

3rd NANO TODAY CONFERENCE

DECEMBER 9–11, 2013, BIOPOLIS, SINGAPORE

December 3, 2013

MEDIA RELEASE

Nanotechnology Experts to Gather in Singapore for 3rd *Nano Today* Conference

Singapore, December 3, 2013 – Over 400 scientists worldwide will converge in Singapore for the [3rd *Nano Today* Conference](#) which will be held at the Biopolis on December 9 to 11, 2013. Organized by *Nano Today*, a leading journal for nanoscience and nanotechnology, the Institute of Bioengineering and Nanotechnology (IBN) and Elsevier, the three-day conference will showcase the latest research advances in nanostructured materials and systems for diverse applications in areas such as biomedical, electronic, chemical and energy.

Chaired by *Nano Today* Editor-in-Chief and IBN Executive Director, Professor Jackie Y. Ying, this conference will feature 3 plenary lectures by Professor Younan Xia (Georgia Institute of Technology, USA), Professor Joseph M. DeSimone (University of North Carolina, USA) and Professor Mostafa A. El-Sayed (Georgia Institute of Technology, USA), invited talks by 25 distinguished scientists from internationally renowned institutions, as well as 17 contributed oral and over 220 poster presentations.

“Nanotechnology offers a new approach to tackling many problems, and the numerous research breakthroughs in recent years have demonstrated the potential of this rapidly evolving field. The *Nano Today* conference series aim to feature the latest advances and applications of nanotechnology. IBN is delighted to host the third conference in Singapore with *Nano Today* and Elsevier. We are honored to have a large number of leading experts as invited speakers for our conference, and the participation of researchers and students from 45 countries. We look forward to a stimulating and exciting meeting,” said Professor Jackie Y. Ying.

“This is a particularly exciting time for research in all areas of nanoscience and nanotechnology, and particularly as these areas touch on materials science and engineering. Such is the growth in the number of nanomaterial-related articles we receive across all of our journals, and such is the demand from researchers to know where the science is going, that a conference such as this is both timely and uniquely placed to help the research community make sense of what is a dynamic and growing focus of research. I am very proud that *Nano Today* is sponsoring this successful conference as it makes its third appearance, and my thanks go to Jackie Ying and all of the IBN team for making this happen,” said Deborah Logan, Publishing Director, Materials Science Journals, Elsevier.

The first *Nano Today* Conference was held in Singapore in 2009. Since then, the *Nano Today* Conference Series has established itself as a major forum for the international research community.

Nano Today is ranked the second most influential journal internationally in Nanoscience and Nanotechnology by Thomson Reuters (Journal Citation Reports®, June 2013). Since successfully transitioning from a magazine to a journal format in 2009 under Professor Ying’s leadership, *Nano Today* has recorded major increases in Impact Factor from 5.929 in 2007 to 17.689 in 2012. This latest impact factor rating also placed the journal #4 out of 239 journals in Materials Science (Multidisciplinary), and #5 out of 152 journals in Chemistry (Multidisciplinary), consolidating its position as a leading journal that serves a broad readership. *Nano Today* is also the only Asia-based journal among the top 5 journals in each list.

At each *Nano Today* conference, one outstanding scientist is recognized for his/her distinguished accomplishments and contributions to the advancement of nanotechnology with the *Nano Today* Award. This

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year, the *Nano Today* 2013 Award will be presented to Professor Younan Xia for his pioneering research in the field of nanostructured materials.

To support the participation of young researchers, 12 PhD students and postdoctoral fellows from 9 countries have been selected to receive the *Nano Today* Student Travel Award. The award recipients will receive a travel grant, conference registration fee waiver and the opportunity to present their research findings at the conference.

Please refer to the appendix for the speakers' bios and talk abstracts. More information about the event and the speakers are available at www.nanotoday2013.com.

