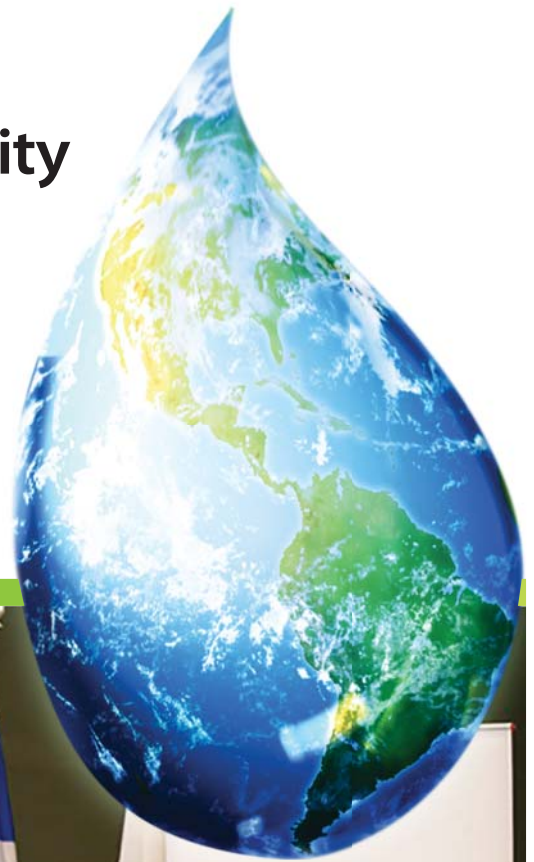


Global Institute for Water Security

Progress Report 2015-16



UNIVERSITY OF
SASKATCHEWAN

www.usask.ca/water

\$77.8 million Federal CFREF Funding Announcement for the
Global Water Futures: Solutions to Water Threats in an Era of Global Change

From left to right: Ph.D. student Holly Anand; John Pomeroy, Canada Research Chair in Water Resources and Climate Change; Karen Chad, Vice-President, Research, U of S
Hon. Ralph Goodale, Minister of Public Safety and Emergency Preparedness; Bettina Hamelin, Vice-President of Partnerships, NSERC; and Peter Stoicheff, President, U of S



OUR VISION

To undertake world-class research that enables and enhances water security. We define water security as the sustainable use and protection of water resources, the safeguarding of access to water functions and services for humans and the environment, and protection against water-related hazards (flood and drought).

OUR MISSION

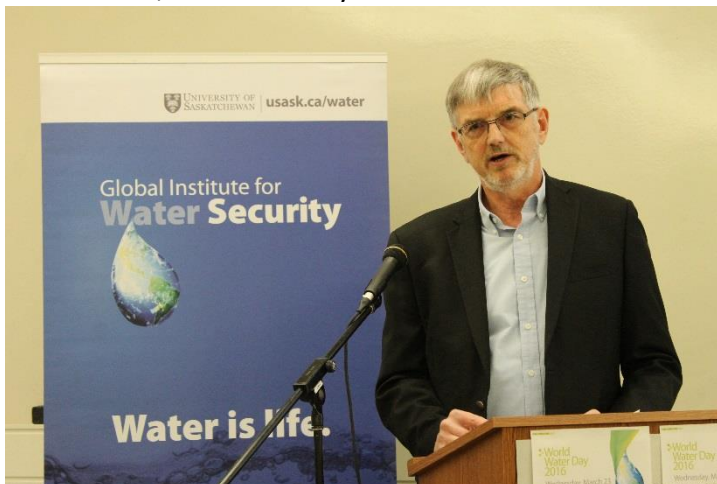
- Create a focus and platform for interdisciplinary collaboration that recognizes the societal dimensions of water security, human impacts on the environment, and the linkages and feedbacks between atmosphere, land and water systems. This requires new integration of the relevant spectrum of natural, health and social sciences, public policy and engineering;
- Develop the knowledge, science and technologies needed to support integrated water quantity and quality management in the face of uncertain climate and water resource futures, and address local, regional and global water security agendas;
- Develop partnerships with key stakeholders to translate science into policy and management support to meet water security challenges, including interactions among water, food, energy and ecosystem services (i.e., benefits to human welfare), climate change adaptation and mitigation challenges, and the human health agenda;
- Provide tools, technologies, and computer models for application to key globally significant water security issues, with international application; and,
- Create a unique opportunity for governments, industry and universities to invest in and collaborate on one of our most pressing global issues.

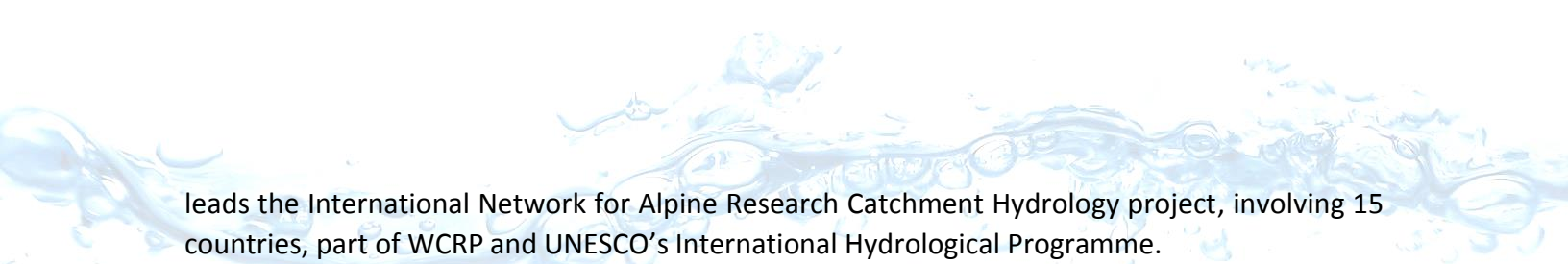
DIRECTOR'S MESSAGE

Welcome to the University of Saskatchewan's (UofS) Global Institute for Water Security (GIWS). I hope that our 2016 annual report will give you a flavor of some of our exciting research and state-of-the art facilities, as well as introducing you to our Faculty, researchers and graduate students. GIWS is a highly international institution, carrying out world-leading research, engaged in major global programs, and attracting student and researchers from around the world. It builds on a 53-year history of water research in Saskatoon, including the co-location of the federal National Hydrology Research Center in 1986. In 2010, the University of Saskatchewan established *Water Security* as a signature area of research focus and excellence, and GIWS was established in 2011 as its focus, with an investment of \$30 million through the Canada Excellence Research Chair in Water Security.

The Institute coordinates research efforts of more than 100 faculty and senior government scientists and fosters research collaboration across the university and with key Federal, Provincial and industrial partners. We are located in one of the world's most rapidly warming environments, and are able to observe and model the profound changes taking place around us. From this base we are addressing regional and global challenges of Water Security, including the sustainable use and protection of water resources and protection against water-related hazards such as flooding and drought. The Institute works to ensure that society globally has the understanding and the tools to sustainably manage and protect the world's water resources and that Canada has the research and expertise needed to understand and manage its water systems in this era of rapid societal and environmental change.

In last 6 years, the Institute has had some remarkable achievements and has seen major growth in research activity and outcomes. We lead Canada's Changing Cold Regions Network (CCRN), funded by NSERC's Climate Change and Atmospheric Research programme, and have established the Saskatchewan River Basin (410,000 km²) and the Mackenzie River Basin (1.8 million km²) as large-scale observatories. This region experiences one of the most extreme and variable climates in the world and is home to 80% of Canada's agriculture, important natural resources and the rapidly developing economies of the three Prairie Provinces and the Northwest Territories. CCRN is now recognized as a Regional Hydroclimate Project of the World Climate Research Program's (WCRP) Global Energy and Water Exchanges (GEWEX) project, one of ten in the world and the only one of its kind in North America. Our state-of-the-art instrumented sites include the biomes of the Rocky Mountains, the Boreal Forest and Prairies in the South, and the sub-arctic in the North, as well as biogeochemical facilities to study our lake and river environments. GIWS also





leads the International Network for Alpine Research Catchment Hydrology project, involving 15 countries, part of WCRP and UNESCO's International Hydrological Programme.

A major development in 2016 has been the award of a \$77.8 million grant from the Canada First Research Excellence Fund (CFREF) to lead "Global Water Futures: Solutions to Water Threats in an Era of Global Change", a transdisciplinary initiative that may be the largest university-led water research program ever funded worldwide. With partner funding, the program budget is \$143.7 million over seven years. GWF involves more than 380 Canadian university researchers at 18 universities, 19 federal and provincial agencies, seven Indigenous communities and governments, 39 industrial collaborators, 15 non-governmental agencies, and 45 international research institutes. Our researchers will also work with UNESCO, the World Climate Research Program and Future Earth, to develop the tools and models to mitigate water disasters, protect the environment and take advantage of economic opportunities.

The overarching goal of Global Water Futures (GWF) is to deliver risk management solutions—informed by leading-edge water science and supported by innovative decision-making tools—to manage water futures in Canada and the world's other cold regions, where global warming is changing landscapes, ecosystems, and the water environment. In the next 7 years we aim to deliver improved forecasting of floods, droughts and water quality, new capability to predict the impacts of environmental change and, working with our 138 partners from government, industry, communities and First Nations, to deliver new tools and solutions to manage water-related risks in an uncertain future.

GIWS has come a long way since its foundation in 2011, and we are proud of our achievements thus far. However, none of this would have been possible without the far-sighted support of our major sponsors, the Canadian Government, through the Canada Excellence Research Chair program and the Canada First Research Excellence Fund, the Province of Saskatchewan, and the UofS. I would like to record my personal thanks for their recognition of the strategic importance of water security, and their vision and confidence in the UofS and myself to deliver on this important and unique opportunity.

We hope you that will enjoy reading about our work, and our outstanding team of students and researchers. And as my close colleague and Associate Director, Jeff McDonnell notes, we very much welcome interest in our work and have many opportunities for collaboration.



Professor Howard Wheeler, FREng
Canada Excellence Research Chair in Water Security
Director, Global Institute for Water Security
Programme Director, Global Water Futures

ASSOCIATE DIRECTOR'S MESSAGE

Welcome to the University of Saskatchewan's Global Institute for Water Security! This past year has been terrifically exciting. The big thing for the university (and Canada) has been the Global Water Futures project, led by Howard Wheater and John Pomeroy. This is truly a remarkable effort and places GIWS at the core of leadership nationally and internationally.

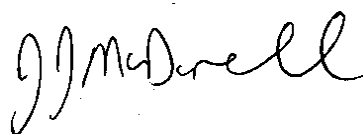
Our commitment to research focuses also on graduate student and postdoctoral training. In 2016 the GIWS continued to lead the Fall term monthly 'Post Doc Mentoring Lunch' and together with Maureen Reed, the annual 'Launching an Academic Career' short-course. The CREATE Program in Water Security, led by Cherie Westbrook is now well underway with a cohort of outstanding students in 2016. This past year also marked the beginning of the project-based master's program in Water Security. That program is led by Andrew Ireson and the first group of students are now actively taking classes.



Sampling the Source of the Seine in France

Our Distinguished Lecture series continued in 2016 with visits from key world leaders in water security research, including: Günter Blöschl (Technical University, Vienna), Hoshin Gupta (University of Arizona), Susan Hubbard (Lawrence Berkeley Labs), Alberto Montanari (University of Bologna), Doerthe Tetzlaff (University of Aberdeen), Chris Soulsby (University of Aberdeen), Jim Hall (University of Oxford), Sue Brantley (Penn State University) and Dara Entekhabi (MIT).

