

# Annual Report

2011/2012





## Our Mission:

to facilitate excellence in research, education and innovation in water science, technology, management and governance.

## Our Vision:

to become an internationally recognized centre of excellence in integrated water management.

## Strategic Goals:

Increase Waterloo's profile as a centre of excellence in water research.

Increase interdisciplinary research among Waterloo faculty.

Facilitate Waterloo, private sector, government and civil society partnerships.

Support the development of interdisciplinary water teaching programs.

“Research and innovation has vaulted into the 21st century with unprecedented speed, range and power. The Water Institute is a tremendous example of how Waterloo’s researchers and educators are working together to extend their reach, collaboratively making a real difference in addressing local, national and global water security issues”.

Dr. Feridun Hamdullahpur  
President and Vice-Chancellor,  
University of Waterloo



## Message from the Executive Director

In this inaugural annual report of the Water Institute, it is appropriate to recognize and honour early faculty members who set the tone and direction of water research at the University of Waterloo. The exceptional individuals featured on the following page all joined Waterloo within the first 12 years of the university’s existence, and were instrumental in developing water-related research programs. Most notably, they were all from different academic departments, reflecting early awareness of the multidisciplinary character of water issues.

The Water Institute remains firmly grounded in the values and traditions of the past, but also recognizes the growing number, size and complexity of modern water issues. With a membership of 135 professors representing all six academic faculties, the Water Institute has the capacity to address most aspects of modern water management. The challenge is to coordinate this capacity, to encourage greater interdisciplinarity and, particularly, to facilitate meaningful and productive communication with our external partners.

The Water Institute is also conscious of its responsibilities in the training of our future water managers, researchers and leaders.

Currently we are pleased to provide support for an affiliated and highly active graduate student association, with a membership of over 400 students. In addition, programs are being developed to provide graduate students the opportunity to acquire a more integrated perspective across the range of water-related disciplines.

This report highlights recent achievements in the areas of Research, Partnerships and Education and includes an assessment against goals listed in the Business Plan. We look forward to your continued support as we pursue our 2012/13 priorities.

Dr. Robert W. Gillham  
Executive Director, the Water Institute

## Message from the Vice-President, University Research



In September 2007, Dr. Amit Chakma, the University of Waterloo’s former Vice-President Academic and Provost, established a Task Force on Water Research charged with developing a proposal to establish an integrated water unit at the University, to focus on interdisciplinary water-related research and the application

of research results. The Task Force responded to teaching and research objectives of Waterloo’s Sixth Decade Plan, which promised that by 2017, the University would have “at least six research centres/institutes supported by institutional funding, recognized by peer evaluation to be among the several best in the world.” In 2009, the University of Waterloo senate approved establishment of the Water Institute as one of the six centres that would receive institutional funding and support.

The Water Institute is truly unique in that it involves researchers and students engaged in water-related research from across all six of Waterloo’s academic faculties. Indeed, it is one of the largest centres at the University and includes a number of discipline-leading researchers at its base. Strategic co-ordination of these disciplines, and the promotion of interdisciplinarity, remains key to the success of the Water Institute. I have been impressed by the Water Institute’s accomplishments thus far – its important role is securing the Southern Ontario Water Consortium and Canadian Excellence Research Chair in Ecohydrology, its student scholarship program, and its support for a thriving graduate student chapter. I look forward to continued growth and success in the years ahead.

Dr. George Dixon  
Vice-President, University Research  
University of Waterloo

# Their Legacies Live On

The University of Waterloo was established in 1957 and quickly began to attract leading experts from a variety of water-related disciplines. In 2009, the university formed the Water Institute, recognizing Waterloo's formidable history and potential in water education and research. We take great pleasure in honouring some of the University of Waterloo's founding water researchers in this inaugural annual report.



## Robert N. Farvolden

Robert Farvolden was born in Alberta, Canada in 1928. Following graduation from the University of Alberta, he was instrumental in establishing the Groundwater Division of the Research Council of Alberta. Dr. Farvolden received his PhD from the University of Illinois in 1963 followed by academic appointments at Illinois and the University of Western Ontario.

In 1967, Dr. Farvolden joined the University of Waterloo as Chair of the Earth and Environmental Sciences Department, for the particular purpose of developing a groundwater research and teaching program. Though a respected researcher, his self-professed strength was in administration and team building. Indeed, in less than five years, Dr. Farvolden had established one of the largest academic groundwater programs in North America. The program gained particular international acclaim in the area of contaminant hydrogeology, and in 1988 the Waterloo Centre for Groundwater Research was designated a provincial Centre of Excellence.

Dr. Farvolden retired in 1993 as Distinguished Professor Emeritus, but remained active in groundwater research and teaching, particularly in Latin America.