Details of Event

Event: 3rd *Nano Today* Conference
Date: December 9-10, 2013
Time: December 9, 8.30am to 6.00pm
December 10, 8.45am to 6.00pm
December 11, 8.45am to 5.30pm
Venue: Level 2, Matrix, Biopolis
30 Biopolis Street
Singapore 138671

Media Registration

Please email your particulars to Elena Tan at elenatan@ibn.a-star.edu.sg by Friday, December 6, 2013.

For media queries and interview requests on the 3rd *Nano Today* Conference and IBN, please contact:

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About the Institute of Bioengineering and Nanotechnology

Established in 2003, the Institute of Bioengineering and Nanotechnology (IBN) is spearheaded by its Executive Director, Professor Jackie Yi-Ru Ying, who was a Professor of Chemical Engineering at the Massachusetts Institute of Technology (1992–2005). In 2008, Professor Ying was recognized as one of “One Hundred Engineers of the Modern Era” by the American Institute of Chemical Engineers for her groundbreaking work on nanostructured systems, nanoporous materials and host matrices for quantum dots and wires. Under her direction, IBN conducts research at the cutting-edge of bioengineering and

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nanotechnology. Its programs are geared towards linking multiple disciplines across engineering, science and medicine to produce research breakthroughs that will improve healthcare and our quality of life.

IBN's research activities are focused in the following areas:

- **Nanomedicine**, where functionalized polymers, hydrogels and biologics are developed as therapeutics and carriers for the controlled release and targeted delivery of therapeutics to diseased cells and organs.
- **Cell and Tissue Engineering**, where biomimicking materials, stem cell technology, microfluidic systems and bioimaging tools are combined to develop novel approaches to regenerative medicine and artificial organs.
- **Biodevices and Diagnostics**, which involve nanotechnology and microfabricated platforms for high-throughput biomarker and drug screening, automated biologics synthesis, and rapid disease diagnosis.
- **Green Chemistry and Energy**, which encompass the green synthesis of chemicals and pharmaceuticals, catalytic conversion of biomass, utilization of carbon dioxide, and new nanocomposite materials for energy applications.

For more information about IBN, please visit: www.ibn.a-star.edu.sg.

About Nano Today

Nano Today: An International Rapid Reviews Journal provides a peer-reviewed forum for the publication of authoritative review articles, rapid communications, news and opinions to shape and define the frontiers of nanoscience and nanotechnology through their multidisciplinary applications. *Nano Today* publishes six print issues per year covering all aspects of nanoscience and nanotechnology. The *Nano Today* journal is the second most influential journal internationally in Nanoscience and Nanotechnology with an impact factor of 17.689 (Thomson Reuters Journal Citation Reports®, June 2013). For more information, please log on to www.journals.elsevier.com/nano-today.

About Elsevier

Elsevier is a world-leading provider of scientific, technical and medical information products and services. The company works in partnership with the global science and health communities to publish more than 2,000 journals, including *The Lancet* and *Cell*, and close to 20,000 book titles, including major reference works from Mosby and Saunders. Elsevier's online solutions include ScienceDirect, Scopus, SciVal, Reaxys, ClinicalKey and Mosby's Suite, which enhance the productivity of science and health professionals, helping research and health care institutions deliver better outcomes more cost-effectively.

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About the Agency for Science, Technology and Research (A*STAR)

The Agency for Science, Technology and Research (A*STAR) is Singapore's lead public sector agency that fosters world-class scientific research and talent to drive economic growth and transform Singapore into a vibrant knowledge-based and innovation driven economy.

In line with its mission-oriented mandate, A*STAR spearheads research and development in fields that are essential to growing Singapore's manufacturing sector and catalysing new growth industries. A*STAR supports these economic clusters by providing intellectual, human and industrial capital to its partners in industry.

A*STAR oversees 20 biomedical sciences and physical sciences and engineering research entities, located in Biopolis and Fusionopolis as well as their vicinity. These two R&D hubs, house a bustling and diverse community of local and international research scientists and engineers from A*STAR's research entities as well as a growing number of corporate laboratories.