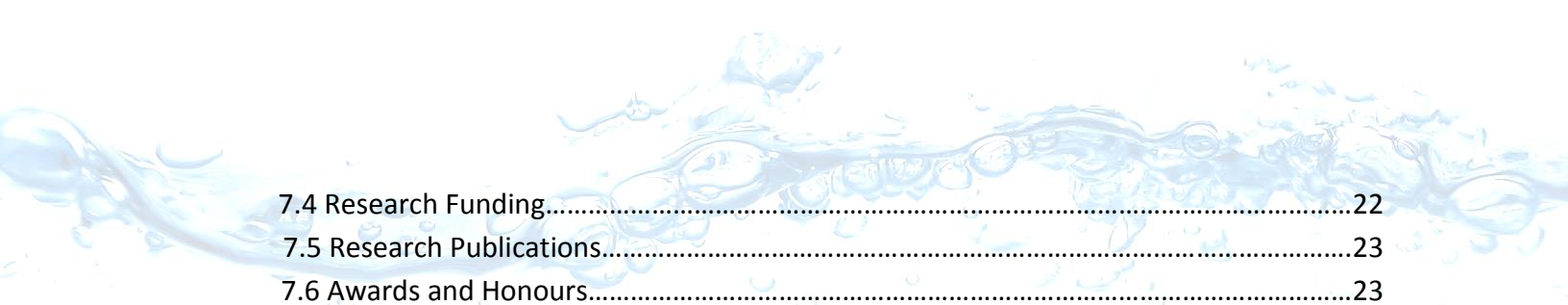
The GIWS continues to be a hub for researchers internationally, this past year hosting sabbatical and research visitors over a dozen countries, including extended visits from Kent Keller (Washington State University), Paolo Burlando (ETH Zurich) and Li Zhi (NW Agriculture and Forestry University). Our GIWS faculty members have spent 2016 working in the field across Europe, Asia, South America and Africa this year. Together with our research staff and our many international partners, we are tackling some of the world's biggest water security challenges. We invite you to come to 'Paris on the Prairie' (aka Saskatoon) and be a part of our team—as a visiting scientist, sabbatical visitor or student intern.



Professor Jeffrey J. McDonnell, FRSC
Associate Director, Global Institute for Water Security

TABLE OF CONTENTS

Vision.....	i
Mission.....	i
Director’s Message.....	ii
Associate Director’s Message.....	iv
Executive Summary.....	viii
1. Local and Global Emergence – Global Institute for Water Security.....	01
1.1 Science Leadership.....	01
1.2 Sustaining Collaboration – Governing Principles.....	04
1.3 Elements of Success.....	05
2. Leadership of Global Programmes.....	06
2.1 Changing Cold Regions Network (CCRN).....	08
2.2 International Network for Alpine Research Catchment Hydrology (INARCH).....	08
2.3 Future Earth – Sustainable Water Future Programme.....	09
3. Global Water Futures – Solutions to Water Threats in an Era of Global Change.....	09
4. Research Themes.....	11
4.1 Climate Change and Water Security.....	12
4.2 Land-water Management and Environmental Change.....	12
4.3 Sustainable Development of Natural Resources.....	12
4.4 Socio-hydrology.....	12
4.5 Water and Health.....	12
4.6 Water and Wastewater Treatment Technologies.....	12
4.7 Groundwater and Hydrogeology.....	13
5. Large-Scale Observatories.....	13
5.1 Western Cordillera.....	13
5.2 Sub-arctic Lowlands.....	14
5.3 Boreal Forest.....	14
5.4 Prairies.....	15
5.5 River Deltas.....	17
6. Major Training Programmes.....	19
6.1 Professional Development and Career Advancement.....	19
6.2 Graduate Program in Water Security.....	20
6.3 NSERC CREATE Program for Water Security.....	20
7. Performance Indicators.....	22
7.1 Membership.....	22
7.2 Support Staff.....	22
7.3 Highly Qualified Personnel.....	22



7.4 Research Funding.....	22
7.5 Research Publications.....	23
7.6 Awards and Honours.....	23
7.7 Research Chairs.....	25
8. Collaborations and Outreach.....	26
9. Student Corner.....	27
9.1 Dragon Boat Festival.....	28
9.2 GIWS Potluck.....	29
9.3 GIWS BBQ.....	29
9.4 World Water Day.....	29
9.5 Better Than Bottled.....	31
9.6 Skate Saskatoon.....	31
10. Concluding Remarks.....	31
Appendix A – Current Membership.....	33
Appendix B – GIWS Employees and Students 2015-16.....	48
Appendix C – Students and Highly Qualified Personnel not Funded by GIWS.....	52
Appendix D – Grants 2015-16.....	62
Appendix E – Publications, Conference Proceedings and Presentations.....	77
Appendix F – Collaborations and Outreach.....	130




EXECUTIVE SUMMARY

This report celebrates the remarkable journey and achievements of the Global Institute for Water Security (GIWS) over last 6 years. From its humble beginning in March 2011 with support from the Canada Excellence Research Chair (CERC) in Water Security funding to Prof. Howard Wheeler - a federal-provincial-university partnership with base funding of \$30 million over seven years to winning the prestigious \$77.8 million Canada First Research Excellence Fund in September 2016, the GIWS has made significant contributions to water science to ensure that society has the understanding and the tools to sustainably manage and protect the world's water resources and ensure that Canada, and the world, has the research and expertise needed to understand our water systems in an era of rapid societal and environmental change. On its way to this remarkable achievements, the GIWS has become the host to the World Climate Research Programme's (WCRP) only *Regional Hydroclimate Project* in North America – Changing Cold Regions Network (CCRN) and also host to the WCRP's *Global Hydroclimate Project* & UNESCO's International Hydrological Programme - International Network for Alpine Research Catchment Hydrology (INARCH). In addition, GIWS is the Canadian node for the Sustainable Water Future Programme with the Future Earth.

GIWS was created to provide: a) a vehicle for the new disciplinary and trans-disciplinary science needed to address the local, regional and global challenges of water security (and specifically the Canada Excellence Research Chair (CERC) programme), and b) a platform and focus for the UofS signature area of water. The institute combines expertise in natural, health and social sciences, public policy and engineering, recognizing that people and their activities are of critical importance for water science and management.

GIWS aims to be a global leader in Cold Region water science and focuses its efforts through seven research themes: Climate Change and Water Security; Land-Water Management and Environmental Change; Sustainable Development of Natural Resources; Socio-hydrology, Water and health, Water and Wastewater Treatment Technologies, and Groundwater and Hydrogeology. We have developed new, internationally recognized research facilities, have taken on important national and international science leadership roles, attracted substantial additional research funding, and are beginning to deliver the exciting science that was foreseen at the programme outset.

GIWS currently leads the \$5 million five year (2013-2018) NSERC's changing Cold Regions Network (8 universities, 4 Federal agencies) and has brought the water community in Canada together and leads the \$143.7 million seven year (2016-2023) CFREF national water programme titled "Global Water Futures – Solutions for Water Threats in an Era of Global Change" (total 157 partners, including 8 Federal Government Agencies, 39 Provincial Government Agencies, 45 international institutions, 34 industries, and 388 researchers from 17 Canadian universities).



GIWS has developed two important new strategic educational initiatives in graduate education and training: 1) The NSERC *Collaborative Research and Training Experience (CREATE) Program in Water Security*, which commenced in September 2015 stimulates research Masters and PhD students to integrate science, engineering, and policy as they address current and future challenges in complex water systems. 2) Beginning in 2016, we are offering an innovative one-year professional Master of Water Security graduate program that provides intensive cross-training to build disciplinary and interdisciplinary expertise for research and practice.

GIWS by the numbers

During 2015-16, GIWS has financially supported 57 graduate students (30 PhD and 27 Masters), 30 postdoctoral fellows, 39 research assistants, 13 research associates and scientists, and 11 visiting scholars. In addition, its members have supported a further 166 graduate students (62 PhD and 104 Masters), 25 postdoctoral fellows and research associates, 6 research scientists, 31 Research Assistants, Research Engineers and Summer Students, and 11 visiting scholars.

In 2015-16, GIWS faculty members have secured a total of \$90 million (93% from federal sources and 2% each from the provincial, industry and international sources, respectively). Since March 2011, GIWS membership has secured a total funding of \$158 million (including the CFREF \$77.8 million) on top of the original \$30 million CERC investment (GIWS grant total is \$188 million over 6 years).

In 2015-16, GIWS members published 304 journal articles, published and presented 235 papers in proceedings and at conferences, delivered 151 plenary, key note and invited lectures, and published 14 book chapters and books. Since 2011, GIWS members have published a total of 1019 journal articles and 57 books/book chapters, participated in 789 conference proceedings and presentations and delivered more than 412 invited, key-note and plenary lectures to share research outcomes and enlighten our stakeholders and scientific community.

It is noteworthy that GIWS members sit on the advisory panels for the world's two leading water prizes (Stockholm Water Prize and Prince Sultan Bin Abdulaziz International Prize for Water), have four fellows of the Royal Society of Canada, three fellows of the American Geophysical Union (only 0.01% recognized as fellows), and that Jeff McDonnell is currently president of the American Geophysical Union's 7500-member Hydrology Section, the world's leading scientific hydrology organization.

During the past 6 years, UofS has appointed 23 new faculty members in water science. Today GIWS integrates the efforts of 151 faculty members at UofS. Our faculty includes one Canada Excellence Research Chair, nine Canada Research Chairs (CRC), four Industrial Research Chairs (IRC), and six endowed Chairs. Over last 6 years, water area at UofS has seen an increase of 23% in new faculty appointments, 300% in IRC appointments, 29% in CRC appointments, plus the addition of the CERC in water security.

1. Local to Global Emergence - Global Institute for Water Security

1.1 Science Leadership

The Global Institute for Water Security (GIWS) was established in 2011 by Prof. Howard Wheater, Canada Excellence Research Chair (CERC) in Water Security, initially funded by a \$30 million 7-year federal-provincial-university CERC grant. GIWS was created to provide: a) a vehicle for the new disciplinary, interdisciplinary and transdisciplinary science needed to address the local, regional and global challenges of water security, and b) a platform and focus for the UofS signature area of *water security: stewardship of the world's freshwater resources*. The Institute combines expertise in natural, health and social sciences, public policy and engineering, recognizing that people and their activities are of critical importance for water science and management.

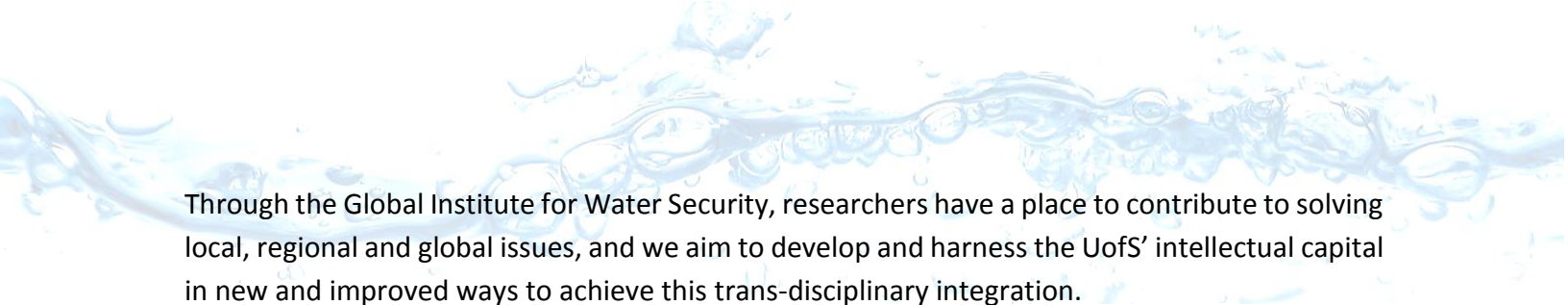
In this report on our 2016 activities, we summarize some of the scientific and personal achievements of our students, Faculty and partners, our international science leadership and our funding achievements. In particular, we are delighted to record that the University of Saskatchewan was, in September 2016, awarded a \$78 million grant from the Canada First Research Excellence Fund to support a \$143 million 7-year Global Water Futures research programme. This is the largest grant ever awarded to the University of Saskatchewan, and we believe the largest university grant for water science world-wide. It will enable GIWS to take a strategic leadership role for Canada in addressing the challenges of a rapidly changing water environment, and an international leadership role in developing new water science for the world's cold regions.