## H.B. Noel Hynes

Noel Hynes was born in Wiltshire, England in 1917 and was educated at Imperial College, earning his PhD in 1941. Following overseas experience in Trinidad and East Africa, Dr. Hynes was a lecturer at Liverpool University before joining the University of Waterloo in 1964 as the first Chair of the Biology Department.

Dr. Hynes established a reputation as an international authority on stream ecology. He published two books on the topic, as well as a seminal paper, "The Stream and its Valley," delivered as the Elgardo Baldi Memorial Lecture at the 1974 International Society of Limnology meetings. In addition, he published 179 scientific papers. Dr. Hynes' particular contribution, and a significant advance in limnological thought, concerned the view of streams as an integral part of a larger ecosystem, the drainage basin. Dr. Hynes received many prestigious awards, both national and international, and to many is the father of "running water ecology". He retired from the University of Waterloo in 1984 as Distinguished Professor Emeritus.



## Bruce Mitchell

Bruce Mitchell was born in British Columbia, Canada. In 1969, he earned a PhD from the University of Liverpool and joined the University of Waterloo's Department of Geography and Environmental Management.

Dr. Mitchell has researched water management for over 40 years, with a particular focus on governance and policy, and integrated resource and environmental management.

Dr. Mitchell is a prolific writer, having written or edited 27 books and over 160 articles. A dedicated teacher, 82 graduate students have completed their degrees under his supervision. Dr. Mitchell has served as an advisor to numerous international agencies and has received several major awards including Fellow of the Royal Society of Canada (2005) and the Massey Medal of the Royal Canadian Geographical Society (2008). Dr. Mitchell is widely acknowledged as Canada's authority on integrated water management.

Dr. Mitchell is currently the Associate Provost, Resources at Waterloo and has been an invaluable supporter and advisor to the Water Institute.



## Tharakal E. Unny

Tharakal Unny was born in Kerala, India in 1928. Dr. Unny worked for several years as a practicing engineer before earning his PhD from the University of Dresden. In 1965, he emigrated to Canada to join the University of Waterloo's Department of Civil and Environmental Engineering and, later, Department of Systems Design Engineering.

Dr. Unny made remarkable contributions in water resources and environmental engineering over his career, including the areas of reservoir theory, finite elements, pattern recognition and water resource management. He was perhaps best known for his leading contributions in the areas of stochastic hydraulics and stochastic hydrology. In 1987, Dr. Unny co-founded what quickly became the leading international journal in the field, "Stochastic Hydrology and Hydraulics." Dr. Unny passed away in 1991, prior to his retirement.

# Building On A Tradition Of Excellence

The University of Waterloo has a long tradition of excellence in water research and education. The Water Institute connects 135 researchers from across all six university academic faculties (Applied Health Sciences, Arts, Engineering, Environment, Mathematics and Science) and 19 departments in facilitating interdisciplinary research and education to address increasingly complex water issues.

Waterloo's water research programs are diverse, and collectively comprehensive, with core disciplinary expertise in areas such as:

- Hydrological (groundwater, surface water) science and engineering;
- Water/wastewater treatment and technology;
- Ecohydrology;
- Aquatic ecology and ecotoxicology;
- Water management and governance.

The Water Institute provides its members with many services, including:

## Co-ordination & Collaboration

- Identify and introduce researchers with common areas of interest.
- Establish and support researcher working groups and clusters.

## Opportunity Identification

- Cultivate industrial, governmental, civil society or other partners.
- Identify funding opportunities.

## International Partnerships

- Facilitate and support international collaborations and partnerships.
- Manage faculty delegations to other countries.
- Host academic delegations at Waterloo.

## Education Programming Support

- Support the development of new education and teaching programs.
- Develop and administer graduate student scholarship program.

## Proposal Development Support

- Identify and organize interdisciplinary teams.
- Solicit co-investigators.
- Solicit letters of support.
- Provide review and advice.

## Knowledge Sharing Support

- Support and organize:
  - Seminars;
  - Workshop/symposia;
  - Distinguished Lectures.
- Organize and support media relations.

## Researcher Recognition

- Promote and profile Waterloo researchers through various business development activities.
- Nominate members for awards or other forms of recognition.
- Provide letters of support.





*Philippe Van Cappellen  
Canada Excellence Research  
Chair in Ecohydrology*

*“The Water Institute is truly unique in that it involves researchers and students engaged in water-related research from across all six of Waterloo’s academic faculties. Strategic co-ordination of these disciplines, and the promotion of interdisciplinarity, remains key to the success of the Water Institute.”*

*Dr. George Dixon  
Vice-President, University Research  
University of Waterloo*



*Rob de Loë,  
Environment and  
Resource Studies*

# Research: advancing understanding and impact

## Canada Excellence Research Chair in Ecohydrology

Launched in 2008, the Canada Excellence Research Chairs (CERC) Program supports Canadian universities in their efforts to build Canada's reputation as a global leader in research and innovation. The program awards internationally-renowned researchers and their teams up to \$10 million over seven years to establish ambitious research programs at Canadian universities. These awards are among the most prestigious and generous available globally.

