



## From the Executive Director's Chair

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I am frequently asked these days “*what water management issues can Canada uniquely contribute to in the near future?*” There is a sense in many sectors of the water field that we are entering a remarkable period of growth and opportunity both nationally and internationally, and that Canada is well-positioned to capitalize on these opportunities and take its place among world leaders.

One area is clearly in the advancement of water technology. Recently, the Water Institute participated in the International Water Association's Bi-Annual World Water Congress and Exhibition in Montreal by contributing a booth in the exhibitor's hall. While delegates from over 45 countries attended this event, only a few exhibition booths were hosted by academic institutions and as a result, a good deal of interest focused on our booth. We were able to make connections with a number of international representatives and with major companies working in water technology, many of them Canadian.

The majority of the queries we received were related to how individual companies, who are already developing water technology, could be linked with university R&D capacity. What really struck me was the global interest in water technology innova-

tion, something that nearly all of the exhibits were stressing. It clearly illustrates that the timing of the new Ontario Provincial Water Opportunities Act (see page 6) could not be better. With the facilitative support of this type of legislation, Canadian industry, in collaboration with academic research capacity, will have the potential to become a major global player in water technology and management services.

*Canada is in an ideal position to be among the world leaders in water technology and management*

This is of particular interest as the world moves to upgrade and improve water infrastructure. Many of our Water Institute members are actively involved in some aspect of this water technology movement and the University of Waterloo is well positioned to facilitate growth in this area. The Water Institute is currently focused on the expansion of our connections with industrial partners to further strengthen this involvement.

On another front, I recently attended a national meeting co-ordinated by

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the Canadian Agricultural Policy Institute regarding the sustainability and viability of Canada's agriculture sector. A fundamental conclusion of the diverse cross section of attendees was that the future of agriculture worldwide will depend on maintaining the health of "Natural Capital," including land, air, water, and carbon, which is required to support all aspects of basic production. As food demand grows and diversifies, the market for bioproducts expands, and the true impact of climate change emerges, Canada's role in providing food and agricultural products to a global market will be unprecedented. Canada's advantage is the key component of "natural capital," the availability of water— something that is progressively becoming insufficient in many other parts of the world. I believe that one uniquely Canadian advantage in the near future, both economically and strategically, will be the expansion of the agricultural industry and assets. This will be directly dependent on the regional management of water resources.

In both of these critical areas, (i.e., water technology and water management), the members of the Water Institute have the expertise and the opportunity to contribute greatly. It is again clear there is no better time than now to demonstrate this to our potential partners.

Dave Rudolph  
Executive Director  
Water Institute



## Water in the News

### PhD student attends Canadian Water Innovation Lab 2010

Seanna Davidson, a PhD candidate in geography and environmental management, was one of 50 facilitators at the Canadian Water Innovation Lab 2010 which took place in Alberta, October 18-24, 2010. This event was hosted by Waterlution, a Canadian organization whose purpose is "to inspire pattern-making and pattern-breaking change toward a healthy and sustainable relationship with water." About 250 young Canadians were selected to participate in the week-long event. Ms. Davidson's area of interest includes issues related to water governance. The aim of the "lab" was to find and discuss solutions to several compelling issues in water resource management. Activities included experimental learning activities, field trips, meetings with Aboriginal and community leaders, taking part in interactive dialogue sessions, and meeting with guest mentors.

### Biology professor named to water panel



George Dixon, professor of biology and vice-president of university research, is one of six scientists who has been appointed by the Government of Alberta to independently investigate conflicting water monitoring data from Alberta's oil sands region.

Alberta's oil sands region.

### Water Institute attends IWA World Water Congress and Exhibition

Leading water experts from around the world gathered at the Palais des Congrès in Montréal in mid-September to discuss the issues and trends that are driving a global transformation of the water economy and urban water ser-

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## Water Institute Events & Activities

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### Recent Events

- The Water Institute hosted its first seminar in early November. Dr. John W. Pomeroy of the University of Saskatchewan spoke to a packed room about “Advancing hydrological processes to better predict water resources in Canada.” The Water Institute will hold seminars monthly.
- The graduate student section of the Water Institute also hosted its first seminar. Three students spoke about their research with regards to “Water in Waterloo” on November 18.
- The CERC chair in Ecohydrology, Philippe Van Cappellen continues to coordinate his future activities at the University of Waterloo. In mid-November, a group of Dr. Van Cappellen’s post-doc fellows and students visited to assist this transition preparation. Philippe Van Cappellen will be joining the University of Waterloo’s Department of Earth and Environmental Sciences next summer.