GIWS provides the organizational structure through which internal and external stakeholders can collaborate, and its activities span 15 colleges, schools and departments across the UofS. The Institute aims to target key opportunities, build effective multi-disciplinary teams within and outside the UofS, provide technical and administrative support, and maximize output of new knowledge, tools and expertise. We use common problems and common places as a focus for trans-disciplinary research, and support our researchers and students to jointly work on these projects and themes. An important goal is to provide a focal point for water research activities across campus in which excellence can flourish and new knowledge can be brought to bear to address society's needs.



Video File: GIWS Introduction

<http://www.usask.ca/water/publications/videos.php>



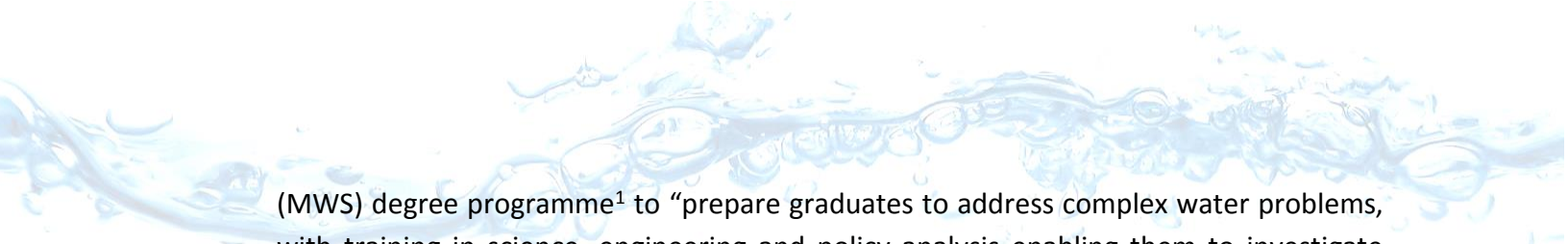
Through the Global Institute for Water Security, researchers have a place to contribute to solving local, regional and global issues, and we aim to develop and harness the UofS' intellectual capital in new and improved ways to achieve this trans-disciplinary integration.

While development of trans-disciplinary science is in itself not novel, there are five key innovative elements associated with the GIWS:

1. Create a focus and platform for interdisciplinary collaboration that recognizes the societal dimensions of water security, human impacts on the environment, and the linkages and feedbacks between atmosphere, land and water systems. This requires new integration of the relevant spectrum of natural, health and social sciences, public policy and engineering;
2. Develop the knowledge, science and technologies needed to support integrated water quantity and quality management in the face of uncertain climate and water resource futures, and address local, regional and global water security agendas;
3. Develop partnerships with key stakeholders to translate science into policy and management support to meet water security challenges, including interactions among water, food, energy and ecosystem services (i.e., benefits to human welfare), climate change adaptation and mitigation challenges, and the human health agenda;
4. Provide tools, technologies, and computer models for application to key globally significant water security issues, with international application; and,
5. Create a unique opportunity for governments, industry and universities to invest in and collaborate on one of our most pressing global issues.

In just six years, GIWS has achieved international prominence and experienced exponential growth by coordinating water-related activities at the UofS and developing new collaborations with partners across Canada and around the world (Figure 1). This was achieved in accordance with the University's Integrated Planning Parameters (Renewing the Dream 2002) as follows:

- **Increase campus-wide commitment to research, scholarly work and artistic work:** GIWS has created project teams of researchers from relevant academic units around its seven research themes to enhance research coordination and collaboration among the campus community. GIWS also provides technical and financial administrative support to assist in the development of research proposals and the management of research.
- **Recruit and retain a diverse and academically promising body of students, and prepare them for success in the knowledge age:** GIWS is training graduates who have in-depth disciplinary knowledge and the capacity to link this knowledge using a systems perspective to a more synthetic understanding of water security. To support this agenda, GIWS has established a 1 year professional project-based Master's in Water Security



(MWS) degree programme¹ to “prepare graduates to address complex water problems, with training in science, engineering and policy analysis enabling them to investigate water security issues of regional, national and international significance. Graduates are ready to become water scientists, managers and policy-makers with the necessary expertise needed to tackle the complex and multidisciplinary water problems facing us now, and in the future”. In addition, GIWS has established the NSERC-CREATE (Natural Science and Engineering Research Council of Canada – Collaborative Research and Training Experience Programme) Water Security training programme² - a “comprehensive and career-oriented research and training program for graduate students and postdoctoral fellows, which offers an experience that expands interactions across disciplines without diluting disciplinary credentials, blurs the line between research and practice, and builds necessary personal and professional skills to best ready you for a career in the water security sector of your choosing”.

- **Commitment to Academic Pre-eminence:** As a research intensive institute, our primary thrust is on developing and sustaining research excellence. This is achieved through developing world-leading research facilities and programmes, by supporting and mentoring our Faculty, and providing world class HQP training and mentoring programmes. GIWS, together with the School of Environment and Sustainability (SENS), UofS, runs an annual shortcourse for doctoral students and postdoctoral fellows “Launching an Academic Career” by creating their own research brand³, and orchestrating a power research group⁴. Also, the graduate students at UofS undergo training with the College of Graduate Studies and Research, and Gwenna Moss Centre for Teaching Effectiveness in the “Philosophy and Practice of University Teaching” and “Thinking Critically – Professional Skills for Global Citizens”. This is complemented by a monthly “Post Doc Mentoring Lunch” where GIWS faculty actively address mentorship issues. The GIWS Distinguished Lecture Series, “Breakthroughs in Water Security Research”⁵ brings 11 international world-leading scientists to Saskatoon each Fall for lectures, tutorials and workshops.
- **Sense of Place:** In western Canada, natural resource development, irrigation, population growth and rapid climate change all interact to create challenging scenarios for policy makers and governments to manage our water resources and ensure water quality and quantity for the future, and to provide protection from water-related risks to human

¹ <http://www.usask.ca/sens/become-a-student/apply-for-mws.php>

² <http://research-groups.usask.ca/createwater/>

³ McDonnell, J.J. 2015. Creating a research brand. *Science* 349(6249): 758.
<http://science.sciencemag.org/content/349/6249/758>

⁴ McDonnell, J.J. 2016. Orchestrating a powerful group. *Science* 352(6283): 378.
<http://science.sciencemag.org/content/352/6283/378>

⁵ <http://www.usask.ca/water/news-and-events/distinguished-lecture-series-.php>

health, safety and livelihoods. It is the importance of water and the complexity around its sustainable use and management that creates the need for well trained, motivated, professional water practitioners. In addition to provincial agencies and local communities, we work in close collaboration with Indigenous communities to address their source water-related issues. As indicated in Figure 1, our initial focus has been on local issues of global relevance (CERC programme and creating of GIWS), which has helped us to establish a strong research base. Subsequently, GIWS activities have been expanded to regional and global scale through programmes such as the Changing Cold Regions Network and Global Water Futures.

- **Attract and Retain Outstanding Faculty:** GIWS has thrived on attracting and retaining outstanding faculty by collaborating with academic units to identify gaps in existing research programs and exploring new opportunities of strategic relevance to UofS in the area of water security.

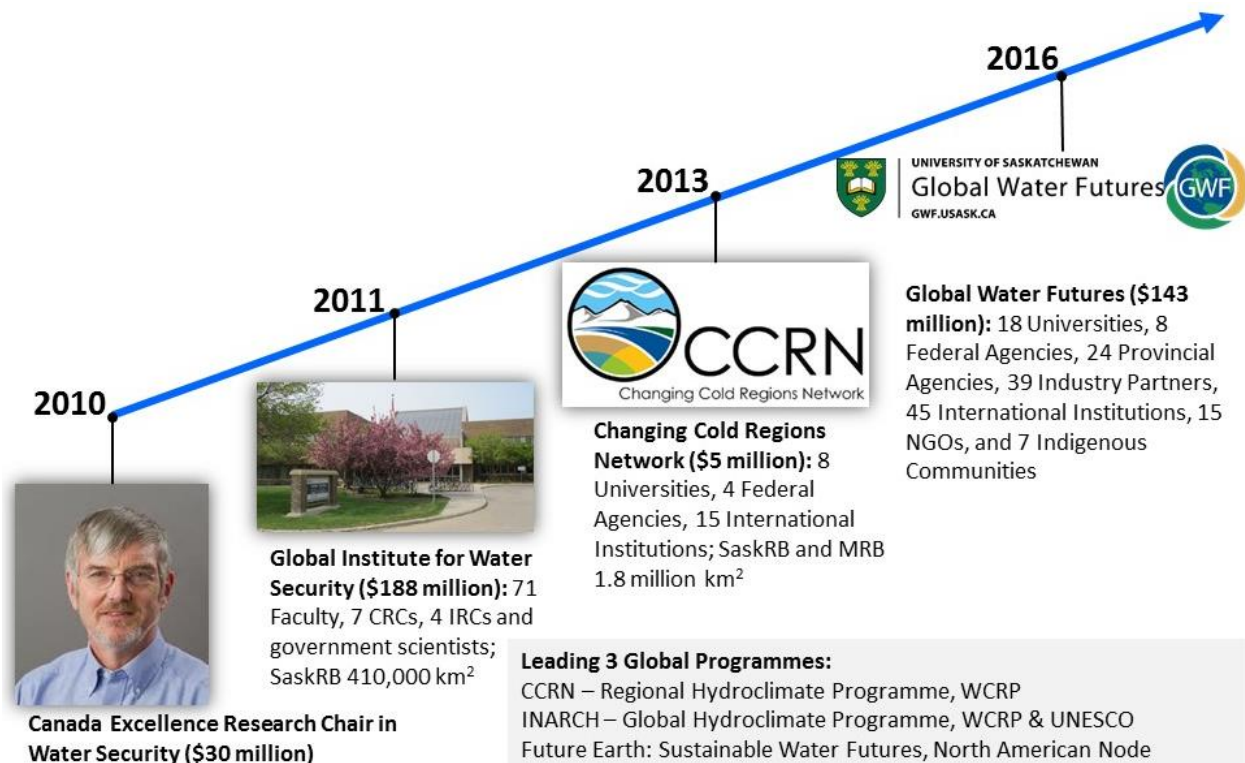



Figure 1: Timeline chart indicating the local and global emergence of the Global Institute for Water Security

1.2 Sustaining Collaboration - Governing Principles

The governing principles of the GIWS have been designed to foster a collaborative, non-competitive environment where all members, encompassing a broad range of perspectives and



disciplines, are encouraged to work in partnership toward a set of common goals. Funding made available or facilitated through the Institute is open to all members; the intention is that participation should be seen as a net benefit for the Institute and for each participant's home college or unit. Administrative support, technical and financial, is available to assist in the management of research. The existing governance structure was established with the sustainability and legacy of the GIWS in mind beyond the end of the CERC term.

