First Announcement

www.mrs.org.sg

ICMAT 2009

International Conference on Materials for Advanced Technologies

28 June - 3 July 2009, Singapore

Suntec Singapore International Convention & Exhibition Centre

Organised by

MRS Materials Research Society SINGAPORE

In association with

NUS National University of Singapore

Institute of Materials Research and Engineering A*STAR

NANYANG TECHNOLOGICAL UNIVERSITY

Supported by

SINGAPORE EXHIBITION & CONVENTION BUREAU

UNIQUELY Singapore www.visitsingapore.com

HIGHLIGHTS OF PREVIOUS ICMAT

Year 2001

- 1-6 July 2001
- 16 Symposia
- 10 Plenary Lectures
- 4 Public Lectures by Nobel Laureates
- 1,400 Delegates

Year 2003

- 7-12 December 2003
- 16 Symposia
- 9 Plenary Lectures
- 2 Public Lectures by Nobel Laureates
- 1,500 Delegates

Year 2005

- 3-8 July 2005
- 25 Symposia
- 9 Plenary Lectures
- 2 Theme Lectures
- 3 Public Lectures by Nobel Laureates
- 2,200 Delegates

Year 2007

- 1-6 July 2007
- 24 Symposia
- 9 Plenary Lectures
- 2 Theme Lectures
- 2 Public Lectures by Nobel Laureates
- 2,300 Delegates

CONTACT DETAILS

ICMAT 2009 Secretariat

Materials Research Society of Singapore

c/o Institute of Materials Research & Engineering

3 Research Link,
Singapore 117602

Tel: (65) 68741975,
(65) 67781036
Fax: (65) 67772393
Email: icmat@mrs.org.sg

ABOUT THE CONFERENCE

Encouraged by the successes of ICMAT 2001, ICMAT 2003, ICMAT 2005 and ICMAT 2007 at some of which more than 2,000 members of the international scientific and materials research community representing over 40 countries attended, the Materials Research Society of Singapore will host the 5th ICMAT from 28 June to 3 July 2009 at the Suntec Singapore International Convention and Exhibition Centre (SICEC).

There will be 23 Symposia covering contemporary topics of importance for the science, engineering and technology of materials. The technical program includes Plenary, Keynote, Invited, Oral and Poster presentations. More than 50 international exhibitors from all sectors of materials science and engineering communities will also be showcasing their products and equipment during the conference.

In keeping with the previous ICMAT conferences, Nobel Laureates will speak on each morning of the conference. Some of the Nobel Laureates who are invited to give plenary lectures at the conference will also be giving public lectures at the University Cultural Centre of the National University of Singapore. These lectures will be opened to conference participants and to the general public including students from local Junior Colleges, Polytechnics and Universities.

Thus, ICMAT 2009 will be a multidisciplinary forum providing over 2,000 research scientists and engineers a first-hand learning platform, as well as the opportunity to share and exchange ideas with some of the best minds in the field.

CALL FOR ABSTRACTS

Authors are invited to submit their abstract(s) electronically via the conference website at: **www.mrs.org.sg** by **31 January 2009**.

The online abstract submission will be opened from mid-September 2008.

SCHEDULE AND DEADLINES

Receipt of Abstracts	31 January 2009
Acceptance of Abstracts	15 March 2009
Receipt of Manuscripts*	01 May 2009

** The submission deadlines for manuscripts may differ for different symposia. Please refer to the website for details.*

CONFERENCE PUBLICATION

All registered participants for the conference will receive a copy of the conference program book, a copy of the abstracts book of the symposium they have selected during registration, and a CD ROM of all abstracts accepted for the conference.

Each symposium publishes its own proceedings volume as full-length manuscripts, either as special journal issues or standalone proceedings. Whichever format is used, all papers will be peer-reviewed. Details will be available on the conference website from September 2008.

PLENARY LECTURES

(Tentative & Partial)

Albert FERT, *Nobel Laureate in Physics, Universite Paris-Sud, France*

Robert GRUBBS, *Nobel Laureate in Chemistry, Caltech, USA*

A. INOUE, *President, Tohuku University, Japan*
Title: Development and applications of Bulky Glassy Alloys

Frederick F. LANGE, *University of California, Santa Barbara, USA*
Title: A Materials World: Revolutions in Society

Chad MIRKIN, *Northwestern University, USA*
Title: Nanostructures in Biodiagnostics and Therapeutics

Sir J.B. PENDRY, *Imperial College, UK*
Title: Metamaterials and non-linear Plasmonic Phenomena

C.N.R. RAO, *FRS, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, India*

THEME LECTURES

(Tentative & Partial)

James L. HEDRICK, *IBM Research, San Jose, CA, USA*
Title: Hierarchical Supermolecular Structures for Delivery of Therapeutics

Martyn POLIAKOFF, *FRS, University of Nottingham, UK*
Title: Supercritical Fluids: Clean solvents for Cleaner Materials

PUBLIC LECTURES

(Tentative & Partial)

Albert FERT, *Nobel Laureate in Physics, Universite Paris-Sud, France*

Robert GRUBBS, *Nobel Laureate in Chemistry, Caltech, USA*

PROGRAM STRUCTURE

<table>
<tr><th></th><th>28 Jun 2009</th><th>29 Jun 2009</th><th>30 Jun 2009</th><th>1 Jul 2009</th><th>2 Jul 2009</th><th>3 Jul 2009</th></tr>
<tr><td>Early AM</td><td></td><td>Opening & Plenary</td><td colspan="4">Plenary Lectures</td></tr>
<tr><td>Late AM</td><td></td><td colspan="5">Oral Presentations</td></tr>
<tr><td>Noon</td><td></td><td></td><td colspan="3">Theme Lectures</td><td></td></tr>
<tr><td>Early PM</td><td rowspan="3">Pre-conference Registration</td><td colspan="5">Oral Presentations</td></tr>
<tr><td>Late PM</td><td colspan="3">Poster Sessions</td><td>Oral Presentations</td><td>End of conference</td></tr>
<tr><td>Evening</td><td colspan="2">Public Lectures</td><td></td><td></td><td></td></tr>
</table>

LIABILITY / DISCLAIMER

The Materials Research Society of Singapore and the Organizing Committee of of ICMAT 2009 shall not be held responsible for personal accidents, illness, losses or damage to private property of registered delegates of the ICMAT 2009. Delegates are advised to arrange for their personal insurance for the duration of the conference and tours.

Whilst every attempt will be made to ensure that all aspects of the conference mentioned in this announcement will take place as scheduled, should the need arise, the Organising Committee reserves the right to make last minute changes without prior notice.