- Dr. James Craig of Civil and Environmental Engineering as well as a Water Institute faculty member recently spoke at the Department of Applied Mathematics’ weekly seminar about analytical models of porous media flow in heterogeneous media.

### Upcoming Events

- Andrew Paterson, Ministry of Environment. “Interpreting Long-Term Data from Ontario Lakes: Ecological Surprises and Emerging Issues” **November 25, DC 1302, 11:30 a.m.** Sponsored by the Water Institute.
- Hydrology Train Trip on tracks adjacent to DC, **November 26, 11:30 a.m.-4:00 p.m.** Sponsored by the Department of Civil & Environmental Engineering and the Water Institute. The train will take students and faculty northward, stopping at points of hydrological interest on its way to St. Jacobs; a running discussion is provided by faculty experts. \$10/ ticket or two for \$18. Tickets are available at E2-3321.

## Beyond Waterloo: Water-related Events

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- **Call for Abstracts** for the 46th Central Canadian Symposium on Water Quality Research, February 22 & 23, 2010, in **Burlington, Ontario**. Submission deadline is **November 29**.
- Canadian Water and Wastewater Association is hosting a two-day event in **Ottawa, Ontario**. 2010 “Window on Ottawa” **December 1-2**.
- The Canadian Geophysical Union-Hydrology Section is holding its 10th annual meeting at the **University of Guelph, December 4**.
- NGWA Groundwater Expo and Annual Meeting. **December 7-10, Las Vegas, Nevada**.
- The American Geophysical Union Fall Meeting, **December 13-17, San Francisco, California**.
- **Call for EOIs**—Development of Regional Watershed Research Consortium Nodes in Canada—Canadian Water Network. Submission deadline is **December 15**.
- Zero Flow: A PUB (Predictions in Ungauged Basins) Workshop on Intermittent Streams, **February 23-25, 2011, Drumheller, AB**.
- Connecting Water Resources 2011: Responding to the Opportunities, **February 28—Mar. 3, 2011, Ottawa**. Organized by the Canadian Water Network.

## Faculty Profile: Keith Hipel, Systems Design Engineering



Keith Hipel of Systems Design Engineering (SYDE) has been at the University of Waterloo for more than 35 years, during which time he has contributed to

the area of water resource management by developing smart decision-making methodologies and improving the science of time-series modelling. These methods are useful for resolving water rights conflicts, fairly allocating water rights when resources are scarce, and predicting the incidence of droughts and floods. A vast number of water problems are amenable to solutions via a Systems engineering approach and Keith has used his expertise in this area to attack a wide array of problems, from ensuring compliance with environmental regulation to reducing risk of overfishing. All of these problems are lying at the interface of society, technology, and the environment. As a result, Keith's work is highly interdisciplinary. Along with fellow researchers in the Conflict Analy-

sis Group, he is currently working to devise new and improved approaches to group decision and negotiation that can handle factors like attitudes, emotions, uncertainty and complexity in water resources, energy and, other interconnected systems problems. As a senior fellow at the Centre for International Governance Innovation, Keith investigates the design of effective policy for use in areas like water resources and brownfield redevelopment. Due, in part, to his international stature, Keith has developed strong ties with international partners, including researchers participating in exchange programs he founded with three universities in Japan as well as Iraqi academics investigating water conflicts among Turkey, Syria and Iraq. Keith was recently the recipient of the Water 2010 Career Contribution Award. This is just the latest of 30 awards, both academic and professional, which include a fellow designation from the Royal Society of Canada as well as the Engineering Medal for Research and Development from Professional Engineers of Ontario. Keith will be attending the Rosenberg International Forum on Water Policy this November in Buenos Aires, Argentina.

