



From the Executive Director's Chair

Although there are many different ways to gauge academic success in our current environment, the term that tends to get the most air time is “*impact*”. From a classical point of view, academic impact for an individual faculty member is gauged primarily through the number of peer reviewed journal papers, the “Impact Factor” of the journals in which the papers appear and the citation history. Although there are indeed other factors involved in assessing academic performance, these three are routinely used by academic institutions and funding agencies to reward faculty members. The ground rules that influence these types of metrics, however, have been evolving and expanding. One might observe that the evolution is accelerating as a result of tighter economic times and changing priorities. This is posing a unique set of challenges from the level of individual faculty all the way to the academic institution as a whole. Take, for instance, the progressive move within NSERC to provide substantial funding opportunities through programs that involve industrial partnerships and their increasing promotion of interdisciplinary research endeavours, including significant interaction between natural and social sciences. Gone are the days when one could support a flourishing research program through only a “pure” science, engineering or

social sciences research grant. A similar trend in funding structure can be seen at the Provincial levels where applied and collaborative research programs, often based on accelerating commercialization, have emerged in recent years to replace the more investigative research opportunities that prevailed in the past. At least part of this transition has resulted from tighter budgets at all levels of government and an increasing focus on improving Canada's competitive advantage at a global scale. So much is driven by economic survival these days. However, the social and public impact of our research results has never been more valued and scrutinized.

Faculty and universities have to adopt new ways of doing business.

From this new reality have emerged some striking opportunities. For example, various levels of government are tending to outsource more science, engineering and technology to the university community while downsizing their staff. Advice and direction on policy development and societal impact is being sought on a more frequent basis. At the same

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Director's Chair (cont.)

time, industry, both national and international, are recognizing the opportunity to partner with Canadian universities for R&D activities, and realizing the benefits of available matching funding. Clearly our academic institutions must maintain their core focus on research and educational excellence. Indeed this focus has positioned us such that we can capitalize on this changing environment. In order to take maximum advantage of the current opportunities, however, faculty and Universities have to adopt new ways of doing business, and let me stress the word *business* here. With multinational companies as our partners, the expectations for deliverables go well beyond the fundamental need for scholarly excellence. These expectations include, for example, third party validation of technologies, an emphasis on research that provides a competitive advantage and market growth and a requirement to consider policy and societal impacts of our research results, all in a timely fashion. Frequently, these expectations can only be met through collaboration across disciplines. These are examples of the new impact metrics that will be used to determine our success. University systems will need to develop an environment for both their faculty members and industrial partners that encourages and supports collaboration among sectors and across disciplines. I believe that the University of Waterloo has demonstrated leadership in this regard and is well positioned to react to these opportunities. Nevertheless, challenges remain.

One approach proving to be extremely effective at nurturing this new academic business paradigm is a novel type of institutional model designed to function as a broker between the industrial/government/civil society partners, the University and the individual faculty members. A great example of this is the Water Institute whose core mission is to attract and facilitate new, innovative, and in many cases, interdisciplinary opportunities for its members and assist in managing the interactions with a new

spectrum of partners. An example is the recent establishment of the Southern Ontario Water Consortium (SOWC), of which WI and many of its members played a significant facilitating role. SOWC is a field-based research and development platform situated throughout southern Ontario and designed to permit the development, testing and demonstration of new water technologies, leading to commercialization in areas of drinking water, wastewater, ecotoxicology, analytical methods and watersheds. SOWC is presented in more detail elsewhere in the newsletter, but let me say that its establishment involved coordinated collaboration among eight universities, three levels of government and dozens of industrial partners. By nature, it is both multi- and interdisciplinary, and provides a mechanism for direct connection among government, industry and institutions. It is unprecedented in its scope and breadth of opportunity for water researchers across the Province and beyond. Truly a new way of doing business.

