

SingNano - Singapore Nanotechnology Network NEWSLETTER

IN THIS ISSUE

[Launch of Singapore
Nanotech Capabilities
Report](#)

[Event Highlights](#)

[Exclusive Interview](#)

[Technical
Achievements](#)

[Industry News](#)

[New Initiatives](#)

[Other Publications](#)

[Upcoming Events](#)

EDITORIAL BOARD

Editor: Jing JIANG

Advisor: Dr Lerwen
LIU

CONTRIBUTORS

NanoGlobe

National University of
Singapore (NUS)

Institute of
Microelectronics (IME)

NanoBright Pte Ltd

Leica Microsystems
(SEA) Pte Ltd

Iran Nanotechnology
Initiative Council
(INIC)

QUICK LINKS

[SingNano](#)

[Asia Nano Forum](#)

[Singapore
Nanotechnology
Capabilities Report](#)

[NanoGlobe
Publication](#)

[Emerging
Nanotechnology
Power](#)

Issue 7 June 2010



Greetings!

Warm greetings from SingNano - Singapore Nanotechnology Network!
Thanks to all your support to SingNano Newsletter, we are pleased to announce the publication of SingNano Newsletter Issue 7. In this issue, you will find:

Launch of Singapore Nanotechnology Capabilities Report (free download)

Event Highlights

- Clean and Affordable Water for Everyone - Singapore the Region Hub -- Membrane Technology in Singapore International Water Week 2010 & Inauguration of Toray Singapore Water Research Center
- Bayer Opens Functional Films Research Centre in Singapore for Pursuing the Electronics Market in Asia Pacific
- Promoting the Adoption of Nanotechnology in Singapore Manufacturing Industries -- Seminar on Nanotechnology in Manufacturing
- Singapore Pursues the Atom Technology -- IMRE Workshops on Atom Technology and Its Applications
- Promoting Nanotechnology Commercialization in Singapore and Asia Pacific -- BritCham Breakfast Seminar in Partnership with NanoGlobe

Exclusive Interview

- Developing Clean-Tech with Membrane Science and Engineering - An Interview and Site Visit at Professor Neal Chung's Laboratory in National University of Singapore
- Eco-friendly and Smart Nano Coating Materials from SUNCOAT
- Nanotech Enabled Transparent Functional Coatings are in the Market Place - Interview of GXC Coatings: a German leading supplier of transparent nano coatings for lighting components and automotive applications
- Fast Growth of a BioNanotech Start-up in China

Technical Achievements

- An Efficient Solid State Dye-Sensitized Solar Cell with TiO₂/D149 dye/ Poly(3,4-ethylenedioxythiophene) structure

Industry News

- Local Firm's Discovery helps light up the dark
- Leica Microsystems Launched Two New Products - Digital Versatile Microscopy and Dual Core 3D Measuring Microscope

New Initiatives

- Regenerative Medicine Initiative in Cardiac Restoration Therapy (Singapore-Israel Joint Research)
- A*STAR and EDB Launched Micro-Electro-Mechanical-Systems (MEMS) Consortium

Other Publications

- New Edition of IraNNano Quarterly Published
- Power Integrity Analysis and Management for Integrated Circuits

Upcoming Events

Last but not the least, we would like to take this opportunity to thank all the contributors and continuous support to our SingNano network!

JOIN OUR LIST

Join Our Mailing List!

NEWS TO SHARE?

Interested members can submit papers/news on the following to us by 23-August-2010:

- Past Events Coverage
- Technical News Release: Scientific breakthroughs
- Press Releases Relating To the Nanotech Industry and Development
- Grant/Funding Update
- Upcoming Events to Be Circulated

Download: [Previous SingNano Newsletters](#)

LAUNCH OF SINGAPORE NANOTECH CAPABILITIES REPORT

NanoGlobe is pleased to launch the Singapore Nanotechnology Capabilities Report (Version I) for the first time in Singapore. This report provides comprehensive information on Singapore nanotech R&D infrastructure and network platform; research capabilities in a) Nanomaterials and Applications, b) Nano-Device and Nano-Patterning, c) Microelectronics / MEMS Platform, d) Clean Technology, and e) Medical Technology; nanotech SMEs (technology, sales and marketing companies); investment, incubation and consulting firms; and government funding agencies. In addition to showcasing Singapore nanotechnology capabilities and ecosystem, the report intends to offer a clear glance of information for companies or research organizations to identify collaboration partners, help seeking incubation and investment support as well as business development services.