SYMPOSIA DETAILS

SYMPOSIUM A — ADVANCED BIOMATERIALS AND REGENERATIVE MEDICINE (IN CONJUNCTION WITH 2ND ASIAN BIOMATERIALS CONGRESS)

Chair

Swee-Hin TEOH, *National University of Singapore, Singapore*

Co-Chairs

Hanry YU, *National University of Singapore, Singapore*
Fwu-Shan SHEU, *National University of Singapore, Singapore*
Tony MIKOS, *Rice University, Texas, USA*
Yasuhiko TABATA, *Kyoto University, Japan*
Hae-Ryong SONG, *Korea Universtity Medical Centre, South Korea*
JW DAI, *Inst Genetics & Dev Biology, China Academy of Sci, China*

Correspondence

Swee-Hin TEOH
National University of Singapore, 9 Engineering Drive 1, Singapore 117576
Tel: (65) 65164605, Fax: (65) 67791459
Email: mpetsh@nus.edu.sg

Scope

Biomaterials have made important contributions to health care, medical device breakthroughs and new methods of drug delivery for cancer treatment and the new tissue engineering fields. It is believed that the next break through in science is working at the interface of one or more discipline. Advanced Biomaterials and Regenerative Medicine are considered key disciplines to drive this breakthrough. Biomaterials cover wide interdisciplinary topics which include biological, metallic, polymeric, ceramic, composite, hybrid implant materials and intelligent materials. Of importance is the study of cell-biomaterial interactions and surface modification to enhance biocompatibility. The scope of the present symposium will cover macro to nano scale biomaterials engineering, including integration of medical imaging, optical microscopy and computational materials modelling techniques to evaluate the performance of biomaterials and tissue engineered organs. While emphasis is placed on basic research findings, the manufacturing and the failure analysis aspects will also be addressed. The restoring of tissues with minimal host rejection through advances in tissue engineering will also be a key focus. The present conference brings the latest trends in advanced biomaterials and regenerative medicine. Participants registered for this symposium will automatically be entitled to attend the Second Asian BioMaterials Congress.

Second Asian BioMaterials Congress (2nd ABMC)

The 1st ABMC was held successfully in Tsukuba, Japan, 6-8, Dec 2007 with more than 500 participants from major Asian countries such as Japan, Korea, China and Singapore (including Australia). Singapore was chosen for the 2nd ABMC. The 2nd ABMC will be held 2 days earlier (27 to 28 June 2009) than the official date for ICMAT2009. It will be held at the Clinical Research Centre, National University of Singapore. The venue was chosen so as to maximise interactions between researchers, provide more opportunities for oral presentations and reduce cost. This will be a unique time and biomaterials scientists will have a chance to hear some of the breakthroughs that is happening in Asia. Special registration and University accommodation has been arranged to make this event a resounding success.

Topics

- Stem cells-biomaterials interactions
- Scaffolds technology in tissue engineering
- Cell-biomaterial interactions
- Drug and gene delivery polymers and hydrogels
- Durability and corrosion issues in metallic implants
- Surface modification of implants and advanced characterisation
- Fatigue, impact failure of biomaterials
- Wear issues
- Bioceramics
- Dental biomaterials
- Intelligent biomaterials
- Self-assembling biomaterials
- Hybrid biomaterials
- Metallic biomaterials
- Advanced manufacturing processes in biomaterials
- Noninvasive evaluation, optical imaging technology
- Bio-nanotechnology
- Bioreactors technology
- BioMems and Biosensors technology
- Artificial organs, Bone, Liver, Cardiovascular tissue engineering
- Clinical case histories related to biomaterial performance
- Computer simulations of biomaterial behaviour
- Bioresorbables biomaterials (including resorbable polymers and metals such as Mg)

SYMPOSIUM B NANOMATERIALS FOR BIOIMAGING AND BIOSENSING

Chairs

Hsiao-hua YU, *Institute of Bioengineering and Nanotechnology, Singapore*
S. Tamil SELVAN, *Institute of Bioengineering and Nanotechnology, Singapore*

Co-Chairs

Paul MULVANEY, *University of Melbourne, Australia*
Hsian-Rong TSENG, *UCLA, USA*
Luis M. LIZ-MARZAN, *University of Vigo, Spain*

Correspondence

S. Tamil SELVAN
Institute of Bioengineering andNanotechnology,
31 Biopolis Way, The Nanos, #04-01, Singapore 138669
Tel: (65) 68247133, Fax: (65) 64789084
Email: selvan@ibn.a-star.edu.sg

Scope

Advanced nanomaterials display unique robustness, physical and chemical properties. They offer a myriad of opportunities to couple analyte-receptor interactions into observable and transduced signals. They also provide unique opportunities for bioimaging applications. In this symposium, different aspects and types of nanomaterials for bioimaging and biosensing will be covered. The objective is to draw a diverse group of researchers including chemists, material scientists, physicists, engineers, medical doctors, and biochemists to discuss new ideas, experimental findings, prototypes, and challenges ranging from synthesis, and characterization to the application of nanomaterials for bioimaging and biosensing.

Topics

Nanomaterials for Bioimaging

- Quantum Dots – Synthesis, Properties, and Surface Functionalization

- Metallic and Magnetic Nanoparticles – Synthesis, Properties, and Surface Functionalization
- Synthesis, Shape Control and Assembly of Nanorods, Nanotubes, and Nanowires
- Composites of Heterogeneous Nanostructures
- Nanomaterials for Targeting and Labeling
- Magnetic Nanoparticles for Bioimaging, Bioseparation and Drug Targeting
- Multifunctional Nanoparticles for Biolabeling, Bioseparation and Bioimaging
- Nanomaterials for Biosensing

Molecular Design and Synthesis of Nanomaterials for Sensing

- Bioconjugate Chemistry to Link Nanomaterials with Biomolecules
- Singal Transducing Mechanisms between Analyte/Receptor and Nanomaterials
- Nanoparticles, Nanorods, and Nanowires for Molecular and Biological sensing
- Nanostuctured Polymers and Polymer Thin Films for Biosensing
- Nanomaterials-Based Electronic Devices for Molecular and Biological Sensing
- Integration of Nanomaterials to Diagnostic and Bioinformatic systems

Keynote Speakers (Tentative & Partial)

Horst WELLER, *University of Hamburg, Germany*
Jackie Y. YING, *Institute of Bioengineering and Nanotechnology, Singapore*

Invited Speakers (Tentative & Partial)

Pi-Tai CHOU, *National Taiwan University, Taiwan*
Anthony GUISEPPI-ELIE, *Clemson University, U.S.A.*
Nicholas A. KOTOV, *University of Michigan, U.S.A.*
Liberato MANNA, *National Nanotechnology Laboratory, Italy*
Chung-Yuan MOU, *National Taiwan University, Taiwan*
Wolfgang J. PARAK, *Philipps Universitaet, Marburg, Germany*
Bengang XING, *Nanyang Technological University, Singapore*
Ramón ÁLVAREZ-PUEBLA, *Universidade de Vigo, Spain*

SYMPOSIUM C ADVANCED DELIVERY OF THERAPEUTICS: NEW CHALLENGES FOR MATERIALS

Chair

Yi-Yan YANG, *Institute of Bioengineering and Nanotechnology, Singapore*

Co-Chairs

Shu WANG, *National University of Singapore, Singapore*
Andrew GEORGE, *Imperial College London, UK*
Dan LUO, *Cornell University, USA*
Kazunori KATAOKA, *University of Tokyo, Japan*

Correspondence

Yi-Yan YANG
Institute of Bioengineering and Nanotechnology
31 Biopolis Way, The Nanos, #04-0, Singapore 138669
Tel: (65) 68247106, Fax: (65) 64789084
Email: yyyang@ibn.a-star.edu.sg

Scope

This symposium will highlight current challenges and new concepts in the delivery of therapeutics including small molecular drugs, peptides, proteins, nucleic acids and cells, and mainly focus on cancer therapy. Topics will address biological barriers for delivery of therapeutics, and novel materials that are designed and developed to overcome these barriers. In addition, strategies for combinatorial drug delivery will be discussed to combat multidrug-resistant problems.

