 2011

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Meeting the challenges arising from the tremendous developments in the rapidly increasing field of nanotechnology and the essential bridge from concept to real-world products posed by nanomanufacturing, advanced instrumentation metrology and standards have become extremely important to the success of that endeavor. Novel achievements in optics, semiconductors, and nanotechnologies altogether significantly enhance the demands for highly sensitive and efficient metrology tools. The requirements have also increased for rapid and thorough coverage of large functional areas. This includes the fast and area-covering measurement of properties such as nanoroughness, flatness and figure, thin film structure, and nano-particle contamination. Furthermore, for the development of nanostructured surfaces with specific functionalities, industry and interferometric techniques integration of these instruments, field and scanned microscopy, scatterometry, and interferometric techniques.

The multidisciplinary character of the conference will provide a forum to present and discuss newest developments of metrology techniques as well as industrial needs for new measurement equipment. The measurement principles include, e.g., scanning-probe microscopy, optical profilometry, light scattering, SEM-based metrology, ellipsometry, reflectometry, scanning microscopy, and interferometry. Integration of these instruments, Interoperability, and Information Management are also critical elements that must be considered for viable nanomanufacturing. Advanced instrumentation, metrology and standards will allow the physical dimensions, properties, functionality, and purity of the materials, processes, tools, systems, products, and emissions that will constitute nanomanufacturing to be measured and characterized. This will in turn enable production to be scalable, controllable, predictable, and repeatable to meet market needs. If a nano-product cannot be measured, it cannot be manufactured; additionally if that product cannot be made safely it also should not be manufactured.

The Advanced Instrumentation, Metrology, and Standards for Nanomanufacturing, Optics, and Semiconductors Conference will become the leading forum for the exchange of foundational information and discussion of instrumentation, metrology and standards which are needed components of nanomanufacturing. This conference welcomes original technical papers on these and other relevant topics. Criteria for abstract peer review and rating will include contribution to scientific understanding, relevance and interest to the nanomanufacturing community, and lack of advertisements. Submitted papers must concentrate on the underlying technologies and methods, not on product marketing. Consistent with the SPIE conference charter and goals, please, submit the technical papers in the technology areas listed below:

- nanomanufacturing methodologies
- metrology and inspection methodologies
- high resolution optics, including full-field, near-field and scanned microscopy, scatterometry, and interferometric techniques
- particle beam (electron, ion), including scanned microscopy and elemental analysis
- atomic force microscopy
- limits of metrology and inspection systems
- regional alliances/clusters for nanomanufacturing
- dimensional metrology for nanomanufacturing
- new metrology requirements for nanomanufacturing
- new instrumentation needed for nanomanufacturing
- characterization metrologies and novel measurement techniques
- process control, characterization, and yield enhancement
• process optimization, monitoring, and quality assurance and reliability
• integration, interoperability, and information management
• calibration for metrology tools linewidth, pitch standards, and reference materials
• estimation of total measurement error, including precision and accuracy
• tool matching
• reference measurement systems, traceability and metrology comparisons
• instrument resolution
• environmental, health and safety monitoring and metrology
• environmental contamination and its measurement
• focused ion beam for nanomanufacturing and metrology
• 3-D metrology
• measurement system modeling and simulation
• physics of the metrology processes, system-sample interaction
• modeling of systems and samples: characterization and model parameters
• predictive modeling: combining experimental and simulated data
• data analysis methods, library-based image analysis, and algorithms
• sampling strategies
• systems integration
• application of statistical data analysis methods in manufacturing
• process integration of image recording and transfer, etch, and deposition
• metrology and related functional testing through self-test in systems-on-a-chip
• characterization of nanostructured functional (e.g., superhydrophobic or hydrophilic) surfaces
• nanotopography and nanoroughness measurement and analysis
• thin film characterization
• CD metrology for semiconductor components
• calibration and standardization in optical metrology
• requirements and roadmaps for advanced characterization tools