I am proud that uWaterloo has been designated the lead implementing organization for the SOWC and that WI was able to substantially contribute to its realization. I believe it is a great example of what Waterloo researchers can accomplish working together with their partners from neighboring institutions on issues that are meaningful and relevant to industry, government and civil society partners. The Water Institute strives to enhance impact for its members and the University not only through promoting excellence and innovation, but also by capitalizing on emerging opportunities that, to some degree, require us to redefine our definition of impact. The SOWC is a compelling example.

Dave Rudolph
Director
Water Institute



Water Institute Events and Activities

Recent Events

- The Water Institute was pleased to have Dr. Tony Allan, 2008 recipient of the Stockholm Water Prize, as its First Annual Distinguished Lecturer.
- The Water Institute ended the search for a managing director in July with the hiring of Kevin Boehmer. See page 6 for an introduction to Kevin.
- In late May, the team of Andre Unger, Mark Knight, Carl Haas, and Edward Sudicky were awarded an NSERC CRD related to their proposal titled "Optimal strategies for the financially sustainable management of drinking-water and wastewater networks."
- The first of the three Water Institute sponsored workshops was held September 8. "Opportunities for research partnerships in membrane-based water treatment applications", a workshop organized by Christine Moresoli, addressed emerging issues concerning membrane filtration processes employed in water treatment.

Upcoming Events

- Dr. Masaki Hayashi, University of Calgary, will deliver the first Water Institute Seminar for 2011-12 on **September 26** at 10:30 am in DC 1304. It is titled "Alpine hydrogeology: Groundwater flow and storage in moraine and talus sediments."
- Lewis Jonker, Director, Integrated Water Resources Management Program, University of the Western Cape, South Africa, will deliver a seminar on **October 6** at 11:30 am in DC 1302. His seminar is titled "Thinking differently about water: Implications for capacity building programs."
- The second of the Water Institute workshops will be: Blue+Green Resilience and Innovation: "Water Source Protection, Ecosystem Resilience, and Social Innovation in a Changing World" organized by Stephen Murphy. F. Stuart (Terry) Chapin III and Keith Bowers will be the key speakers in this **December 7** workshop.

See our website for detailed and up-to-date event listings:

<http://water.uwaterloo.ca/>

Beyond Waterloo: Water-related Events

- Grand River Watershed Water Forum. A Sustainable Watershed? Can we get there from here? **September 16, GRCA, Cambridge, ON.**
- Conference to Honour and Celebrate Barry J. Adams: Probabilistic Methodologies in Water and Wastewater Engineering, **September 23–24, Toronto, ON**
- 38th Annual Aquatic Toxicology Workshop. **October 2-5, Winnipeg, MB**
- RES'EAU—Waternet's biennial knowledge-transfer workshop: Big value in small systems, **October 5-6, Vancouver, BC.** Sponsored by the Canadian Water Network and Walkerton Clean Water Centre.
- Great Lakes Water Quality Biennial Meeting: H2O NOW. **October 21-14, Detroit, MI, USA.** Sponsored by the International Joint Commission.
- 2nd International Forum on Integrated Water Management. "Stormwater Management in Urban Areas", **October 23-25, Sherbrooke, QC**
- A.D. Latornell Conservation Symposium: Water—the Future of the Source, **November 16-18, Alliston, ON.** Sponsored by Conservation Ontario and the University of Guelph.

Faculty Profile: Marios Ioannidis, Chemical Engineering



Marios Ioannidis has been with the University of Waterloo since 1989, when he first joined the Department of Chemical Engineering as a PhD student. For over 20 years, he has been integrating pore-scale numerical models with experimental techniques in order to understand how the void structure of soil and rock, existing ubiquitously over multiple length scales (often from less than a nanometer to several millimeters), conspires with solid-fluid interactions to determine

multiphase flow and transport at the macroscopic scale. Although initially motivated by applications in petroleum reservoir engineering, where he made pioneering contributions in the area of digital petrophysics, his research on the basic physics of transport in porous media has more recently been applied to fuel cell engineering and soil remediation. A co-inventor of the process of gas-supersaturated water injection, Marios and his students are currently collaborating with fellow researchers from Canada, the U.S.A. and Switzerland in demonstrations of the potential of this process to remove residual organic contaminants from the subsurface.