1.3 Elements of Success

GIWS was created with the vision to attain research excellence at UofS and become one of the world's leading research-intensive institutions in the area of water security. After its first 6 years, GIWS has made remarkable progress, and is now delivering the exciting science that was foreseen at the programme outset (Figure 1). Some of the elements contributing towards our success are as follows:

- **International Leadership:** GIWS is the host of the World Climate Research Programme's (WCRP) only *Regional Hydroclimate Project* in North America – Changing Cold Regions Network (CCRN) and also hosts the WCRP's *Global Hydroclimate Project* & UNESCO's International Hydrological Programme - International Network for Alpine Research Catchment Hydrology (INARCH). In addition, GIWS is the Canadian node for the Sustainable Water Futures Programme with the Future Earth. The GIWS Director, Howard Wheater is currently an expert advisor to Chile in a dispute between Chile and Bolivia before the International Court of Justice. GIWS members also serve as advisory panel members for the Stockholm Water Prize and Prince Sultan Bin Abdulaziz International Prize for Water. Associate Director Jeff McDonnell is currently President of the American Geophysical Union's 7500-member Hydrology Section, the world's leading scientific hydrology organization.
- **National Leadership:** GIWS/CERC leads the \$5 million five year (2013-2018) NSERC's changing Cold Regions Network (8 universities, 4 Federal agencies) and has brought the water community in Canada together and leads the \$143.7 million seven year (2016-2023) Canada First Research Excellence Fund national water programme titled "Global Water Futures – Solutions for Water Threats in an Era of Global Change" (total 157 partners, including 8 Federal Government Agencies, 39 Provincial Government Agencies, 45 international institutions, 34 industries, and 388 researchers from 17 Canadian universities).
- **Institutional leadership:** With \$30 million CERC investment (2010-2017), CERC founded the GIWS, which integrates expertise of 211 members (including 7 Canada Research Chairs and 4 Industry Research Chairs) from 15 academic units at the UofS.
- **External Leveraged Funding:** In six years, an investment of \$30 million the GIWS has leveraged an additional \$158 million in external funding to advance water research and training of highly qualified personnel.

- **Training:** GIWS/CERC established a new professional Master of Water Security graduate programme and developed the NSERC CREATE in Water Security graduate programme.
- **Quality of Trainees:** Since inception in 2011, 48 GIWS trainees (53% of PDFs) have accepted faculty appointments or research positions in 18 countries; our students have won 3 Vanier scholarships, 23 Canada Graduate Scholarships and 19 Tri-agency Postgraduate Scholarships.
- **Knowledge Dissemination:** From 2011-2016, the GIWS team has published 1019 journal articles (3 Nature, 4 Science), and 57 books/book chapters, contributed 789 conference papers, and presented and delivered more than 412 invited, key-note and plenary lectures.
- **Exponential Growth:** In 2016, GIWS trained 223 graduate students (more than 500% increase since 2011), 61 postdoctoral fellows, research associates and research scientist (more than 300% increase since 2011), and 57 research technicians and research assistants.

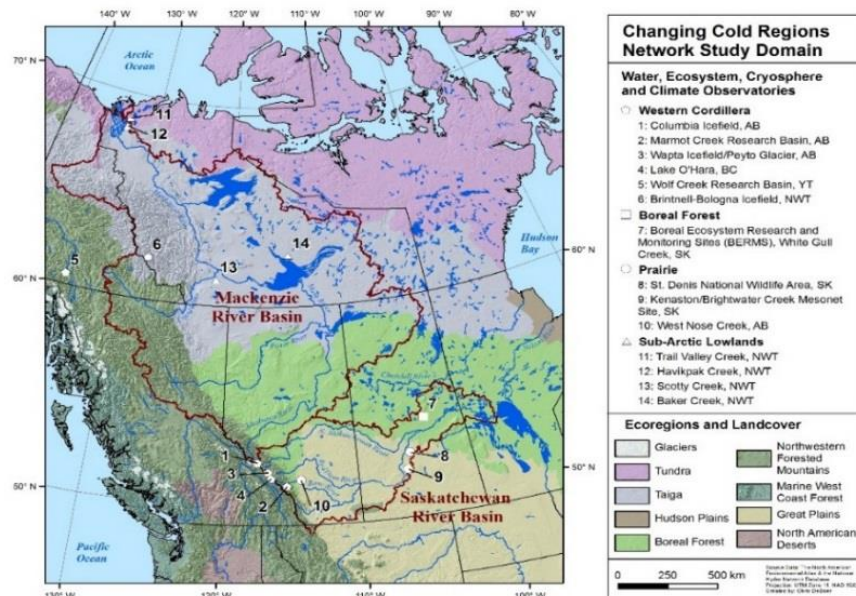
2. Leadership of Global Programmes

GIWS works to ensure that society has the understanding and the tools to sustainably manage and protect the world's water resources and ensure that Canada, and the world, has the research and expertise needed to understand our water systems in an era of rapid societal and environmental change. Particularly, it claims to be a global leader in Cold Region (CR) water science. We note that the world's cold regions provide water resources for 50% of the world's population, are sites of globally-important agricultural and natural resource production, feeding and fueling the world, and are a critically-important component of the Earth System. Canada's cold regions, as elsewhere, are also home to many First Nations communities who rely heavily on traditional livelihoods, and have made innovative partnerships with modern resource development.



Saskatchewan River Basin

Consequently, through support from the CERC and Canada Foundation for Innovation, GIWS has established the Saskatchewan River Basin (SaskRB; 406,000 km²) as a large scale observatory, which has come to be seen as an internationally-leading initiative. The multiple dimensions of water security and the accompanying science and management challenges, ranging from issues of water quality and quantity, anthropogenic activities, competing societal uses, industrialization, agricultural intensification, extreme weather events (flooding and drought), etc. are all represented in the SaskRB. The basin, with an area approximately half the size of France, spans Canada's three Prairie Provinces of Alberta, Saskatchewan and Manitoba and faces a climate characterized by extremes and rapid climate change. Further, the basin encompasses critical environments deemed significant both nationally and globally.



GIWS focus on interdisciplinary research on SaskRB has been complemented by the [Changing Cold Regions Network](#) (CCRN) project, with its focus on changing climate, cryosphere, hydrology and ecosystems and expansion to the Mackenzie River Basin (MRB; 1.8 million km²). The CCRN is led by Howard Wheeler, CERC in Water Security which brings together 42 Canadian co-Investigators, 4 Federal government agencies and 15 leading international researchers. CCRN is integrating existing and new experimental data with modelling and remote sensing products to understand, diagnose and predict changing land, water and climate, and their interactions and feedbacks, for this important region and also its effects on large-scale Earth system change and the region's major rivers - the Saskatchewan, Mackenzie and Peace-Athabasca.

The above field facilities build on the long history of observations and expertise available with the [Centre for Hydrology](#), which focuses on the advancement of the theory and practice of hydrology as a physical environmental science leading to improved prediction and management of water resources in Canada and around the world. The Centre has a long track record of innovation in observing systems; recent developments include new sonar-based snow sensors and



innovative application of Unmanned Aerial Vehicles (drones) for remotres sensing of hydrological and cryospheric systems.


2.1 Changing Cold Regions Network – A Regional Hydroclimate Programme, World Climate Research Programme

The Changing Cold Regions Network (CCRN) is one of the ten Regional Hydroclimate Programmes of the World Climate Research Programme's (WCRP) Global Energy and Water Exchanges (GEWEX) project – the only current one in North America.

CCRN is also supported by and linked to Climate and Cryosphere (CliC) projects, to the Canadian High Arctic Research Station (CHARS) programme and integrated within NASA's Soil Moisture Active Passive (SMAP), Airborne Microwave Observatory of Subcanopy and Subsurface (AirMOSS), and Arctic Boreal Vulnerability Experiment (ABOVE) arctic programmes. CCRN has an active research partnership with the US National Centers for Atmospheric Research (NCAR); currently discussions are underway concerning use of the basin as a focus for international model development and inter-comparison studies. In addition, SaskRB basin-scale water quality modelling is also under development. The SaskRB is a tributary of Lake Winnipeg, and the SaskRB project is assisting the work of the Canada-US International Joint Commission by developing a nutrient model for the Saskatchewan River, based on the U.S. Geological Survey SPARROW (SPAtially Referenced Regressions ON Watershed attributes) modelling platform, to provide the first basin-wide modelling capability with which nutrient management issues can be explored. In addition, as noted above, large-scale hydrological modelling is being addressed by development and implementation of Environment Canada's MESH modelling system for the Basin.

2.2 International Network for Alpine Research Catchment Hydrology – A Global Hydroclimate Programme, World Climate Research Programme and UNESCO

The International Network for Alpine Research Catchment Hydrology (INARCH) project is led by John Pomeroy, Canada Research Chair in Water Resources and Climate Change. INARCH is a Global Hydroclimate Programme (GHP) cross-cut project of WCRP's GEWEX and a recognized contribution to the world water security initiative of UNESCO's International Hydrological Programme. The overall objective of INARCH is to better understand alpine cold region hydrological processes, improve their prediction and find consistent measurement strategies. To achieve this objective it is necessary to develop transferable and validated model schemes of different complexity that can support research in data-sparse mountain headwaters where climate change impacts on water resources are anticipated to be very severe. INARCH has 25 intensely instrumented high-mountain research catchments in North and South America, Europe and Asia that form a vast outdoor intercomparison laboratory. By combining the expertise of over 40 principal collaborators from 17 countries, INARCH addresses important issues such as snow, glacier and permafrost hydrology;



representation of snow and ice in hydrological land surface models, model downscaling in complex terrain, and improving the prediction of climate change impacts in themountain headwaters that support water resources for half the world's population www.usask.ca/inarch. INARCH is publishing global mountain research catchment datasets in a special issue of *Earth System Science Data*:

http://www.earth-system-science-data.net/special_issues/schedule.html#9

2.3 Future Earth – Sustainable Water Future Programme

The Sustainable Water Future Programme (Water Future) is a global research programme established under Future Earth⁶ and aims to provide the knowledge and support to accelerate transformations to a 'more sustainable water world'. Recently, the GIWS has developed a memorandum of understanding to establish a collaborative Partnership, founded on the principles of collaboration and cooperation, to provide expertise and resources for undertaking coordinated and strategic research activities that will underpin the sustainable management and use of water in this time of significant global environmental change. The broad aim is to enhance the contribution of strategic scientific and technical research and innovation to the sustainable management of the hydrological cycle, including rivers, groundwater and wetlands. Consequently, the GIWS is now considered as the Canadian hub and a secretariat to support Canadian engagement with Water Futures in order to build links to the international community and Future Earth and publicise the activities and achievements of the program with a particular emphasis on global cold regions, and enhance the contribution of strategic scientific and technological research and innovation to the sustainable management of the hydrological cycle, including rivers, glaciers, snowpacks, rivers, groundwater, permafrost and wetlands.

3. Global Water Futures

The GIWS and UofS have been awarded \$77.8 million from the Canada First Research Excellence Fund (CFREF) to lead the "Global Water Futures: Solutions to Water Threats in an Era of Global Change" initiative—the largest university-led water research program ever funded worldwide. With additional partner funding, the total program budget is \$143.7 million over seven years.

⁶ <http://www.futureearth.org/>

The UofS-led water research network will involve more than 380 Canadian university researchers at 18 universities in a wide range of disciplines, 19 federal and provincial agencies, seven Indigenous communities and governments, 39 industrial collaborators, 15 non-governmental agencies, and 45 international research institutes. Researchers will also work with international organizations such as UNESCO, the World Climate Research Program and Future Earth, to develop the tools and models to mitigate water disasters, protect the environment and take advantage of economic opportunities.