This report will be updated by the end of August 2010. If you think your group/organization should be included in this report, please email jing@nano-globe.biz

We would like to thank all the contributors featured in the report and the support of the Singapore Economic Development Board (EDB). If you are interested in getting in touch with any of the groups featured in this report or have any comments on the current version, please feel free to email us at contact@nano-globe.biz.

Free Download: [Singapore Nanotechnology Capabilities Report \(Version I June 2010\)](#)

EVENT HIGHLIGHTS

Clean and Affordable Water for Everyone - Singapore the Regional Water Hub

-- Membrane Technology in Singapore International Water Week 2010 & Inauguration of Toray Singapore Water Research Center

(Ms. Yesie BRAMA, NanoGlobe)



Singapore once again organized the third Singapore International Water Week (SIWW), taking place on 28 June - 2 July 2010. Themed Sustainable Cities: Clean and Affordable Water, SIWW 2010 as usual included the water trade show focusing on innovations, products and services, and applications of water technologies. At the same event, Toray Singapore Water Research Center (TSWRC) which was established in August 2009 was officially launched on the first day of the trade show, 29 June 2010. In this article we share our site visits and interviews of Singapore membrane technology company booths such as Hyflux and Ultra-Flo, and the opening of TSWRC. ([Read the Whole Article](#))

Figure caption: The opening ceremony of Toray Singapore Water Research Centre (TSWRC) at SIWW 2010, 29 June 2010.

The Launch of Bayer Functional Films Research Centre in Singapore

-- Targeting at Printed Electronics and Energy Market in the Asia Pacific

(Ms. Jing JIANG, NanoGlobe)



Bayer's first research centre in Asia Pacific and outside Germany, Function Films Research Centre was officially launched on June 22nd 2010 at Golden Agri Plaza. This research centre represents an initial investment of approximately S\$ 12 million (Euro 7 million) with further expansion of capability development in subsequent years. The newly launched research centre occupies 2200 square

meters and has employed about 30 research scientist and engineers in phase one focusing on research in nanotechnology-enabled coating films and functional materials. Bayer will double the current manpower capacity in phase two by 1st quarter of 2011. Mr Patrick Thomas, CEO of Bayer MaterialScience acknowledged in his opening speech the support of Singapore government especially EDB in facilitating partnerships and funding for R&D during the course of setting up the research centre. Dr Beh Swan Gin, Managing Director of Singapore Economic Development Board (EDB) expressed his warm welcome of the Bayer's Functional Films Research Centre located in Singapore. By collaborating with a network of research organizations and business partners in Singapore and the rest of Asia Pacific region, this centre will undertake application R&D of innovative advanced materials including the multifunctional films, quantum dots, printable CNT / Ag nano inks and others. ([Read the Whole Article](#))

Figure caption: group photo of key executives of Bayer MaterialScience and the VIP guests. (left to right): Dr Christian Haessler, Head of Functional Films R&D Asia Pacific; Mr. Bernd Steinhilber, Head of Functional Films; Dr Beh Swan Gin, Managing Director of Singapore EDB; Mr. Patrick Thomas, CEO of Bayer MaterialScience AG; Mr Jörg Ranau, Ambassador of the Federal Republic of Germany to Singapore; Dr. Joachim Wolff, Member of the Executive Committee of Bayer MaterialScience and Head of Business Unit Coatings, Adhesives, Specialties; Mr. Marcus Yim, the managing director of Bayer (South East Asia) Pte Ltd and Senior Bayer Representative - Country Group South ASEAN.)

Promoting the Adoption of Nanotechnology in Singapore Manufacturing Industries

-- Seminar on Nanotechnology in Manufacturing
(Ms. Yesie BRAMA, NanoGlobe)



Half-day seminar on Nanotechnology in Manufacturing has attracted over 150 participants who are interested in learning about the vision, technology development and application of nanotechnology in manufacturing processes enable better, cheaper, greener and smarter processes, products, and services. This timely seminar provided not only an overview about the nanotech related research activities at SIMTech, and overview about nanotechnology applications and commercialization worldwide, but also featured some specific

technologies that enable greener and more precise manufacturing techniques, namely Atomic Layer Deposition (ALD), Atomic Precise Manufacturing (APM) and Nanostructured Surface Functionalities via Biomimetic Nanoimprinting. Although this seminar was meant for only Singapore community, we were privileged to have Benec's Asia Sales Director from Finland and Zyvex's Founder and Chairman from the United States, in addition to Singapore's nanotechnology players: Institute of Materials Research Engineering (IMRE) and NanoGlobe. ([Read the Whole Article](#))