The Water Institute played a critical role in securing and establishing a CERC in Ecohydrology at the University of Waterloo with Dr. Philippe Van Cappellen joining the Department of Earth and Environmental Sciences and the Water Institute as the CERC in 2011. Dr. Van Cappellen was previously the Georgia Research Alliance Eminent Scholar in Global Environmental Studies in the School of Earth and Atmospheric Sciences at the Georgia Institute

of Technology and part-time professor in the Department of Earth Sciences at Utrecht University, The Netherlands. He holds a PhD in geochemistry from Yale University with Bachelor and Master degrees in geology and mineralogy from the Free University of Brussels, Belgium.

Dr. Van Cappellen's interdisciplinary research program is dedicated to advancing the understanding of the fluxes and transformations of nutrient elements and metals at the groundwater-surface water interface, and assessing their consequences for the health and functioning of aquatic ecosystems and, ultimately, the well-being of human populations. His research team includes biogeochemists, hydrologists, ecologists, environmental chemists and microbiologists, who combine laboratory experiments, field sampling and mathematical modelling methods. Dr. Van Cappellen's CERC, along with the previous capacity at Waterloo, positions the university as a global centre of excellence in research and education in ecohydrology.



Photo by Warwick Vincent

## Research Chairs

The Water Institute has 15 members who currently hold prestigious research chairs:

### Canada Excellence Research Chair

**Dr. Philippe Van Cappellen**

*Ecohydrology*

### Canada Research Chairs

**Dr. Pu Chen**

*Nano-Biomaterials*

**Dr. Brian Dixon**

*Fish & Environmental Immunology*

**Dr. John Heikkila**

*Stress Protein Gene Research*

**Dr. Dongqing Li**

*Microfluidics & Nanofluidics*

**Dr. Janusz Pawliszyn**

*New Analytical Methods & Technologies*

**Dr. Carolyn Ren**

*Lab-on-a-Chip Technology*

**Dr. Mark Servos**

*Water Quality Protection*

**Dr. Ed Sudicky**

*Quantitative Hydrogeology*

**Dr. John Yeow**

*Micro & Nanodevices*

### Industrial Research Chairs

**Dr. Peter Huck**

*Water Treatment*

**Dr. Janusz Pawliszyn**

*New Analytical Methods & Technologies*

### University Research Chairs

**Dr. Rob de Loë**

*Water Policy & Governance*

**Dr. Sherry Schiff**

*Watershed Biogeochemistry*

**Dr. Michael Tam**

*Functional Colloids & Nanomaterials*

### Centre for Governance & Innovation Research Chair

**Dr. Thomas Homer-Dixon**

*Global Systems*

# Research: advancing understanding and impact

## Southern Ontario Water Consortium

In August 2011, the Government of Canada and Province of Ontario announced support for the Southern Ontario Water Consortium (SOWC) – an integrated platform to develop, test and demonstrate new water technologies and services, primarily within the Grand River watershed, but with additional facilities in London, Toronto and Oshawa. The SOWC is a \$50M collaborative project of eight universities with numerous industrial, municipal and not-for-profit sector partners and supporters. The University of Waterloo is the lead university in the consortium with the Water Institute having actively supported its development, negotiation and early-implementation. The SOWC will provide over \$8M in infrastructure funding to about 20 Waterloo researchers from five departments over the next two years.

### Key SOWC platform infrastructure or “nodes” will include:

- drinking and wastewater treatment;
- contaminated groundwater and soil remediation;
- integrated watershed monitoring and management;
- sensor technologies;
- analytical equipment and methods.

IBM is the major industrial partner in the SOWC having invested computer hardware and software capable of managing platform data and applying advanced analytics to enable “smart” water management. The SOWC will build on Ontario’s recognized leadership in the water sector by enabling researchers, technology developers, conservation authorities and municipal water and sewage properties to work together in a practical yet innovative environment – a “living laboratory” at the watershed scale. In the longer-term, the SOWC will equip participants with leading-edge technology, tools and knowledge to address water-related issues influenced by, among other things, urbanization and climate change.