For more information about A*STAR, please visit www.a-star.edu.sg.

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APPENDIX

3rd Nano Today Conference Plenary Lecturers

Plenary Lecture 1

Monday, December 9, 8:45am to 9:30am



Professor Younan Xia
Georgia Institute of Technology, USA
Nano Today 2013 Award Winner

Colloidal Metal Nanocrystals: Past, Present and Future

Although the first documented synthesis of colloidal metal nanocrystals can be traced back to the groundbreaking work on gold colloids by Michael Faraday in 1856, only within the last decade have methods become available for generating samples with the quality, quantity and reproducibility needed for a systematic study of their properties as a function of size, shape and structure, and for the exploration of their novel applications. Of particular importance is to control the shape of colloidal metal nanocrystals, which may initially seem like a scientific curiosity but with implications going far beyond aesthetic appeal. For nanocrystals made of noble metals, shape not only determines their chemical, plasmonic and catalytic properties, but also their relevance for electronic, photonic and catalytic applications. In this talk, I will briefly discuss some of the new developments, with a focus on shape-controlled synthesis of noble-metal nanocrystals via seed-mediated growth in the presence/absence of a capping agent, and the symmetry breaking phenomenon. We have been working diligently to understand the nucleation and growth mechanisms leading to the formation of nanocrystals with specific shapes and structures. For example, we have discovered that the shape of metal nanocrystals is dictated by surface capping and the crystallinity and structure of seeds, which are, in turn, controlled by factors such as reduction kinetics and oxidative etching. The success of these syntheses has enabled us to tailor the properties of noble-metal nanocrystals for a range of applications in photonics, sensing, imaging, medicine, catalysis and fuel cell technology.

About the Speaker:

Younan Xia is the Brock Family Chair and Georgia Research Alliance (GRA) Eminent Scholar in Nanomedicine at Georgia Institute of Technology. He holds appointments in three academic units: The Wallace Coulter Department of Biomedical Engineering (a joint program of Georgia Tech and Emory University), School of Chemistry & Biochemistry, and School of Chemical & Biomolecular Engineering. He received a B.S. degree in chemical physics from the University of Science and Technology of China (USTC) in 1987, a M.S. degree in inorganic chemistry from University of Pennsylvania (with Professor Alan G. MacDiarmid) in 1993, and a Ph.D. degree in physical chemistry from Harvard University (with Professor George M. Whitesides) in 1996. His group has invented a myriad of elegant approaches to the facile synthesis of metal nanocrystals with well-controlled sizes, shapes, structures, compositions, and properties, which did not exist previously. These novel nanocrystals open up a world of opportunities for many applications as diverse as plasmonics, surface-enhanced Raman scattering, electronics, photonics, photovoltaics, display, catalysis, fuel cells, and biomedical research, all of which will have a profound impact on the society. He has co-authored more than 530 publications in peer-reviewed journals, together with a total citation of more than 63,300 and an h-index of 132. He has been named a Top 10 Chemist and Materials Scientist based on the number of citation per publication.

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Plenary Lecture 2

Tuesday, December 10, 8:45am to 9:30am



Professor Joseph M. DeSimone
University of North Carolina at Chapel Hill, USA & North Carolina State University, USA

Co-Opting Moore's Law: Design of Shape-Specific Particulate-Based Vaccines and Therapeutics