Figure caption: speakers of the Seminar (left to right): Dr Lerwen Liu, Dr Sun Zheng, Dr Low Hong Yee, Mr Juha Tanskanen and Mr Jim von Ehr

Singapore Pursues Atom Nanotechnology

-- IMRE Workshop on Atom Technology and Its Applications
(Ms Jing JIANG, NanoGlobe)



10 June 2010, IMRE Workshop on Atom Technology (AT) and its applications was held at Seminar Room 1 (SR1), Institute of Materials Research and Engineering (IMRE). Over 100 participants from academia and industries attended this half-day workshop, which brought together worldwide leading companies working in AT and its related areas to discuss the emerging trends of future applications in electronics and future manufacturing. IMRE is one of A*STAR leading research institutes with established credentials in innovation. Atom Technology is IMRE's

flagship program led by well known scientist Prof. Christian Joachim from France and world leading nanotechnology company Zyvex in the USA. Atom Technology in IMRE focuses on molecular electronics device research headed by Prof. Joachim and atomic precise manufacturing (APM) in partnership with its industry partner Zyvex Asia (sister company of Zyvex Labs in the United States which is leading the DARPA funded APM program. The workshop is to showcase IMRE's effort in scientific and technological frontier of the ultimate electronic device and manufacturing R&D. The Atom Technology

program has a very interesting balance between basic research and industry application which was nicely presented at the workshop specially by Prof. Joachim, First Class Director of Research at the France Centre National de la Recherche Scientifique (CNRS)) and Mr James Von Ehr (Founder and President of Zyvex Corporation and a visionary of nanotechnology).

Prof Christian Joachim, who is also a visiting scientist under the A*STAR Visiting Investigator Programme (VIP) attached to IMRE, presented his vision and progress on the ultimate atomic and molecular transistors. Mr Jim Von Ehr presented his vision and his industry "making things and sell" approach towards atomic precise manufacturing, the ultimate manufacturing with digital design and atomic precision that will revolutionize how we make things today, like the way how semiconductor manufacturing has transform our lives. Other speakers distinguished scientists include Dr T. Hasegawa from NIMS Japan, Prof. Damian Allis from Syracuse Univ. USA, and Dr Cedric Troadec from IMRE; and industry representatives Dr. Toshihiko Nagamura from UnisokuJapan and Dr. Ramesh Mohan Thamankar from Omicron NanoTechnology Germany.

Details of the workshop program can be found at IMRE website. ([Read here](#))

Promoting Nanotechnology Commercialization in Singapore and Asia Pacific

-- BritCham Breakfast Club in Partnership with NanoGlobe
(Ms Jing JIANG, NanoGlobe)



In partnership with NanoGlobe, the British Chamber of Commerce Singapore (BritCham Singapore), organized a breakfast seminar on 3rd June 2010, which brought together investors, entrepreneurs, government and academic representatives to discuss the impact of nanotechnology in our everyday life and industry advancement now and future. The bimonthly BritCham Breakfast Club is a series of presentations providing an opportunity for the participants to discuss the current "hot topics" with the industry experts who are leaders in their fields.

Dr Liu, managing director of NanoGlobe, started her presentation from a vivid video of Nokia Research on Nanotechnology. Nanotechnology is going to revolutionize the way we make things and transform the way we live. It is able to transform multiple industries including aerospace, agriculture, automotive, chemical, energy and environment, food, information and communication, medicine and health care, security and transportation. Nanotechnology offers so many possibilities such as providing cheap and clean energy; clean water; lighter and stronger materials; faster, more powerful and energy efficient computers; an exponential increase in information storage capacity; lotus-like self cleaning surfaces; the reduction or elimination of pollution; and early detection and treatment for cancer and other diseases. Asia is one of the fastest growing regions in nanotechnology R&D and commercialization. Dr Liu shared her insight on nanotechnology development in policy & funding, infrastructure, R & D & commercialization, education and risk management in the Asia Pacific in the last 10 years since the announcement of the US National Nanotechnology Initiative (NNI). She also presented a number of nanotechnology commercialization case studies to highlight on the current status of nanotechnology impact in different industry development and challenges companies are facing in the course of business development.