Peter Huck  
Civil & Environmental  
Engineering



David Rudolph  
Earth & Environmental Sciences

## Major Awards

### Dr. Keith Hipel

*University Professor, Department of Systems Design Engineering*

Received the 2012 Japan Society for the Promotion of Science (JSPS) Eminent Scientist Award. This followed receipt of the 2011 Sir John William Dawson Medal (Royal Society of Canada) and appointment as an Honorary Member of the American Water Resources Association.

### Dr. Janusz Pawliszyn

*Professor, Department of Chemistry*

Awarded the 2012 Canadian Society for Chemistry’s E.W.R. Steacie Award, and inducted as a Fellow of the Royal Society of Canada in November 2010 for outstanding contributions in the field of chemistry.

### Dr. David Rudolph

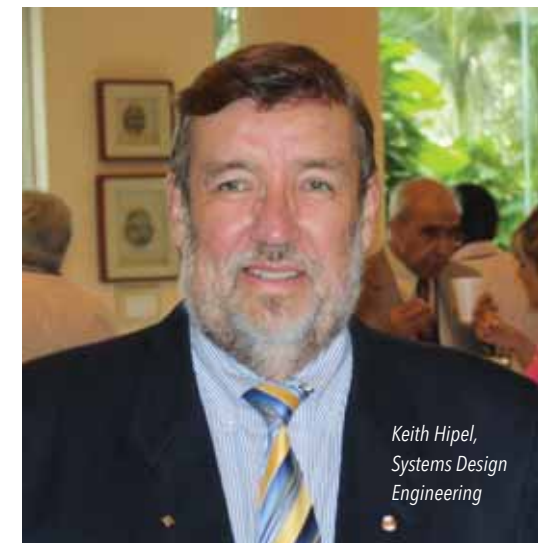
*Professor, Department of Earth & Environmental Sciences*

Received the 2010 M. King Hubbert Award of the National Ground Water Association for major scientific contributions in the field of groundwater.

### Dr. Robert Gillham

*Distinguished Professor Emeritus and Executive Director, the Water Institute*

Awarded the Queen Elizabeth II Diamond Jubilee Medal.



Keith Hipel,  
Systems Design  
Engineering



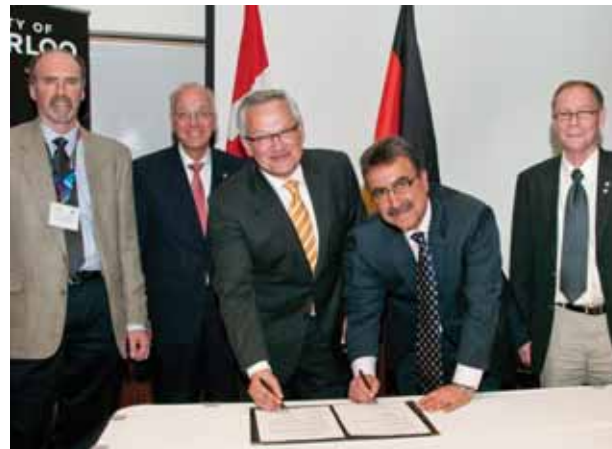
# Partnerships: extending our reach

## Highlights

- The Water Institute established its website and launched its quarterly newsletter "Splash Pad".
- The Water Institute Executive Director advised the Province of Ontario on the development and promulgation of Ontario's Water Opportunities and Water Conservation Act.
- Dr. Peter Huck, Professor, Civil and Environmental Engineering, was appointed Board Member of WaterTAP, Ontario's Water Technology Acceleration Project and was reappointed to the Ontario Ministry of the Environment's Advisory Council on Drinking Water Quality and Testing Standards for a third term.
- Dr. George Dixon, Professor, Department of Biology and Vice-president of University Research, was one of six scientists appointed by the government of Alberta to independently investigate conflicting water monitoring data from Alberta's oil sands region.
- The Water Institute facilitated several academic visits to Waterloo, including delegations from Germany, Brazil, Nigeria, Kenya and Trinidad and Tobago.
- The Water Institute convened a number of meetings with government, private sector, research institute and civil society stakeholders to introduce Waterloo's water capabilities and explore collaborative opportunities.

## Helmholtz Centre for Environmental Research, Germany

In April 2010, the Water Institute facilitated the signing of a Memorandum of Understanding (MoU) between the University of Waterloo and Germany's Helmholtz Centre for Environmental Research - UFZ to enable collaboration in water science, technology, management and governance. The Water Institute hosted a delegation of 19 Helmholtz scientists to witness the signing ceremony and participate in a week-long program of scientific exchange with Ontario researchers, governments and companies. The Waterloo-Helmholtz agreement is the basis for anticipated watershed-scale studies in the twinned catchments of the Grand River in Canada and the Elbe/Bode River in Germany.