Water in the News

ORF Early Researcher Awards for James Craig and Juewen Liu

Two of uWaterloo's water researchers were awarded Early Researcher Awards under the Ontario Ministry of Research and Innovation's Ontario Research Fund program. James Craig, Department of Civil and Environmental Engineering, saw his project titled "Assessing the Vulnerability and Environmental Impact of Pumping Wells Near Wetlands and Steams" funded. This project will develop specialized computer models to study the exchange of water between public and private wells, streams, and wetlands. Juewen Liu, Department of Chemistry, also had success with his project titled "DNA-functionalized hydrogels for visual detection and removal of contaminants in water". This project will develop sensors that can detect contaminants in water and remove them at the same time.

ORF-RE Grant Announced

The Ontario Ministry of Research and Innovation announced funding of projects from its ORF-RE program. The project titled "Improved Strategies for Management of Metal-Bearing Residues" headed by David Blowes, Department of Earth and Environmental Sciences,

was awarded \$2.95 million. Within this project they are developing new, cost-effective, long lasting approaches for preventing and treating industrial waste contamination.

Peter Huck Appointed to WaterTAP Board

The chair and board members of the provincial government's Water Technology Acceleration Project (WaterTAP) were announced in August. Peter Huck, civil and environmental engineering, was among the seven board members. WaterTAP was established under Ontario's Water Opportunities and Water Conservation Act, 2010. WaterTAP aims to identify opportunities, build partnerships, and improve information within the water and wastewater sector, including providing advice to government on developing Ontario's water sector.

Two CWN Calls for Expressions of Interest

The Canadian Water Network (CWN) is soliciting Expressions of Interest (EOI) for two new consortiums. They are looking to establish research teams in the Canadian Municipal Water Consortium and the Secure Source Waters Consortium. EOI submission deadlines are September 30 and 26, 2011 respectively. See the CWN web site for further information.

www.cwn-rce.ca

Southern Ontario Water Consortium

On August 23, 2011, the Government of Canada announced the Southern Ontario Water Consortium (SOWC) - an integrated platform to develop, test and demonstrate new water technologies primarily within the Grand River watershed, but with additional facilities in London, Toronto, and Oshawa. The consortium involves more than 70 companies, five municipalities and eight universities. The platform will integrate various elements of water management (e.g., drinking water, wastewater, ecotoxicology, analytical methods, watersheds) and be enabled by a sophisticated data generation, processing and management environment courtesy of IBM. Investors in the platform include FedDev Ontario (\$19.5M), Ontario MRI (\$9M), IBM Canada (\$20M), universities and equipment vendors (\$4M), together with in-kind contributions of \$7M from private sector users. The SOWC - a huge undertaking - will vault Ontario's recognized leadership in the water sector to a new level by enabling researchers, technology developers, conservation authorities and municipal water and sewage properties to work together in a practical yet innovative environment. In the longer-term, the SOWC will equip participants with leading-edge technology, tools and knowledge to address water-related issues impacted by, among other things, urbanization and climate change not only in Ontario, but around the world.

Key roles in obtaining SOWC funding were played by Jim Barker, Professor Emeritus, Department of Earth and Environmental Sciences, and Dave Rudolph, Executive Director of the Water Institute. Along with other Water Institute members, they helped both prepare the original application and attend to the revisions needed to convert the original CFI/MRI application to an application to FedDev/MRI. uWaterloo is the lead university in the consortium.

While several WI members will be active in building the SOWC platform, the platform itself will represent an important basis for future uWaterloo research and educational activities. The platform will represent an integrated facility - perhaps the only one of its kind in the world - for water-related research and technology development, testing, and demonstration on a watershed scale. The platform will therefore give Waterloo researchers unique access to physical and institutional infrastructure designed to promote academic discovery that meets the real world needs of the water technology industry, conservation authorities and various governments.