Topics

- Nano-structured materials including polymers and organic/inorganic hybrids
- Novel materials based on synthetic peptides, nucleic acids and polymer constructions
- Novel delivery approaches for therapeutic drugs, peptides, proteins and genes
- Delivery of cell-based therapies and immunotherapy
- Nanotoxicology

Keynote Speakers (Tentative & Partial)

Ruth DUNCAN, *Cardiff University, UK*
Andrew GEORGE, *Imperial College London, UK*
Craig HAWKER, *University of California Santa Barbara, USA*
James L. HEDRICK, *IBM Research, USA*
Kazunori KATAOKA, *The University of Tokyo, Japan*
Kam W. LEONG, *Biomedical Engineering, Duke University, USA*
Dan LUO, *Cornell University, USA*
Jackie YING, *Institute of Bioengineering and Nanotechnology, Singapore*

Invited Speakers (Tentative & Partial)

Sangyong JON, *Gwangju Institute of Science and Technology (GIST), Korea*
Terry D. TETLEY, *Imperial College London, UK*
Jun WANG, *University of Science and Technology of China, China*
Shu WANG, *National University of Singapore*
Ho Sup YOON, *Nanyang Technological University, Singapore*

SYMPOSIUM D FUNCTIONAL CERAMIC MATERIALS, OXIDE THIN FILMS AND HETEROSTRUCTURES

Chairs

Hans HILGENKAMP, *University of Twente, The Netherlands*
Jun Min XUE, *National University of Singapore, Singapore*

Co-Chairs

Venky VENKATESAN, *National University of Singapore, Singapore*
John WANG, *National University of Singapore, Singapore*

Correspondence

Hans HILGENKAMP
Faculty of Science and Technology
University of Twente, P.O. Box 217, 7500 AE Enschede, The Netherlands
Email: H.Hilgenkamp@utwente.nl

Jun Min XUE
Dept. of Materials Science and Engineering, NUS, Singapore
Tel: (65) 65164655, Fax: (65) 67763604
Email: msexuejm@nus.edu.sg

Scope

This symposium is aimed at providing a forum for participants from academic, research and development, and industrial communities worldwide to exchange latest information and progress on functional ceramic materials, oxide thin films and heterostructures. It also addresses the future development of functional ceramic materials and oxide thin films for electrical, electronic, magnetic, optical, optoelectric and functional applications. Topical areas will cover all the new and rapidly developing areas of functional ceramic materials, oxide thin films and heterostructures, fabrication, physical and functional properties as well as their applications.

Topics

- Ferroelectric and piezoelectric ceramic materials
- Electronic properties of complex oxide thin films and heterostructures
- Multiferroics
- High-K and low-K materials
- Transparent conducting oxides
- High-Tc superconductors
- Magnetic materials and applications
- Mesoporous materials, nanohybrids and thin films
- Materials for photovoltaics and sustainable energy
- Complex oxide thin film growth techniques with atomic control
- Mott metal-insulator transition
- Interface electronic effects
- Defects and dopants
- In situ diagnostics (e.g. RHEED at high oxygen pressures)
- New characterization techniques

SYMPOSIUM E NANOSTRUCTURED MAGNETIC MATERIALS AND THEIR APPLICATIONS

Chairs

Jun DING, *National University of Singapore, Singapore*
S. N. PIRAMANAYAGAM, *Data Storage Institute, Singapore*

Co-Chairs

Gan Moog CHOW, *National University of Singapore, Singapore*
Jingsheng CHEN, *National University of Singapore, Singapore*
Ganping JU, *Seagate Research (Pittsburgh), USA*

Correspondence

Jun DING
Department of Materials Science & Engineering
National University of Singapore, Singapore 119260
Tel: (65) 65164317 Fax: (65) 67763604
Email: msedingj@nus.edu.sg

Scope

This symposium focuses on nanostructured magnetic materials with the emphasis on various applications, such as data storage, electronics and biomagnetics. The topics of the symposium include magnetic recording, spintronics, magneto-optics, magneto-mechanics, hard & soft magnets and modelling/simulation. Efforts will be made to publish selected papers in an ISI journal.

Topics

- Magnetic thin films and nanostructures in magnetic recording (recording media and read/write devices)
- Magneto-electronic, magneto-optic and magneto-mechanical properties of nanostructured magnetic materials
- Nanomagnets with high energy products
- Nanomagnets in soft-magnetic and microwave applications
- Nanostructured Magnetic materials for bio-medical applications
- Domain structure and magnetization reversal mechanisms of magnetic nanostructures
- Modeling/simulation of magnetic nanostructures

Keynote Speakers (Tentative & Partial)

J.N. CHAPMAN, *University of Glasgow, UK*
C.L. CHIEN, *John Hopkins Univesity, USA*

T.C. CHONG, *Data Storage Institute, Singapore*
J.M.D. COEY, *Trinity College, Dublin, Ireland*
Stuart S.P. PARKIN, *IBM Fellow Director, IBM Almaden Research Center*
M.E. WELLEND, *University of Cambridge, UK*

SYMPOSIUM F — NANOSTRUCTURED MATERIALS FOR ELECTROCHEMICAL ENERGY SYSTEMS: LITHIUM BATTERIES, SUPERCAPACITORS AND FUEL CELLS

Chair

Balaya PALANI, *National University of Singapore, Singapore*

Co-Chairs

San Ping JIANG, *Nanyang Technological University, Singapore*
B.V.R. CHOWDARI, *National University of Singapore, Singapore*

Correspondence

Balaya PALANI
Engineering Science Programme, Faculty of Engineering, Block E3A, #04-23
National University of Singapore, 7 Engineering Drive 1, Singapore 117574
Tel: (65) 65167644, Fax: (65) 67754710
Email: mpepb@nus.edu.sg

Scope

This symposium will provide an excellent opportunity to bring together experts in the area of energy conversion and storage. Nanomaterials have shown unusual and exciting performances in the area of electrochemical energy systems due to enhanced surface to volume ratio and reduced transport length for the charge carriers, ions and electrons. Number of novel mechanisms has been introduced recently for the energy conversion and storage due to nanocrystallinity. Members belonging to materials community will be highly benefited as this symposium is expected to provide an excellent exposure for them to exploit the usage of nanostructured materials in various electrochemical systems such as fuel cells, lithium batteries and supercapacitors.

