



# SPLASHPAD

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# WATERLOO

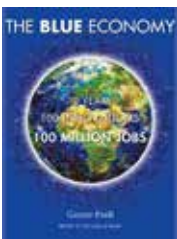


## introducing the blue economy

ROY BROUWER, Executive Director, Water Institute

**It is my pleasure to write this editorial for the first Splashpad in the new year. I shared some of my first impressions as new Executive Director of the Water Institute (WI) with our members already after arriving here early January 2016.**

**I take this opportunity to share some thoughts about bringing the Blue Economy into the WI.**



As the new Executive Director I aim to bring something new to the WI's research and capacity building agenda and work within the WI's research areas and interdisciplinary research teams on the Blue Economy. Given my background in environmental economics, it may not come as a surprise that I have a particular interest in researching the economic, technological, institutional and political mechanisms by which we are able to reconcile economic growth and prosperity with good governance principles of our natural resources. Green growth and blue economy initiatives seem to pop up like mushrooms. Adding the Blue Economy to the WI's research agenda means that we have to identify how we contribute to this theme more specifically and distinguish ourselves from other institutes in the waters around

us. Sound science and partnering with stakeholders are key principles here in my view, making optimal use of the bridges WI members have already built between science, engineering, policy and society.

The Blue Economy is a relatively new concept. In 2010, Gunter Pauli, a Flemish entrepreneur, founder of the Zero Emissions Research and Initiatives (ZERI), and member of the prestigious Club of Rome, published his widely acclaimed book *The Blue Economy*. In the book he presents 100 examples of how working with green technologies creates new jobs and values in economies that depend increasingly on scarce natural resources such as water. Although a single definition or blueprint of the Blue Economy does not exist, existing descriptions have in common the firm belief that (i) natural capital and ecosystem services have economic value and (ii) scarcity can be converted into abundance by applying alternative, resource efficient, circular business models. A frequently used example is coffee production, where through the combination of chemistry, engineering and recycling, coffee beans can be put to many more uses than just coffee drinking. The role of technology and innovation in adding new value is crucial in this new governance model and this is



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where Waterloo scientists and engineers excel and already play a distinctive role worldwide. Adding in the finance and economics is merely a small step to differentiate and brand the WI further and play a leading role in this area.

The book fits well in a time where the discussion about limits to growth seems to have re-emerged from the 1970s and the search for a green(er) economy has activated both academics and policymakers. For example, the European Commission introduced its *Blue Print to Safeguard Europe's Water Resources* in 2012, aiming to ensure the long-term sustainability of all activities that impact on water, thereby securing the availability of good-quality water for sustainable and equitable water use. Last year the *European Action Plan for a Circular Economy* was launched, aiming to facilitate the transformation into a resource efficient economy where waste flows are minimized and irreversible damages caused by exhausting natural resources avoided: *'The circular economy will boost the EU's competitiveness by protecting businesses against scarcity of resources and volatile prices, helping to create new business opportunities and innovative, more efficient ways of producing and consuming. It will create local jobs at all skills levels and opportunities for social integration and cohesion.'*



Similar aspirations are found in Canada in Ontario's 2010 Water Opportunities and Conservation Act, in which water technology acceleration and the creation of opportunities for economic development and clean-technology jobs are key elements to conserve and sustain water resources for present and future generations.



Canada also has the Blue Economy Initiative ([www.blue-economy.ca](http://www.blue-economy.ca)), a project founded by Canadian Water Network, the Royal Bank of Canada, and the Walter and Duncan Gordon Foundation. The initiative

aims to ensure that Canada becomes a global leader in water use and sustainability. I believe that the WI with its competitive advantage in interdisciplinary water science can play a major role in this Initiative and develop a distinct profile in this area. For example, I see a key role for us in developing integrated water information systems based on available 'in-house' data and information collected elsewhere. This could complement, for example, existing plans for monitoring the Great Lakes' water resources in a Great Lakes Blue Accounting initiative<sup>1</sup>. The WI can help to design such an accounting system based on our expertise in integrated water resources management and experiences for instance in Europe with integrated water accounting<sup>2</sup>.

In conclusion, I see several opportunities to further develop the Blue Economy as a promising new research and capacity building agenda within and outside Canada to build bridges between the social sciences and natural sciences in the WI, support policy and decision-making in Canada towards sustainable water use, and add to the WI's international profile. I look forward to further explore the potential of this new research area in the WI with you in the coming years! 💧

<sup>1</sup> Seelbach, P.W., Read, J.G., Buckner, K.A., Eder, T. and Manninen, C. (2014). *Great Lakes Blue Accounting: Empowering Decisions to Realize Regional Water Values. A report to the Council of Great Lakes Governors in response to the governors'2013 resolution on water monitoring.* March 28, 2014.