<http://www.mri.gov.on.ca/blog/index.php/2011/08/walterstewartowc/>

<http://www.feddevontario.gc.ca/eic/site/723.nsf/eng/00598.html>

Spotlight: Centre for Control of Emerging Contaminants

The Centre for Control of Emerging Contaminants (CCEC) was started in 2008-09 with funding from the Ontario Research Fund. In 2010 CCEC members received additional funding from the Canadian Municipal Water Research Consortium (CMWRC) administered through the Canadian Water Network (CWN) Centres of Excellence that is expanding the CCEC research projects across Canada. Recently, additional projects have been approved with international collaborators in Singapore.

The Centre focuses on control of Emerging Contaminants (ECs) in water, wastewater, and residuals (i.e., biosolids). Emerging Contaminants is a term encompassing thousands of compounds released into our water systems daily such as pharmaceuticals, personal care products, industrial chemicals and nanomaterials. Although the CCEC is based in the Department of Civil & Environmental Engineering, it brings together an interdisciplinary group of the researchers, technology implementers and regulators to develop technologies to remove and monitor ECs in the environment and evaluate EC risk from uWaterloo and elsewhere.



Staff Profile: Kevin Boehmer, WI Managing Director



The Water Institute welcomed Kevin Boehmer as its inaugural Managing Director in July 2011. Kevin was born and raised in the Waterloo Region and obtained a Bachelor of Environmental Studies (Honours Geography, 1984/90) and Master of Arts (Regional Planning and Resource Development, 1992) from the Faculty of Environment, University of Waterloo. Kevin has over 20 years of professional experience in the environment and water sectors as a researcher, trainer, consultant and manager.

After obtaining his undergraduate degree, Kevin began his professional career administering a river water quality monitoring network at the Canada Centre for Inland Waters (CCIW) in Burlington, Ontario. After a one year "working holiday" in Australia, Kevin returned to the Waterloo Region where over the next several years he worked for CH2M HILL. At CH2M HILL, Kevin was involved in a wide range of projects including ground and surface water contamination/remediation assessments and water supply studies.

In 1990, Kevin returned to the University of Waterloo to obtain a Master's degree in environmental planning. Kevin completed his Master's research in Indonesia as part of the joint Waterloo/York/Dalhousie Bali Sustainable Development Project where he investigated

links between traditional ecological knowledge (including water management) and "modern" development planning. Following his Master's work, Kevin returned to CH2M HILL where he focused on integrated watershed management planning, including directing several (sub) watershed studies within the Grand River watershed.

In 1996, Kevin returned to Indonesia where he spent the next three years as an independent environmental/international development consultant. During this period, Kevin managed several water resources/environmental management capacity building projects funded by various bi-lateral (e.g., Canada, Japan) and multi-lateral (e.g., World Bank) institutions.

In 1999, Kevin returned to Canada where he spent the next eleven years working for the Canadian Standards Association (CSA) in Toronto. At the CSA, Kevin was Director of the Sustainability standards program where his team was responsible for developing national and bi-national sustainability standards (e.g., sustainable products, social responsibility, sustainable forest management, carbon capture and storage) through multi-stakeholder (e.g., government, industry, academia, civil society) technical committees. In addition, Kevin was International Secretary for the ISO Technical Committee on Environmental Management, responsible for the development of the ISO 14000 series of international environmental and greenhouse gas management standards.

Kevin can be reached at Ext. 32643 or kboehmer@uwaterloo.ca

Four New Water Institute Scholarships

The Water Institute is pleased to announce four new scholarships available to graduate students in water-related areas. Each scholarship is valued at \$5,000. Two **Malcolm Pirnie Graduate Scholarships** will be awarded, one to a student from the Faculty of Science and the other will be open university-wide. Two **Golder Associates Graduate Scholarships** will be awarded following the same format. The scholarships will be awarded to graduate students

on the basis of scholastic excellence and demonstrated success in water research. The Malcolm Pirnie Graduate Scholarship gives special consideration to students with international experience in water research. Students wishing to apply should consult the website: www.grad.uwaterloo.ca/scholarships/forms.html The deadline for applications is **October 28, 2011**.

