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- NOMS
- Nanoengineering
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Nikolay I. Zholudev, Univ. of Southampton (United Kingdom), Nanyang Technological Univ. (Singapore)
Metamaterials, Metadevices, and Metasystems 2014 (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), Nanyang Technological Univ. (Singapore)

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Metamaterials and artificial electromagnetic media that are structured on the subwavelength scale were initially suggested for the negative-index ‘superlens’. Later, as metamaterials became a paradigm for engineering electromagnetic space and controlling the propagation of waves, the field of transformation optics was born. The research agenda is now shifting towards achieving tunable, switchable, nonlinear, sensing and data processing functionalities. This heralds the emergence of the new fields of metadevices and metasystems with unique and useful functionalities, realized by the structuring of functional matter on the subwavelength scale. The conference evolves from the SPIE Conference “Metamaterials: Fundamentals and Applications” and now broadens its remit. It will be a platform to discuss cutting-edge research on photonic, terahertz, microwave, acoustic and mechanical metamaterials, metadevices and metasystems with advanced functionalities attained through the exploitation of the entire plethora of classical and quantum mesoscale and nanoscale forces and interactions.

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Nanoscale systems have peculiar optical properties, deriving from confinement in one or more dimensions, efficient energy and charge transfer and enhanced role of interfaces. As nanophotonic properties can be finely tailored by controlling the dimensions, material properties and surface chemistry, fabrication and synthesis issues are central to emerging applications. Continuous technological improvements open the way to novel nanodevices at the forefront of scientific knowledge, which exploit interaction phenomena between electromagnetic waves and materials, 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.

This year, the conference will focus on multi-functional nanomaterials, specifically in semiconductor/metal oxides like Zinc oxide or Titanium oxide, plasmonic metals and organic-inorganic hybrid materials. Such materials are emblematic of this newly emerging field of nanophotonics. 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:

- metal oxide materials and their optical and catalytic properties
- fundamental research on the optical properties of nanocrystals
- nanoscale structures, related optical property determination and their relationship
- nanocrystalline surface and interface optics
- nanofabrication, processing, templates, and device design
- optical and optoelectronic materials based on nanoscale 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
- optical materials base on Sol-Gel preparation
- nanowires for solar applications.

Critical Dates

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Author Notification: The contact author will be notified of abstract acceptance by email no later than 14 April 2014
Manuscript Due Date: 21 July 2014

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 manuscript by the deadline.
Active Photonic Materials VI (OP103)

Conference Chairs: Ganapathi S. Subramania, Sandia National Labs. (United States); Stavroula Foteinopoulou, Univ. of Exeter (United Kingdom)

Program Committee: Koray Aydin, Northwestern Univ. (United States); Paul V. Braun, Univ. of Illinois at Urbana-Champaign (United States); Kurt Busch, Humboldt-Univ. zu Berlin (Germany); Allan Chang, Lawrence Livermore National Lab. (United States); Shanhui Fan, Stanford Univ. (United States); Didier Felbacq, Univ. Montpellier 2 (France); Alexander V. Kildishev, Purdue Univ. (United States); Yuri S. Kvivshar, The Australian National Univ. (Australia); Michal F. Lipson, Cornell Univ. (United States); Cefe López, Consejo Superior de Investigaciones Científicas (Spain); Michelle L. Povinelli, The Univ. of Southern California (United States); Jörg Schilling, Martin-Luther-Univ. Halle-Wittenberg (Germany); Andrey A. Sukhorukov, The Australian National Univ. (Australia); Ralf B. Wehrspohn, Fraunhofer-Institut für Werkstoffmechanik (Germany); Daniel M. Wasserman, Univ. of Illinois at Urbana-Champaign (United States); William Whelan-Curtin, Univ. of St. Andrews (United Kingdom)

Artificially structured materials can enable unprecedented control of electromagnetic energy, offering unique possibilities in light matter interaction. Incorporating active components, such as gain or non-linear materials advances the functionality of these photonic materials to a higher level, breaking current boundaries in light control. Structured materials with active components are most promising platforms for a wide range of applications including biological/chemical sensing, nanoscale thresholdless lasing, solid state lighting as well as chip-scale optical computing. This vast potential for high impact applications has been a driving force in active photonic materials research. Current open directions include fabrication of active elements (such as quantum dots) inside structured photonic materials, dynamically tunable photonic platforms, novel THz sources, light harvesting, as well as active carbon-based photonic devices.