EXCLUSIVE INTERVIEW

Developing Clean-Tech with Membrane Science and Engineering - An Interview and Site Visit at Professor Neal Chung's Laboratory in NUS

(Ms. Yesie BRAMA, NanoGlobe)



Professor Neal Chung, the guru of membrane technology, has been actively developing world-class R&D capability in membrane technology in Singapore with focused application in clean-tech. His co-invention in ultrafiltration hollow fibre membrane has been widely adopted by industries for water treatment. His passion and expertise in membrane

science and engineering has enabled strong industry partnerships worldwide with various value add benefits. Together with his hard working and world class research team in Singapore, Prof. Chung's research in membrane technology for water reuse and desalination, and gas separation has been adopted by industries. Prof. Chung's group is building capabilities in membrane for life science application. He is currently teaching and conducting his research in National University of Singapore, with total of 40 people under his group. This article shares more insights about his research activities in membrane science and engineering in all three sectors of application: energy, water and life science. ([Read the Whole Article](#))

Eco-friendly and Smart Nano Coating Materials from SUNCOAT

(Ms. Jing JIANG, NanoGlobe)



Nanotechnology enables energy saving and high performance coating materials. NanoGlobe interviewed another interesting company **SUNCOAT**, a European high-tech company specializing in developing functional films using nanoparticle coating technology. SUNCOAT's functional films dispersed with nanoparticles are superior in IR absorption, UV protection and electrical conductivity. Their heatstop foils can be used as exterior coating of greenhouse, automotive and roofs of industry plants for heat protection. SUNCOAT works closely with companies such as EVONIK industries AG and government organizations in Abu Dhabi to bring their product in the market place. ([Read the Whole Article](#))

Nanotech Enabled Transparent Functional Coatings are in the Market Place - Interview of GXC Coatings: a German leading supplier of transparent nano coatings for lighting components and automotive applications

(Ms. Jing JIANG, NanoGlobe)



GXC Coatings GmbH is a German nano coating company providing permanent, transparent anti-fog, anti-scratch and easy-to-clean nano coating technology and products for optics and safety applications in the automobile, motor cycle, safety, metrology and medical device applications. Founded in 2000, the business strategy of GXC is to develop and manufacture new materials for industrial customers and to create lasting B-to-B business relationships. In addition, GXC offers highly automatised toll coating services on various plastics, glass and metal to customers around the globe using its fully automatic coating line for 2D and 3D parts. ([Read the Whole Article](#))

Fast Growth of a BioNanotech Start-up in China

(Ms. Jing JIANG, NanoGlobe)



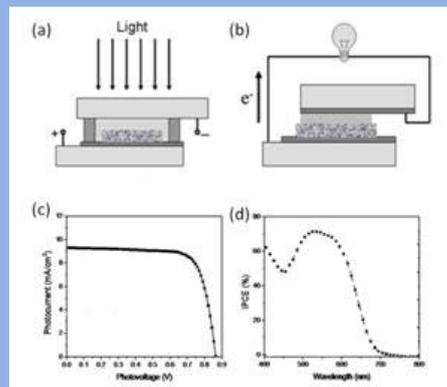
NanoGlobe team conducted a site visit at NanoMed, a global bionano start-up company based in Suzhou BioBay incubator, founded by a team of overseas Chinese and Americans. NanoMed's innovative Functional Micro Array (FMA-TM) technology is a non-invasive drug delivery technology, which has four distinct advantages compared to the conventional needle injection: painless, less toxicity for potent drugs, improved drug efficacy, and reduced treatment time. Currently NanoMed's FMA-TM Patch has potential clinical applications in the areas

including skin diseases, diabetes, tumors and pain relief. Its first product for acne treatment was launched in the market in March 2010 and NanoMed expects to break even in 2011. ([Read the Whole Article](#))

TECHNICAL ACHIEVEMENTS

An Efficient Solid State Dye-Sensitized Solar Cell with TiO₂/D149 dye/Poly (3,4-ethylenedioxythiophene) structure

(Dr Bin LIU, Department of Chemical and Biomolecular Engineering, NUS)