Signing of the Waterloo-Helmholtz MoU. From left, David Rudolph (then Executive Director, the Water Institute), Georg Witschel (German Ambassador to Canada), Georg Teutsch (Scientific Director, Helmholtz), Feridun Hamdullahpur (then Provost, University of Waterloo), Ed Sudicky (Professor, University of Waterloo).

## University of São Paulo, Brazil

In April 2012, the Water Institute facilitated agreement on a Memorandum of Understanding (MoU) between the University of Waterloo and the University of São Paulo, Brazil to promote joint research and education in "water science, engineering, technology, health, economics, management, policy and governance with a particular focus on interdisciplinary activities."

Waterloo President Feridun Hamdullahpur was in Brazil to sign the agreement where he commented that "water-related research and education is a core strength of our two institutions. We look forward to expanding opportunities for our students and faculty while addressing real issues affecting water security in Brazil and Canada." The University of São Paulo is a leading Latin American university and the agreement will broaden existing Waterloo-University of São Paulo co-operation from groundwater-focused activities to a wider spectrum of activities across the water sector.



Signing of the Waterloo- University of São Paulo MoU. From left, Feridun Hamdullahpur (President, University of Waterloo), Gary Goodyear (Canadian Minister of State for Science and Technology), Edson Luiz Riccio (Director, International Office, University of São Paulo).



*"Recognizing the complexity of modern water issues, programs are being developed to provide graduate students the opportunity to acquire a more integrated perspective across the range of water-related disciplines."*

*Dr. Robert W. Gillham  
Executive Director, the Water Institute*



*Photo by Rajiv Neal Tanna*



*Jonathan Bielaski - Light Imaging*

# Education: training tomorrow's leaders

## Highlights

- The Water Institute Education Committee was established to consider various interdisciplinary water education and training options and establish priorities.
- The Water Institute hosted Dr. Tony Allan, 2008 recipient of the Stockholm Water Prize, as its First Annual Distinguished Lecturer.
- The Water Institute hosted 18 seminars on a wide range of topics.
- The Water Institute sponsored a short course on "Monitored Natural Attenuation" to groundwater scientists, practitioners and regulators in São Paulo, Brazil (2012).

## Water Institute Graduate Scholarships

The Water Institute received generous donations from two private-sector partners to support its inaugural graduate student scholarships. The 2011/12 ARCADIS Graduate Scholarships were awarded to Ms. Madeline Rosamond, PhD candidate in the Department of Earth and Environmental Sciences and Ms. Taylor Wilkes, MES candidate in the Department of Environment and Resource Studies. The 2011/12 Golder Associates Graduate Scholarships were awarded to Ms. Lauren MacDonald, PhD candidate and Ms. Jana Tondu, MSc candidate, both in the Department of Biology. Water Institute graduate scholarships were awarded to students demonstrating scholastic and research excellence in water-related fields.

## Students of the Water Institute, Graduate Section

The Water Institute's graduate students section (SWIGS) was established in 2010 to promote interdisciplinary water research and learning among graduate students from various academic faculties. By 2011/12, SWIGS had over 400 graduate student members from across all six faculties. Under the leadership of the SWIGS executive, a myriad of academic, social and outreach events focused on water-related themes have been successfully organized. Of particular note are annual World Water Day Graduate Research Fairs organized and co-hosted by the Water Institute, SWIGS and Wilfrid Laurier University.

In 2011/12, the Waterloo World Water Day celebration was privileged to host the Canadian launch of the United Nations (UN) Fourth World Water Development Report, the flagship publication of UN-Water. "We are particularly honoured to host the official Canadian release of this important document," said Professor Robert Gillham, executive director of the Water Institute. "This report provides a comprehensive assessment of the world's water resources and reminds us that effective water management requires a mix of technical, social, economic and political inputs, which are all areas where Waterloo and Laurier student researchers are making a positive contribution locally, nationally and internationally."



## Interdisciplinary Workshops

Since 2010, the Water Institute has supported workshops or small symposia to encourage new initiatives in interdisciplinary water research or education. Workshops were co-ordinated by faculty members and provided opportunity for a variety of international experts to visit campus and share knowledge.

**September 8, 2011**

### *Opportunities for Research Partnerships in Membrane-based Water Treatment Applications*

Faculty Co-ordinator:

**Christine Moresoli**, *Chemical Engineering*

**December 7, 2011**

### *Innovations in Water Source Protection, Protected Areas and Ecosystem Resilience*

Faculty Co-ordinator:

**Stephen Murphy**, *Environment & Resource Studies*

**March 21 to 23, 2012**

### *Governing Wetlands and Watersheds: Issues, Cases, Practices*

Faculty Co-ordinator:

**Larry Swatuk**, *Environment, Enterprise & Development*

**April 24, 2012**

### *Complex Systems and Agent Based Modeling: Applications in Integrated Management of Water Systems*

Faculty Co-ordinator:

**Sheree Pagsuyoin**, *Civil and Environmental Engineering*



Janusz Pawliszyn  
Chemistry

## Water Institute Seminars

**March 23, 2010**

Michael Campana, *Oregon State University*

*My Recent Life As A Foreign-Policy Tool: Transboundary Water Resources And The "New Great Game" In The South Caucasus*

**April 29, 2010**

Lorrie Minshall, *GRCA*, Eric Hodgens, *RMOW*,  
Ian Smith, *Ont. MOE*, Georg Teutsch, *UFZ*

*Current Status Of Source Water Protection Programs  
In The Grand River Watershed Area*

**November 4, 2010**

John Pomeroy, *University of Saskatchewan*

*Advancing Hydrological Processes To Better Predict  
Water Resources In Canada*

**November 25, 2010**

Andrew Paterson, *Ont. MOE*

*Interpreting Long-Term Data From Ontario Lakes:  
Ecological Surprises And Emerging Issues*

**January 13, 2011**

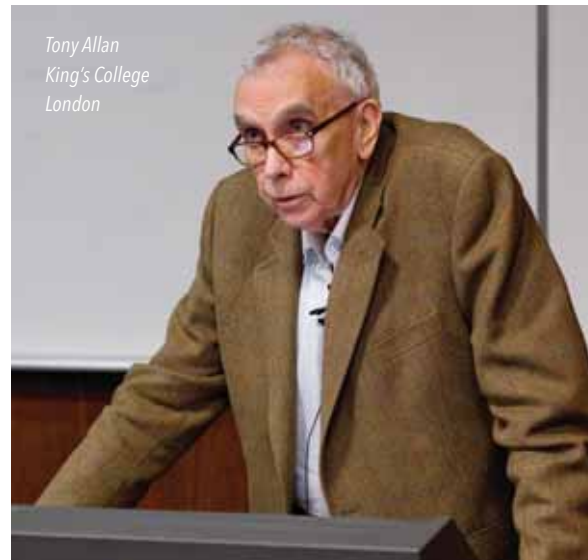
Alex Campbell, *Lifewater Canada*

*Water For The Rural Poor: A Grassroots Approach*

**January 26, 2011**

Dean Jeffries, *Environment Canada*

*Acid Rain In Canada: Developing The Critical Load Indicator To  
Guide Acidifying Emission Reductions And Factors That Delay  
Aquatic Ecosystem Response*



Tony Allan  
King's College  
London

**February 18, 2011**

Jack Imhof, *Trout Unlimited Canada*

*Learning To Speak The Same Language: Evolution Of The Science  
And Practice Of Managing Stream Corridors In Ontario*

**March 24, 2011**

Steve Hruddy, *University of Alberta*

*The Environmental And Health Impacts Of Canada's Oil Sands*

**May 26, 2011**

Tony Allan, *King's College, London*

*Water Security And The Role Of Trade*

**July 21, 2011**

John Quinn, *National Institute of Water & Atmospheric Research, New Zealand*  
*Rural Land Use And Streams In New Zealand: Overview And Use  
Of Bayesian Networks To Guide Interdisciplinary Research And  
Consensus Decision-Making*

**September 26, 2011**

Masaki Hayashi, *University of Calgary*

*Alpine Hydrogeology: Groundwater Flow And Storage In  
Moraine And Talus Sediments*

**October 6, 2011**

Lewis Jonker, *University of the Western Cape, South Africa*

*Thinking Differently About Water: Implications For Capacity  
Building Programs*

**November 1, 2011**

Lloyd Treinish, *IBM Thomas J. Watson Research Center*  
*Coupled Environmental Modelling For Business  
Decision Making*

**November 16, 2011**

Garth van der Kamp, *Environment Canada*  
*Prairie Groundwater And Prairie Wetlands:  
50 Years Of Observations And Changing Concepts*

**January 18, 2012**

Roland Hall, *University of Waterloo*  
*Information Across Broad Spatial And Temporal Scales Is  
Important For Water Resource Management: A Case Study  
From The Peace-Athabasca Delta*

**February 10, 2012**

Gerald Pollack, *University of Washington*  
*The Secret Life Of Water: E=H<sub>2</sub>O*

**February 15, 2012**

Zafar Adeel, *United Nations University INWEH*  
*Crawling Under The Roadblocks To Global Water Solutions*

**March 29, 2012**

Jeffrey McDonnell, *Oregon State University*  
*Conceptualizing Runoff Processes In Headwater Catchments*



Corinne Schuster-Wallace  
United Nations University  
Institute for Water,  
Environment & Health