This conference aims to bring together scientists and engineers working in the emerging field of active photonic materials, to compare methods and results, identify novel applications, and cross-fertilize among various application fields. Topics will cover active photonic materials and devices ranging from THz to the ultraviolet regime. 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
• extra-ordinary light harvesting structures
• advances in fabrication of photonic structures with active materials
• photonic structures for quantum control and cavity QED systems
• fabrication of quantum dots and nanowires for active photonics
• carbon-based active photonic materials and devices
• tunable and dynamic photonic platforms
• novel second harmonic generation and optical rectification systems; novel THz generation prototypes
• chemical sensors and biosensors based on active control of light
• photonic bandgap optoelectronic devices
• magneto-photonic crystals and modulators.

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Plasmonics: Metallic Nanostructures and Their Optical Properties XII (OP104)

Conference Chair: Mark I. Stockman, Georgia State Univ. (United States)

Program Committee: Martin Aeschlimann, Technische Univ. Kaiserslautern (Germany); Harry A. Atwater, Jr., California Institute of Technology (United States); David J. Bergman, Tel Aviv Univ. (Israel); Harald W. Giessen, Univ. Stuttgart (Germany); Jean-Jacques Greffet, Lab. Charles Fabry (France); Naomí J. Halas, Rice Univ. (United States); Martti Kauranen, Tampere Univ. of Technology (Finland); Satoshi Kawata, Osaka Univ. (Japan); Fritz Keilmann, LASNIX (Germany); Dai-Sik Kim, Seoul National Univ. (Korea, Republic of); Laurens Kuipers, FOM Institute for Atomic and Molecular Physics (Netherlands); Olivier J. F. Martín, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Peter Nordlander, Rice Univ. (United States); Lukas Novotny, Univ. of Rochester (United States); Vahid Sandoghdar, ETH Zurich (Switzerland); George C. Schatz, Northwestern Univ. (United States); Tigran V. Shahbazyan, Jackson State Univ. (United States); Vladimir M. Shalaev, Purdue Univ. (United States); Gennady B. Shvets, Institute for Fusion Studies (United States); Din Ping Tsai, National Taiwan Univ. (Taiwan); Niek F. van Hulst, ICFO - Institut de Ciències Fotòniques (Spain); Hongxing Xu, Institute of Physics (China); Nikolay 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, non-linear generation, luminescence, including molecules and nanostructured metals
- novel plasmonic systems such as graphene
- Fano resonances in 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, spacing, and nanolasing 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 nanoscales, 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 XI (OP105)

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

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 statistical mechanics, of soft condensed matter and of hydrodynamic interactions. Novel sample 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 well over one hundred presentations and, of course, a larger number of participants. The poster sessions are given sufficient room and sufficient refreshments are offered to ensure an excellent level of interaction. Notably, this conference 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:

• toward (or in) the quantum limit of opto-mechanics
• photonic devices for optically induced forces
• statistical mechanics of small systems
• single molecule manipulation and study
• studies of active swimmers/hydrodynamics
• enhanced sensitivity and resolution of optical force actuators
• optically driven micro rheology and mechanical properties
• “gonzo” trapping (i.e., trapping at extremes)
• using the photonic toolbox to study cells and their organelles
• optically bound matter
• optofluidics and optically shaped structures
• optical manipulation of matter through gaseous media
• foundations of the electromagnetic theory of force and momentum
• radiation pressure
• near-field micromanipulation, plasmonic, and nanoparticle trapping
• beam shaping and abberation / wavefront correction
• optical sorting / optical lab-on-a-chip / microfluidics
• optically manipulated robotics and novel samples.

Every year, there is also a special tutorial session, freely included and open to all attendees.

