

IEEE Nanotechnology Newsletter 2008

Newsletter Editor-in-Chief:

Professor John T.W. Yeow
Department of Systems Design Engineering
University of Waterloo
Canada

jyeow@engmail.uwaterloo.ca

Welcome to the NTC IEEE Nanotechnology Newsletter. I am John Yeow from the Waterloo Institute of Nanotechnology at the University of Waterloo, Ontario, Canada where I am currently a Canada Research Chair in Micro/Nanodevices and Director of the Advanced Micro/Nanodevices Lab.

I was invited by Dr. Chennupati Jagadish and Dr. Meyya Meyyapan to be the Editor-in-Chief of the NTC IEEE Nanotechnology Newsletter. It is a position I gladly accepted because this position allows me to get in touch with many of you within the nanotechnology community. It is also my role to keep you updated on the latest nanotechnology trends and development, be it commercial or research. Throughout the year, I look forward to working with Dr. Ning Xi who is the current President of the Council in bringing you exciting new issues of the newsletter.

The goal is to provide 4 issues of newsletter annually. I seek your inputs in terms of interesting articles, news, announcements, and commentaries. If you have ideas to share, please email me.

Sincerely,

John Yeow

Nanocenters provides an updated list and pointers to centers with core activities in nanoscience and nanotechnology research, education, commercialization, and societal impact, along with a brief description of the topical foci of the centers.

Nanoeducation and Students' Corner provides a compilation of pointers to new developments in undergraduate and graduate curricula universities, science education in elementary through high schools, and short courses germane to nanoscience and nanotechnology.

The interplay between Nanotechnology and Society and vice versa is not only a hot research topic, but also a critical dynamic that will shape future technologies and society. The links point to key research centers and articles on this important topic.

Nanobusiness lists companies and consortia related to nanotechnologies.

Jobs and Classifieds list new opportunities.

Books, Periodicals, Reviews, and Audiovisuals. Check out the [IEEE Nanotechnology Magazine](#) - a focal point to disseminate updated R&D, manufacturing, commercialization, and educational activities related to Nanotechnology through out the world.

Nano Art Galleries

Nanocenters

[NNI Centers, Networks and Facilities](#)

The National Nanotechnology Initiative (NNI) is the program established to coordinate Federal nanotechnology research and development. A highly significant impact of the NNI has been the focused investment by the [NNI-participating agencies](#) in the establishment and development of multidisciplinary research and education centers devoted to nanoscience and nanotechnology. NNI agencies have developed an extensive infrastructure of over 60 major interdisciplinary research and education centers and user facilities across the country. Many such centers, with state of the art equipment for nanoscale S&T research, are designated as user facilities and are available to researchers from academia and the private sector, and to scientists at the national laboratories.

[Center for Nanotechnology, University of Washington](#)

Center for Nanotechnology, University of Washington, offer an [Optional Ph.D. Program](#) in Nanotechnology, the first of its kind in the nation, providing graduate students with excellent interdisciplinary education experiences in nanoscale science and nanotechnology. The [NanoTech User Facility](#) (NTUF) was established to provide the Pacific Northwest nanotechnology community with access to advanced characterization and nanofabrication equipment.

[International Institute for Nanotechnology, Northwestern University](#)

The IIN embodies an extraordinary combination of scientific capabilities, outreach programs, and partnerships. The institute also provides a unique and fertile ground from which to make substantial contributions to the field and ensure that the U.S. remains a world leader in nanotechnology.

[Birck Nanotechnology Center, Purdue University](#)

BNC leverages advances in nanoscale science and engineering to create innovative nanotechnologies addressing societal challenges and opportunities in computing, communications, the environment, security, energy independence, and health. In turn, the BNC exploits the accelerating progress in nanotechnology utilizing the most advanced nanoscale instrumentation to pursue answers to fundamental questions in the life and physical sciences.

[London Center for Nanotechnology](#)

The London Centre for Nanotechnology, LCN, is a UK based multidisciplinary enterprise operating at the forefront of science and technology. It is a joint venture between University College London and Imperial College London and is based at the Bloomsbury and South Kensington sites.

[Center for Nanotechnology Education And Utilization, Penn State University](#)

The Penn State Center for Nanotechnology Education and Utilization is the home of the Pennsylvania Nanofabrication Manufacturing Technology Partnership and the National Science Foundation Regional Center for Nanofabrication Manufacturing Education, an NSF-sponsored regional Advanced Technology Education Center . The Center for Nanotechnology Education and Utilization is dedicated to research, development, and education across all aspects of micro- and nanotechnology.

[Center for Nanotechnology, University of Wisconsin-Madison](#)

The University of Wisconsin Center for NanoTechnology, the interdisciplinary research center was the first academic facility to have clean rooms for computer chip fabrication. CNTec continue to be a national leader in pioneering research for the field of semiconductor manufacturing. CNTech research has also expanded into biological investigations, such as the production of large strands of DNA using photolithography.

[Center for Nanotechnology and molecular materials, Wake Forest University](#)

At Wake Forest University's NANOTECH Center the revolutionary principles of nanotechnology are being used to address the pressing needs of human society from health care and alternative energy technologies to defense technologies that aid in the development of peaceful nations

[Maryland Nanocenter, University of Maryland](#)

Maryland NanoCenter promotes major nano research and education **initiatives**, provides **one-stop shopping** for those seeking expertise and/or partnerships at Maryland, and supplies **infrastructure** to facilitate nano activities at Maryland through equipment, staff support, and informational and administrative functions.

[A compilation of many nanocenters](#)

News and Newsmakers

Materials, devices and products

- [Project to develop micro, nano tech for diamond device fabrication concludes with launch](#)

The Micromachined Diamond Device Initiative (MIDDI), led by UK researchers at Element Six Ltd in collaboration with the Institute of Photonics at The University of

Strathclyde has concluded, and its "successful outcomes have already underpinned the formation of a new subsidiary by Element Six. Diamond Microwave Devices Ltd is aiming to develop the world's first commercial high frequency, high power diamond transistors," the partners say.

- [**Catalyx begins low-cost commercial nanomaterials production; plans new nanomanufacturing facility**](#)

Catalyx Nanotech says it has begun manufacturing Platelet Graphite Nanofibers (PGNF) at a fraction of competitors' costs on a small commercial scale. "A myriad of environmentally friendly applications for PGNF have not previously been economically viable due to their high cost," the company says. Further, Catalyx plans to open a 35 ton/year capacity plant in late 2008 to produce nanoparticulate polymers, ceramics, and precious/transition metals.

- [**Nanosensors intros AFM probes for precise positioning, hi-res imaging**](#)

Switzerland-based Nanosensors has introduced gold- and platinum-coated variations its AdvancedTEC SPM probe for atomic force microscopes (AFMs). The highly doped monolithic silicon probes are designed for precise positioning and high-resolution imaging.

- [**Qualcomm MEMS demos IMOD color display**](#)

Qualcomm MEMS Technologies has demonstrated the first reflective Interferometric Modulation (IMOD) color mirasol display. Freestyle Audio will feature the first 0.9-inch low-power, MEMS-based display, which is viewable even in direct sunlight, in its next-gen MP3 players, designed for rugged sports use.

- [**EoPlex builds factory for nanomanufacture of cell phone antennas**](#)

EoPlex Technologies is building its first full-scale plant for production of cell phone antennas enabled by nanomanufacturing. The company uses nanodeposition techniques and proprietary "inks" that carry ceramic, metallic, or polymer materials.

- [**UniPixel unveils polymer MEMS-based TMOS flat-panel displays**](#)

May 19, 2008 -- Uni-Pixel Inc. is making its first public demonstration of Time Multiplexed Optical Shutter (TMOS) flat panel color display prototypes this week. TMOS technology leverages polymer MEMS, and also uses Frustrated Total Internal Reflection (FTIR) to transmit light to the display viewer.

- [**Nanotube production leaps from sooty mess in test tube to ready formed chemical microsensors**](#)

Carbon nanotubes' potential as a super material is blighted by the fact that when first made they often take the form of an unprepossessing pile of sooty black mess in the bottom of a test tube. Now researchers in the University of Warwick's department of chemistry have found a way of producing carbon nanotubes in which they instantly form a highly sensitive ready made electric circuit.

- [**Spiraling nanotrees offer new twist on growth of nanowires**](#)

When University of Wisconsin-Madison chemistry professor Song Jin and graduate student Matthew Bierman accidentally made some nanowire pine tree shapes one day -- complete with tall trunks and branches that tapered in length as they spiraled upward -- they knew they'd stumbled upon something peculiar.

- [**Graphene-based gadgets may be just years away**](#)

Researchers at The University of Manchester have produced tiny liquid crystal devices

with electrodes made from graphene -- an exciting development that could lead to computer and TV displays based on this technology.

Processing and manufacturing methods

- [Center for High-rate Nanomanufacturing's "revolutionary" technology for nanoscale assembly](#)
Researchers at the Nanoscale Science and Engineering Center for High-rate Nanomanufacturing (CHN) at Northeastern University say they have discovered "an innovative technology that will have a tremendous impact on the nanotechnology industry." And they plan to demonstrate a prototype next month.
- [By adding graphene, researchers create superior polymer](#)
Researchers at Northwestern University and Princeton University have created a new kind of polymer that, because of its extraordinary thermal and mechanical properties, could be used in everything from airplanes to solar cells. The polymer, a nanocomposite that incorporates functionalized, exfoliated graphene sheets, even conducts electricity, and researchers hope to use that property to eventually create thermally stable, optically transparent conducting polymers.
- [Engineers demonstrate first room-temperature semiconductor source of coherent Terahertz radiation](#)
Engineers and applied physicists from Harvard University have demonstrated the first room-temperature electrically-pumped semiconductor source of coherent Terahertz radiation, also known as T-rays. The breakthrough in laser technology, based upon commercially available nanotechnology, has the potential to become a standard Terahertz source to support applications ranging from security screening to chemical sensing.
- [Spin control: New technique sorts nanotubes by length](#)
Researchers at NIST have reported a new technique to sort batches of carbon nanotubes by length using high-speed centrifuges. The technique should be easy to scale to industrial quantities for a variety of nanotube applications where length is an important factor.
- [Nanotechnology in reverse uses cell to calibrate tools](#)
Nanotechnology researchers at UC Davis have shown that they can use a red blood cell to calibrate a sensitive instrument, an atomic force microscope.
- [Commencement 2008: Student innovation could improve data storage, magnetic sensors](#)
Paul Morrow, who will graduate from Rensselaer Polytechnic Institute on May 17, has come a long way from his days as an elementary school student, pulling apart his mother's cassette player. The talented young physicist has developed two innovations that could vastly improve magnetic data storage and sense extremely low level magnetic fields in everything from ink on counterfeit currency to tissue in the human brain and heart.
- [Golden nanocrown](#)
Researchers led by Shu-Yan Yu have recently made a "golden crown" with a diameter of only a few nanometers, a large ring-shaped molecule containing 36 gold atoms.
- [Scientists demonstrate method for integrating nanowire devices directly onto silicon](#)
Applied scientists at Harvard University in collaboration with researchers from the German universities of Jena, Gottingen, and Bremen, have developed a new technique for

fabricating nanowire photonic and electronic integrated circuits that may one day be suitable for high-volume commercial production.

- [New technique measures ultrashort laser pulses at focus](#)
Lasers that emit ultrashort pulses of light are used for numerous applications, but the quality of the results is limited by distortions caused by lenses and other optical components that are part of the experimental instrumentation. Researchers have developed a system that tells researchers what types of aberrations are present, which allows them to create the desired pulse at the focus that's free of distortions.
- [Melting defects could lead to smaller, more powerful microchips](#)
As microchips shrink, even tiny defects in the lines, dots and other shapes etched on them become major barriers to performance. Princeton engineers have now found a way to literally melt away such defects, using a process that could dramatically improve chip quality without increasing fabrication cost.

Energy

- [MIT creates new material for fuel cells](#)
MIT engineers have improved the power output of one type of fuel cell by more than 50 percent through technology that could help these environmentally friendly energy storage devices find a much broader market, particularly in portable electronics.
- [New efficiency record for solar cells](#)
Physicist Bram Hoex and colleagues at Eindhoven University of Technology, together with the Fraunhofer Institute in Germany, have improved the efficiency of an important type of solar cell from 21.9 to 23.2 percent (a relative improvement of 6 percent). This new world record is being presented on Wednesday May 14 at a major solar energy conference in San Diego.
- [Nanowires may boost solar cell efficiency, UC San Diego engineers say](#)
University of California-San Diego electrical engineers have created experimental solar cells spiked with nanowires that could lead to highly efficient thin-film solar cells of the future.
- [Go Speed Racer! Revving up the world's fastest nanomotors](#)
In a "major step" toward a practical energy source for powering tomorrow's nanomachines, researchers in Arizona report development of a new generation of sub-microscopic nanomotors that are up to 10 times more powerful than existing motors. The tiny motors, made of platinum and gold nanowires, are supercharged with carbon nanotubes. Go Speed Racer, go!

Biotechnology

- [IBN's new lab-on-a-chip achieves speed with nanotech](#)
The Institute of Bioengineering and Nanotechnology (IBN) in Singapore has developed an "extreme," nanotechnology-enabled lab-on-a-chip capable of sample prep and PCR in just 17 minutes. The microsystem uses magnetic nanoparticles to speed and simplify DNA testing.
- [Failed HIV drug gets second chance with addition of gold nanoparticles](#)
Researchers at North Carolina State University have discovered that adding tiny bits of gold to a failed HIV drug rekindle the drug's ability to stop the virus from invading the body's immune system.

- [Real-time observation of the DNA-repair mechanism](#)
For the first time, researchers at Delft University of Technology have witnessed the spontaneous repair of damage to DNA molecules in real time. They observed this at the level of a single DNA molecule. Insight into this type of repair mechanism is essential as errors in this process can lead to the development of cancerous cells. Researchers from the Kavli Institute of Nanoscience Delft publish this in the leading scientific journal Molecular Cell.
- [Fluorescent nano-barcodes could revolutionize diagnostics](#)
A new technology with research and clinical application including the early detection of disease has been invented and developed by University of Queensland researchers.
- [Carbon nanotubes that look like asbestos, behave like asbestos](#)
A major study published today in Nature Nanotechnology suggests some forms of carbon nanotubes -- a poster child for the "nanotechnology revolution" -- could be as harmful as asbestos if inhaled in sufficient quantities.
- [New cancer gene found](#)
Researchers at the OU Cancer Institute have identified a new gene that causes cancer. The ground-breaking research appears in Nature's cancer journal Oncogene.
- [UC San Diego researchers target tumors with tiny 'nanoworms'](#)
Scientists at USD, UCSB and MIT have developed nanometer-sized "nanoworms."
- [Scientists make chemical cousin of DNA for use as new nanotechnology building block](#)
While scientists are fully exploring the promise of DNA nanotechnology, Biodesign Institute researcher John Chaput is working to give scientists brand new materials to aid their designs. Chaput and his research team have made the first self-assembled nanostructures composed entirely of glycerol nucleic acid -- a synthetic analog of DNA.

Newsmakers

[UCLA professor wins international award for pioneering nanotechnology research](#)

UCLA professor and California nanosystems Institute member, Dr. Robin Garrell, has been selected by an independent panel of scientists to receive an international award and special recognition for her pioneering research work in nanotechnology.

[Nanomedicine company elects former Aventis vice chairman/CFO as its chairman](#)

Nanobiotix, an emerging nanomedicine company focused on combining advances in nanotechnology and molecular biology for cancer therapy, says it has elected Patrick Langlois as chairman of its board of directors. Because it targets cancer cells for destruction -- leaving healthy cells untouched -- Nanobiotix's nano-enabled NanoXray platform has the potential to dramatically impact cancer therapy, says Langlois.

Conferences

[12th ETH-Conference on Combustion Generated Nanoparticles](#)

Date: Monday 23rd to Wednesday 25th of June 2008
Venue: ETH-Zentrum, Zurich, Switzerland.

SPIE NanoScience+Engineering

Date: August 10 (Sunday) to August 14, 2008 (Thursday)
Venue: San Diego Convention Center, San Diego, CA.

Governing Emerging Technologies

Date: August 17 (Sunday) ?August 27, 2008 (Wednesday)
Venue: Big Sky Resort, Big Sky, Montana.

The 8th International Conference on Nanotechnology

Date: August 18 (Monday) to August 21, 2008 (Thursday)
Venue: Sheraton Hotel & Arlington Convention Center, Arlington, Texas, USA.

COMS 2008- Commercialization of Micro and Nano Systems Conference

Date: August 31 (Sunday) to September 4, 2008 (Thursday)
Venue: Puerto Vallarta, Mexico.

nanoTX'08

Date: October 2 (Thursday) ?October 3, 2008 (Friday)
Venue: Hyatt Regency Dallas conventional hotel, Dallas, TX, USA

IEEE Nanotechnology Materials and Device Conference 2008

Date: October 20 (Monday) ?October 22, 2008 (Wednesday)
Venue: Kyoto University Clock Tower Centennial Hall, Kyoto, Japan..

NanoRisk 2008

Date: October 21 (Tuesday) ?October 24, 2008 (Friday)
Venue: Sofitel Paris Bercy, Paris, France.

2nd IEEE International Conference on Nano/Molecular Medicine and Engineering

Date: November 7 (Friday) to November 9, 2008 (Sunday)
Venue: Suzhou, China.

International Institute for Nanotechnology 2008 Symposium

Date: November 20, 2008 (Thursday)
Venue: Northwestern University, Orrington Hotel Grand Ballroom, 1710 Orrington Avenue, Evanston, IL, USA

IEEE International Conference on Nano/Micro Engineered and Molecular Systems 2009

Date: January 5 (Monday) to January 8, 2009 (Thursday)

Venue: Sheraton Dameisha Resort, Shenzhen, China.

7th Annual Nano Investment Forum

Date: February 6, 2009 (Friday)

Venue: Renaissance Esmeralda Resort & Spa, Palm Springs, CA, USA

NanoGlobe Exposition & Conference

Date: March 20 (Friday) ?March 22, 2009 (Sunday)

Venue: RAI International, 23-25, rue Jean Jacques Rousseau, Paris, France.

NanoEnergy 2009

Date: April 1 (Wednesday) ?April 3, 2009 (Friday)

Venue: Sofitel Paris Bercy, Paris, France.

NanoNEWS.TV website with monthly calendar of upcoming events

Nanobusiness

European Nanobusiness Association

European Nanobusiness Association aims to benchmark European progress in nanotechnology commercialization, and to identify areas of strength and encourage best practice from across the continent.

Nanotechnology Industries

A huge list nanotechnology industries

EoPlex builds factory for nanomanufacture of cell phone antennas

EoPlex Technologies is building its first full-scale plant for production of cell phone antennas enabled by nanomanufacturing. The company uses nanodeposition techniques and proprietary "inks" that carry ceramic, metallic, or polymer materials.

Nanoeducation

Brown U launches Institute for Molecular and Nanoscale Innovation

The Institute for Molecular and Nanoscale Innovation (IMNI) at Brown University has opened encompasses the Center for Advanced Materials Research, focused on nano- and micromechanics of materials; a new Center for Nanoscience and Soft Matter, covering sensing, molecular electronics, nanomagnetism, and supramolecular chemistry; and The NanoHealth Working Group for nano EHS and nanomedicine.

[NT-MDT, Nano & Giga Solutions develop nanotech-focused educational portal](#)

NT-MDT, manufacturer of atomic-force and scanning-probe microscopes (AFMs and SPMs) for nanotechnology R&D, has signed an agreement with Nano & Giga Solutions, a networking research and consulting company, for joint development of an informal educational web portal, Atomic Scale Design Network (ASDN.NET), covering atomic scale science fundamentals for nanotechnology.

[Professional Master's Program in Nanoscale Physics](#) at Rice University Wiess School of Natural Sciences, Houston, Texas, USA.

[Nanoeducation links](#) by NanoIndustries

Students' Corner

[NNI: Nanotechnology for students K-12](#) program links and information

[Nanotechnology Basics](#)

[Nanotechnology studies](#) attempts to answer the question "why should students study nanotechnology?"

[Nanotechnology software enables high school students to design molecular machines](#). Check out **[NanoEngineer-1](#)** modeling software for atomically-precise nanotechnology.

[Nanooze: A website to expose young kids to the field of nanotechnology!](#)

[List of 4-year colleges where the teaching of nanotechnology is well underway!](#)

[Nanotechnology and Nanoscience Student Association](#)

Jobs

[Research Jobs](#)--a weekly email service that lists new positions available within the research and development sector throughout Australia.

[Nanotechnology jobs](#)-- at the Nanotechnology career site.

[Career Voyages](#) provides information and resources for career decisions and moves

[Job listings at Nanotechnology Now](#)

Books, Periodicals, Reviews and Videos

· [IEEE Nanotechnology Magazine](#) - a new periodical published by the [IEEE](#) and the [IEEE Nanotechnology Council](#) to serve as a focal point to disseminate updated R&D, manufacturing, commercialization, and educational activities related to Nanotechnology through out the world. From time to time, special tutorial articles and important leading-edge research topics will also be highlighted in the Magazine.

- [Books](#)
- [Magazines](#)
- [Streaming Videos](#)

Nano Art Galleries

- [Nano Art](#) at Nanotechnology Now
- [Nano Images](#)
- [Discover Nano Art](#) at Northwestern University
- [Nanotech modeling and arts](#)