Although a high efficiency of 11% has been reported for dye-sensitized solar cells (DSSCs) with conventional liquid electrolytes, it remains a problem to fabricate large-area modules with high efficiency and good stability. Conventional liquid electrolyte contains iodine and organic solvents, which leads to difficulties of electrode corrosion and electrolyte leakage. To solve these problems, we use hole transporting polymers (HTP) as the replacement for iodine based liquid electrolyte. In these devices, indoline dye D149 was used as the sensitizer and in-situ polymerized Poly(3,4-ethylenedioxythiophene) (PEDOT) was used

as the HTP. The in-situ polymerization was conducted in a specially designed thin layer electrolytic cell from bis-EDOT solution sealed by parafilm in between pyrolyzed Pt/FTO glass as the counter electrode and a working electrode made of FTO glass, TiO₂ dense film and dye-sensitized TiO₂ layer. Under optimized conditions, the light-to-electrical efficiency of PEDOT based DSSCs reached 6.1% with photocurrent of 9.3mA/cm², photovoltage of 860 mV and a fill factor of 0.75. These results indicate that iodine-iodide DSSCs based on HTP are promising devices and in-situ polymerization in the thin layer electrolytic cell is a promising method in fabricating HTP for DSSCs. Details please refer to Liu, B. et. al. *Advanced Materials* 2010, DOI: 10.1002/adma.200904168.

Figure Caption: a) Structure of the thin layer electrolytic cell for *in-situ* polymerization. From bottom to top: FTO glass, TiO₂ dense film, dye-sensitized TiO₂ layer, bis-EDOT solution sealed by parafilm and pyrolyzed Pt/FTO glass. b) The structure of DSSC based on *in-situ* polymerized PEDOT. From bottom to top: FTO glass, TiO₂ dense film, dye-sensitized TiO₂ layer, PEDOT layer, gold layer and FTO glass. c) The photocurrent-photovoltage curve of PEDOT based DSSCs with D149 as the sensitizer under 100 mW/cm² AM1.5 illumination. The active area is 0.15 cm². d) The IPCE spectrum of PEDOT based DSSCs with D149 dye as the sensitizer.

INDUSTRY NEWS

Local Firm's Discovery helps light up the dark

(Source: The Straits Times, Science, pD8)

Nippon is rolling out a new paint that can glow in the dark, thanks to a discovery made by a local start-up, NanoBright.

While such paints would have much more practical use in buildings that require some glow-in-the-dark elements for security reasons, it also opens up options for those who prefer to sleep with some light in the room.

Mr Henry Ang, business development manager of Nippon Singapore, said several of its commercial clients have already bought the paint. "The paint has been popular with some establishment using it for safety and emergency lighting purposes, For example, dealing with blackouts and dark premises," he said.



Mr Ho, NanoBright's CEO, in a room illuminated by glow-in-the-dark products. The wall behind him is coated in the "self-glow paint" that his company helped to develop. ST PHOTO: SAMUEL HE

Consumers can expect to see the "self-glow paint" sold in the mass market later this year, and it will be priced several times higher than the Nippon odourless paint, which retails at \$ 21.50 per litre.

While other self-glow paints in the market are solvent-based, which is potentially hazardous to health, Nippon's new paint is water-based. In the past, there were no water-based self-glow paints as the phosphor particles, the key ingredient for glow-in-the-dark products, dissolve in water.

But NanoBright, a spin-off company from the National University of Singapore (NUS), formed by two researchers together with two NUS alumni, discovered a process that could resolve this issue.

The company, which started in 2007, has managed to coat the phosphor particles to make them waterproof and so last longer in brightness than current products in the market. The discovery can also be used in other products, such as toys, signs, plastics and even paper, to create a glow-in-the-dark effect.

NanoBright's discovery is a result of its foray into similar technologies dealing with fluorescent materials, as its main product is a solar film that converts ultraviolet (UV) light into visible light.

This is done by infusing the plastic materials with fluorescent nanoparticles, which emit light when they are "excited" by another light source, or energy such as electrical or chemical. When a solar cell is coated with the fluorescent solar film, it receives more usable light, and that equates to more power output, increasing the efficiency of solar panels.

This technology was then used on agricultural films, which are used for green-houses to protect crops.

UV rays, which are harmful to living organisms, can now be turned into coloured light that promotes faster plant growth.

In an experiment performed by a team of Singapore Polytechnic students, results showed that plants grew up to 30 per cent faster with NanoBright's film, as compared to the normal ethylene vinyl acetate (EVA) films.

Currently, there are some Europe-produced EVA agricultural films that inhibit UV light with a blocking agent, but they do not convert it.