## Water news (cont.)

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vices. Congress highlights included workshops and industry forums on water technology innovation, water infrastructure optimization, and capacity building. The Water Institute was an exhibition participant at this event. Several Canadian companies as well as representatives from different levels of government participated in the exhibition, along with exhibitors from around the world.

### **Executive Director Wins M. King Hubbert Award**

Dave Rudolph, executive director of the Water Institute and professor in the Department

of Earth and Environmental Sciences, has received the National Ground Water Association's 2010 M. King Hubbert Award for major science contributions to the knowledge of groundwater. In the nomination, Dr. Rudolph was noted to be not only an educator, but was also recognized for his extensive, broadly based research on groundwater resources, with a major focus on the protection of groundwater resources, groundwater contamination remediation from agricultural sources, vadose zone processes, and the mechanisms of groundwater recharge. The award will be presented at the NGWA's 2010 Ground Water Expo and Annual Meeting in Las Vegas, Nevada on December 8.

## Water Institute Call for Proposals

The Water Institute has issued a call for proposals to its faculty members for collaborative workshops designed to facilitate the discussion and development of new research, educational and/or partnership opportunities that would advance the goals of the Water Institute and its members. The Water Institute will provide funding up to \$15,000 per workshop.

Two workshops, which must take place prior to September 1, 2011, could be funded from this request for proposals. The deadline for proposal submission is **January 7, 2011**.

Please note that although a Water Institute member must act as the primary applicant, co-applicants from partner institutions or industries are encouraged.

Guidelines and selection criteria are available on the Water Institute website.



The Water Institute is actively soliciting suggestions for ways we can help individual members, both students and faculty, push the envelope in the area of water research and ensure that Waterloo continues to be a leader in the field. If you would like your research, recent successes or future water-related events highlighted in future issues please contact Assistant Professor James Craig at [jrcraig@uwaterloo.ca](mailto:jrcraig@uwaterloo.ca).

### Spotlight: Waterloo Atmosphere-land Interactions Research Group

The Waterloo Atmosphere-land Interactions Research group (“WatAIR”) is a locus of research activity in the Water Institute studying the atmosphere and the land surface in an integrated fashion. The properties of the air that we breathe, live, and play in are controlled by atmosphere-land interactions. Accordingly, many of the environmental issues confronted by human society lie at the same interface between the atmosphere and the land. For instance, the weather and climate we experience depend a great deal on the energy exchange between the land surface and the atmosphere. Furthermore, the availability of water resources is controlled significantly by soil moisture, land cover, and the hydrometeorological processes of evaporation and precipitation. Thirdly, greenhouse gases and pollutants impacting air quality are sensitive to the conditions of the land surface.



Led by “Chief Airhead” John Lin (assistant professor, Earth and Environmental Sciences), WatAIR is studying these environmental issues using a combination of observations and computer models. The computer models simulate both the atmosphere as well as the land surface, incorporating the physical, biological, and hydrological processes within a single framework. For instance, a project is underway to simulate the climate of the Grand River Basin at high-resolution, as a domain nested within a regional climate model covering the entire eastern North America.



## Water and the government

On May 18, 2010, the Ontario Minister of Environment, John Gerretsen, announced a proposed water act: the Water Opportunities and Water Conservation Act, 2010. The act, or Bill 72, is part of Ontario's five-year Open Ontario Plan which strives to "open" Ontario to global opportunities through job creation and sustainment as well as through the development of knowledge and skills. The Open Ontario Plan also includes proposed bills and amendments on green energy, health care, and education funding.

The Water Opportunities and Water Conservation Act, 2010 consists of a standalone bill—the Water Opportunities Act, 2010 — as well as amendments to existing legislation.

The Water Opportunities Act, 2010 is Ontario's attempt to capitalize on its rich background of clean-water technology. Through the act, the Ontario government would seek to "foster innovative water, wastewater and stormwater technologies, services and practices in the public and private sectors, to create opportunities for economic development and clean-technology jobs in Ontario, and to conserve and sustain water resources for present and future generations." The Conference Board of Canada has reported the global water technology market is valued at more than \$400 billion

and will double every five to six years. Ontario currently has over 300 companies providing water technologies, 21 water-related institutes in the Greater Toronto Area alone and seven university- and college-based research institutes committed to this field. The Ontario government feels it would be particularly advantageous to focus on water and wastewater technologies, especially with the resources available in the province.