Video File: GWF Funding Announcement
<http://www.usask.ca/water/publications/videos.php>


At least half the world's population is dependent upon water from 'cold regions' where snow, ice and frozen soils drive water availability and quality. Cold regions are severely affected by climate change and human activity, resulting in dramatic rates of warming, changing water availability and unsustainable water use. Canada and much of the world are ill prepared for this unprecedented shift, which has already resulted in intensified floods and droughts, reduced water availability, degraded water quality and loss of ecosystem services, costing billions in economic loss and impacting the health of populations. Addressing how to protect communities and society against these intensifying water threats and consequent health and socioeconomic risks in the face of climate uncertainty and human-induced global changes is one of the world's grand challenges.

Our response, through GWF, will transform the way communities, government, and industry prepare for and manage water-related risks in an era of unprecedented change.

GWF's overarching goal is to deliver risk management solutions—informed by leading-edge water science and supported by innovative decision-making tools—to manage water futures in Canada and other cold regions where global warming is changing landscapes, ecosystems, and the water environment.

End-user needs will be our beacon and will drive strategy and shape our science as we focus on three main goals:

- **Deliver new capability for providing disaster warning** to governments, communities and the public, including Canada's first national flood forecasting and seasonal flow forecasting systems, new drought warning capability, and water quality models and monitoring that warn of hazards to health and drinking water supply;

- 
- **Diagnose and predict water futures** to deliver improved scenario forecasting of changing climate, landscape and water for the future, with information outputs tailored to the needs of users. This will enable us, for example, to assess risks to human health from changing flood, drought and water quality; and
 - **Develop new models, tools and approaches to manage water-related risks** to multiple sectors, integrating natural sciences, engineering, social and health sciences to deliver transformative decision-making tools for evidence-based responses to the world's changing cold regions. New models will define changing risk from floods and drought, and allow end-users to plan sustainable infrastructure investment to manage future risk.

Canada and the world have record shrinking glaciers, melting permafrost, reduced snow cover, increased floods and droughts, and degraded water quality at the same time as our demands on water are increasing. With the GWF programme, we can address these problems. Supported by new sensors, drones, nano-satellites, instrumented watersheds, computer models, and unprecedented data, we will better understand and forecast water disasters, supply and quality. Through better prediction, we will reduce the damages from extreme weather events, like floods, droughts and wildfires. And we will unravel the social, health, environmental, political and economic implications of changes to our water.

Further information is accessible at: <http://www.globalwaterfutures.ca>

4. Research Themes

The area of water security research is broad. To guide our efforts, and based on our current research strengths, we have identified a set of seven inter-disciplinary research themes, recognizing the need for deep disciplinary knowledge and the broader disciplinary dimensions of water security, and addressing challenges of local, regional and global significance.

These themes are supported by fully instrumented research observatories within SaskRB providing data of regional and global significance. Due to the importance of, and diversity in, its cold region hydro-climate and ecological zones, the rapid rate of environmental change and the need for improved understanding, diagnosis and modelling of change, the basin also raises numerous globally-relevant science challenges.

Themes 1 to 3 were initiated with funding through the CERC grant to Dr. Wheeler. As GIWS has matured, Themes 4 to 7 have been developed to address broader inter-disciplinary issues that focus additional U of S expertise and address other local and global priorities.

4.1 Theme 1 - Climate Change and Water Security: Developing sophisticated understanding and modelling of current and future effects of climate change on hydrology, ecology and water resource systems, and the associated land-atmosphere feedbacks.



Video File: Forecasting Extreme Weather Events
<http://www.usask.ca/water/publications/videos.php>

4.2 Theme 2 - Land-water Management and Environmental Change: Exploring the effects of agricultural and urban land and water management on water quality and water movement through a watershed, as well as the potential for agricultural beneficial management practices (BMPs) to mitigate adverse effects.

4.3 Theme 3 - Sustainable Development of Natural Resources: Developing new science and management practices that could significantly change the way water is used, how land and water are reclaimed, and how environmental risks are assessed and managed in natural resources development.

4.4 Theme 4 - Socio-hydrology: This program encompasses both the human drivers of hydrological change and the social processes through which hydrological science is translated and communicated to relevant decision-makers.



Video File: Socio-Hydrology

4.5 Theme 5 - Water and Health: We are looking at issues that are critical to society, such as drinking water quality, water hygiene and sanitation, transmission of waterborne and water-related diseases in an ecosystem, aquatic pollution and effects on the food chain, wastewater re-use, extreme events such as flooding and drought, and health-based water quality standards.

4.6 Theme 6 - Water and Wastewater Treatment Technologies: We are assessing impacts of contaminants on environmental and human health by addressing challenges that include appropriate technology for rural communities, development of advanced water treatment technologies to tackle emerging contaminants in our water systems, improved technologies for

the treatment of industrial wastes, including those generated by natural resource extraction, and improved technologies for remediation of pollution.

4.7 Theme 7 - Groundwater and Hydrogeology: This theme is exploring major challenges to quantify the extent of groundwater resources and their quality, the natural recharge, the long-term impacts of abstractions and waste disposals, the impact of resource development, and hence to provide the information needed for sustainable development.

5. Large-Scale Observatories

The research sites within SaskRB and MRB provides the basis for the development of improved process understanding and fine-scale models, and the application of those models in the analysis and prediction of environmental change at local scales. They also provide an important resource for the development and testing of improved large-scale models, which are needed for weather and climate models and for large basin-scale hydrological, water resource and water quality modelling for decision support.

5.1 Western Cordillera: In Western Canada the availability of water is dependent upon cold water processes involving snow, glaciers, wetlands and frozen soils that control the storage and delivery of water to river systems. The Western Cordillera includes the southern cordillera headwaters exemplified by the Canada Foundation for Innovation (CFI) - funded Canadian Rockies Hydrological Observatory (including Marmot Creek) in the sub-alpine and mountain forested Saskatchewan River headwaters, Lake O'Hara alpine sites and the Natural Resources Canada (NRCan) -funded Columbia Icefield Glacier-Climote Observing System in the glaciated Athabasca headwaters, Alberta. This provides a cluster of >25 high elevation snow/ice and hydro-meteorological stations in nested gauged catchments. In addition, the NRCan-funded Brintnell-Bologna Icefield, NoSubrth West Territories and the Yukon Environment-supported Wolf Creek Research Basin, Yukon, exemplify glaciated and nonglaciated sub-arctic northern cordillera headwaters of the Mackenzie River. Unique observations of alpine and sub-alpine sub-surface storage and release are available from Lake O'Hara and Marmot Creek. Alpine treelines in this area are advancing in elevation where geomorphology and microclimate permit. Provincial, territorial and federal observation stations for flood forecasting, climate and fire prediction are clustered at both high and low elevations in the region. The archive for Marmot Creek covers most of 50 years and for



Video File: Canadian Rockies Hydrological Observatory
<http://www.usask.ca/water/publications/videos.php>

Wolf Creek covers 20 years. Sibbald Wetlands is the focus of hydro-ecological research into Rocky Mountain wetlands and the effects of current and legacy beaver activity⁷.

5.2 Sub-arctic Lowlands: Key study sites are located at the northern (Trail Valley and Havikpak Creeks) and southern (Scotty Creek) margins of the Taiga Plains ecoregion along the Mackenzie Valley. In addition, between these end-member sites we have a network of 204 representative permanent sample plots (PSPs), each with historical and contemporary data on vegetation (ground and canopy), soil properties and active layer thickness. These existing observatories, along with Wolf Creek (Western Cordillera), are ideally suited for the study of permafrost thaw-induced changes to ecosystems and the resulting impacts on surface-atmosphere interactions and hydrology, as they cover a wide latitudinal and altitudinal range and therefore a wide range of permafrost ecosystem characteristics, from discontinuous permafrost characterised by a forest wetland mosaic to continuous permafrost overlain by forest, grading into tundra. In addition, these sites are located in areas where permafrost is very sensitive to change.

5.3 Boreal Forest: Key short-term objectives of research conducted at Boreal Forest sites are to assess the vulnerability of ecosystem response to climate variability and change, and the performance of land surface schemes for simulating hydrological processes in the Boreal Forest. Longer-term objectives are to synthesize, integrate and upscale hydro-ecological understanding of stand-scale processes to watershed scales. The western boreal forest study area traverses the latitudinal and altitudinal extents of boreal forests in Canada and the range of permafrost conditions across which these forests exist (nonpermafrost through to deep, continuous permafrost). Western permafrost-free boreal sites include the Boreal Ecosystem Research and Monitoring Sites (BERMS) in Saskatchewan that derive from the mid-1990s NASA-Canada Boreal Ecosystem-Atmosphere Study (BOREAS) and were subsequently expanded to the Environment Canada (EC) BERMS Programme. These sites in the Boreal Plains ecozone are characterized by heterogeneous forest types interspersed with wetlands and frequent wildfire disturbance, and include Black Spruce, Aspen, Jack Pine and Fir. Additional data sources in this region include Northern Alberta flux tower sites, developed in collaboration with the Oil Sands industry, as well as provincial and federal observation stations for climate and fire prediction.



Video File: Boreal Forest

<http://www.usask.ca/water/publications/videos.php>

⁷ Janzen and Westbrook. 2011. Hyporheic flows along a channeled peatland: influence of beaver dams. Canadian Water Resources Journal, 36(4): 331-347.

5.4 Prairies: The prairie hydrology is complex and presents a unique set of challenges including the effects of changing climate on agriculture, flood and drought risk, and water quality. In addition, land management practices, such as drainage and wetland removal, are changing the landscape and the ecological services that it provides.

The St. Denis National Wildlife Area site comprises of internally drained wetlands, cultivated fields and pasture, and consists of numerous prairie pothole lakes of varying salinity. The focus is on runoff processes and pothole lake connectivity, surface-subsurface interactions and salinity dynamics. The Brightwater Creek, near Kenaston, Saskatchewan, represents mesonet site of lowland level pasture and cultivated grasslands. A multi-scale scale monitoring of spatial soil moisture, groundwater and land-atmosphere interactions is ongoing. Specialised soil moisture measurement arrays, cosmic ray soil moisture probes, a geological weighing lysimeter coupled to a network of groundwater observation wells, atmospheric measurements using large aperture scintillometer and Sonic Detection and Ranging (SODAR) and weather radar provide a unique concentration of measurements in a Canadian prairie environment. Hydrological connectivity and the effects of agricultural drainage on flows and water quality is the research focus at Smith Creek, Saskatchewan. The site has demonstrated the dramatic effects of inter-annual climate variability on water quality, and a complex response of flood generation and transmission to agricultural drainage⁸. The effects of agricultural Beneficial Management Practices (BMPs) on flows and water quality, particularly those associated with changing tillage practices and on-farm reservoirs, are explored at Tobacco Creek, Manitoba. The Swift Current research site in Saskatchewan is home to AAFC agricultural research runoff plots. Thorough analysis of high frequency, long-term data, experimental monitoring of the surface hydrology and hydrological model building and testing are conducted at this site to improve understanding of the fundamental drivers of threshold-like hydrological runoff responses to snowmelt and rainfall events in a semi-arid, prairie landscape. Similarly, at semi-arid West Nose Creek site in Alberta, the studies are focused on groundwater recharge, groundwater hydraulics, surface- groundwater interaction, snow hydrology, and sustainable watershed management. At the Rosthern research site in Saskatchewan, the effect of agricultural practices such as stubble height on prairie snow dynamics, melting, and management is studied.