# A Progress Report

Area	Goal	Status
<b>Management</b>	Formalize proposed administrative structure.	Business Plan that included WI's administrative structure formally approved in December 2010.
	Hire a Managing Director.	K. Boehmer hired in July 2011.
	Executive Director is appointed as "interim".	D. Rudolph appointed interim Executive Director in 2010.
	Affirm the Executive Director or advertise the position.	R. Gillham appointed Executive Director in 2012.
	Appoint External Advisory Board.	To be established in 2012.
<b>Communications and Marketing</b>	Secure permanent office space on the main campus.	Office space established in RAC.
	Establish website.	Visit <a href="http://www.water.uwaterloo.ca">www.water.uwaterloo.ca</a>
	Initiate newsletters:	
	- Internal - Quarterly beginning August 1, 2010;	- Four issues of Splash Pad published (Summer 2010, Fall 2010, Winter, 2011, Fall 2011) and regular information emails circulated to WI members.
	- External - Semi-annually beginning October 1, 2010.	- Four issues of Splash Pad published (Summer 2010, Fall 2010, Winter, 2011, Fall 2011).
	Arrange WI "founding" event.	Not completed.
	Lecture series will be initiated.	Eighteen WI-hosted seminars held, including Distinguished Lecture with Dr. Tony Allan in May 2011.
	Initiate development of WI external profile:	
	- presentations, where appropriate, to external groups (particularly government, industry and civil society groups);	WI administration represented members at various events and meetings, including discussions with industry, government and civil society groups.
	- continue to foster relations with government agencies.	
<b>Research and Technology Development</b>	Develop a comprehensive plan through the Communications and Marketing Committee.	Inaugural marketing and communications plan developed and implemented, including website, sponsorship, collateral, newsletter and seminar initiatives.
	By the end of Year 1, there should be demonstrable benefits of WI to the membership and particularly to the faculty members and the university.	Ongoing efforts to measure and improve value of WI to members and stakeholders.
	WI will secure or facilitate procurement of \$1M in incremental research funding in water-related topics.	WI instrumental in securing i) over \$8M for about 20 Waterloo researchers from 5 departments from SOWC, and ii) ±\$10M CERC research program.
	One significant international agreement will be signed by WI.	WI facilitated water-specific agreements with the Helmholtz Centre for Environmental Research (Germany), the University of São Paulo (Brazil) and Nnamdi Azikiwe University (Nigeria).
	One partnership agreement with a government agency, industry partner, or civil society group will be developed by, or with the assistance of, WI.	WI instrumental in forging SOWC collaboration of eight universities, municipal, civil society and 70 private sector partners.
	There will be evidence of a cultural change within the research community towards more interdisciplinary projects.	SOWC is evidence of an ambitious, interdisciplinary research effort.
	WI will assist the CERC and the three new faculty members associated with the CERC in the transition to Waterloo.	WI supported the CERC with administrative (e.g., hiring) and technical (e.g., co-host events, industry letters of support) activities.
	One workshop on an interdisciplinary research topic will be partially supported by WI.	Four WI sponsored interdisciplinary workshops were held.
	<b>Education and Outreach</b>	The Education Committee will present a report and recommendations for education and outreach programs by April 30, 2011.
<b>Budget and Finance</b>		The Budget and Finance Committee will review the annual budget and will track expenditures.
	By the end of Year 1, the committee will make recommendations concerning means to ensure the financial sustainability of WI beyond the five years of university support.	The WI administration presented a Financial Sustainability options paper to the SPC in early 2012.

# Priorities for 2012-13

The Water Institute will continue to build and maintain operations and programming in its core areas of research, education and partnerships in 2012/13. Specific initiatives are discussed below.

## Member Communications

The Water Institute's strength is its members. The Institute comprises 135 researchers from across all six Waterloo academic faculties and over 400 graduate students. These researchers have great diversity in interest and expertise. As participation in the Institute is voluntary and researchers have other commitments to departments and research programs, the Water Institute must clearly articulate and demonstrate its purpose and value. During 2012/13, a concerted effort will be made to strengthen communications with Water Institute researchers and to increase opportunities for faculty collaboration under the auspices of the Institute.

## External Partnerships

The Water Institute will increase dialogue, co-operation and partnerships with external stakeholders during 2012/13. External partnerships will facilitate opportunities for researchers and students and raise the Institute's profile. External organizations benefit through partnership with the Institute by gaining greater access to Waterloo's water researchers, their technologies, research and graduating students. Specific partnership activities we will be undertaking in 2012/13 include establishment of an external advisory board and corporate membership program.