NanoBright's chief executive Anthony Ho, said its film is now commercially available, and they are making a deal with a Japanese firm keen on trying it out.

"For the same price as a Europe-produced agricultural film, you can now get film that not only inhibits UV light, but converts it too," he said.

As for the self-glow technology, Mr Ho thinks the paint will be popular in countries such as South Africa and India, where blackouts are common. The paint can be used to light up emergency exits when there is a blackout.

Currently, in places such as New York and China, photoluminous tape or plates are already used for emergency lighting.

Mr. Ho also hopes more buildings will adopt such safety measures of lighting up escape routes and emergency exits with the self-glow paint. "We have very low incidence of power failure, but it doesn't mean we won't have power failures."

Leica Microsystems Launched Two New Products - Digital Versatile Microscopy (DVM) and Dual Core 3D Measuring Microscope (DCM 3D)

(Contributed by Leica Microsystems)

Leica Microsystems is a leading global designer and producer of innovative high-tech precision optics systems for the analysis of microstructures. Here Leica Microsystems would like to share with you the launch of the latest two 3D imaging microscope which may be of use to your research work - Digital Versatile Microscopy (DVM 2000 - 5000) and Dual Core 3D measuring microscope (DCM 3D).

Leica Digital Microscopes (DVM series) product family is the first step into a purely screen based area. The product family offers some distinct application advantages over traditional approaches and provides a great synergy to our existing range of industrial



microscope solution. Leica Digital Microscopes do feature outstanding, high-quality optics and also offer a wide variety of quantitative analysis options-whether 2D analyses or advanced 3D surface measurements. The highlights of the DVM series at a glance:

- Leica Digital Microscopes speed up documentation, analysis and reporting
- Quantitative 2D and 3D imaging made fast and easy
- Gain new insights from the sample by 360° rotating view
- Coding of zoom optics for high repeatability of measurements

With this product introduction, Leica Microsystems will introduce three Digital Microscopes product groups:

1. Leica DVM5000 -A portable standalone solution which provides 3D imaging and other unique features
2. Leica DVM3000 -A modular and PC based solution with its strength also in 3D imaging
3. Leica DVM2000 -Based on standard components and interfaces the essentials of digital microscopes

Leica's Dual Core 3D measuring microscope (DCM 3D) is the first system which combines both confocal and interferometry techniques for the first time. In addition to its compact and robust design, the DCM 3D is a complete tool that is ideal for obtaining a super fast, non-invasive assessment of the micro-and nano-geometry of technical surfaces, in multiple configurations. From R&D, quality inspection laboratories to robotic driven systems during online process controls, the new DCM 3D is able to solve a wide range of applications where high-speed and high-resolution measurements down to 0.1nm are needed. DCM 3D includes the following inspection and measurement technologies:



- Bright Field Microscopy
- Dark Field Microscopy
- Confocal Microscopy
- Phase Shift Interferometry(PSI)- Vertical Scanning Interferometry(VSI)

If you are interested to know more about Leica Microsystems's latest technology and products, please contact Miss Lena HENG ([lena.heng@leica-microsystems.com](mailto:lana.heng@leica-microsystems.com)).

Figure caption:

Top:Leica DVM5000 -A portable standalone solution

Down: (left) DCM 3D microscope; (right) 3D technical images taken by DCM 3D microscope.

NEW INITIATIVES

Regenerative Medicine Initiative in Cardiac Restoration Therapy (Singapore-Israel Joint Research)

(Source: [NUSNNI brochure 2008-2009](#) and [NRF press release](#))

Since February 2009, NRF started up a long term research collaboration program between Singapore's research organizations and the top Israeli universities. The first two programs are "Regenerative Medicine Initiative in Cardiac Restoration Therapy" between Technion, NTU and NUS and "Molecular Mechanisms of Morphogenesis" between Weizmann Institute of Science (WIS), Temasek Life Sciences Lab (TLL) and NUS. The "Regenerative Medicine Initiative in Cardiac Restoration Therapy" research program is

also part of NRF's billion-dollar initiative called the Campus for Research Excellence and Technological Enterprise (CREATE), set up by the Singapore government to foster joint research between Singapore and top global research centers. Technion is one of the world's top science and technology research universities, known as "Israel's MIT," which is famous for its pioneering work in areas such as medicine, water management, nanotechnology, biotechnology, materials engineering and aerospace. Through this research program, the teams of NUS (Singapore) - NTU (Singapore) - Technion (Israel) join their hands together for an outstanding proposal that make global impact in translational research in cardiac restoration. These teams will systematically combine core discoveries in cell source & growth conditions, scaffold design, engineering bioreactor design, and in vivo integration into three different potential therapeutic strategies for cardiac restoration following MI. This will be done in order to identify a clinically enormous unmet need in cardiovascular disease (CVD) and coronary heart disease (CHD). The investigation will be on the discovery and integration of enabling technologies, the systematic use of these technologies for cardiac restoration using increasingly more complex therapeutic modalities, and the identification of a clinically effective methodology with minimal translational impediments. The scientists involved in this joint research program are as follows:

- NUS: Seeram Ramakrishna (NUSNNI program coordinator for the NUS-NTU-Technion Joint Project, S\$20 million), Lee C N, Theodoros Kofidis, Phan Toan Thang, Ariff Bongso, Colin Sheppard
- NTU: Freddy Boey Yin Chiang, Subbu Venkatraman
- Israel: Havazelet Bianco-Peled, Dror Seliktar, Shulamit Levenberg, Lior Gepstein, Eyal Zussman, Dvir Yelin, Marcelle Machluf

A*STAR and EDB Launched Micro-Electro-Mechanical-Systems (MEMS) Consortium

(Source: [IME press release](#))

08 April 2010, the Institute of Microelectronics (IME), a research institute of the Agency for Science, Technology and Research (A*STAR), announced the launch of the Micro-Electro-Mechanical-Systems (MEMS) Consortium, bringing together 8 MNCs and local enterprises from the MEMS supply chain in public-private sector research collaboration to grow the MEMS industry in Singapore. The members include Coventor, Inc., EPCOS PTE LTD (A Group Company of TDK-EPC Corporation), GLOBALFOUNDRIES, Intellisense Software Corp., NEC SCHOTT Components Corporation, Seiko Instruments Inc., Systems on Silicon Manufacturing Company Pte. Ltd. (SSMC) and Tango Systems, Inc.

Supported by A*STAR and the Singapore Economic Development Board (EDB), the consortium will establish a technology platform, where the members could collaborate on:

- standardizing the MEMS design, process and packaging for multiple applications, eg. Post-CMOS (Complementary metaloxide-semiconductor) Surface Micromachining MEMS, Bulk micro-machined Silicon on Insulator (SOI) MEMS; and hermetic sealing and wafer level packaging of MEMS devices;
- developing technical expertise and know-how to facilitate MEMS development, prototyping and manufacturing in Singapore;
- promoting collaboration among companies for an integrated solution for MEMS Manufacturing;
- training manpower in MEMS related technology

OTHER PUBLICATIONS

New Edition of IraNNano Quarterly Published

(Published by [Iran Nanotechnology Initiative Council \(INIC\)](#))

The second edition of the third volume of IraNNano quarterly report was published on May 2010 on the official website of Iran Nanotechnology Initiative Council (INIC). In addition to review the Iran public education program in nanotechnology and feature the Institute for Nanoscience and Nanotechnology, Sharif University of Technology, the latest edition introduces the Iranian firms active in the field of nanotechnology and their products. These companies are Reefiran, Vahid Industrial Group, Nano System Pars Co.

and NanoPac Persia Co. For more details, please read [IraNNano Quarterly \(Vol. 3, No. 2, May 2010\)](#).

Power Integrity Analysis and Management for Integrated Circuits (Published by Pearson Education / Prentice Hall in May 2010)

Scaling of transistors and integrated circuits has brought about decades of wonders in electronics. As this progression in integration continues, with minimum dimensions smaller than 10,000th of the width of a human hair, or below 100 nano meters, electrical power consumed by integrated circuits and systems is seen to become a significant challenge and a critical design constraint, referred to as the "Power Wall". This book introduces the reader, both intuitively and theoretically, to the rise of this challenge to electronic integration. More importantly, it highlights a less known challenge, that of power integrity, or the quality of the power supply within integrated circuits, bringing to plain view key relationships between scaling, power integrity, and energy. Revealing key aspects impacting power integrity, such as resistance, inductance, and capacitance, the book discusses numerous modeling and analysis methods employed to study integrated circuit power integrity, developed by researchers in the academia as well as the industry.