Topics

- Fundamentals, theory and modeling of energy conversion and storage
- Lithium batteries: cathode materials - insertion reaction
- Lithium batteries: Anode Materials - insertion, alloy and conversion reactions
- Fuel cells: low temperature fuel cells
- Fuel cells: high temperature fuel cells
- Supercapacitors

Invited Speakers (Tentative & Partial)

Jamnik JANEZ, *National Institute of Chemistry, Slovenia*
Hong LI, *Chinese Academy of Sciences, China*
Ménétrier MICHEL, *ICMCB-CNRS, France*

SYMPOSIUM G — PLASMONICS AND APPLICATIONS

Chairs

Boris LUK'YANCHUK, *Data Storage Institute, A*STAR, Singapore*
Daniel S. PICKARD, *National University of Singapore, Singapore*

Co-Chairs

Mark BRONGERSMA, *Stanford University, USA*
Girsh BLUMBERG, *Bell Laboratories, Murray Hill, USA*
Erping LI, *Institute for High Performance Computing, Singapore*

Correspondence

Daniel S. PICKARD
National University of Singapore
Department of Electrical and Computer Engineering
Block E4, Level 5, Room 45, 4 Engineering Drive 3, Singapore 117576
Tel: (65) 65167116, Fax: (65) 67791103
Email: elepds@nus.edu.sg

Scope

There is a growing interest in the sub-wavelength control and manipulation of electromagnetic energy at optical frequencies (nano-photonics). A rapidly expanding branch of this field, plasmonics, aims at harnessing the unique properties of surface plasmon polaritons (SPPs) to miniaturize optical components to the nanoscopic dimensions of their electronic counterparts. Metallic nanostructures can also be fabricated to concentrate and locally enhance the electromagnetic fields by orders of magnitude. This effect is achieved by either engineering the metallic nanostructures to function as optical antennas or by controlling the illumination conditions to launch SPPs at a metal-vacuum or metal-dielectric interface. The potential applications of these phenomena span many disciplines and include high speed nano-scale interconnects, meta-materials, chemical and biological sensing, sub-wavelength optics and waveguides, near-field optical trapping, high-density data storage, and the enhancement of non-linear effects.

Topics

- Surface Plasmon Polaritons
- Imaging techniques of surface plasmon-polaritons
- 2D optics on metallic films
- Non-linear interactions in metals
- Stimulated light or electron emission by surface plasmons
- Computational electromagnetics for plasmonics
- Surface plasmon polariton band-gap structures
- Surface plasmon wave guide structures
- Resonant optical structures: both optical antennas and enhanced transmission apertures
- Applications of surface plasmons in IC interconnects, high density data storage and sensing applications

Keynote Speakers (Tentative & Partial)

Harry ATWATER, *California Institute of Technology, USA*
Naomi HALAS, *Rice University, USA*

Invited Speakers (Tentative & Partial)

V.M. AGRANOVICH, *Institute of Spectroscopy, Russian Academy of Science, Troizk, Russia*
A. BOLTASSEVA, *Technical University of Denmark, Lyngby, Denmark*
B. CHICHKOV, *Laser Zentrum Hanover, Germany*
T.C. CHONG, *Data Storage Institute, A*STAR, Singapore*
A. DEREUX, *l'Universite de Bourgogne, France*
M.H. HONG, *Data Storage Institute, A*STAR, Singapore*
Le-Wei LI, *National University of Singapore*
O.J.F. MARTIN, *EPFL, Lausanne, Switzerland*
E. OZBAY, *Nanotechnology Research Center, Bikent University, Ankar, Turkey*
J.B. PENDRY, *Imperial College, London, UK*
V. SHALAEV, *Purdue University, USA*
M.I. STOCKMAN, *Georgia State University, Atlanta, Georgia, USA*
M. STUKE, *Max-Plank-Institute fur biophysikalische Chemi, Gottingen, Germany*
R. THAMPURAN, *Institute of High Performance Computing, A*STAR, Singapore*

H.X. XU, *Institue of Physics, Chinese Academy of Science, Beijing, China*
E. YABLONOVITCH, *University of California, Berkeley, USA*
A. ZAKHIDOV, *UTD NanoTech Institute, Richardson, USA*
N.I. ZHELUDEV, *University of Southampton, UK*
R. ZIA, *Brown University, USA*

SYMPOSIUM H — CARBON NANOTUBES: SYNTHESIS, CHARACTERISATION AND APPLICATIONS

Chair

Patrick POA, *Institute of Materials Research and Engineering, Singapore*

Co-Chairs

Yuan CHEN, *Nanyang Technological University, Singapore*
Lain-Jong LI, *Nanyang Technological University, Singapore*
Ravi SILVA, *University of Surrey, U.K.*
John ROGERS, *UIUC, U.S.A.*

Correspondence

Patrick POA
Institute of Materials Research and Engineering
3 research link, Singapore 117602
Tel: (65) 68727749, Fax: (65) 68727744
Email: patrick-poa@imre.a-star.edu.sg

Scope

Carbon nanotubes are one of the most important building blocks and materials in nanotechnology. Their unique combination of nano-sized diameter with macroscopic length scale has lead to many new phenomena and properties. Progress in large-scale synthesis, control of their structural properties, thin film transparent electrodes and nano-composites continues to widen their application in many new technologies.

Carbon nanotube research has over a short period time generated sufficient critical mass to be known as emerging technology on its own. This material is of high importance to the materials research community as it covers a broad range of fundamental understanding in nano-science as well as applications.

Topics

- Synthesis of carbon nanotubes
- Optical Spectroscopy
- Theory and Characterization of Nanotubes
- NEMS and Related Properties
- Electronics and Related Properties
- Physical Properties and Devices
- Biological and Chemical Properties and Devices
- Device Integration

SYMPOSIUM I — CARBON RICH MATERIALS (CRMs) AND APPLICATIONS

Chair

Valiyaveettil SURESH, *Department of Chemistry, National University of Singapore, Singapore*

Co-Chairs

Kian Ping LOH, *Department of Chemistry, NUS, Singapore*
Furong ZENG, *IMRE, Singapore*
Klaus MUELLEN, *Max-Planck Institute for Polymer Research*
Barbaros, *Physics (NUSNNI), NUS*

Correspondence

Valiyaveettil SURESH
Department of Chemistry S9-05-12,
National University of Singapore, 3 Science Drive 3, Singapore 117543
Tel: (65) 65164327, Fax: (65) 67791691
E-mail: chmsv@nus.edu.sg

Scope

Research and development of carbon rich materials (CRMs) hold a key to new generation of technologies and industries. Even though many carbon rich materials (e.g. diamond, graphite, fullerene, carbon nanotubes, carbon fibers)1 are known and used by the industry, there are plenty of room to discover new compounds from carbon. Such optimism stems from the fact that elemental carbon has the unique feature of high stability and optimum reactivity. In addition, many industries use carbon for various applications, which range form adsorbents for pollutants to electronic industries. The symposium will review the state-of the-art development in this emerging area.

Topics

- Graphenes
- Carbon rich oligomers and polymers
- Amorphous and crystalline carbon forms
- Nanostructured carbon
- New sources for carbon
- Devices and applications

SYMPOSIUM J NANODEVICES AND NANOFABRICATION

Chair

Qing ZHANG, *Nanyang Technological University, Singapore*

Co-Chairs

Carl V. THOMPSON, *Massachusetts Institute of Technology, USA*
Bill MILNE, *University of Cambridge, UK*
Wei ZHOU, *Nanyang Technological University, Singapore*

Correspondence

Qing ZHANG
School of EEE, Nanyang Technological University
50 Nanyang Ave, Singapore 639798
Tel: (65) 67905061, Fax: (65) 67933318
Email: eqzhang@ntu.edu.sg

Scope

A variety of devices at nanometer scale / molecular scale for electronic, photonics, optoelectronics, biological and mechanical applications have been created through a rapid development of materials and fabrication technology. Further development of such devices strongly depends on the state-of-the-art knowledge of science and technology at the sub-100nm length scale. The objective of this symposium is to present up-to-date and highlights some of the key advances in the following topics.