Video File: St. Denis National Wildlife Area



Video File: Brightwater Creek

⁸ Shook and Pomeroy. 2011. Memory effects of depressional storage in Northern Prairie hydrology. *Hydrological Processes*, 26: 1752-1766



Video File: Swift Current Research Site



Video File: Rosethern Research Site – Prairie Hydrology

<http://www.usask.ca/water/publications/videos.php>

Research to explore water quality issues in the basin spans the study of the winter biogeochemistry of lakes to the monitoring of pharmaceutical products and heavy metals in urban wastewater and storm water. The first major study of pollutant loads and their ecological impacts for the South Saskatchewan River, Lake Diefenbaker and its tributary, Swift Current Creek, is underway. This project brings together researchers from the U of S (Biology, Toxicology, Geography, Civil and Geological Engineering, the Schools of Environmental and Sustainability and Public Health), EC and the SWSA. Lake Diefenbaker is more than 200 kilometers long and plays a major role in economic and social development of a large proportion of the province. However, the capability of the reservoir to continue to provide water of reasonable quality under rapid economic development and under a changing climate is unknown given nutrient loads and increasing evidence of eutrophication. A comprehensive evaluation of the sensitivity of the reservoir to current and future nutrient inputs includes limnology, paleo-limnology, toxicology and hydrodynamic water quality modelling. A similar study has been initiated for Buffalo Pound Lake, including real-time water quality monitoring to support treatment of this major source of drinking water for the cities of Regina and Moosejaw, Saskatchewan.



Video File: Lake Diefenbaker



Video File: Buffalo Pound



Video File: Lake Diefenbaker – Toxicology & Water Quality



Video File: Swift Current Creek – Urban Municipal Drainage



Video File: Sediment and Nutrient Transport Modelling
<http://www.usask.ca/water/publications/videos.php>

5.5 River Deltas: The Saskatchewan River, Peace-Athabasca, and Slave River deltas are biologically diverse and complex systems of rivers, lakes, and wetlands and are part of the [Delta Dialogue Network](#) (DDN). These deltas support a range of fish, wildlife, bird, and plant species. The ecological changes in these deltas are often an indicator of issues arising in our river systems; if there are problems, people in the delta are often the first to notice. These deltas continue to play an important role in supporting traditional, subsistence, and cultural activities of the Aboriginal peoples who have occupied these regions since time immemorial. Historically, inland deltas were also a central part of the fur trade industry⁹.

Located near the Saskatchewan/ Manitoba border, the Saskatchewan River Delta, is a complex series of abandoned and active river channels, lakes and wetlands. Home to Cumberland Marshes which has been designated as an Important Bird Area, this region experiences the accumulated effects of upstream water use, including abstractions and power generation. Since the beginning of the last century, annual discharge has been reduced by approximately 30%. In addition, winter base-flow is now higher and spring freshets have been dampened due to capture and storage in the Experts in climate, hydrology, ecology and social science are addressing the cumulative repercussions of these changes in flow for the production of fish, water-birds and mammals, and

⁹ <http://www.usask.ca/research-groups/ddn/index.php>

for the activities and livelihoods of local communities. The aim of this research is to develop scenarios and an operational plan to provide for sustainable power output without endangering the Delta habitat in the long-term.



**Video File: E.B. Campbell Dam –
Saskatchewan River Delta**



Video File: Delta Dialogue Network

<http://www.usask.ca/water/publications/videos.php>

Working with local communities and the Slave River and Delta Partnership (SRDP), the [Slave Watershed Environmental Effects Program](#) (SWEEP) is establishing a community-based monitoring program. This program will empower communities to assess impacts to water quantity and quality in the Slave River Delta, monitor future changes, and collect information that can inform management decisions. A system of environmental indicators that incorporate both western science and Traditional Knowledge will address key community priorities, including water quality, hydrology and sediment load, air and climate, vegetation, and health of wildlife, fish, and insect populations.

One of the primary concerns in the Peace-Athabasca and Slave River deltas is understanding what factors are contributing to the changes in the delta that people are seeing. A decreasing number of annual floods and lower water levels are especially important, given their ecological and social role in the region. In response to this concern, we are working to understand how water flow is changing in the Peace-Athabasca-Slave catchment area. By [modelling both natural and regulated river flow scenarios](#), this project will provide insight into what the influence of climate change and the Bennett Dam have been on water flow in the area. In addition, another component of this project will examine whether or not there will be severe enough ice jams to flood the Slave River Delta and maintain delta ecology. It will also look at what changes in vegetation have occurred in the delta.



Video File: Modelling Riverine Processes

<http://www.usask.ca/water/publications/videos.php>

6. Major Training Programmes

The GIWS and UofS has a rich history of preparing trainees for 21st century challenges in the public and private sectors. GIWS through its research and training programmes is creating national and international capacity to provide the expertise needed for Canada and the world to sustainably manage water futures. Building on new graduate programme in water security launched in 2016 and taking advantage of recent UofS investments (\$50M) in three relevant graduate schools (Public Policy, Public Health, and Environment and Sustainability), GIWS will use both place-based and on-line delivery to offer professional and research-based training and specialized international courses in cold regions water science. By expanding our Master of Water Security graduate program, we will prepare new graduates to tackle complex and multidisciplinary water problems. In addition, the UofS *CREATE Training Program in Water Security* exemplify water research collaborations among its partner universities and users. These collaborations integrate science, engineering, and policy analysis and provide internships, exchanges, and specialized training courses.



Video File: GIWS Training Opportunities
<http://www.usask.ca/water/publications/videos.php>

6.1 Professional Development and Career Advancement

GIWS strongly believes in professional development of graduate students and postdoctoral fellows, particularly international scholars. In order to achieve this objective, GIWS offers a short course on "The Future Professoriate," to shed light on and facilitate discussions regarding the workings of academia for graduate students and postdoctoral fellows interested in pursuing academic careers. In addition, we advise our student and postdoctoral fellows in "creating a

research brand” of their own ambitions and for a successful and satisfying research career^{10, 11, 12, 13}.

In addition, GIWS hosts a yearly Distinguished Lecture Series entitled “Breakthroughs in Water Security Research,”¹⁴ which brings 10 world-leading scientists to GIWS for lectures, tutorials and workshops in the areas of soil physics, instrumentation, lab experiments, uncertainty estimation, hydro-ecological modeling, watershed observatory networks, instream flow modeling, engineering hydrology, aquatic ecosystem science, isotope hydrology and socio-hydrology. This lecture series provides students, postdoctoral fellows, faculty, staff and the broader community with an opportunity to understand breakthroughs in various areas of water security from a global perspective and to network with international leaders. Each lecture is streamed live online and archived for subsequent access for the benefit of off-campus Canadian and international participants which further expands the reach of the lecture series.

6.2 Graduate Program in Water Security

In 2016, GIWS implemented an innovative Master of Water Security (MWS) graduate program that builds both disciplinary expertise and awareness of and capability for interdisciplinary work. MWS is a cross-disciplinary, course-based, professional-style program that can be completed within one year of full-time study that will provide an unprecedented depth and breadth of training for industry, government and research. Students enrolled in this program will not only take courses for credit but also has to attend a mandatory Field Camp in the weeks before the start of the fall term. This program is intended to provide prospective or current environmental practitioners a post-graduate learning opportunity in water security. Graduates are ready to become water scientists, managers and policy-makers with the necessary expertise needed to tackle the complex and multidisciplinary water problems facing us now, and in the future. Applications from outstanding students are welcomed.

6.3 NSERC CREATE Program for Water Security

In order to address pressing global water security challenges such as flooding, drought, and reduced water quality, the *CREATE for Water Security* program was funded by the Natural Science and Engineering Research Council (NSERC) of Canada in 2015 to support graduate education and training.

This grant, led by Dr. Cherie Westbrook, brings together top water security researchers from the University of Saskatchewan, University of Waterloo, McMaster University, University of Manitoba, and University of Calgary, with federal and provincial government partners (Manitoba,

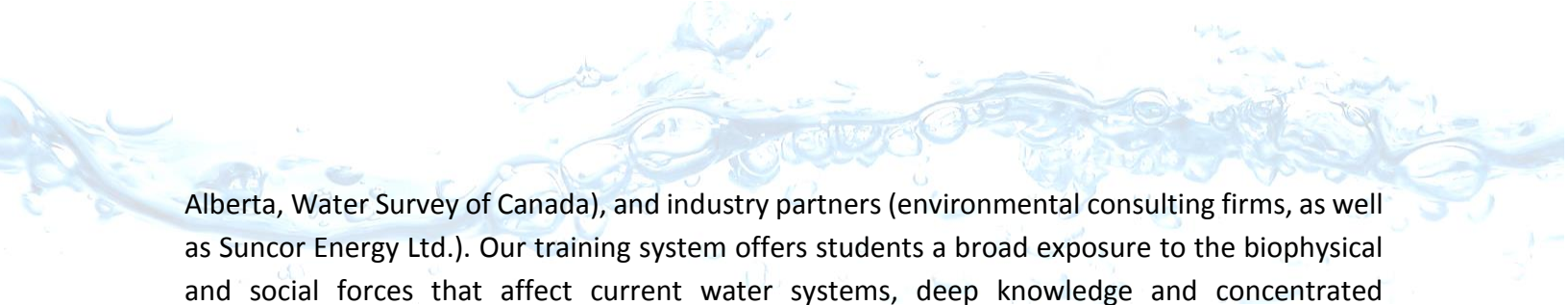
¹⁰ McDonnell. 2015. Creating a research brand. *Science* 349(6249):758, doi: 10.1126/science.349.6249.758

¹¹ McDonnell. 2016. Orchestrating a powerful group. *Science* 352(6283), doi: 10.1126/science.352.6283.378

¹² McDonnell. 2016. The 1-hour workday. *Science* 353(6300):718, doi: 10.1126/science.353.6300.718

¹³ McDonnell. 2017. Paper writing gone Hollywood. *Science* 355(6320):102, doi: 10.1126/science.355.6320.102

¹⁴ <http://www.usask.ca/water/lecture-series.php>



Alberta, Water Survey of Canada), and industry partners (environmental consulting firms, as well as Suncor Energy Ltd.). Our training system offers students a broad exposure to the biophysical and social forces that affect current water systems, deep knowledge and concentrated capabilities in an aspect of water security, and the personal and professional skills needed to put this understanding to work.

The *NSERC CREATE for Water Security* program operates on a scholar-practitioner model wherein there is a common platform and customizable pieces designed to facilitate the transition of graduate students to their desired research or practitioner career in water security. The platform consists of two required courses geared toward enhancing student fluency across the research areas that make up the field of water security. The customizable opportunities include workshops in which to develop professional skills, short-courses to familiarize students with cutting edge technologies and ideas, lab exchanges to expand a student's technological fluency, and internship opportunities with our partners to give students experience applying their skills in practice. In addition, the CREATE program is designed to enhance networking opportunities between students in different disciplines/departments/ universities, as well as networking with our industry and government partners.

The first year and half of the CREATE program has been very successful. There are currently 21 Master's students, 13 PhD students and 3 postdoctoral fellows in the program. This group of talented trainees came together in October 2016 with researchers, industry, and government partners in our inaugural workshop *Scaling Science to Practice*, for two days of professional development, discussions, and networking. This provided second year students a chance to share their research goals and findings with a diverse mix of practitioners, faculty, and the incoming cohort of students, and provided a framework for discussions and questions. Key skill sets and traits of the future water security practitioner were also discussed, as well as what the critical water security challenges are facing western Canada. The workshop had a great atmosphere that led to considerable knowledge sharing and networking for everyone involved.

It is anticipated that *CREATE* will train more students than initially proposed, and will continue to recruit excellent graduate students through the duration of the grant.

For more information, please visit the NSERC CREATE for Water Security website: <https://research-groups.usask.ca/createwater/>

7. Performance Indicators

GIWS was created with the vision to attain research excellence at U of S and become one of the world- leading research-intensive institutions in the area of water security. Persistent and intensive efforts have been invested to recruit members, recruit and retain HQP, develop internationally-recognized research facilities with cutting-edge instrumentation, find a niche in research, take on national and international science leadership roles, attract substantial additional research funding, develop leading training programs, gain recognition of research outcomes through peer reviewed publications, secure national and international awards and honours, and establish collaboration with industry, government and non-government organizations. Since inception, GIWS has made remarkable progress in each of these areas, and is now delivering the exciting science that was foreseen at the programme outset.