The Water Opportunities Act, 2010, would, if passed, establish a corporation without share capital, the Water Technologies Acceleration Project (Water TAP), "to encourage collaboration and coordination between industry, governments and academia." Through Water TAP, an easier exchange of ideas and skills would be possible between these groups and would encourage the creation and growth of globally competitive water technologies and water-technology companies based in Ontario, paving the way for Ontario to become a global leader in water and wastewater technology.

It is expected that one of the byproducts of this bill will be increased provincial funding toward water technology and science, specifically in the treatment and supply sector.

Bill 72 also includes amendments to several

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### Student Profile: Pete Whittington, Geography



Pete is pursuing a PhD in geography under the supervision of Jonathan Price, Geography and Environmental Management. Pete has spent most of his academic career at the University of Waterloo, first achieving a joint undergraduate degree in geography and in environment and resource studies, then a master's degree in geography. He is currently focusing his

attention on the effects of diamond mining on peatlands in the James Bay lowlands. Extensive dewatering is required to conduct mining activities; this process may provide insight into the effects of lowering water tables. Pete is also deeply involved in the graduate student section of the Water Institute. He serves as the Academic Committee Chair and is currently organizing what he calls lunchtime seminars. They would each feature three student speakers discussing their research. Seminars would hopefully occur monthly.

## Water and government (cont.)

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existing acts: the Building Code Act, 1992; the Capital Investment Plan Act, 1993; the Green Energy Act, 2009; and the Ontario Water Resources Act. The amendments generally promote water conservation and the ability to review the effectiveness of regulations. One of the amendments would make it illegal to install toilets with a flush of more than six litres. Currently installation of water inefficient toilets is merely restricted.

The Water Institute was asked to review Bill 72 and comment on its objectives and capacity to achieve its goals. Executive Director Dave Rudolph and Associate Director Bob Gillham were positive about the overall objectives of

the act, but felt that because water and wastewater technology is only one element in a very broad sector, the scope of Bill 72 would be too narrow to fully appreciate the complexities of water-related technologies. Their review of the bill also stresses the need to address the shortage of highly trained water specialists and the need for strong industry-academia partnerships.

The Water Opportunities and Water Conservation Act, 2010 was ordered for a third reading on October 26, 2010.

**Congratulations to Bruce Mitchell, who won the Water Institute newsletter naming competition with “*Splash Pad*”**

## Students of the Water Institute, graduate section (SWIGS)

SWIGS is a newly formed student group at the University of Waterloo. A subsection of the Water Institute, it is focused on encouraging interdisciplinary collaboration between students and the faculty and partners of the Water Institute.

- Membership is open to graduate students of all faculties who have an interest in water-related issues.
- A SWIGS website has been launched. [www.swigs.uwaterloo.ca](http://www.swigs.uwaterloo.ca) includes information on graduate opportunities, outreach initiatives, a members forum and SWIGS sponsored events.
- An executive committee has been formed in which multiple faculties and backgrounds are represented.
- Drafting of the SWIGS constitution and by-laws has begun. They should be available within the next month.

- An exciting outreach goal is to send some SWIGS members to Haiti to drill water wells.
- Another goal is a campaign to eliminate the usage of disposable plastic water bottles on the Waterloo campus.
- Many events coming soon! SWIGS plans to hold multiple student lectures and social activities each term.

SWIGS seeks to foster education and teamwork between departments and faculties in water-related studies. This ambitious goal includes creating an environment where SWIGS members can freely share ideas and experiences to further the understanding of all.

**SWIGS is seeking student volunteers from all departments!**





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## 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 110 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.

*"We never know the worth of water till the well is dry."  
-Thomas Fuller, Gnomologia, 1732*



### Contact Us!

The Water Institute is actively recruiting student and faculty volunteers, and is seeking new ways to improve the services we provide. Contact [water.institute@uwaterloo.ca](mailto:water.institute@uwaterloo.ca) or talk to one of the SPC members to get involved.