More information can be accessed at: <http://www.anasim.com/pi-books/power-integrity-for-ics-the-first-book/>

UPCOMING EVENTS

Singapore

IME Technical Seminar: Novel Electronic and Optoelectronic Devices in Germanium Integrated on Silicon

2:45 - 4:00 PM, 06 July 2010, Institute of Microelectronics (IME), Singapore

Website for registration: http://eastar.eventshub.sg/ems_wb_Details.aspx?CallID=28&EventID=125923

IME Technical Seminar: Nanostructures and the control of thermal conductivity

2:45 - 4:00 PM, 07 July 2010, Institute of Microelectronics (IME), Singapore

Website for registration: http://eastar.eventshub.sg/ems_wb_Details.aspx?CallID=28&EventID=125982

Celebrating 20 Years Anniversary of Suzhou Industrial Park - To Promote Closer Bilateral Cooperation between China and Singapore in Advancing High-tech Industries

3:00 PM, 08 July 2010, Island Ballroom, Shangri-La Hotel (22 Orange Grove Road, Singapore 258350)

Registration: Please email your particulars (name, company, job title and contact information) to event@cssd.com.sg

IMRE Seminar on "Functional Metallopolynes and Metallophosphors for Organic Optoelectronics"

3:00 - 4:00 PM, 09 July 2010, Institute of Materials and Research Engineering (IMRE), SR1

Website: <http://www.imre.a-star.edu.sg/events.php?id=P532W539>

Nobel Laureate Seminar at IMRE on "Proteins and their Structures, Basic Science and Application" by Prof Robert Huber

2:00 PM, 14 July 2010, Institute of Materials and Research Engineering (IMRE), SR1

Website: <http://www.imre.a-star.edu.sg/events.php?id=F533K530>

International Conference on Precision Engineering (ICoPE2010) and 13th ICPE

28 - 30 July 2010, Grand Copthorne Waterfront Hotel, 392 Havelock Road, Singapore

Website: <http://www.simtech.a-star.edu.sg/simcorp/loadEventDetail.do?id=1.6&currId=1.6.1&cid=4718602&pid=18513921>

The 5th SBE International Conference on Bioengineering and Nanotechnology (ICBN 2010)

01 - 04 August 2010, Biopolis, Singapore

Website: <http://www.icbn2010.com/>

The 5th Asian Conference on Electrochemical Power Sources (ACEPS-5)
17 - 20 September 2010, National University of Singapore, Singapore
Website: <http://aceps-5.org/>

Worldwide

Nanotechnology for Sustainable Energy

04 - 09 July 2010, Obergurgl, Austria
Website: <http://www.esf.org/activities/esf-conferences/details/2010/confdetail315.html?conf=315&year=2010>

Nanofair 2010

06 - 07 July 2010, Dresden, Germany
Website: <http://www.nanofair.com>

7th International Conference on Nanosciences & Nanotechnologies (NN10)

11 - 14 July 2010, Halkidiki, Greece
Website: <http://nnconf.physics.auth.gr>

Kyoto EnviNano Forum 2010 (KEN Forum2010)

21 - 23 July 2010, Clock Tower Centennial Hall, Kyoto University, Japan
Website: <http://www.envinano-kyoto.astem.or.jp/?lang=en>

Nano Korea 2010

18 - 20 August, Kintex, Korea
Website: www.nanokorea.or.kr/

Taiwan Nano 2010

07 - 09 October 2010, Taipei, Taiwan
Website: <http://nano.tca.org.tw/index.php?lang=e>

Iran Nano 2010

25 - 29 October 2010, Khomeini Mosalla, Tehran, Iran
Website: <http://festival.nano.ir>

Nanotech India 2010

19 - 21 November 2010, Cochin, India
Website: <http://www.nanotechindia.in>

Malaysia Nanotechnology 2010

01 - 03 December 2010, Kuala Lumpur Convention Center KLCC, Malaysia

Nano 2010 (International Conference on Nanomaterials and Nanotechnology)

13 - 16 December 2010, K. S. Rangasamy College of Technology, Tiruchengode, Namakkal-637215, India
Website: <http://www.nano.ksrct.ac.in>

MEMSIC Cup, The Second International Contest of Applications in Nano-micro Technology (iCAN'11)

May to June 2011, Beijing China
Website: <http://www.iCAN-contest.com>

Sincerely,
Jing

JIANG Jing, Technology Analyst
NanoGlobe Pte Ltd
Mobile: +65 8533 0532
Email: jing@nano-globe.biz
www.nano-globe.biz

Email Marketing by