## New Teaching Programs

A key goal of the Water Institute is to "promote and support development of multidisciplinary and interdisciplinary teaching programs at both the undergraduate and graduate levels". With increasingly complex water problems, there is a recognized need for water managers with a broader, multi-disciplinary background. During 2012/13, the Water Institute will be working with faculties and departments in defining and developing a new graduate program that will maintain focus on discipline expertise, while exposing students to the principles, concepts, terminology and tools of water-related disciplines outside of their specialization.

## Identifying New Research Opportunities

Perhaps the Water Institute's most important and elusive objective is to identify new research opportunities. The Water Institute was established to encourage and support interdisciplinarity – to match Waterloo faculty from disparate backgrounds and interests to jointly research increasingly complex water issues, and to match research teams with funding opportunities. The Institute is committed to this objective as it not only represents Waterloo's competitive advantage, but also represents the most practical approach to contributing to local, national and international water security. During 2012/13, the Water Institute will work with the university administration, its membership and external partners to identify and implement proactive measures to stimulate new interdisciplinary research.

## Water Institute Senior Management Committee

**André Roy**  
Chair, Dean, Faculty of Environment  
**Susan Elliott**  
Dean, Faculty of Applied Health Sciences

**Adel Sedra**  
Dean, Faculty of Engineering

**Terry McMahon**  
Dean, Faculty of Science

**George Dixon**  
VP University Research

**Bruce Mitchell**  
VP University Academic Designate

**James Craig**  
Chair, WI SPC Communications & Marketing Committee

**Roland Hall**  
Chair, WI SPC Education Committee

**Robert Gillham**  
WI Executive Director

**Kevin Boehmer**  
WI Managing Director

## Water Institute Strategic Planning Committee

**Robert Gillham**  
Chair, WI Executive Director

**David Rudolph**  
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Institute for Groundwater Research (WIGR)

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Institute for Groundwater Research (WIGR) (to 2011/12)

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Interdisciplinary Centre on Climate Change (IC3) (to 2011/12)

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**Andrew Snowdon**  
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Earth & Environmental Sciences

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Biology

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Earth & Environmental Sciences

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Civil & Environmental Engineering

**Bryan Tolson**  
Civil & Environmental Engineering

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Earth & Environmental Sciences

**Philippe Van Cappellen**  
Earth & Environmental Sciences

**Michele Van Dyke**  
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**Matt Vijayan**  
Biology

**Michael Waite**  
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Geography & Environmental Management

**Barry Warner**  
Earth & Environmental Sciences

**Mary Wells**  
Mechanical & Mechatronics Engineering

**Jonathan Witt**  
Biology

**Sarah Wolfe**  
Environment & Resource Studies

**Lingling Wu**  
Earth & Environmental Sciences

**John Yeow**  
Systems Design Engineering



## The Waterloo Pump

*Since its founding in 1957, the University of Waterloo has been committed to water-related research and education. Problem solving through applied research and the development of appropriate technologies is close to the cultural core of the university. Perhaps there is no better example of these values than the development of the "Waterloo Pump."*

*The World Health Organization estimated that in 2010 about 780 million people lacked access to safe drinking water and that 2.2 million people die each year from gastrointestinal infections primarily transmitted by contaminated water. In the mid-1970's, the International Development Research Centre (IDRC) challenged two University of Waterloo professors, Alan Plumtree of Mechanical Engineering and Alfred Rudin of Chemistry, to develop a hand-operated water pump suitable for use in developing countries. Drs. Plumtree and Rudin studied the hand pumps commonly used in the local Mennonite community and adapted the same principles of operation to the Waterloo Pump. By the late 1990s, the Waterloo Pump was estimated to be providing water to almost a million people in 13 countries. Though there have been several modifications over time, the Waterloo Pump continues to be used throughout the developing world. Though perhaps lacking in sophistication, the Waterloo Pump was nevertheless clever, innovative and appropriate for its intended purpose. Indeed one could be hard pressed to find a Waterloo innovation that has contributed more to human wellbeing.*

## Water Institute Administration and Contact Information

### Robert W. Gillham

Executive Director, the Water Institute  
519-888-4567 x84658  
rwgillha@uwaterloo.ca

### Kevin Boehmer

Managing Director, the Water Institute  
519-888-4567 x32643  
kboehmer@uwaterloo.ca

### Mary Anne Hardy

Administrative Associate, the Water Institute  
519-888-4567 x32658  
mahardy@uwaterloo.ca

## Mailing Address

the Water Institute  
University of Waterloo  
200 University Avenue West  
Waterloo, Ontario N2L 3G1  
Canada

## Office Location

Research Advancement Centre, Room 3018  
David Johnston Research + Technology Park  
475 Wes Graham Way  
Waterloo, Ontario N2L 3G1  
Canada

[water.uwaterloo.ca](http://water.uwaterloo.ca)



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