Critical Dates
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Manuscript Due Date: 21 July 2014

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Interfaces play an essential role in many (bio-)chemical processes, ranging from solar energy conversion via biological membrane processes to catalysis. Recent developments in nanomaterials highlight the importance of surfaces and interfaces in quantum confined systems. The detailed study of the physics and physical chemistry at interfaces and in nanomaterials 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 femto- to nanoseconds.

The intent of this conference is to bring together an interdisciplinary group of scientists (from academia, industry and government laboratories) who study fundamental processes at interfaces and in nanomaterials.

For the 2014 call, the scope of the conference will focus on the following topics:

- charge separation at organic, inorganic, hybrid and biological interfaces
- physical processes in solar energy conversion at interfaces and on nanostructures
- photophysics of novel perovskite-based nanomaterials
- physical understanding of biological systems and interfacial processes
- advanced microscopy techniques for biophysics
- single particle tracking of (bio-)nanomaterials
- confinement effects in nanostructures and nanowires
- carrier transport in complex nanostructured systems
- emerging experimental tools for biophysics
- novel spectroscopic tools to probe kinetics of energy and charge transfer at interfaces
- advances in modeling of electronic processes in nanomaterials and at interfaces.

Joint sessions will be organized with other conferences, such as "Organic Photovoltaics XV" and "Organic Field-Effect Transistors XIII".
Biosensing and Nanomedicine IV (OP107)

Conference Chairs: Hooman Mohseni, Northwestern Univ. (United States); Massoud H. Agahi, Harbor-UCLA Medical Ctr. (United States); Cedars-Sinai Medical Ctr. (United States); Manijeh Razeghi, Northwestern Univ. (United States)

Program Committee: Gert Cauwenberghs, Univ. of California, San Diego (United States); Philippe M. Fauchet, Univ. of Rochester (United States); Guilhem Gallot, Ecole Polytechnique (France); David H. Gracias, Johns Hopkins Univ. (United States); Kimberly S. Hamad-Schifferli, Massachusetts Institute of Technology (United States); Keon Jae Lee, KAIST (Korea, Republic of); Yu-Hwa Lo, Univ. of California, San Diego (United States); Ryan McClintock, Northwestern Univ. (United States); Omer Gokalp 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)

The huge explosion of research and development in the field of biosensing over the last decade has led to new discoveries over a wide variety of areas. Biosensing has had a major impact in commercial, medical, research, and homeland security applications and is poised to take the next step in integration with other mature technologies leading to a potential revolution in personalized medicine. 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 atmosphere to foster new innovations in nanomedicine, nanosensing, bioMEMS, 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
- graphene, carbon-nanotube, and quantum-dot biosensors
- nano-photonic and plasmonic bio-sensing
- nano drug delivery
- nanoxicity
- molecular imaging and therapy
- bio-inspired components and systems
- bio-inspired sensory processing
- implantable or biodegradable electronics
- neurophotonic and neuroimaging
- nano-bio interactions
- nano-composite and hybrid biosensors.

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Spintronics VII (OP108)

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

**Program Committee:** Franco Ciccacci, Politecnico di Milano (Italy); Russell P. Cowburn, Univ. of Cambridge (United Kingdom); Scott A. Crooker, Los Alamos National Lab. (United States); Vincent Cros, Unité Mixte de Physique CNRS/Thales (France); Hanan Dery, Univ. of Rochester (United States); Rogério de Sousa, Univ. of Victoria (Canada); Michel I. Dyakonov, Univ. Montpellier 2 (France); Michael E. Flatté, The Univ. of Iowa (United States); Jean-Marie George, Unité Mixte de Physique CNRS/Thales (France); Erez Hasman, Technion-Israel Institute of Technology (Israel); Henri Jaffrès, Unité Mixte de Physique CNRS/Thales (France); Tomás Jungwirth, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Giti A. Khodaparast, Virginia Polytechnic Institute and State Univ. (United States); Mathias Klau, Univ. Konstanz (Germany); Xavier Marie, INSU - Univ. of Toulouse (France); Laurens W. Molenkamp, Julius-Maximilians-Univ. Würzburg (Germany); Hiro Munekata, Tokyo Institute of Technology (Japan); Yoshichika Otani, The Univ. of Tokyo (Japan); Dafiné Ravelosona, Institut d'Électronique Fondamentale (France); Georg Schmidt, Martin-Luther-Univ. Halle-Wittenberg (Germany); Jing Shi, Univ. of California, Riverside (United States); Luc Thomas, Headway Technology (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); Igor Zutic, Univ. at Buffalo (United States)