<sup>2</sup> Brouwer, R., Schenau, S. and van der Veeren, R. (2005). *Integrated river basin accounting and the European Water Framework Directive.* *Statistical Journal of the United Nations Economic Commission for Europe*, 22(2), 111-131.

# water institute in the news

## ROY BROUWER JOINS THE WATER INSTITUTE AS EXECUTIVE DIRECTOR

Following an exhaustive international search, the University of Waterloo has announced the appointment of Dr. Roy Brouwer as The Water Institute's new Executive Director effective January 1, 2016. Dr. Brouwer is joining the University from Vrije Universiteit (VU) Amsterdam in The Netherlands.

Dr. Brouwer is an eminent water economist, and comes to Waterloo after seven years as Head of the Department of Environmental Economics at VU Amsterdam. Prior to joining VU Amsterdam, he was Chief Economist at the Dutch Water Ministry for five years. In addition to his positions at Waterloo, Roy will continue as Visiting Professor at the Swiss Federal Institute for Aquatic Science and Technology (Eawag) in Zürich, and as Editor-in-Chief for the Elsevier journal *Water Resources and Economics*. Roy's primary research interest is in water resource economics, including the economic valuation and modelling of water resources, and the design and evaluation of policy instruments to support sustainable water management. Over the past twenty years, Roy has participated in, and successfully led, a wide range of multi- and inter-disciplinary water projects across Europe, Africa and Asia. In addition to his position at the Water Institute, Dr. Brouwer will be joining the Department of Economics as Professor.

## KEITH HIPEL ELECTED TO NATIONAL ACADEMY OF ENGINEERING

Keith Hipel, Systems Design Engineering, has been recognized with one of the highest professional engineering distinctions: election to the National Academy of Engineering. Academy membership honours those who have made outstanding

contributions to engineering research, practice, or education and to "the pioneering of new and developing fields of technology, making major advancements in traditional fields of engineering, or developing/implementing innovative approaches to engineering education." Keith was recognized for his "development and application of conflict resolution techniques from a systems engineering perspective." The newly elected class will be formally inducted during a ceremony at the NAE's Annual Meeting in Washington, D.C. on October 9, 2016. Congratulations Keith! 🎉

## the water institute

IS NOW ON CAMPUS!



The Water Institute has moved onto the main University of Waterloo campus. The Water Institute is now located in the **EIT BUILDING** rooms 3007 to 3011. **DROP BY AND SAY HELLO!**

# technology and innovation

## ADAPTING TO CLIMATE CHANGE IN URBANIZING WATERSHEDS

Climate change impacts on freshwater resources and water security are likely to be significant in developing countries. While empirical studies on climate vulnerability assessment have proliferated in recent years, developing a truly integrated understanding remains a challenge. Climate change is not the only problem in these rapidly changing regions. They face *multiple stressors* including urbanization and land use changes shaping the availability of water. Moreover, vulnerability to climate change is often not the primary concern. Local stakeholders and policy makers face *multiple concerns* of inequity and unequal access to water resources. In urbanizing areas, water is supplied through infrastructure that is managed by different government and private agencies, which act as *mediating linkages* between the available water resources and the end users.

The group of four RBC Water Fellows visiting the Water Institute in this winter term (Sharachchandra Lélé, Priyanka Jamwal, Veena Srinivasan and Bejoy Thomas) focus their research precisely on these key issues at their home institution, the Ashoka Trust for Research in Ecology and the Environment in Bangalore, India. They launched the project 'Adapting to Climate Change in Urbanizing Watersheds' (ACCUWa) in September 2012 to study what concerns and stressors influence current water management and how climate change influences this. Their research is conducted using a comparative framework across two river basins in southern India: the Arkavathy basin in Karnataka state and the Noyyal basin in Tamil Nadu state.

Over 30 researchers, field staff and faculty members representing a range of disciplines have been engaged in field research, analysis and modelling of socio-hydrological data. This involves extensive household and farm surveys, hydrological measurements and modelling, water quality monitoring, satellite-based land-use change



Water Quality Studies in the Polluted Vrishabhavathy River



Field Hydrology Studies in the upper Arkavathy catchment

mapping, expert consultation workshops, interviews, focus group discussions and stakeholder outreach. The latter includes a Water Literacy Campaign.

The project examines how water and wastewater are governed in the two basins and what coping mechanisms users employ to adapt to climate-induced or other changes. The research shows that urbanization transforms agricultural practices in different ways upstream and downstream of cities.

For instance, upstream of the mega-city of Bangalore, labour scarcity and urban demand has pushed most farmers away from traditional food grain crops to commercial agriculture (if they have access to borewells) or to eucalyptus plantations (if they do not). The competitive drilling of borewells and expansion of deep rooted eucalyptus plantations have led to serious groundwater depletion, which in turn has resulted in drying up of streams.