7.1 Membership: A key aim of GIWS is to develop the new science and new trans-disciplinary science integration that is needed to address the major challenges to water security faced locally, regionally and globally. GIWS now integrates expertise from 254 members (72 Members, 43 Associate Members, 3 Affiliate Members, and 136 Student Members) from 15 academic units across the U of S, and has formed strong and mutually supportive working partnerships with Federal and Provincial agencies, in particular Environment and Climate Change Canada (ECCC) and the Saskatchewan Water Security Agency (SWSA) (Appendix A).

7.2 Support Staff: GIWS has grown under a policy of developing a lean and efficient administration, and only making new staff appointments when absolutely necessary. However the number of researchers and the level of research funding and facilities to be managed are large, and financial accounting requirements are quite onerous. Therefore, GIWS currently has a Director, an Associate Director, an Assistant Director, an Executive Assistant, a Financial Officer, a Communication Specialist (0.5FTE), a Communications Coordinator (0.25 FTE), a Clerical Assistant, and a Data Manager (Appendix B).

7.3 Highly Qualified Personnel: During 2015-16, GIWS has financially supported 57 graduate students (30 PhD and 27 Masters), 30 postdoctoral fellows, 39 research assistants, 13 research associates and scientists, and 11 visiting scholars (Appendix B). In addition, its members have supported 166 graduate students (62 PhD and 104 Masters), 25 postdoctoral fellows and research associates, 6 research scientists, 31 Research Assistants, Research Engineers and Summer Students, and 11 visiting scholars (Appendix C).

7.4 Research Funding: To support our research and training endeavours, financial resources are critical. Healthy financial resources help attract and retain the 'best-of-the-best' from around the world, and help develop cutting edge research facilities. Therefore, another of the institute's main objectives has been the pursuit of research funding to leverage the base CERC funding of \$30 million over seven years. In 2015-16, GIWS faculty members have secured a total of \$90 million (93% from federal sources and 2% each from the provincial, industry and international sources, respectively) (Appendix D). Since March 2011, GIWS membership has secured a total

funding of \$158 million (including the CFREF \$77.8 million) on top of the original \$30 million CERC investment (GIWS grant total is \$188 million over 6 years).

7.5 Research Publications: In 2015-16, GIWS members have published 304 journal articles, including papers in Science and Nature, published and presented 235 papers in proceedings and at conferences, delivered 151 plenary, key note and invited lectures, and published 14 book chapters and books. Since 2011, GIWS members have published a total of 1019 journal articles and 57 books/book chapters, participated in 789 conference proceedings and presentations and delivered more than 412 invited, key-note and plenary lectures to share research outcomes and enlighten our stakeholders and scientific community (Appendix E).

7.6 Awards and Honours: One of the measurable parameters for research and training excellence is the number of awards and honours received by GIWS members and students. Again in 2015-16, we have achieved significant success in this area and are targeting to promote and support our members and students in pursuing strategic awards and honours in near future. It is a pleasure to recognize that Jeff McDonnell, GIWS Associate Director, was awarded the 2016 IAHS Dooce Medal and appointed Fellow of the Royal Society of Canada. It is noteworthy that GIWS members sit on the advisory panels for the world's two leading water prizes (Stockholm Water Prize and Prince Sultan Bin Abdulaziz International Prize for Water), have four fellows of the Royal Society of Canada, three fellows of the American Geophysical Union (only 0.01% recognized as fellows), and that Jeff McDonnell is currently president of the American Geophysical Union's 7500-member Hydrology Section, the world's leading scientific hydrology organization.

Tim Jardine, Assistant Professor, School of Environment and Sustainability was awarded the GIWS Research Excellence Award for 2016 in recognition of his outstanding excellence in water security research as acknowledged by his peers based on his international stature, impact of research, training of highly qualified personnel, and research productivity. Particularly, Tim's contribution to science, the University and society (to northern communities and the Saskatchewan River Delta) more generally has been noteworthy.



Tim Jardine receiving the GIWS Research Excellence Award 2016



Some notable member achievements include:

Baulch, Helen

- Appointed to University of Saskatchewan Centennial Enhancement Chair in Aquatic Ecosystem Biogeochemistry

Elshorbagy, Amin

- Benjamin Meaker Visiting Professor Fellowship, University of Bristol, Bristol, UK
- Visiting Professor at the University of Bologna, Bologna, Italy
- Visiting Professor at the University of New South Wales, Sydney, Australia

Ferguson, Grant

- Chair, International Association of Hydrogeologists Groundwater and Energy Commission
- President, International Association of Hydrogeologists - Canadian National Chapter

Giesy, John

- Distinguished Researcher Award from the University of Saskatchewan, 2016

Hendry, Jim

- Honorary Visiting professor in the National Center for Groundwater, Research and Training – School of the Environment, Faculty Science and Engineering, Flinders University, Adelaide, January – February, 2016.
- Visiting Research Scientist GNS Science. Lower Hut, New Zealand, February 2016.
- Visiting professor University of Texas at San Antonio, Texas, November-December 2015.

Mantyka-Pringle, Chrystal

- Thomson Reuters Citation and Innovation Awards (http://ip-science.thomsonreuters.com.au/m/pdf/PROFILE_CITATION_AWARDEES.pdf)

McDonnell, Jeffrey

- International Hydrology Prize (Dooge Medal), International Association of Hydrological Sciences/UNESCO/World Meteorological Organization (presented in Paris, June 2016)
- J.W. George Ivany Internationalization Award, University of Saskatchewan (Presented at Fall Convocation)
- Fellow, Royal Society of Canada (Elected to Canada's National Academy of Science), Presented in November 2015 in Victoria (in absentia)
- Boussinesq Lecture, The Boussinesq Society, Amsterdam, The Netherlands (Presented in October 2015 in Amsterdam)
- Chaired the AGU Fellows selection committee and the Ad Hoc Committee on Re-thinking the AGU Fall Meeting
- President-Elect Hydrology Section of the American Geophysical Union



Pickering, Ingrid

- Chair, Proposal Review Panel (PRP), Molecular Environmental and Interface Science (MEIS) subpanel, Stanford Synchrotron Radiation Lightsource (SSRL), Menlo Park, California, USA.
- Board of Directors, Canada Foundation for Innovation (CFI), July 2013-June 2019.
- Brookhaven National Laboratory Science Advisory Committee Member, NSLS-II, May 2013-present. Advises on scientific utilization and developments of the National Synchrotron Light Source II (NSLS-II), and previously Photon Sciences incorporating NSLS and NSLS-II.
- Organizing Committee Member, International Conference on X-Ray Microscopy (XRM2018), to be held summer 2018 in Saskatoon, SK.

Pomeroy, John

- Bert Tanner Award – American Meteorological Society student presentation (Harder 2016)
- Robert Falside Stoddart Memorial Scholarship (Aksamit 2016)
- DCMIP Summer School on Future-Generation Non-Hydrostatic Weather and Climate Models (Rasouli 2016)
- Cryosphere Innovation Award - AGU (Harder 2015; Aksamit 2015)
- W. Garfield Weston Award for Northern Research (Anderson 2015)
- Northern Studies Training Program (Anderson 2015)

Wheater, Howard

- Co-Chair UNESCO's GWADI arid zone water program
- Adviser to the State of Nevada, USA concerning a proposed nuclear waste repository at Yucca Mountain
- International Court of Justice 70th Anniversary Celebration, The Hague, Netherlands (April 2016)
- Plenary Address – International Congress on Modelling and Simulation, Broadbeach, Queensland (December 2015)
- Globe 2016, Vancouver, British Columbia (March 2016)
- 2016 Orlob Symposium, UC Davis, California (June 2016)
- 2016 Schultz Oration, Flinders University, Adelaide, Australia (June 2016)

5.7 Research Chairs and Faculty: During the past 6 years, UofS has appointed 23 new faculty members in water science. Today GIWS integrates the efforts of 151 faculty members at UofS. Our faculty includes one Canada Excellence Research Chair, nine Canada Research Chairs (CRC), four Industrial Research Chairs (IRC), and six endowed Chairs. Over last 6 years, water area at UofS has seen an increase of 23% in new faculty appointments, 300% in IRC appointments, 29% in CRC appointments, plus the addition of the CERC in water security.


8. Collaborations and Outreach

One of the primary objectives of the GIWS is to stimulate, reinforce and enhance collaborative, interdisciplinary research opportunities across the campus community and with external stakeholders. These include research partnerships with internal and external stakeholders, provision of expert advice to stakeholders, and engagement with the community at local, national and international levels regarding the GIWS research programme, and challenges to be addressed by research conducted here. Since inception of GIWS in March 2011, we have made significant strides and established meaningful collaborations with 157 partners as outlined in the following chart:



In June 2016, GIWS hosted its annual two-day workshop bringing together researchers, postdoctoral fellows, students and research staff from the UofS, Environment and Climate Change Canada (ECCC), the Saskatchewan Water Security Agency (SWSA) and Agriculture and Agri-Food Canada (AAFC) working on water-related projects. The workshop provides the opportunity for research teams to present their findings and to discuss opportunities for interdisciplinary collaborative research.

Over the course of the reporting period collaboration with external partners was also enhanced through visits by international researchers to GIWS to explore potential collaborative research opportunities. Most notably, in autumn 2015 the second GIWS Distinguished Lecture Series in Water Security was held. Between September and November, ten distinguished lecturers from a broad range of disciplines visited the UofS to give a lecture, participate in a graduate course in water security and meet with potential collaborative research partners. Each lecture was streamed live and has subsequently been made available on the GIWS website spawning global interest in the outputs of this lecture series.



Effective communications remains a key component of GIWS collaboration and outreach as guided by three overarching communications goals to: 1) raise local, national and international profile by communicating the work and achievements of the GIWS, 2) cultivate and strengthen the sense of community amongst UofS and affiliated agency water researchers, and 3) raise profile for the institute internally on the UofS campus to strengthen member and potential-member participation and commitment to GIWS goals and mandate. Within this reporting period, media interactions and published stories of GIWS members numbered 85 (this number includes on campus publications). A few highlights of communications activities include:

- Continued circulation of a weekly online newsletter, *GIWS This Week*, to keep the GIWS membership base well informed of water-related activities/ opportunities. We continue to receive lots of positive feedback about this communications tool;
- Publication of two issues of *Water News* newsletter;
- Continuation of Distinguished Lecture Series in Water Security in Fall 2015 which saw nine international experts in water security research visit GIWS, give seminars and meet with faculty and students;
- In March, GIWS and the Canadian Water Resources Association celebrated World Water Day with an event showcasing water research at the U of S. Events began with the Water Leaders Lecture Series and presentation of the GIWS excellence award winners. The day finished with a student and postdoctoral fellow poster competition;
- Internally, GIWS and/or its researchers were featured in seven *On Campus News* stories;
- GIWS members convened 76 sessions and poster presentations at the AGU Fall Meeting in December 2016.

A new communications and teaching method undertaken during this reporting period has been the development of a video suite featuring some of the work of the Institute, focused mainly on the experimental sites in the Saskatchewan River Basin and our modelling efforts¹⁵.

Additional outreach activities by our members have been listed in Appendix F.

7. Student Corner

The GIWS Student Outreach Committee (SOC) had an active year hosting and participating in many academic and social events during 2015/2016. These events encouraged the building of teams, mingling of people, passage of knowledge and having just plain fun. Through active participation, members gained new friends, ideas, and an appreciation for teamwork.