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, nonvolatile magnetic memories, or magnetic logic units. Recent developments are being considered for spin-transfer devices, spin-based logic, or quantum computing. New topics are emerging in frontier fields, e.g. like spin optics which is based on recent developments in plasmonics, or spin-dependent thermoelectric effects. These advances make 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:

- spin-coherence, semiconductor spin physics, quantum wells and quantum dots
- magnetic nanostructures and spin-injection
- spin-transfer, micromagnetism
- new materials (oxides, organics, etc.)
- new structures and applications (magnetoresistive devices, MRAMs, spin transistors, crystalline tunnel barriers, etc.)
- spin optics.

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Carbon Nanotubes, Graphene, and Associated Devices VII (OP109)

Conference Chairs: Manijeh Razeghi, Northwestern Univ. (United States); Young Hee Lee, Sungkyunkwan Univ. (Korea, Republic of); Maziar Ghazinejad, California State Univ., Fresno (United States)

Program Committee: Paolo Bondavalli, Thales Research & Technology (France); Costel-Sorin Cojocaru, Ecole Polytechnique (France); Konji Hata, National Institute of Advanced Industrial Science and Technology (Japan); Mark C. Hersam, Northwestern Univ. (United States); Seong Chan Jun, Yonsei Univ. (Korea, Republic of); Horacio Lamela Rivera, Univ. Carlos III de Madrid (Spain); Seung Hee Lee, Chonbuk National Univ. (Korea, Republic of); Annick Loiseau, ONERA (France); Ryan McClintock, Northwestern Univ. (United States); William I. Milne, Univ. of Cambridge (United Kingdom); Philip W. T. Pong, The Univ. of Hong Kong (Hong Kong, China); Seunghyun Baik, Sungkyunkwan Univ. (Korea, Republic of); Young Hee Lee, Sungkyunkwan Univ. (Korea, Republic of)

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) and more recently, graphene, have 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 1 nm 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 ?A/tube are now routinely achieved 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 or bilayer material) 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. The creation of a forbidden gap in graphene is an active field of research.

The purpose of the conference is to provide a broad overview of the state-of-the-art and perspectives of carbon nanotubes, and graphene as well as few layers graphene films, bringing together experts from different communities: materials science and chemistry as well as biology, device physics, nanofabrication and nanoorganisation, industrial developments, etc.

Contributions for this conference are encouraged in the following areas:

- graphene and few layers graphene films
- band gap creation in graphene
- synthesis of carbon nanotubes
- synthesis of graphene and few layers graphene films
- characterisation at different length scales
- CNT and graphene-based devices
- separation methods for CNTs
- device physics
- device engineering
- optoelectronic devices
- novel devices including sensors
- random networks and methods for their deposition
- large-area graphene films
- CNT organisation and high density packing
- field emission from CNTs
- chemical and biological sensors (CNT and graphene)
- CNT interactions with liquid crystals
- CNT-graphene hybrid nanostructures
- optical metrology of carbon nanomaterials.
NanoScience

Nanoimaging and Nanospectroscopy II (OP110)

Conference Chairs: Prabhat Verma, Osaka Univ. (Japan); Alexander Egner, Laser-Lab. Göttingen e.V. (Germany)