Students of the Water Institute, Graduate Section

SWIGS is the Graduate Student Section of the Water Institute at the University of Waterloo. It focuses on encouraging interdisciplinary collaboration among the students, the faculty and the partners of the Water Institute. Membership is open to all graduate students who have an interest in water-related issues.

News

- "Blue Drinks" socials have been held on a monthly basis this summer. SWIGS and CWN Students and Young Professionals alternate hosting these events. The events provide a relaxed atmosphere for students, faculty and professionals to meet in a casual setting.
- A "Bell Ringer" event was held in late July where five minute presentations were given by multiple students on "Lessons from the Lab". This event provided an opportunity for students to share the lessons they have gleaned from mistakes and successes during the course of their research.
- A trip to Elora Gorge to go tubing down the river was held in July. An exciting and wet time was enjoyed by all participants.

- The Ban the Bottle campaign has begun with efforts to garner support and awareness about plastic bottled water on and around the university. SWIGS is also building relationships with other organizations interested in stopping bottled water use (WPIRG, Polaris).

Upcoming Events

- The "Blue Drinks" socials will continue on a monthly basis. Check the SWIGS events web site for the next dates.
- Student lunchtime seminars will begin again on **September 29**, 12:30 PM in EV1-350. Contact SWIGS if you are interested in participating.
- The Outreach Committee is launching, in partnership with "Blue W", a new awareness program on campus to help people identify locations where reusable water bottles can be refilled without the need to purchase any additional items.



Student Profile: Jen Ings, Biology



Jen Ings has just completed a PhD in biology under the co-supervision of Mark Servos and Matt Vijayan. Jen started her academic career at the University of New Brunswick in Saint John, receiving a B.Sc. in environmental biology. She

was fortunate to get a summer job working in a lab, which introduced her to research and inspired her to continue her studies in the field. She started an M.Sc. at the University of Guelph, studying the effects of man-made

contaminants such as pulp and paper mill effluents and pesticides on fish reproduction. She then decided to continue her studies at the University of Waterloo, looking at municipal wastewater effluent and how it impacts stress and metabolic function in exposed fish, which is an especially important regional issue in the Grand River watershed. Now that she has completed her studies, she has decided to come full circle and return to the University of New Brunswick to pursue a post-doctoral fellowship that will hopefully tie together all the experiences she has gained along the way.



University of Waterloo
200 University Ave West
Waterloo, ON
N2L 3G1

Phone: 519-888-4567 x32643
E-mail: water.institute@uwaterloo.ca

water.uwaterloo.ca



UNIVERSITY OF WATERLOO

The sustainable management of the world's fragile water resources has emerged as one of our greatest challenges. The University of Waterloo has been actively involved in water-related research throughout its history. Since its inception in 1957, Waterloo has deliberately and systematically fostered a highly diversified water research capacity in topics that cross faculty boundaries campus wide. Over the more than five decades of growth, Waterloo has emerged as an internationally recognized research institution specializing in aquatic ecology and toxicology, groundwater, atmospheric sciences, hydrological sciences, water and wastewater treatment, and water policy, management and governance. More than 115 faculty members from all six faculties and close to 20 departments are engaged in these key areas providing innovative expertise in research, education, and technology development.

Fostering interdisciplinary research and empowering individual faculty, the Water Institute aims to use the strength of Waterloo's people to improve the management and understanding of our most precious commodity.

"Water is life's matter and matrix, mother and medium.
There is no life without water." Albert Szent-Gyorgyi



Mary Anne Hardy

Contact Us!

The Water Institute is actively recruiting student and faculty volunteers, and always on the lookout for new ways to improve the services we provide. Contact water.institute@uwaterloo.ca or talk to one of the SPC members to get involved.