In 1965, Gordon Moore, co-founder of Intel, described the trend that the number of components in integrated circuits had doubled every year since 1958. This trend has continued to today, enabled by advances in photolithography, which have taken the minimum feature size of transistors down from about 10 microns in 1970 to 0.045 microns (45 nm) today. In biological terms, this corresponds to going from the size of a red blood cell to the size of a single virus particle! As such, this top-down nano-fabrication technology from the semiconductor industry is, for the first time, in the size range to be relevant for the design of medicines, vaccines and interfacially active Janus particles. This lecture will describe the design, synthesis and efficacy of organic nano- and micro-particles using a top-down nano-fabrication technique we developed called PRINT (Particle Replication in Non-Wetting Templates). PRINT is a continuous, roll-to-roll, high-resolution molding technique that allows the fabrication of precisely defined micro- and nano-particles in a continuous manner with control over chemical composition, size, shape, deformability and surface chemistry. With these 'nanotools', we are establishing definitive biodistribution maps to elucidate the interdependent roles that size, shape, deformability and surface chemistry play on particle distribution as a function of different dosage forms (IV, IP, inhaled, subcutaneous, intramuscular, etc). This information is setting the stage for the design of highly effective chemotherapeutics, respiratory therapeutics and vaccines, which will be described.

About the Speaker:

Joseph DeSimone is the Chancellor's Eminent Professor of Chemistry at the University of North Carolina at Chapel Hill, and William R. Kenan, Jr. Distinguished Professor of Chemical Engineering at North Carolina State University and of Chemistry at UNC. Additionally, in 2012 he was named director of the Frank Hawkins Kenan Institute of Private Enterprise at UNC. DeSimone is also an adjunct member at Memorial Sloan-Kettering Cancer Center. DeSimone has published over 290 scientific articles and has 130 issued patents in his name with over 80 patents pending.

DeSimone is a member of both the National Academy of Sciences (2012) and the National Academy of Engineering (2005). He is also a member of the American Academy of Arts and Sciences (2005). DeSimone has received over 50 major awards and recognitions including the 2012 Walston Chubb Award for Innovation by Sigma Xi; the 2010 AAAS Mentor Award in recognition of his efforts to advance diversity in the chemistry PhD workforce; the 2009 NIH Director's Pioneer Award; the 2009 North Carolina Award; the 2008 Lemelson-MIT Prize for Invention and Innovation; the 2007 Collaboration Success Award from the Council for Chemical Research; the 2005 ACS Award for Creative Invention; the 2002 John Scott Award presented by the City Trusts, Philadelphia, given to "the most deserving" men and women whose inventions have contributed in some outstanding way to the "comfort, welfare and happiness" of mankind; the 2002 Engineering Excellence Award by DuPont; and the 2002 Wallace H. Carothers Award from the Delaware Section of the ACS.

DeSimone, an innovative polymer chemist, has made breakthrough contributions in green chemistry, fluoropolymer synthesis, colloid science, and nano-biomaterials. He pioneered supercritical CO₂-based polymerization reactions and the self-assembly of molecules in compressible media. He has shown the benefit of novel fluoro-elastomers for soft lithographic applications, including the synthesis of shape-controlled nano-biomaterials. DeSimone received his BS in Chemistry in 1986 from Ursinus College in Collegeville, PA and his Ph.D. in Chemistry in 1990 from Virginia Tech.

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Plenary Lecture 3

Wednesday, December 11, 8:45am to 9:30am



Professor Mostafa A. El-Sayed
Georgia Institute of Technology, USA

Plasmonically Enhanced Imaging of Cells and of Intra-Cellular Molecules During the Cancer Single Cell Full Life Cycle or As It Dies

Using biochemical-targeting methods, one can conjugate the plasmonic-nanoparticles to any part of the cell, healthy or sick. Since the nanoparticles have comparable size to many parts of the cell, binding plasmonic-nanoparticles to certain parts of the cell (e.g. the nucleus) could change its properties, including its death. At lower concentrations, plasmonic-nanoparticles have the advantage of using their enhanced scattering properties to image cell behavior with time if Rayleigh-scattering is studied. If Raman-scattering is studied with time, the changes of the molecular cell composition within the plasmonic enhancing field of the nanoparticles of a single cell can be recorded.

Plasmonic Rayleigh Cellular Imaging¹⁻³: From these studies, the effect of nanoparticle type and concentration on cell life, the community behavior of dying cells or the safety of using different metallic nanoparticles as medicine can all be evaluated.