Program Committee: Joerg Bewersdorf, Yale School of Medicine (United States); Alberto Diaspro, Istituto Italiano di Tecnologia (Italy); Christian Eggeling, Univ. of Oxford (United Kingdom); Joerg Enderlein, Georg-August-Univ. Göttingen (Germany); Katsumasa Fujita, Osaka Univ. (Japan); Stefan W. Hell, Max-Planck-Institut für Biophysikalische Chemie (Germany); Samuel Hess, Univ. of Maine (United States); Bo Huang, Univ. of California, San Francisco (United States); Satoshi Kawata, Osaka Univ. (Japan); Alfred J. Meixner, Eberhard Karls Univ. Tübingen (Germany); Peter Nordlander, Rice Univ. (United States); Bruno Pettinger, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany); Markus B. Raschke, Univ. of Colorado at Boulder (United States); Bin Ren, Xiamen Univ. (China); Vahid Sandoghdar, Max-Planck-Institut für die Physik des Lichts (Germany); Markus Sauer, Julius-Maximilians-Universität Würzburg (Germany); Yung Doug Suh, Korea Research Institute of Chemical Technology (Korea, Republic of); Din Ping Tsai, National Taiwan Univ. (Taiwan); Renato Zenobi, ETH Zürich (Switzerland); Xiaowei Zhuang, Harvard Univ. (United States)

There is a huge demand for research tools allowing one to “see” nanostructures and to characterize and understand materials as well as biochemical processes at nanoscale resolution. Optical techniques such as imaging and spectroscopy at nanoscale make this possible. Optical imaging with spatial resolution far beyond the diffraction limits of light together with spectroscopic studies with highly localized optical fields have pushed the limits of spatial resolution and sensitivity to new scales. Continuous improvements open ways to novel applications at the forefront of scientific knowledge.

The purpose of this interdisciplinary conference is to encompass all aspects of nano-imaging and nano-spectroscopy, including theory and novel concepts, experimental demonstration of novel concepts, major developmental progress and applications to any field in science, in particular, biology, medicine, and the material sciences.

Papers are solicited in (but not restricted to) the following areas:

Far-field super-resolution imaging/nanoimaging techniques, such as:
- stimulated emission depletion (STED) microscopy
- photoactivated localization microscopy (PALM)
- stochastic optical reconstruction microscopy (STORM)
- direct stochastic optical reconstruction microscopy (dSTORM)
- structured illumination microscopy (SIM)
- ground state depletion-individual molecule return (GSDIM) microscopy
- reversible saturable optical fluorescence transitions (RESOLFT) microscopy.

Near-field super-resolution imaging/nanoimaging techniques, such as:
- near-field scanning optical microscopy (NSOM/SNOM)
- tip-enhanced Raman scattering (TERS) microscopy
- tip-enhanced photoluminescence (TE-PL) microscopy
- tip-enhanced coherent anti-Stokes Raman scattering (TE-CARS) microscopy.

Other super resolution optical imaging techniques, such as:
- saturated excitation (SAX) microscopy
- other nonlinear optical microscopy.

Nano-spectroscopic techniques, such as:
- surface-enhanced Raman spectroscopy (SERS)
- surface-enhanced infrared absorption spectroscopy (SEIRAS)
- shell-isolated nanoparticle-enhanced Raman spectroscopy (SHINERS)
- stimulated Raman spectroscopy (SRS).

New/unconventional experimental techniques for nano-imaging and nano-spectroscopy

Plasmonics for nano-imaging and nano-spectroscopy

Growth/fabrication of plasmonic materials for nano-imaging and nano-spectroscopy

Theoretical/simulation studies in related fields
Nanoengineering: Fabrication, Properties, Optics, and Devices XI (OP111)

Conference Chairs: Eva M. Campo, Bangor Univ. (United Kingdom); Elizabeth A. Dobisz, HGST (United States); Louay A. Eldada, Quanergy, Inc. (United States)