SPECIAL “GREEN” MATERIALS AND METROLOGY SESSION
Dr. Nora Savage, Environmental Protection Agency (United States)

The optics and photonics industries are poised to be instrumental factors in the realization of environmental sustainability. Starting with the employment of benign materials in the research and production of novel devices enabled by the science to the development of innovative reclaim and recycling options for materials and devices that have reached the end of the product life cycle, optics and photonics have the potential to impact the way we devise, employ and dispose of/recycle products. As a result of the size and inter-disciplinary nature of these industries, efforts and activities by the members thereof toward protection of public health and the ecosystem can usher in an environmental consciousness within our society. In addition, the application of technological advances in these areas can transform conventional components and devices. The resultant novel products would have a more environmentally friendly design.

This session will provide information concerning novel photonic and optical devices and components that are processed using benign materials. The processes and devices showcased will inform the audience about potential methodologies and tools for developing such products. This session will also feature presentations concerning the advances in the field which result in the replacement of more toxic constituents and products with other “greener” constituents and products. Such products would include those that use less energy, require less water, and utilize fewer starting materials. Such devices and products would have increased durability and efficiency. Anticipated benefits to public health and the environment will be described.
Nanoepitaxy: Materials and Devices III (OP115)

Conference Chairs: Nobuhiko P. Kobayashi, Univ. of California, Santa Cruz (United States); A. Alec Talin, National Institute of Standards and Technology (United States); M. Saif Islam, Univ. of California, Davis (United States)

Program Committee: Kristine A. Bertness, National Institute of Standards and Technology (United States); Albert V. Davydov, National Institute of Standards and Technology (United States); Shadi A. Dayeh, Los Alamos National Lab. (United States); Supratik Guha, IBM Thomas J. Watson Research Ctr. (United States); Jung Han, Yale Univ. (United States); Chennumati Jagadish, The Australian National Univ. (Australia); Mutsumi Kimura, Ryukoku Univ. (Japan); Takhee Lee, Gwangju Institute of Science and Technology (Korea, Republic of); Marina S. Leite, California Institute of Technology (United States); Francois Leonard, Sandia National Labs., California (United States); Samuel S. Mao, Lawrence Berkeley National Lab. (United States); Sanjay Mathur, Univ. zu Köln (Germany); Samuel T. Picaux, Los Alamos National Lab. (United States); Sharka M. Prokes, U.S. Naval Research Lab. (United States); Zhifeng Ren, Boston College (United States); Atsuhiro Sawabe, Aoyama Gakuin Univ. (Japan); A. Fred Semendy, U.S. Army Research Lab. (United States); Loucas Tsakalakos, GE Global Research (United States); Emanuel Tutuc, The Univ. of Texas at Austin (United States); Lionel Vayssieres, National Institute for Materials Science (Japan); Deli Wang, Univ. of California, San Diego (United States); George T. Wang, Sandia National Labs. (United States)

Low-dimensional semiconductor structures with two or three of their dimensions at the nanometer scale are rich in fundamental issues and promise revolutionary new device concepts. Homo and heterogeneous synthesis of nanomaterials on lattice-matched and mismatched substrates have revealed a wealth of interesting properties and dramatic enhancements of magnetic, electrical, optical, and other properties. Devices fabricated from these nanoscale structures offer significantly improved photonic and electronic performance and, because of their small footprint, are candidates for device level integration with Si CMOS technology. For example, lattice strain, which strictly limits composition and thickness in 3D and 2D semiconductor heterostructures, can be significantly relaxed at the nanoscale thus permitting a wider range of materials and properties, and in some cases strain can be used as a tool to dictate the lateral dimensions and spatial ordering of epitaxial nanostructures. Furthermore, recently demonstrated branched heterostructures obtained by controlled surface nucleation can lead to novel interconnect and device concepts. To fulfill this tremendous potential many technological barriers however must still be overcome.

Controlled incorporation of impurities/doping in nanostructures is a formidable challenge. For example, in most metal-catalyzed VLS synthesis of self-assembled nanowires, both the source gas and doping molecules dissociate at the metal catalyst droplet, diffuse through or around the droplet, and then condense at the catalyst-substrate interface, eventually forming a solid. However, in some cases the dominant mechanism for dopant atom incorporation is through the nanowire surface and not at the catalyst growth interface. This tendency of doping the entire nanowire severely limits the realization of abrupt junctions and device designs crucial for many applications. Equally important are methods to form new device heterostructures with sharp interfaces and controlled designs. Thus, techniques to measure and control the composition and doping concentration in nanoscale structures must be advanced to realize their potential. Other challenges include compositional and dimensional uniformity over macroscopic area, contact formation, surface effects, and methods for large scale and mass-manufacturable integration.

This conference will provide a forum for the presentation and discussion of nanoscale epitaxial structure synthesis, characterization of these structures, the development of processes for the fabrication of nanoscale devices, device characterization, and the interfacing and integration of these devices for electronics, photonics, sensing and energy conversion. Fundamental processes that drive selective nucleation and growth, and lead to quantum dot and quantum wire formation as well as methods that address manufacturable device integration are of particular interest.

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NanoEngineering

Nanoepitaxy: Materials and Devices III (OP115) continued

Topics of interest include:

- Growth and device integration of graphene
- Homo and hetero-epitaxial synthesis of zero-dimensional structures (e.g., nanoparticles, core-shell structures, quantum dots) and their device integration
- Homo and hetero-epitaxial synthesis of one-dimensional structures (e.g., nanowires, nanorods, etc.), built-in heterostructures, orientation control, and device integration
- Epitaxial growth and device applications of novel organic/inorganic framework materials such as metal organic frameworks (MOFs)
- Nanometer scale synthesis compatible to and integral onto CMOS devices
- Template, catalyzed, uncatalyzed, tip assisted, field induced, locally heated synthesis methods
- Mass-manufacturable interfacing for electronics, photonics, optoelectronics, sensing and energy conversion
- Surface passivation for controlling surface states
- Role of strain and extended defects in synthesis and spatial ordering of nanometer scale structures
- Heterogeneous interface characteristics, DC, RF and high frequency characterization, defects, noise, traps, coherent- incoherent structures: mechanical, acoustic, magnetic, and piezoelectric properties
- Physical characteristics of nanometer-scale structures analyzed individually and in ensembles, ex-situ and in-situ studies
- Introduction of impurities and their roles in zero-dimensional and one-dimensional structures; dopant spatial distributions and segregation
- Novel electrical, optical, and structural characterization techniques for nanoepitaxially grown zero- and one-dimensional structures
- Precise positioning, electrical contact formation and interface properties between nanometer-scale structures and bulk
- 3D heterogeneous integration, application of advanced patterning techniques for positioning and dimension control of nanostructures, integration with NEMS, functionalization

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Exhibition Dates: 23–25 August 2011
San Diego Convention Center
San Diego, California, USA
Nanooptomechanical Systems (NOMS) is to stir an interest in the field of photoactuators; promoting NOMS to mainstream R&D. In this scheme, light sources promote liquid crystal elastomers as much sought-after the photoactuation of polymer composites and highly collaborative discipline. Obvious synergistic research areas set the foundation to build NOMS as a close-ly collaborative discipline. Obvious synergistic research areas are Electroactive Polymer Actuators and Devices (EAPAD), Liquid Crystal Elastomers (LCE), actuators, or microsystem technologies. A special call in made to in situ characterization in-cluding but not limited to thermal analysis, electron and probe microscopy. Suitable computational models are needed to understand the actuation phenomenon from first principles and to devise theoretical models capable of predicting mechanica-l performance. To maximize this collaborative effort, this meeting is open to contributions from academia, Government, industry, and other non-for profit organizations with an invested interest in the prompt development of this technology.

**Conference Chairs:** Jaume Esteve, Ctr. Nacional de Microelectrónica (Spain); Eugene B. Terentjev, Univ. of Cambridge (United Kingdom); Eva M. Campo, Univ. of Pennsylvania (United States)

**Program Committee:** Joseph Bar-Cohen, Jet Propulsion Lab. (United States); Federico Carpi, Univ. di Pisa (Italy); Nibir K. Dhar, Defense Advanced Research Projects Agency (United States); Toribio Fernández Otero, Univ. Politecnica de Cartagena (Spain); Paolo Gaudenzi, Univ. degli Studi di Roma La Sapienza (Italy); Pablo V. Negron-Marrero, Univ. de Puerto Rico en Humacao (United States); Johannes Riemenschnieder, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Mária Omastová, Polymer Institute (Slovakia); Balaji Panchapakesan, Univ. of Louisville (United States); Idalia Ramos, Univ. de Puerto Rico en Humacao (United States); Jorge J. Santiago-Aviles, Univ. of Pennsylvania (United States); Gilbert Sloan, Consultant (United States); Nelson Tabriian, BEAM Engineering for Advanced Measurements Co. (United States); Richard A. Vaia, Air Force Research Lab. (United States); Mark Warner, Univ. of Cambridge (United Kingdom)

The need to increase awareness of newly generated scientific findings within the general public to enhance consumer acceptance has been well established by funding agencies and consumer groups. Concurring with the current trend of early-addition of innovation from K12 through graduate programs, this session will also include the discus-sion of programs and best practices to bring NOMS into the education space.

- Synthesis mechanisms; dispersion and alignment of nanoparticles and moieties
- First principle and mechanistic modeling
- Microsystem integration
- Material and device characterization: static and dynamic testing
- Thermal analysis
- Atomic probe
- In-situ actuation
- Applications:
  - human-machine interfaces: tactile displays
  - artificial muscles
  - biomimetics
  - energy storage
  - micromachines
- Education and dissemination

**Critical Dates**

**Abstract Due Date:** 7 February 2011

**Author Notification:** The contact author will be notified of abstract acceptance by email no later than 18 April 2011.

**Manuscript Due Date:** 18 July 2011

**Please Note:** Submissions imply the intent of at least one author to register, attend the symposium, present the paper as scheduled, whether it is an oral or poster presentation, and submit a full-length manuscript by the deadline.
The aim of this conference is to offer a forum of discussion for scientists, engineers, and industrials involved in photo- and electrochemical systems and nanotechnology for solar generation of hydrogen (and other 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:

- fundamentals of hydrogen generation via photo- and electrochemical water splitting
- modeling and simulation of reactions on semiconductors
- energetics and electronic structure of photo-catalysts and semiconductor nanostructures
- surface and interface properties of photo-catalysts/electrolyte junctions
- optical, chemical, and physical properties of photo-electrodes
- charge generation and transfer dynamics on photo-catalysts and semiconductors
- recent advances in time-resolved laser spectroscopies to monitor photo-induced catalytic processes
- long term aqueous stability, corrosion, and photo-corrosion of semiconductors
- recent advances in synthetic techniques for preparation of photo-catalysts
- new approaches to band-gap profiling and engineering
- combinatorial approaches to photo-catalysts
- new devices, methods, and apparatus for solar hydrogen generation
- national and international solar hydrogen energy systems, projects, and networks
- social, educational, environmental, and economic aspects of solar hydrogen
- hydrogen generation via solar thermal (chemical) and photo-biological systems
- carbon dioxide conversion at irradiated semiconductor surfaces
- photo-catalytic production of fuels.

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This conference centers on the science and application of advanced (nano) photonic structures for light management in solar energy conversion, as well as advanced/nanostructured solar cell concepts employing novel device architectures, new physical properties, and/or advanced light-to-energy conversion mechanisms that are enabled by nanostructures and other novel materials systems. While the focus is on photovoltaic (PV) cell-related technologies, research that impacts other parts of a solar energy system is also of interest. The aim of this meeting is to bring together scientists, engineers, and technologists to discuss and review the state-of-the-art in research and application of novel concepts to next generation PV devices and sub-systems.

The scope of the conference will cover the following areas:

- bulk nanostructured and nanocomposite solar cells (organic, hybrid, and inorganic)
- quantum well solar cells
- nanowire and nanotube-based solar cells
- quantum dot solar cells
- nano plasmonic structures for PV
- nanostructures for light management and sub-wavelength 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
- novel materials for solar energy conversion, including ferroelectrics
- novel photonics, materials, and devices for solar-to-fuel conversion
- concentrators employing advanced photonics and nanostructures
- charge transport in nano PV structures and nanoscale PV device physics.

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Manuscript Due Date: 18 July 2011

Please Note: Submissions imply the intent of at least one author to register, attend the symposium, present the paper as scheduled, whether it is an oral or poster presentation, and submit a full-length manuscript by the deadline.
The focus of this conference will be the presentation of papers dealing with emerging and advanced nano- and macro-photonic technologies appropriate for use in space and terrestrial applications where the effects of ionizing radiation, temperature ranging, and other environmental effects such as atomic oxygen (AO), vacuum, and ultraviolet (UV) radiation can degrade space sensors, systems, and related components.

Papers are sought dealing with satellite architectures and systems, especially those ranging from small to pico-satellite payloads which require micro-component and systems such as ring laser gyros, integrated monolithic photonics and new, innovative, miniaturized, cost-effective, reliable and radiation resistant sensor and communications technologies. Emerging and improved photonics technology can facilitate implementation of future small sat systems, as well as significantly improve related dual-use commercial and military terrestrial system applications where reduced size, reliability, and resistance to temperature and ionizing and displacement radiations are major issues. Topics dealing with research and development in these areas, and especially technologies expected to operate in adverse UV and AO environments found in near-Earth orbits or galactic cosmic rays encountered in interplanetary space, are solicited. Recent innovations in nanotechnologies, photonic crystals, photonic bandgap devices, quantum-well, quantum-dot and nanoparticle semiconductor components, molecularly engineered organic, biological and polymer-based photonics both linear and nonlinear are sought. Papers that highlight and explore the latest innovations in hybrid-inorganic-organic/polymer technologies are strongly encouraged.

Papers reporting on commercial and military R & D breakthroughs and implementation of hardened nano-, micro-, and macro-photonic components and systems such as: optical fibers, fiber gratings, fiber amplifiers, and fiber lasers as well as optical sensors, optical data buses, high- and low-power laser sources, detectors, modulators, couplers, optical interconnects, multiplexers-demultiplexers, signal processing systems, guidance systems, targeting, radar, imaging, optical communications, optical limiters and components, as well as other related photonic technologies are solicited.

Authors involved in demonstrations of photonic components and systems for radiation hardened space and terrestrial environments are especially encouraged to present papers. Papers are sought reporting on the use of photonics in aerospace, DOD applications, space missions, and space experimentation, as well as the related behavior of photonic sensors, systems, and components in the harsh environments found in particle accelerators.

Several keynote paper presentations dealing with specific photonics areas are planned and authors interested in presenting keynote topics should contact Conference Chair Ed Taylor at (505) 797-4799 or IntPhoton@aol.com.

Nanophotonics and Macrophotonics for Space Environments V (OP516)
Venue
SPIE Optics+Photonics 2011 will be held at the San Diego Convention Center, 111 West Harbor Dr., San Diego, CA 92101 and at the San Diego Marriott Hotel & Marina located adjacent to the Convention Center at 333 West Harbor Dr.

Technical Program
Available April 2011
The comprehensive Advance Technical Program for this symposium will list conferences, paper titles, and authors in order of presentation; an outline of all planned special events; and hotel and registration information.

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