¹⁵ <http://www.usask.ca/water/publications/videos.php>



GIWS Student Body in the foyer of the National Hydrology Research Centre

7.1 Dragon Boat Festival: In July 2016, the GIWS students and members gave it their all in the 2016 FMG Saskatoon Dragon Boat Festival. This festival provided a fun way to raise money for both “The Children’s Wish Foundation of Canada” and the “Ronald McDonald House Charities Saskatchewan”, where teams of 25 people competed in Dragon Boat races. The GIWS team, “Team GeeWiz”, raised over \$1000 through personal fundraising, a GIWS Bake Sale, and even a “Dunk Your Supervisor” day. On event day, Team GeeWiz had a slow start, but they were able to regroup. By the last race of the day, the GIWS team had honed their skills and routine. The team had its fastest run in the championship bout, where they took first in the third division. It was a complete win raising over \$1000, taking first place, and making lasting memories. Plans for next year’s event have already been made.



GIWS Dragon Boaters Celebrate after Taking First Place in the Third Division

7.2 GIWS Potluck: In October 2015, the GIWS-SOC organized a potluck lunch and best dishes competition. Each student brought one of his/her traditional dish to share with others. Students presented different types of home-made curries, samosas, rice, meats, sandwiches, pizzas, salads, cookies and desserts. It was a fantastic idea to bring everyone together and enjoy the food from many diverse countries including Bangladesh, Canada, Iran, Nepal and Pakistan. Finally, all the participants voted for the selection of best dishes. GIWS student members Apurba Das and Farshad Shafiei won the first and second prizes, respectively, for their dishes. Overall, it was one of the most enjoyable and successful social events for the student group.



A Tasty View of Some Home-Cooked Meals at the GIWS Potluck

7.3 GIWS BBQ: The GIWS Student Chapter held a student barbecue event on August 14, 2016 along the Meewasin Trail near the South Saskatchewan River. Classic barbecue food was served along with some great games! The event had a great turnout and provided an excellent opportunity for socializing.



GIWS Student Members having Some Fun Cooking and Eating Classic BBQ food

7.4 World Water Day: The annual World Water Day celebration was held on March 23, 2016 by the GIWS and the Canadian Water Resources Association at the University of Saskatchewan. The seminar featured a series of student and postdoctoral research projects. This event brought together an interdisciplinary group of professionals working in the fields of water resources management to participate and exchange valuable scientific knowledge.

During this event, the 2016 Best Doctoral Thesis was awarded to Zilefac Elvis Asong for his thesis entitled *Multivariate Multisite Statistical Downscaling of Atmosphere-Ocean General Circulation Model Outputs over the Canadian Prairie Provinces*, supervised by: H. Wheeler and N. Khaliq. In addition, Amin Haghnegahdar, a postdoctoral fellow of GIWS, and Hammad Javaid, a PhD student at GIWS, both took first place for their posters on Developing New Sensitivity Analysis for

Environmental Models and Assessment of Flow Regulation Effects by Dam in the Athabasca River, respectively.



Zilefac Elvis Asong Received the Best PhD Thesis Award

Also, the GIWS SOC invited the GIWS faculty and staff to attend Trivia Night, which marked World Water Day 2016. The event was well attended and the members participated in constructive discussions and some water related trivia and games with prizes.



Water Trivia Night organized by the GIWS Student Committee in celebration of the World Water Day


7.5 Better Than Bottled: Better Than Bottled is a student initiative from the GIWS Student Body, the School of Environment and Sustainability Student Association, the University of Saskatchewan Student Union and the Office of Sustainability to reduce the consumption of bottled water at the University of Saskatchewan. This collaboration promoted a healthy and sustainable alternative to bottled water – tap water. This campaign continues to aim at raising awareness throughout the University by exposing the environmental impacts associated with the production and sale of bottled water. It also directed attention to the use of refillable water bottles, while limiting, and potentially eliminating, the sale of bottled water at the University. Besides hosting green campaigns on campus, the organizations created a website, betterthanbottled.ca, to promote this initiative by providing facts and information regarding bottled water.

7.6 Skate Saskatoon: On February 4th, 2016 the GIWS-SOC organized an ice skating event at the Cameco Meewasin Skating Rink-Potash Crop Plaza on Spadina, next to the Delta Bessborough Hotel. Despite the cold and chilling weather, the event was well attended by many GIWS members. Overall, it was a fun-filled winter event enjoyed by both novice and expert skaters. Most interestingly, it was ‘the first’ experience for many international students. After skating, the group headed over to the Spadina Freehouse (bar and grill) for drinks and appetizers. It was a bt!



8. Concluding Remarks

2015-2016 was another remarkable and productive year for GIWS and members. We have experienced exponential growth in terms of activities, members, and outcomes as evidenced by our “Performance Indicators”, which we anticipate to continue in foreseen future. GIWS productivity and training programs are testaments of our commitment and excellence to advance the area of Water Security having local, national and global significance.



A significant effort has been invested in enhancing communication of our research outcomes and impact stories to society and stakeholders. GIWS will continue to go with its momentum and will establish new and sustain existing collaborations of mutual benefit to local and international partners and communities.

In this brief overview of the recent work of GIWS it has not been possible to do full justice to the work of our members, and we encourage those interested to visit our web-site www.usask.ca/water or to contact our members directly. We welcome students and postdoctoral researchers to either join our team full time or spend time with us as visiting researchers and we also welcome academic colleagues for short or longer visits. Our Assistant Director, Dr. Phani Adapa phani.adapa@usask.ca is always available for contact regarding the work of GIWS and welcomes enquiries from individuals, governments, industry and others concerning research collaboration.

APPENDIX A – Current Membership

Members: Individuals working at a level of responsibility which includes initiating and leading water research activities. This may include, but is not limited to Faculty members at UofS; Research Scientists, Staff Scientists, or Science Associates in recognized co-located (e.g. Saskatoon-based) research institutions (i.e. Environment Canada, Saskatchewan Research Council, Canadian Light Source, Agriculture and Agri-food Canada); and UofS Research Scientists.

Barbour, Lee, Professor, Civil and Geological Engineering
Geotechnical/Geo-environmental: Saturated/Unsaturated Groundwater Flow and Contaminant Transport, Mine Waste Reclamation

Baulch, Helen, Assistant Professor, School of Environment and Sustainability
Water quality; Aquatic ecology; Global change; Biogeochemical cycles; Greenhouse gas emissions; Eutrophication

Bedard-Haughn, Angela, Associate Professor, Soil Science
Study fundamental understanding of pedologic properties of Canadian ecosystems and how land use and climate changes affect, and are affected by, these properties

Belcher, Ken, Professor, Bioresource Policy, Business and Economics
Ecological economics; Resource and environmental economics; Environmental policy; Climate change; Wetland and wildlife conservation policy

Bharadwaj, Lalita, Associate Professor, School of Public Health
Barriers and Key Issues to the Access of Safe and Sustainable Drinking Water Sources in First Nations Communities; Community Based Participatory Research with Indigenous Communities; Human and Environmental Health Risk Assessment; Community-Based Education


Cessna, Allan, Research Scientist, Agriculture and Agri-Food Canada
Agricultural pesticides and veterinary pharmaceuticals

Chambers, Patricia, Research Scientist and Section Head, Environment Canada
Human Impacts on Aquatic Ecosystems Processes

Chang, Won Jae, Assistant Professor, Civil and Geological Engineering
Contaminated site assessment and remediation; Bioremediation of oil sands pollutants, mine wastes, frozen contaminated sites; Characterization of microbial communities/populations; Molecular biology techniques for contaminated environmental matrices

Chapra, Steve, Professor, Civil and Environmental Engineering, Tufts University
Water Quality Modeling, Numerical Methods, Advanced Computer Applications in Environmental Engineering

Clark, Bob, Research Scientist and Adjunct Professor, Environment Canada
Avian Ecology, Reproduction and breeding habitat selection, Landscape ecology



Clark, Doug, Centennial Chair and Assistant Professor, School of Environment and Sustainability
Polar bear-human conflicts; Decision-making under conditions of rapid social-ecological change;
Wildlife and protected area management; Environmental governance and policy processes

Dalai, Ajay, Canada Research Chair in Bioenergy and Environmental Friendly Chemical
Processes, Chemical and Biological Engineering
Renewable Energy; Heavy Oil and Gas Processing; Catalytic Reaction Engineering

Davison, Bruce, Research Scientist, Environment Canada
Hydrometeorological modelling, including incorporating physical or statistical processes into
models; Operationalization of modelling tools; Incorporating software engineering tools into
model development; Models for decision making

de Boer, Dirk, Research Scientist, Environment Canada
Drainage basin; Suspended sediment; Fluvial geomorphology; Soil Erosion

Doig, Lorne, Research Scientist, Toxicology Centre
Bioavailability and toxicity of metals, including nanomaterials, in surface waters and sediments;
Deriving environmental quality criteria (water, sediment, and tissue-based); Aquatic
ecotoxicology; Aquatic paleoecotoxicology

Elliott, Jane, Research Scientist, Environment Canada
Soil processes; Soil-water interactions and agrochemical leaching; Impacts of management
practices on water transport of nutrients and contaminants

Elshorbagy, Amin, Professor, Civil and Geological Engineering
Water Resources Engineering: Hydrinformatics - mechanistic & data-driven watershed modeling,
soft-computing techniques; Multicriterion decision analysis, system dynamics

Ferguson, Grant, Associate Professor, Civil and Geological Engineering
Hydrogeology; Geothermal Energy; Climate Change

Fulton, Murray, Professor and Graduate Chair, Johnson-Shoyama School of Public Policy
Economics of biotechnology; Policy analysis of corruption; Performance of co-operatives

Giesy, John, Professor and Canada Research Chair in Environmental Toxicology
Ecology; Ecotoxicology; Aquatic toxicology; Environmental analytical chemistry of organic
compounds; Environmental chemistry (Fates of trace substances in aquatic ecosystems)

Gober, Patricia, Professor, Johnson-Shoyama School of Public Policy
Water policy; Sustainability science; Decision making under uncertainty; Urban systems; Human
migration and population geography; Science-policy interface and stakeholder engagement;
Applied climatology

Gray, Richard, Professor, Bioresource Policy, Business and Economics
Agricultural trade; Agricultural marketing; Environmental economics



Hania, Patricia, Assistant Professor, College of Law
Legal water governance models in Canada

Hecker, Markus, Associate Professor and Canada Research Chair in Predictive Aquatic Ecotoxicology
Investigation of biological effects of environmental stressors; Environmental risk assessment; Development and application of bioanalytical techniques to assess environmental pollution; Aquatic ecology/fish biology

Helgason, Warren, Assistant Professor, Chemical and Biological Engineering
Atmospheric boundary layer processes; Energy and mass transport in the soil-plant-atmosphere continuum; Irrigation

Hendry, Jim, Professor and NSERC-Cameco Industrial Research Chair
Aqueous and environmental geochemistry of contaminants in uranium tailings; Characterization of biogeochemical reaction rates in vadose zones; Fate and transport of solutes in aquitards; Sorption controls on the transport of bacteria in saturated porous media; Reactive barrier technologies

Hill, Harvey, Research Scientist, Agriculture and Agri-Food Canada
Economics; Climate decision support and adaptation

Hobson, Keith, Research Scientist, Environment Canada
Conservation and management of boreal forest birds and other wildlife; Conservation and management of waterbirds with particular emphasis on the interactions between fish-eating birds and commercial and sport fisheries; Use of stable isotopes to track the source and fate of environmental contaminants in terrestrial and marine systems

Hogan, Natacha, Assistant Professor, Animal and Poultry Science
Aquatic toxicology; Sources and fate of aquatic contaminants; