Nano Undergrad Paper Featured in Science

A paper published by Michael Burek, a 4th year Waterloo Nanotechnology Engineering Student, has been selected as “Editors Choice” in the December 18 Issue of Science. Michael's paper, “Fabrication and Microstructure Control of Nanoscale Mechanical Testing Specimens via Electron Beam Lithography and Electroplating”, was written as part of his 8-month co-op term while at Caltech. The paper was published in the December issue of NanoLetters.

Michael is part of the first cohort of students who entered the newly created nanotechnology engineering program back in September 2005. Mentored by WIN members Thorsten Hesjedal and Ting Tsui, Burek also completed research co-op terms at the College of NanoScale Science and Engineering in Albany (NY), and later at Penn State before landing in Julia Greer's group at Caltech. Michael graduates with a BASc in Nanotechnology Engineering in June and plans to pursue a PhD in nanostructured materials and nanomechanics.

Collaborative Nanotechnology Graduate Program

In January 2010, The University of Waterloo will offer collaborative MASc, MSc and PhD programs in Nanotechnology. The research programs are jointly offered by seven departments (three in the Faculty of Science and four in the Faculty of Engineering). Students are exposed to a truly interdisciplinary educational environment that spans from basic research through to application. Inaugural Director, Pearl Sullivan says, “The goal of the collaborative programs is to allow students to gain perspectives on nanotechnology from a wide community of scholars across Science and Engineering.” "Now a Chemistry student is able to take PhD level courses and work on his/her thesis with Professors from Electrical and Computer Engineering or a Chemical Engineering student may study in Biology. It’s at these interfaces where truly innovative research is happening.”

Interested applicants should apply directly to the department or reference nano.uwaterloo.ca/education/grad.
Outreach

It was a WIN-WIN!

WIN’s scientific outreach program is in full swing. Parents and kids of all ages stumped through “Magic NanoMud”, marvelled at Ferro Fluid Art and built a 20-foot Carbon Nano Tube out of balloons during “NANO-DAY” at the Children’s Museum. “It was a joint effort between WIN and the University of Guelph”, said WIN Managing Director, Alain Francq. Undergraduate nanotechnology students were able to engage the imagination of the kids, and peak the interest of the parents. It was “WIN-WIN”. Later that week Nanotechnology exhibits were on full display at the Science Open House.

Flexible, transparent display screens

WIN members Hany Aziz, Andrei Sazanov and Thorsten Hesjedal opened the doors of the Giga-to-Nano laboratory to the public and presented their Ontario Research Fund project on transparent, organic, flexible electronics for future display screens, to over 300 grade 11 highschool science students. The events, organized by WIN, Science outreach (Michelle Coulombe) and Engineering outreach (Mary Wells), were held over 3 days during the Quantum-2-Cosmos festival.

Soccer playing nanorobots

The student run Waterloo NanoRoboticsGroup (NRG) demonstrated their entry into the 2010 RoboCup Nanogram Competition to 150 students over 3 sessions as part of an outreach panel discussion. The Nanogram Competition is designed to simulate the sport of soccer in an attempt to motivate students, engineers and scientists to think of innovative solutions using Nanotechnology. There are four challenges for the soccer playing nanobots; a 2 mm dash, a slalom race, a shootout, and a creative dance. The University of Waterloo Nanorobotics Group has designed a system which utilizes a thermally actuated microfluidic pump to create an air propelled, laser controlled robot that is no larger than 300x300 microns in size. WIN Member, Mustafa Yavuz mentors the NRG team. For more on the students, their design and the competition, visit www.uwnrg.org.

WIN Membership

WIN now has 54 regular members across 9 departments. To become a member you must have an active nano research program with nano publications and participate actively in WIN. WIN also offers membership to students and corporate partners. Would you like WIN Business Cards? Contact us.

The ISAB is an external expert committee that provides advice to the Executive Director and the Board of Directors of WIN on the excellence, relevance and impact of research programs carried out by WIN members; the degree to which the research programs reflect the vision and objectives of the institute; the strategic positioning of the institute; the identification of promising new areas of focus; the identification of potential synergies and partnerships with other major players in nanotechnology and other issues of scientific importance that may affect WIN’s progress and goals.

Inaugural Meeting of the WIN International Scientific Advisory Board (ISAB)

On Friday, November 13th, the WIN ISAB met for the first time. Members of the ISAB are:

» **Chair, Savvas Chamberlain**, Chairman of Dalsa Corporation (Canada)

» **Thomas Picraux**, Chief Scientist, Centre for Integrated Nanotechnologies, Los Alamos National Laboratory (United States)

» **Eugenia Kumacheva**, Professor, Department of Chemistry, University of Toronto (Canada)

» **Mauro Ferrari**, Professor and Director, Division of Nanomedicine, University of Texas Health Centre at Houston (United States)

» **David Reinhoudt**, Chairman of the Board of NanoNed (The Netherlands)

» **C.N.R. Rao**, National Research Professor and Honorary President, Jawaharlal Nehru Centre for Advanced Scientific Research (Bangalore, India)

» **Gerbrand Ceder**, R.P. Simmons Professor of Materials Science and Engineering, Massachusetts Institute of Technology (United States)

» **Teruo Kishi**, Special Advisor, National Institute for Materials Science (Japan)

» **Richard Martel**, Canada Research Chair, Université de Montréal (Canada)

From left to right: Arthur Carty, David Reinhoudt, Savvas Chamberlain, Eugenia Kumacheva, Mauro Ferrari, and Thomas Picraux.
International Doctoral School in Functional Materials

WIN is the new administrative office for Waterloo’s participation in the Erasmus Mundus – International Doctoral School in Functional Materials (IDS-FunMat). After fierce competition among 129 proposals, the European Union announced the creation of 13 prestigious doctoral schools, one of which was IDS-FunMat. A consortium of 9 universities is tasked with delivering this international double-degree program. Waterloo is one of the 9 consortium partners, and is the only non-EU partner. Other partners include Bordeaux (UB), Grenoble (INP), Caen (UCBN), Paris (UPMC), Louvain la Neuve (UCL), Liege (ULG), Darmstadt, Lisboa (IST). Ten fellowships are granted per year for 5 years. These 3 year fellowships offer an international student up to 7500€ for travel and a guaranteed 2800€/month in salary.

Each fellowship requires the participation of 2 Universities and 1 Industry Sponsor. The program is administered as a “joint” degree with the student enrolled at both Universities and receiving separate degrees from both institutions.

IDS-FunMat provides funding for top students interested in an international, co-mentored PhD in advanced materials. “The program aligns with our strategic plan to internationalize graduate studies”, says Sue Horton, Associate Provost, Graduate Studies at Waterloo. The program was initiated through WIN by Eric Pouzet and the departments of Chemistry and Chemical Engineering and the French Consulate in Toronto.


WIN Executive Director Arthur Carty attended the 6th annual STS Forum in Kyoto. The meeting is aimed at creating a global human network of trust to openly discuss the progress of science and technology for the benefit of humankind. More than 800 scientists, industrialists, political leaders and members of the media from 86 countries, regions and international organizations attended.

Canada had a strong delegation, the largest to date, with 38 Canadian participants, most of whom were invited speakers and chairs.

For the first time, a Canadian Ambassador to Japan, Jonathan Fried, attended the Forum and members of the Canadian team distinguished themselves with excellent presentations, interventions and session leadership. Rupert Murdoch conducted a Plenary Session entitled “Dialogue among Political Leaders, Scientists and Industrialists”.

WIN International

2010 will bring exciting opportunities for International collaboration:

India
In January 2010 a delegation of WIN researchers will be heading to India to participate in a workshop to further collaboration under Waterloo’s nanotechnology MOU with IIT-Bombay, signed by David Johnston in Jan. 2007. Since that signing, two major Indian delegations have visited Waterloo and several faculty members, including a WIN delegation last year, have visited India. Last year, Dr. Carty chaired a committee to evaluate the feasibility of a Joint Canada-India Nanotechnology Institute and summer school. As a result, the Indian government committed $200,000 toward research exchanges which was matched by five Canadian Universities (UBC, Edmonton, Waterloo, Toronto, McGill).

In addition to a nano workshop at IIT-Bombay, WIN will travel to IISc Bangalore to develop collaborations and offer scholarships to top students to study at Waterloo. A visit is also planned to Bigtec Inc., an Indian microfluidics/lab-on-a-chip company looking to set up an office in Waterloo to be closer to WIN researchers.

Japan
Building on the success of Japan Nano 2009, WIN will be leading a delegation to Japan Nano 2010 to sign an MOU and hold a workshop with Japan’s National Institute for Materials Science (NIMS). “Collaboration was initiated between WIN and NIMS during a tour last year” Said Dr. Carty. “This year, we want to build on that success and hold a workshop specifically in nanotechnology for Energy and Nano-bio systems.” The WIN delegation will also visit corporations to establish partnerships and commercialize WIN research.
WIN Distinguished Lecturers

On Monday, September 21st, the Waterloo Institute for Nanotechnology held its third Distinguished Lecture Series by hosting Professor Hideo Hosono of the Tokyo Institute of Technology, Frontier Research Centre, who spoke on “New Frontiers of Materials Research: from Functional Transparent Oxides to High Temperature Superconductors” to a packed crowd.

WIN fellowships

In late November, the Waterloo Institute for Nanotechnology announced the results of the second round of its NanoFellowships program. Twenty one awards of $10,000 each were awarded to candidates from 6 different departments. A sample of some winning projects include:

- Gold Nanoparticles as Localized Heat Sources - Temperature Measurements
- Amorphous silicon p-i-n photo detector with Frisch grid
- Unipolar Charge Sensing for Evaporated Large-area Solid State Detectors for Medical X-ray Imaging Applications
- Surface Nanostructure of Volatile Organic Amphiphiles in Aqueous Solution
- Silicon Nanophotonics and All-Optical Integrated Circuits

WIN would like to congratulate the Nanofellowship winners and express its appreciation to all of the talented students who applied. A reception for the students will be held in the new year. A third competition will open in Spring of 2010.

WIN events

Upcoming Events at WIN...

Thursday, January 14th, 2010 | WIN Seminar | Professor Zhihong Nie
Monday, February 8th, 2010 | WIN Seminar | Professor Matiar Howlader
Monday, February 22nd, 2010 | WIN Seminar | Professor Ali Khademhosseini

For more information on any of these events or new members, please visit nano.uwaterloo.ca.

WIN would like to welcome its new members:

David Cory, Institute for Quantum Computing
Melanie Campbell, Physics
Flora Ng, Chemical Engineering
Garry Rempel, Chemical Engineering
Russell Thompson, Physics
Frank Wilhelm, Physics
Norman Zhou, Mechanical and Mechatronics Engineering

www.nano.uwaterloo.ca