Program Committee: André-Jean Attias, Univ. Pierre et Marie Curie (France); Irene Fernandez-Cuesta, Lawrence Berkeley National Lab. (United States); Sarah Haigh, The Univ. of Manchester (United Kingdom); Sondra Hellstrom, California Institute of Technology (United States); Ghassan E. Jabbour, Arizona State Univ. (United States); Robert Magnusson, The Univ. of Texas at Arlington (United States); Balaji U. Panchapakesan, Univ. of Louisville (United States); Won Park, Univ. of Colorado at Boulder (United States); Dorota A. Pawlak, Institute of Electronic Materials Technology (Poland); 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, actuators, systems on a chip, biotechnology, photonics, photovoltaics, molecular electronics and optics are emerging. The upcoming synthetized of nanomaterials per se: nanotubes, nanowires, and graphene; as well as their composites and innovative ensembles, 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, data communications, 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/environmental 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-assembly techniques
- engineered nano- and micro-structured materials
- synthesis of nanotubes and nanowires
- stacked 2D atomic crystals.

**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 nano-devices and nanostructures
- nano-MEMS devices and structures
- NOMS: Nano-Opto-Mechanical Systems
- photovoltaic cells and structures
- biological devices and structures
- molecular devices and structures
- atomic devices and structures
- quantum devices and structures
- nanosensors
- smart mechanical actuators
- nanotubes
- stacked 2D atomic crystals.

**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, nanocoatings, and nanolubricants for power-generating wind turbines
- nanocomposites for smart behavior: reciprocity in electroactuation
- nanotechnologies for secondary batteries and ultracapacitors, including powder-based, carbon-nanotube-based, silicon-nanowire-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.)

Continues next page
NanoEngineering

Nanoengineering: Fabrication, Properties, Optics, and Devices XI (OP111) continued

- 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.

Akhlesh Lakhtakia, Editor-in-Chief

The Journal of Nanophotonics (JNP) focuses on the fabrication and application of nanostructures that facilitate the generation, propagation, manipulation, and detection of light from the infrared to the ultraviolet regimes.

www.spie.org/jnp
Call for Papers

Nanobiosystems: Processing, Characterization, and Applications VII (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 Dodababapu, 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 Iijiri, Hokkaido Univ. (Japan); Jung-II Jin, Korea Univ. (Korea, Republic of); Francois Kajzar, Polytechnical Univ. of Bucharest (Romania); 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 Y. 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 Serdar 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 bionanotechnology 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 electronics 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.

Critical Dates

Abstract Due Date: 3 February 2014
Author Notification: The contact author will be notified of abstract acceptance by email no later than 14 April 2014
Manuscript Due Date: 21 July 2014

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 manuscript by the deadline.
Nanostructured Thin Films VII (OP113)

Confidence Chairs: Akhlesh Lakhtakia, The Pennsylvania State Univ. (United States); Tom G. Mackay, The Univ. of Edinburgh (United Kingdom); Motofumi Suzuki, Kyoto Univ. (Japan)

Program Committee: Bharat Bhushan, The Ohio State Univ. (United States); Pankaj K. Choudhury, Univ. Kebangsaan Malaysia (Malaysia); Didier Felbacq, Univ. Montpellier 2 (France); Flavio Horowitz, Univ. Federal do Rio Grande do Sul (Brazil); Yi-Jun Jen, National Taipei Univ. of Technology (Taiwan); H. Angus Macleod, Thin Film Center, Inc. (United States); Raul J. Martin-Palma, Univ. Autónoma de Madrid (Spain); Anders Kristensen, Technical Univ. of Denmark (Denmark); Sidney J. Ribeiro, Univ. Estadual Paulista (Brazil); Geoffrey B. Smith, Univ. of Technology, Sydney (Australia)

Nanostructuring 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
• superhydrophobicity
• functionalization of nanostructures
• biomedical applications
• bioinspired and biomimetic thin films
• structural evolution.

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 Journal of Nanophotonics.

The Inaugural Lecture will be delivered by Francois Flory, Ecole Centrale Marseille (France). Confirmed speakers for invited talks are Vamsy Chodavarapu, McGill Univ. (Canada); Zeno Gaborro, Harvard Univ. (USA) and Univ. of Trento (Italy); Qiaoqiang Gan, Univ. of Buffalo (USA); Reuven Gordon, Univ. of Victoria (Canada); Yi-Jun Jen, National Taipei Univ. of Technology, (Taiwan); and Cheng-Chung Lee, National Central Univ. (Taiwan).

Critical Dates

Abstract Due Date: 3 February 2014
Author Notification: The contact author will be notified of abstract acceptance by email no later than 14 April 2014
Manuscript Due Date: 21 July 2014

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 manuscript by the deadline.
Nanomanufacturing is the essential bridge between nanoscience and real world nanotech products. In this rapidly developing field, a broad spectrum of products that will affect virtually every industrial sector is emerging. In order to achieve the broad impacts envisioned, nanotech products must be manufactured in market-appropriate quantities in a reliable, repeatable, and commercially viable manner. In addition, they must be manufactured so that environmental and human health concerns are met, worker safety issues are appropriately assessed and handled, and liability issues are addressed. Critical to this realization of robust nano-manufacturing is the development of appropriate instrumentation, metrology, and standards.

As novel applications emerge, the demand for highly sensitive and efficient metrology tools with capability of rapid and thorough coverage of large functional areas is emerging. 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 (e.g. self-cleaning, tribological effects), a tight link between measurement and modeling tool becomes essential.

The multidisciplinary character of the conference provides a forum to present and discuss the newest developments of metrology techniques as well as industrial needs for new measurement equipment and reference materials. The measurement principles include e.g. scanning-probe microscopy, optical microscopies and profilometry, light scattering methods, SEM-based metrology, ellipsometry, reflectometry, interferometry and nanoparticle characterization instrumentation.

If a nano-enabled product cannot be measured, it cannot be manufactured; additionally if that product cannot be made safely it also should not be manufactured. The Instrumentation, Metrology, and Standards for Nanomanufacturing will become the leading forum for the exchange of foundational information and discussion of the essential instrumentation, metrology and standards required for 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 broad 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
- high throughput and roll-to-roll methodologies
- particle beam (electron, ion), including scanned microscopy and elemental analysis
- atomic force microscopy
- regional alliances/clusters for nanomanufacturing
- characterization metrologies and novel measurement techniques
- 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
- reference measurement systems, traceability and metrology comparisons
- environmental, health and safety monitoring and metrology
- 3D critical dimension metrology
- 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
- 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, nanoparticle measurement and analysis
- characterization of nano-objects used in commercial products.
NanoEngineering

Nanoepitaxy: Materials and Devices VI (OP115)

Conference Chairs: Nobuhiko P. Kobayashi, Univ. of California, Santa Cruz (United States); A. Alec Talin, National Institute of Standards and Technology (United States); Albert V. Davydov, 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); Necmi Biyikli, Virginia Commonwealth Univ. (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); Muhammad M. Hussain, King Abdullah Univ. of Science and Technology (Saudi Arabia); Chennaipati Jagadish, The Australian National Univ. (Australia); Francois Leonard, Sandia National Labs.. California (United States); Samuel S. Mao, Lawrence Berkeley National Lab. (United States); Tariq Manzur, Naval Undersea Warfare Ctr. (United States); Nezih Palu, Florida International Univ. (United States); Samuel Tom Picraux, Los Alamos National Lab. (United States); S. M. Prokes, U.S. Naval Research Lab. (United States); Zhifeng Ren, Boston College (United States); Atsuhito Sawabe, Aoyama Gakuin Univ. (Japan); Loucas Tsakalakos, GE Global Research (United States); Emanuel Tutuc, The Univ. of Texas at Austin (United States); Lionel Vayssieres, Xi’an Jiaotong Univ. (Japan); George T. Wang, Sandia National Labs. (United States)

Low-dimensional material systems possessing at least one of their dimensions in the nanometer scale offer intriguing physical properties and undiscovered pathways toward revolutionary new device concepts. Homo and heterogeneous synthesis of low-dimensional material systems on various substrates result in building blocks that reveal a wealth of interesting physical properties. Devices fabricated from such low-dimensional material systems could offer significantly improved performance. Control of thermodynamics and kinetics in synthesis of low-dimensional material systems at the nanometer scale would offer unprecedented opportunities to tailor microscopic and macroscopic physical properties of such material systems. To further pursue this tremendous opportunities, however, many fundamental questions need to be addressed and technological barriers need to be overcome. This conference provides a forum for the presentation and discussion of synthesis and characterization of low-dimensional material systems tailored at the nanometer scale. The scope of the conference also includes unique and peculiar physical properties exhibited by such low-dimensional material systems. Design, fabrication, and characterization of novel device platforms that employ low-dimensional material systems are also of interest. Interfacing and integration of such devices toward novel electronics, photonics, sensing and energy conversion are also within the scope. Topics of interest include:

- synthesis of two-dimensional material systems such as graphene and ultra-thin films and their device integration
- synthesis of one-dimensional material systems (e.g., nanowires and nanorods with built-in heterostructures), control of their orientation and morphology; device integration
- synthesis of zero-dimensional material systems (e.g., core-shell nanoparticles, quantum dots) and their device integration
- synthesis and device applications of novel organic/inorganic framework materials such as metal organic frameworks (MOFs)
- self-limiting deposition technique such as atomic layer deposition (ALD) that can produce ultrathin and conformal thin film structures for many applications including thin film devices, display technology, energy storage and capture, as well as solid state lighting
- nanoscale synthesis compatible to and integral onto CMOS devices
- templated, catalyzed and uncatalyzed, tip assisted, field induced, locally heated synthesis methods
- scalable and mass-manufacturable interfacing for electronics, photonics, optoelectronics, sensing and energy conversion
- surface passivation for controlling surface states
- role of strain and extended defects on synthesis and spatial ordering of nanoscale structures and on their optical and electrical properties
- heterogeneous interface characteristics, DC, RF and high frequency characterization, defects, noise, traps, coherent/incoherent structures: mechanical, acoustic, magnetic, and multifunctional properties
- physical characteristics of nanometer-scale structures analyzed individually and in ensembles, ex-situ and in-situ studies
- introduction of electrically/optically active impurities and their roles in low-dimensional structures; dopant spatial distributions and segregation
- novel electrical, optical, and structural characterization techniques for epitaxially grown zero-, one- and two-dimensional structures
- precise positioning, electrical contact formation and interface properties between nanoscale structures and metal contacts
- 3D heterogeneous integration, application of advanced patterning techniques for positioning and dimension control of nanostructures, integration with NEMS, functionalization.
The aim of this symposium is to offer a forum of discussion for scientists, engineers, and industrials involved in material challenges for 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, and the role and contribution of solar hydrogen towards sustainable energy production will be discussed. Interested individuals from academia, national laboratories, and industries are kindly invited to contribute to this conference by submitting their abstract on the following topical areas:

- emerging new photocatalysts for solar water splitting
- recent advances in synthetic techniques for preparation of photocatalysts
- new architectures for band gap 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 reactions at semiconductor interfaces
- energetics and electronic structure of photocatalyst semiconductor (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
- long term aqueous stability, corrosion, and photo-corrosion of semiconductors
- hydrogen generation via solar thermal (chemical) and photo-biological systems
- artificial photosynthesis: nano-leaf, tree and forest for better energy harvesting
- sustainable photocatalytic production of fuels
- national and international solar hydrogen energy systems, projects, and networks
- social, educational, environmental, and economic aspects of solar hydrogen.

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Call for Papers

NanoScience + Engineering
SPIE Optics + Photonics

Conference Chair: Sanjay Mathur, Univ. zu Köln (Germany)

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

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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The focus of this conference will be the presentation of papers dealing with emerging and advanced nano- and macrophotonic technologies appropriate for use in space and some 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 and cubesat payloads which require micro-component and systems such as MEMS, IFOG and ring laser gyro, 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, solar cells, high- and low-power laser sources, detectors, modulators, couplers, optical interconnects, multiplexers-demultiplexers, signal processing systems, guidance systems, targeting, radar, imaging, optical communications, optical limiter materials 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.

Call for Papers

Nanophotonics and Macrophotonics for Space Environments VIII (OP416)

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