Topics

- Electronic and optoelectronic devices of nanometer scale / molecular scale
- Nanomechanics and NEMS
- Electromechanical coupled devices
- Manipulation and aligning processes at nanometer scale / molecular scale
- Quantum phenomena
- Modeling of nanodevices and nanostructures
- Fabrication and property characterization of nanodevices
- Nanofabrication with focused beam technology, e.g., focused ion beam, laser and proton beam.

SYMPOSIUM K NANO PATTERNING & SURFACE CHARACTERIZATION

Chairs

Isabel RODRIGUEZ, *Institute of Materials Research and Engineering, Singapore*
Hua ZHANG, *Nanyang Technological University, Singapore*

Co-Chairs

Andrew T.S. WEE, *National University of Singapore*
Lars MONTELIUS, *Lund University, Sweden*
Li-Jun WAN, *Chinese Academy of Sciences, China*

Correspondence

Isabel RODRIGUEZ
Institute of Materials Research and Engineering, Singapore
Research Link, Singapore 117602
Tel: (65) 68748137, Fax: (65) 68720785
Email: i-rodriguez@imre.a-star.edu.sg

Scope

New functional nanostructured surfaces have emerged with applications that go beyond information and data storage to optics and biomedicine. In particular, nanofabrication technologies applied to polymers have enabled the development of new products such as organic electronic displays, sensors, flexible solar cells and biofluidic devices. SPM technologies are invaluable research tools for patterning and characterization of surface morphologies, surface properties and interactions of materials at the nanometer scale.

The symposium is intended to be a forum devoted to advances in nanopatterning and surface characterization technologies that enable the successful development and expansion of materials science into new fields of application.

Topics

- Nanoimprint lithography
- Micro- and nano-contact printing
- Edge & nanosphere lithography
- 2-Photon lithography
- Scanning beam lithographic techniques
- Bottom-up nanofabrication: self-assembly and templated growth
- Atom and molecular manipulation
- Scanning probe lithography
- Surface structure characterization at nanoscale
- Tip preparation and functionalization
- Theory of probe-matter interactions

Invited Speakers (Tentative & Partial)

Ryutaro MAEDA, *National Institute of Advanced Industrial Science and Technology (AIST), Japan*
Yong CHEN, *Ecole Normale Supérieure, Paris, France*
Yoshihiko HIRAI, *Osaka Prefecture University, Japan*
Francesco STELLACCI, *Massachusetts Institute of Technology (MIT), USA*
Jason J DAVIS, *University of Oxford, UK*
Seunghun HONG, *Seoul National University, Korea*
Chang LIU, *Northwestern University, USA*
Li-Jun WAN, *Chinese Academy of Sciences, China*
Kornelius NIELSCH, *University of Hamburg, Germany*
Emmanuel DELAMARCHE, *IBM Zurich Research Laboratory, Switzerland*
Hideki MASUDA, *Tokyo Metropolitan University, Japan*
Kai WU, *Peking University, China*

SYMPOSIUM L NEMS/MEMS TECHNOLOGY AND DEVICES

Chairs

Ai-Qun LIU, *Nanyang Technological University, Singapore*
T. BOUROUINA, *ESIEE, France*

Co-Chairs

Vincent, LEE Chengkuo, *National University of Singapore, Singapore*
Hua LI, *Nanyang Technological University, Singapore*
Gwo-Bin LEE, *National Cheng Kung University, Taiwan*
T. FUJITA, *The University of Tokyo, Japan*
Franck Alexis CHOLLET, *Nanyang Technological University*

Correspondence

Ai-Qun LIU
School of Electrical & Electronic Engineering,
Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798
Tel: (65) 67904336, Fax: (65) 67920415
Email: eaqliu@ntu.edu.sg

Scope

The emphasis of this symposium is on Nanoelectromechanical Systems (NEMS) /Microelectromechanical Systems (MEMS) technology and devices. Particularly applications that involve MEMS design, modeling, fabrication processes (e.g. semiconductors, polymers, etc.) lab-on-a-chip, and biophotonic medical devices (e.g. DNA, protein and cell sorting, etc.) are preferred. This symposium will explore new devices and processes innovation and engineering applications, especially related to NEMS/MEMS technology and devices.

Topics

- Theory, Design, Analysis of MEMS and NEMS
- Materials and Device Characterization
- Fabrication Technologies
- Packaging and Assembly Technology
- Mechanical and Physical Sensors
- Chemical Sensors and Microsystems
- BioMEMS and Fluidic Systems
- Actuators and micro-structure modeling
- Optical MEMS and nanophotonic (PBG, QD and plasmonics)
- RF MEMS devices and switching circuits
- Sensing System, Algorithm and Sensor Networks
- Nanotechnology and NEMS Devices
- Lab-on-a-chip and uTAS devices
- Plasmonic MEMS and devices

SYMPOSIUM M DNA NANOSCIENCE AND PHYSICS

Chairs

Johan R.C. VAN DER MAAREL, *National University of Singapore, Singapore*
Jie YAN, *National University of Singapore, Singapore*

Co-Chair

Daniel LUBRICH, *National University of Singapore, Singapore*

Correspondence

Johan R.C. VAN DER MAAREL
Department of Physics
National University of Singapore, 2 Science Drive 3, Singapore 117542
Tel: (65) 65164396, Fax: (65) 67776126
Email: phyjrcvd@nus.edu.sg

Scope

This symposium provides a platform to discuss and present the latest developments in the exciting area of DNA nanoscience and physics. Specifically, the symposium shall focus on biophysical methods to understand the structure, dynamics and functional mechanisms of DNA from the level of the single molecule to the assembling in dense phases such as in viruses and chromatin. Another aspect of the symposium is the application of this knowledge to the design of nano-devices of technological importance based on the unique self-assembling properties of nucleic acids.

Topics

- Nanomechanics and nanostructures
- Molecular motors
- Nanofluidics and single molecule manipulation techniques
- Theoretical aspects and computer modeling
- DNA packaging

Keynote Speakers (Tentative & Partial)

Steven CHU, *Stanford University, USA*
Carlos BUSTAMANTE, *University of California Berkeley, USA*
Stephen KOWALCZYKOWSKI, *University of California Davis, USA*
Nadrian SEEMAN, *New York University, USA*
Harold GRAIGHEAD, *Cornell University, USA*

Invited Speakers (Tentative & Partial)

Phil NELSON, *University of Pennsylvania, USA*
Rob PHILLIPS, *Caltech, USA*
Vincent CROQUETTE, *Chercheur CNRS, France*
John MARKO, *Northwestern University, USA*
Andrew TURBERFIELD, *Oxford University, UK*

SYMPOSIUM N PLASTIC ELECTRONICS

Chairs

Peter HO, *Department of Physics, National University of Singapore, Singapore*
Hardy CHAN, *Department of Chemistry, National University of Singapore, Singapore*

International Chairs

Richard Friend, *Department of Physics, National University of Singapore; and Cavendish Laboratory, JJ Thomson Road, CB3 0HE, United Kingdom*

Correspondence

Peter HO
Department of Physics, National University of Singapore, Singapore
Email: phyhop@nus.edu.sg

Scope

This symposium covers recent advances in the physics, chemistry and engineering aspects of solution-processed organic semiconductors for plastic electronics applications, including organic light-emitting diodes (OLEDs), thin-film transistors (OTFTs), photovoltaics (OPVs) and memory devices. We would like to emphasise fundamental advances in materials and device physics, materials and device chemistry, device architecture; as well as applied advances in patterning and fabrication of devices (inkjet and other forms of printing or deposition methods) and circuits. Materials classes covered include solution-processed pi-conjugated polymers and oligomers, graphenes, small molecules, self-assembled monolayers, dielectric materials, and conductor materials.