Downstream of cities the story is often different. "Nutrient rich" wastewater from the city, typically untreated, allows an expansion of irrigated agriculture, supporting commercial crops like baby corn, fodder and mulberry. However, in the Arkavathy basin, the wastewater used for irrigation also contains heavy metals from industrial discharges, which hence also find their way into the food chain.

For more information, please visit the RBC Visiting Fellows during their Waterloo stay, or view project outputs at [atree.org/accuwa](http://atree.org/accuwa).

# water institute news

## FALL 2015 SEED GRANT RECIPIENTS

In July 2015, the Water Institute distributed a call for proposals for our Fall 2015 Seed Grant Program competition. Three proposals were received by the September 25 deadline, and these were subsequently assessed by the Water Institute Executive Director against eligibility criteria and program objectives. The following two projects were funded from this call.

### » **Boomerang Effect: Climate Change Adaptation, Organized Violence and Regional (In)Security**

Principal Investigator Larry Swatuk from Environment, Enterprise and Development, with co-investigators Richard Kelly and Alain-Désiré Nimubona.

### » **Do Watershed Biogeochemical Models Really Inform Coastal Ecology and Environmental Policy? Assessing knowledge gaps and charting the way forward in linking hydrology, biogeochemistry and land use to coastal ecosystem functions and environmental impacts**

Principal Investigator Philippe Van Cappellen from Earth and Environmental Sciences, with co-investigators Nandita Basu, Simon Courtenay, James Craig, Hans Dürr, Bruce MacVicar, Dave Rudolph, Sherry Schiff, Ed Sudicky and Bryan Tolson.



The Water Institute sent out a second call for proposals for the Winter 2016 Seed Grant Program with a total of \$115,000 available for the Winter competition.

Twelve proposals were received by the February 9 deadline. 💧

## GRADUATE SCHOLARSHIP RECIPIENTS SELECTED

The Water Institute was pleased to receive 41 applications for the five scholarships generously supported by our External Partners during 2015-2016. This year it was again a very competitive field with many outstanding applications. The scholarships will be formally awarded at the Water Institute's annual Research Symposium on April 28th.

The Water Institute is pleased to announce the following scholarship recipients:

### » **Golder Associates Graduate Scholarships in Water Research**

**Name:** Pieter Aukes, PhD candidate, Earth and Environmental Sciences

**Topic:** Determining the quality of dissolved organic matter in northern environments and the implications for aquatic health and drinking water quality

**Supervisor:** Sherry Schiff

**Name:** Allison Turner, MES candidate, Environment, Resources and Sustainability

**Topic:** Rethinking water governance: a new approach for the Great Lakes

**Supervisor:** Rob de Loë

### » **AECOM Graduate Scholarship in Water Research**

**Name:** Keegan Hicks, PhD candidate, Biology

**Topic:** Assessing the cumulative effects of multiple stressors including agriculture and waste water on fish populations and communities in a highly impacted watershed

**Supervisor:** Mark Servos

**Name:** Shabnam Mostofi Zadeh, PhD candidate, Civil and Environmental Engineering

**Topic:** Flood quantiles estimation in Canada: Learning from the past and preparing for the future

**Supervisor:** Don Burn

### » **The Water Institute Graduate Scholarship (Stantec)**

**Name:** Kimberly Murray, MSc candidate, Geography and Environmental Management

**Topic:** Water as a control on methane flux from reclaimed and natural peatlands

**Supervisor:** Maria Strack 💧

# collaborative water program



Team-building activities at the Leadership Retreat. (photo by B. MacVicar)

## MESSAGE FROM THE INCOMING PROGRAM DIRECTOR, BRUCE MacVICAR

I'm honoured to have been given the chance to be the Director of the Collaborative Water Program (CWP) and will do my best to build on the legacy left by the program's first director, Prof. Mark Servos. I'm excited about the program and where we can take it over the next couple of years. The third cohort is now here and I'm pleased to say that the program is working fantastic. Some of the brightest Waterloo students are working on a wide range of problems, and the CWP is giving them a chance to engage with each other and the big transdisciplinary problems in water research that will command our attention over the coming decades. The fall Leadership Retreat was a great success, and I'm excited to see them in Water 601 with Professors Simon Courtenay and Bill Annable applying themselves with such enthusiasm.