Plasmonic Raman Molecular Cell Biology Imaging^{4,5}: We were recently able⁴ to record the change in the enhanced Raman vibration (SERS) spectra of molecules anywhere in the cell during its full cell cycle, from birth to division. Furthermore, we can determine drug efficacy from the time it takes the drug to kill the cell (when the Raman spectrum ceases to change with time). The potential future applications of this technique⁴ in the determination of molecular cell mechanisms of different functions, drug efficacy⁵ and action, and cell death mechanisms are expected.

References:

1. Kang, B.; Mackey, M. A.; El-Sayed, M. A. JACS Comm. 2010, 132, 1517
2. Austin, L.; Kang, B.; Yen, C.-W.; El-Sayed, M. A. JACS Comm. 2011, 133, 17594.
3. Austin, L. A.; Kang, B.; Yen, C.-W.; El-Sayed, M. A. Bioconjugate Chem. 2011, 22, 2324.
4. Kang, Bin; Austin, Lauren A. and El-Sayed, Mostafa A.; Nano Lett., 2012, 12 (10), 5369–5375.
5. Austin, L.; Kang, B.; Yen, C.-W.; El-Sayed, M. A. JACS comm, in press.

About the Speaker:

Mostafa A. El-Sayed is Julius Brown Chair and Regents Professor at the Georgia Institute of Technology (1994-present). He received his Ph.D. from Florida State University; was postdoctoral fellow at Yale, Harvard and Caltech, and faculty member at UCLA (1961-94). In the last 20 years, he has published over 250 papers in the field of nanoscience studying the properties and applications of metallic-nanoparticles in sensing, catalysis and using plasmonic-nanoparticles (Au&Ag) in imaging and nano-medicine. During the 2000-2010 period, his lab was ranked fourth in academic chemistry-research worldwide by Times-Higher-Education and #17 worldwide among all chemistry research labs by Thomson-Reuters. He is an Elected Member of the US National Academy of Sciences, the American Academy of Arts and Sciences, the Third World Academy of Sciences, the ACS, APS and the AAAS. He received the King Faisal International Prize in Science, Doctors Honorius Causa from the Hebrew University and the American University of Beirut. He received the 2007 US National Medal of Science and the Medal of the Egyptian Republic of the First Class.

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3rd Nano Today Conference Invited Speakers

- Ritesh Agarwal, University of Pennsylvania, USA
- Frank Caruso, University of Melbourne, Australia
- Christopher J. Chang, Howard Hughes Medical Institute and University of California, Berkeley, USA
- Hui-Ming Cheng, Shenyang National Laboratory for Materials Science, China
- Yi Cui, Stanford University, USA
- Benoit Dubertret, ESPCI ParisTech, France
- Toshiaki Enoki, Tokyo Institute of Technology, Japan
- Harald Fuchs, University of Münster, Germany
- Herbert Gleiter, Karlsruhe Institute of Technology, Germany
- Taeghwan Hyeon, Seoul National University, Korea
- Kazunori Kataoka, The University of Tokyo, Japan
- Ali Khademhosseini, Harvard University, USA
- Nicholas Kotov, University of Michigan, USA
- Kian Ping Loh, National University of Singapore, Singapore
- Jeffrey R. Long, University of California, Berkeley, USA
- Igor Medintz, US Naval Research Laboratory, USA
- Milan Mrksich, Northwestern University, USA
- Wolfgang Parak, Philips-Universität Marburg, Germany
- Shouheng Sun, Brown University, USA
- Horst Weller, University of Hamburg, Germany
- Hong Yang, University of Illinois, USA
- Peidong Yang, University of California Berkeley, USA
- Yadong Yin, University of California Riversides, USA
- Shu-Hong Yu, University of Science and Technology of China, China
- Nanfeng Zheng, Xiamen University, China

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