Topics

- Materials and device physics and chemistry
- Device architectures (OLEDs, OTFTs, OPVs, memories, and others)

- Novel solution-processing methods (inkjet and other forms of printing)
- Organic thin-film morphology and structure-property correlations

SYMPOSIUM O

COMPOUND SEMICONDUCTOR PHOTONICS: MATERIALS, DEVICES AND INTEGRATION

Chair

Soo-Jin CHUA, *National University of Singapore/Institute of Materials Research and Engineering, Singapore*

Co-Chairs

Jung HAN, *Yale University, USA*
Hiromasa ITO, *Tohoku University, Japan*
JingHua TENG, *Institute of Materials Research and Engineering, Singapore*
Aaron DANNER, *National University of Singapore, Singapore*

Correspondence

JingHua TENG
Institute of Materials Research and Engineering (IMRE)
3 Research link, Singapore 117602
Tel: (65) 68748590, Fax: (65) 68720785
Email: jh-teng@imre.a-star.edu.sg

Scope

Photonics is a cross discipline between materials, devices, semiconductor processing and physical optics and has vast industry relevance. Semiconductors are the dominant materials used in photonics. In recent years continued progress in the research and development of new materials and devices has led to a better understanding of fundamental knowledge in electronic structures, carrier dynamics and electron-photon-phonon interactions. These have generated widespread applications in solid state lighting, imaging, displays, signal processing, chemical and biological sensing, surveillance, solar cells and wide band-width communications.

Topics

- Solid state lighting including GaN and ZnO based material development and LED fabrication
- Semiconductor lasers including edge emitting and VCSEL
- Solar cells
- Saturable optical amplifiers and absorbers
- Novel photonic materials and devices
- Heterogeneous material growth
- III-V compound semiconductor epitaxy
- Self-assembled and patterned nano-structured material growth or synthesis
- Semiconductor nanostructures growth including quantum dot, wire, well and other quantum confined system
- Metamaterials, including plasmonic structures
- Materials and engineered structures for light control
- Photonic crystals: modeling, fabrication, characterization and device application
- Nano-photonics including nano-patterning-fabrication-device
- Photonic devices and integration
- Microwave and Terahertz photonics
- Modeling and simulation of materials and devices

Keynote Speakers (Tentative & Partial)

Xi Cheng ZHANG, *Rensselaer Polytechnic Institute, USA*
Susumu NODA, *Kyoto University, Japan*
Federico CAPASSO, *Harvard University, USA*

Invited Speakers (Tentative & Partial)

Charles TU, *University of California, San Diego, USA*
Shumin WANG, *Chalmers University of Technology, Sweden*
C. JAGADISH, *Australia National University, Australia*
H. C. LIU, *IMS, National Research Council, Canada*
Alois KROST, *Otto-von-Guericke University Magdeburg, Germany*
Didier DECOSTER, *IEMN, CNRS, France*
Xiaoqing PAN, *Michigan State University, USA*
Boon Siew OOI, *Lehigh University, USA*
Zhi-Yuan LI, *Institute of Physics, ACS, China*
Hui YANG, *SINTNB, ACS, China*

SYMPOSIUM P — OPTICAL FIBER DEVICES AND APPLICATIONS

Chair

Ping SHUM, *Nanyang Technological University, Singapore*

Co-Chairs

Changyuan YU, *National University of Singapore, Singapore*
Xia YU, *Nanyang Technological University, Singapore*
John HARVEY, *University of Auckland, New Zealand*
Tanya MONRO, *University of Adelaide, Australia*

Correspondence

Ping SHUM
Network Technology Research Centre, Research Techno Plaza,
50 Nanyang Drive, Singapore 637553
Tel: (65) 67904217, Fax: (65) 67926894
Email: epshum@ntu.edu.sg

Scope

This symposium provides a platform for academics, scientists, technologists and industrial players to present innovations, exchange views, share results and discuss opinions and thoughts in the field of optical fiber. Specifically, the symposium shall focus on some novel optical fiber devices and applications, such as microstructured optical fiber, fiber grating devices and fiber sensors. Moreover, both theoretical and experimental investigations in fields like nonlinear optics, measurement techniques, packaging etc, will be covered.

Topics

- Microstructured optical fibers
- Fiber gratings and fiber grating-based devices
- Fiber-based sensors
- Nano fibers
- Acousto-optic devices
- Optical fiber amplifiers and fiber lasers
- Non-linear and polarization effects in fibers
- Fiber measurement techniques
- Splices, connectors, and fiber coupling
- Silicon photonics and polymer waveguides
- Device packaging, testing and reliability

SYMPOSIUM Q — COMPUTATIONAL MATERIALS DESIGN AT ALL SCALES: FROM THEORY TO APPLICATION

Chair

Khin Yong LAM, *Nanyang Technological University, Singapore*

Co-Chairs

Ping WU, *A*STAR Institute of High Performance Computing, Singapore*
Yuan Ping FENG, *National University of Singapore, Singapore*

Teng Yong NG, *Nanyang Technological University, Singapore*
J. N. REDDY, *Texas A&M University, USA*
Joan ADLER, *Technion - Israel Institute of Technology, Israel*

Correspondence

Teng Yong NG
School of Mechanical and Aerospace Engineering
Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798
Tel: (65) 67904797
Email: mtyng@ntu.edu.sg

Scope

The availability of advanced simulation tools which are sufficiently accurate to design and predict novel materials and processes is the key to achieve a quantum leap in the way new materials are developed. In order to fully understand the macroscopic properties of novel material systems, especially new nanomaterials, it is crucial to understand/simulate the properties and mechanisms on shorter length- and time-scales, even all the way to the most fundamental mechanisms describing the chemical bonds. Thus nanoscale modeling and simulation will become increasingly important in the design and study of new nanomaterials. This symposium will provide the ideal forum for computational materials scientists and engineers to showcase their latest endeavors in this broad and exciting field of computational materials design. The symposium will cover the design and development of all novel/refined material systems, including new nanomaterials. It will range from theory to application, for which computational tools have been deployed in the process. It will also encompass the hierarchy of simulation techniques, from first principle ab initio techniques to continuum approaches and multiscale techniques.

Topics

Design and Modeling of Novel Material Systems

- electronic materials
- magnetic materials
- photonic materials
- electrochemical materials
- catalytic materials
- ionic liquids
- biomaterials
- plymetic systems
- green materials

Design and Modeling of Novel Nanomaterials

- quantum dots, nanodots, inorganic macromolecules
- nanocrystalline, nanophase, nanostructured materials
- nanorods, nanoplatelets, nanotubes, nanofibrils, quantum wires
- nanofilms, nanoholes
- nanocomposites

Modeling Techniques and Applications

- Ab Initio
- Semi-Empirical
- Empirical Molecular Dynamics
- Continuum Modeling
- Multiscale Modeling
- Artificial Intelligence
- Digital Materials Design
- Device Level Simulation

Invited Speakers (Tentative & Partial)

Jisoon IHM, *Seoul National University, Korea*
Duc NGUYEN-MANH, *Culham Science Centre, UKAEA, UK*
Sukit LIMPIJUMNONG, *Suranaree University of Technology, Thailand*
John ROBERTSON, *University of Cambridge, United Kingdom*
David J. SINGH, *Oak Ridge National Laboratory, USA*
Enge WANG, *Chinese Academy of Sciences, P.R. China*
Risto M. NIEMINEN, *Helsinki University of Technology, Finland*
Su-Huai WEI, *NREL, USA*
Vu Ngoc TUOC, *Hanoi University of Technology, Vietnam*
Christian JOACHIM, *CEMES/CNRS, France*
Sundaram BALASUBRAMANIAM, *Jawaharlal Nehru Centre for Advanced Scientific Research, India*

SYMPOSIUM R — SINGLE CRYSTALS; GROWTH AND APPLICATIONS FOR RESEARCH AND INDUSTRY

Chair

Christian KLOC, *Nanyang Technological University, Singapore*

Co-Chairs

Wenping HU, *Institute of Chemistry, Chinese Academy of Science, China*
Fang-Cheng CHOU, *National Taiwan University, Taiwan*

Correspondence

Christian KLOC
School of Materials Science & Engineering
Nanyang Technological University, Nanyang Avenue, Singapore 639798
Tel: (65) 67904716, Fax: (65) 67909081
Email: ckloc@ntu.edu.sg

Scope

This symposium will cover the field of growth and application of single crystals of considerable scientific and technological interest. Availability of high quality single crystals continuously determines the pace of progress in many areas of condensed matter physics; like for example in semiconductors, ferroelectrics, magnetics, optoelectronics, organic microelectronics or superconductivity. Crystal growth from its very beginning has included experts from different disciplines currying on interdisciplinary research focused on samples for basic research, technology or commercial interest. This symposium should encompass single crystal growers with single crystal users. Should help crystal growers to define current needs for samples leading to breakthrough enabling materials as well as allows crystal users to formulate the critical parameters achievable in crystal growth laboratories. This symposium will focus on interactions between growth, purity, quality or structure and physical properties. This symposium will provide a forum for exploring current results inspired by availability of single crystals. Abstracts are solicited on all aspects of properties and characterization of single crystals emerging from perfection of crystal growth technology.

Topics

- Methods and technologies of single crystal growth
- Purity, structure, defects and characterization of crystals
- Specific substances: organic and inorganic crystals
- Intrinsic properties resulted from high quality of crystals
- Crystalline samples required for basic research
- Crystals of electronic materials
- Anisotropy of physical properties
- Growth of crystals composed from biological molecules
- Selected high impact crystals, GaN, AlN, SiC, diamond,

- Classical industry crystals, Si, GaAs, quartz
- Single crystals of organic semiconductors
- New materials and methods

SYMPOSIUM S NOVEL ROUTES OF SOLUTION PROCESSING

Chairs

K. BYRAPPA, *University of Mysore, India*
Gregory K.L. GOH, *IMRE, Singapore*

Co-Chairs

Richard E. RIMAN, *Rutgers University, USA*
Shouhua FENG, *Jilin University, China*
Tadafume ADSCHIRI, *Tohoku University, Japan*

Correspondence

K. BYRAPPA
University of Mysore, P.B. No. 21, Manasagangotri P.O., Mysore 570 006, India
Tel: +91-821-2419720 / +91-821-2515346, Fax: +91-821-2515346
Email: kbyrappa@gmail.com

Scope

This symposium provides a perfect platform for academics, researchers, technologists and industrial players to meet and discuss the latest developments in the area of novel routes of solution processing to fabricate advanced materials covering polyscale crystals, particles, films, composites, nanostructures, patterned materials, etc. The symposium will focus also on the in situ fabrication and intelligent engineering of functional materials, thermochemical modelling, reactions kinetics, transport kinetics and crystallization kinetics.

Topics

- Nature inspired, Biomimetic, Bio-inspired, Geomimetic Solution Processing. Geothermal reactors.
- Solution processing - Conventional Methods and Novel Methods including CBD, Soft Solution Processing, Spray Pyrolysis, Solution Plasma Processing, High Temperature Solution, Wet Chemical Processing, Hydrothermal, Solvothermal, Supercritical Fluid Technology, Ammonothermal, Glycothermal, methods, Hydrothermal-epitaxy, Direct write technology, etc.
- Multi-Energy Solution Processing of Materials: Mechanochemical, Sonochemical, Microwave, Electrochemical, etc., in combination with conventional solution routes.
- In situ fabrication of functional products from Novel Solution Routes.
- Thermochemical modeling, Reaction Kinetics, Transport Kinetics, Crystallization Kinetics.
- Solution processing of Technological Materials and their applications including semiconductor, ceramic, optoelectronic, photonic, negative index, catalysis, treatment, sensors, biomedical and next generation display applications; Polyscale Crystals - Bulk single crystals, Fine crystals, Nanocrystals; Thin Films; Fibers; Nanomaterials - nanotubes, nanosheets, nanosphere, nanowires, nanoprobes, nanoscale films, nanocarriers, Composites – bulk to nano size, organic-inorganic composites; Patterned materials, etc. Solution routes for recycling, green chemistry.

SYMPOSIUM T

ADVANCED COMPONENT MANUFACTURE FROM LIGHT MATERIALS

Chair

Anders Eric Wollmar JARFORS, *Singapore Institute of Manufacturing Technology, Singapore*

Co-Chairs

Karl-Ulrich KAINER, *GKSS Research Centre Geestacht GmbH, Germany*
John Ming Shyan YONG, *Singapore Institute of Manufacturing Technology, Singapore*
Ming Jen TAN, *Nanyang Technological University, Singapore*

Correspondence

Anders Eric Wollmar JARFORS
71 Nanyang Drive, Singapore 638075
Tel: (65) 67938576, Fax: (65) 67925362
Email: anders.jarfors@simtech.a-star.edu.sg

Scope

The focus will be process innovation, development and modeling with particular focus on material and part performance related to advanced manufacturing of light materials. The light materials covered are Al, Ti, Mg-alloys and Ti- or Al-based intermetallics. Ad¬vanced processing will cover processes primarily relevant to the automotive, aerospace end 3C sectors to generate both sheet metal components and structural parts made by casting, powder metallurgical means (including reactive processing) as well as assemblies by joining. Particularly important is the performance of the material at the component level and the effects of the processing route and the micro structural changes of the material.