Over the next couple of years the program will face a few challenges. First, what do we do if the program is wildly successful? The growth of this program is great, but we need to ensure that it remains personal and interactive. We would also like to increase the range of voices in the program. For instance, we would love to have more students from programs like Economics, Applied Mathematics, and Chemical Engineering, adding their voices to the conversation. Finally, we have started to think about the legacy of the program. Ideally, the CWP is helping to build an interconnected web of individuals from different disciplines and cohorts that would last well beyond graduation, and we are investigating ideas about what we can do to enhance that network. I look forward to working with all of you over the next years as we continue to develop this strategic water program at the University of Waterloo. 💧

## FUTURE RBC FELLOWS APPROVED

The Water Institute is pleased to announce that the following four RBC Fellows were approved to visit the Institute and the University of Waterloo in the coming years:

- » **Dr. Pieter van der Zaag**, Professor Integrated Water Resources Management, UNESCO-IHE and Technical University Delft, Netherlands; September 2016
- » **Dr. Christian Stamm**, Senior Scientist and Deputy Head Department of Environmental Chemistry, Swiss Federal Institute of Aquatic Science and Technology (Eawag), Switzerland; Winter 2017
- » **Dr. Veronica Strang**, Executive Director of the Institute of Advanced Study, Department of Anthropology, Durham University, U.K.; Fall 2017 or Winter 2018
- » **Dr. Anthony (Tony) Turton**, Director of TouchStone Resources, South Africa, and former Executive Director of the International Water Resources Association (IWRA); Fall 2017 or Winter 2018 💧

# WATER

# students of the water institute

## GRADUATE SECTION

It's been quite a change in the seasons, and SWIGS has been busy throughout! The SWIGS and UWEG camping trip to Point Pelee National Park in October was a great success. Chilly and blustery to start, students learned from one another about the ecology and history of the area, as well as some wildlife photography tips. Later in October, a group of SWIGS members split into two teams and went on an escape room challenge at Adventure Rooms, in Kitchener. Working together, we attempted to break out of rooms by solving tricky clues and puzzles. At the end of 2015, SWIGS hosted an extra special Blue Drinks with a wintery theme, trivia, and prizes. We had a great turnout and shared some delicious food at the Grad House.

2016 is already full of excitement. We are planning for World Water Day (March 22), continuing with Blue Drinks, coordinating with visiting scholars after Water Talks lecture series events, and more. The team is working hard to allow students opportunities to meet with faculty and visiting scholars to truly enrich their water education experience.



## LOOKING FOR A 2016-17 EXECUTIVE TEAM

It's hard to believe, but it's already nearing the time to call out for a new Executive Team to take over for 2016-2017. Are you interested in connecting with water students, researchers, professionals, and more? Check out the position descriptions at [SWIGS.uwaterloo.ca/opportunities/swigs\\_opportunities](http://SWIGS.uwaterloo.ca/opportunities/swigs_opportunities). Stay tuned for details of our Annual General Meeting and election opportunities. 💧

## UPCOMING EVENTS

### » March 4

SWIGS Lunch Talks — Come share your research! Students are invited to present their work to their colleagues. Lunch is on us! Contact [uw.swigs@gmail.com](mailto:uw.swigs@gmail.com) if you would like to present.

### » March 22

UN World Water Day: *Water and Jobs* — Keynote by Linda Gowman, Trojan Technologies, poster and photo contests, and panel discussion with Bev Mollard, Robert Pockar, and Krystyn Tully. EIT Atrium and EIT 1015: 11:00 a.m. – 5:30 p.m. Social Event 7:00 p.m. at the Huether Hotel. Details and registration here: [uwaterloo.ca/events/events/world-water-day-2016](http://uwaterloo.ca/events/events/world-water-day-2016)







### » April 13

Blue Drinks — Last Blue Drinks of the term, 6:00 pm and on. Come celebrate the term!

### » April/May (TBD)

AGM and Elections 💧

## CONTACT US

-  [swigs.uwaterloo.ca](http://swigs.uwaterloo.ca) (Find out more or contribute to our blog!)
-  [uw.swigs@gmail.com](mailto:uw.swigs@gmail.com) (Join our mailing list!)
-  [facebook.com/uw.swigs](https://facebook.com/uw.swigs) (Engage in conversation!)
-  [@UW\\_SWIGS](https://twitter.com/UW_SWIGS) (Updates at events and news of water interest!) 💧

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# save the date

## THURSDAY, APRIL 28, 2016

### Research Symposium 2016

## Water Institute RBC Distinguished Lecture 2016

**APRIL 28, 2016**

» **Dr. Jay Famiglietti**

University of California Irvine  
and JPL Senior Water Scientist,  
NASA Jet Propulsion Laboratory,  
California Institute of Technology







*Photo by Riley Kern*



#### CONTACT US AT:

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

-  519-888-4567, ext. 32658
-  [water.institute@uwaterloo.ca](mailto:water.institute@uwaterloo.ca)
-  [@water\\_institute](https://twitter.com/water_institute)
-  [youtube.com/user/uwaterloo/playlists](https://www.youtube.com/user/uwaterloo/playlists)

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