Topics

- Superplastic Forming, Creep Age Forming and Quick Plastic Forming, Rotary forming and similar.
- PM-components, with special focus on reactive materials such as Mg and reaction processing of intermetallics.
- Advanced joining processes such as Friction Stir Welding, Electron Beam Welding, Self-Piercing Rivets and Adhesive joining.
- Machining related problems for high precision components made from light materials.
- Microstructural control in components and component performance, especially at elevated temperature or under fatigue loading and associated failure characteristics.
- Joining process and influence on the component performance under fatigue load and impact.
- Implementation of new processes and the implication on material related matters following scale up for part soundness, quality and tolerance control. and replication of lab-scale results

Keynote Speaker (Tentative & Partial)

Karl-Ulrich KAINER, *GKSS Research Centre Geestacht GmbH, Germany*

Invited Speakers (Tentative & Partial)

Manoj GUPTA, *National University of Singapore, Singapore*
Taylan ALTAN, *Ohio State University, USA*
Ingvar L SVENSSON, *Jönköping University, Sweden*
Ekkard BRINKMEIER, *University of Bremen, Germany*
Gerhard HIRT, *RWTH Aachen, Germany*
B. S. S. DANIEL, *Indian Institute of Technology, Roorkee, India*

SYMPOSIUM U

MECHANICAL BEHAVIOR OF MICRO- AND NANO-SCALE SYSTEMS

Chair

Kaiyang ZENG, *National University of Singapore, Singapore*

Co-Chairs

Zhong CHEN, *Nanyang Technological University, Singapore*
Ming DAO, *Massachusetts Institute of Technology, USA*
Upadrasta RAMAMURTY, *Indian Institute of Science, India*
Yongwei ZHANG, *National University of Singapore, Singapore*

Correspondence

Kaiyang ZENG
Department of Mechanical Engineering,
National University of Singapore, 9 Engineering Drive 1, 117576, Singapore
Tel: (65) 65166627, Fax: (65) 67791459
Email: mpezk@nus.edu.sg

Scope

With ever-increasing miniaturization and the prominence of nano-scale materials and systems for engineering, functional and biological applications, understanding of the mechanical behavior of the nano- and micro-scale materials/systems becomes critical to the technological progress. Issues concerning mechanical response and reliability pervade wide ranging areas, from bulk materials to thin films, from crystalline materials to amorphous materials, from monophase materials to advanced composite materials, from thin films in microelectronic circuits, displays, MEMS/NEMS to coatings for wear resistance or thermal protection. The techniques that are developed for these purposes, such as the micro-mechanical testing, nanoindentation, Atomic Force Microscopy, continuum mechanics modeling and molecular level modeling also enable the study of some fundamental aspects of mechanical behavior of materials at nano to micron levels. Examples include deformation and fracture of biological materials, amorphous metals, interfaces, polymer-based composites and so on.

This symposium is a continuation of the successful symposium in ICMAT 2005, it aims to bring together active researches working on various experimental and modeling aspects of mechanical behavior of nano- and micro-systems, advanced materials, thin films, and biological materials together to discuss the current status and identify future research opportunities.

Topics

- Mechanical behavior of nanostructured materials
- Mechanical behavior of thin films and multilayer systems
- Modeling and experimental aspects of Instrumented-indentations
- Mechanical behavior of biological materials at micro- and nano-scales
- Tribology and wear mechanisms of advanced materials
- Size effect on the mechanical properties of small structures
- Modeling of mechanical behavior of the nanostructured materials
- Multi-scale simulations of mechanical behavior of nano and micro scale systems
- Application of SPM on characterizing mechanical behavior of micro- and nano-scale systems
- Mechanical behaviors of advanced materials such as amorphous materials, composites, functional materials including piezoelectric or ferroelectric materials.
- Mechanical behaviors of nanostructures, such as nanotubes, nanorods, nanorings and nanobelts, etc

Keynote Speaker (Tentative & Partial)

Huajian Gao, *Brown University, USA*

Invited Speakers (Tentative & Partial)

Lei LU, *Institute of Metal Research, Chinese Academy of Sciences, China*
Michelle OYEN, *Cambridge University, UK*
Upadrasta RAMAMURTY, *Indian Institute of Science, India*
Sujeet Kumar SINHA, *National University of Singapore, Singapore*
Vincent TAN, *National University of Singapore, Singapore*
Yueguang WEI, *Institute of Mechanics, Chinese Academy of Sciences, China*

SYMPOSIUM V MATERIALS EDUCATION: NEW TOOLS AND RESOURCES

Chairs

John BAGLIN, *IBM Almaden Research Center, USA*
B.V.R. CHOWDARI, *National University of Singapore, Singapore*

Co-Chairs

Laura M. BARTOLO, *Kent State University, USA*
Tim J WHITE, *Nanyang Technological University, Singapore*

Correspondence

J.E.E. BAGLIN
IBM Almaden Research Center, K10/D1
650 Harry Road, San Jose, CA 95120, USA
Tel: +1 408 927 2280
Email: baglin@almaden.ibm.com

Scope

An unprecedented variety of excellent resources readily available today offers opportunities for creating, polishing, and sustaining dynamic, compelling, and state-of-the-art programs in materials education. And new curricula, new software, new web resources, new literature, new lab modules, and new facilities are actively being developed. This Symposium invites innovators in these areas to discuss their works-in-progress, and invites presentations of new, successful teaching tools and strategies. It especially seeks to present summaries and reviews of available resources (such as modules online or on CD, or great reference sources) that will be useful for all those seeking to update and enrich their materials education activities at levels including K-14, undergraduate, graduate, continuing education, and community outreach.

Topics

- Interdisciplinary programs, e.g., nano-bio, eco-science, energy, water resources, environment, economics, etc.
- New software modules and online resources
- Lab modules and class demonstration materials
- Useful web sites
- Distance learning
- Integration of materials topics in K-12, university, and public education
- Assessment of new programs
- Student research as a learning tool
- Shared major facilities for research/teaching
- Virtual labs and instrumentation
- Community outreach activities. Exhibits. Contests. Public Policy

Special Forum

"Materials Education Strategic Roadmap?"

SYMPOSIUM W — GEM⁴ SYMPOSIUM ON INFECTIOUS DISEASES

Chairs

Peter PREISER, *Nanyang Technological University, Singapore*
Mike KEMENY, *National University of Singapore, Singapore*

Co-Chairs

Paul MATSUDAIRA, *MIT, USA*
Vincent CHOW, *National University of Singapore, Singapore*
Laurent RENIA, *SIgN, Singapore*
Thomas Dick, *Novartis Institute of Tropical Diseases, Singapore*
Chwee Teck LIM, *National University of Singapore, Singapore*
Richard SUGRUE, *Nanyang Technological University, Singapore*

Scope

This symposium aims to provide a platform for scientists in the area of infectious diseases to come together and share recent developments. Special emphasis will be on new technologies in terms of detection, imaging, drug and vaccine delivery and structural approaches. Cross disciplinary interaction with the ICMAT meeting on materials will be emphasised. Furthermore, infectious diseases in relation to basic research as well as clinical aspects will be covered.

Topics

- Drug discovery and Delivery
- Vaccine development
- Host pathogen interaction
- Bioimaging and tools for structural biology
- Diagnostics
- Biofilms in clinical applications
- Clinical and field related challenges

SPONSORSHIP & EXHIBITION OPPORTUNITIES

Sponsors / exhibitors at ICMAT 2009 will be able to:

- Build and reinforce name/brand recognition of your organization and products among the expected 2,000+ local and visiting international materials research engineers, scientists and professionals in related industries
- Promote the latest in scientific advances and discoveries
- Demonstrate your support for the materials research community and commitment to education

The exhibition will bring together related industry representatives from all over the world, thus contributing to the opening of potential markets to one's products in other countries, particularly those in the Asia-Pacific region.

It will be a unique opportunity for equipment manufacturers/suppliers to showcase their products and services to a vital research market, which is ordinarily difficult for sales people to reach.

The sponsorship & exhibition prospectus is available for download from the conference website:
www.mrs.org.sg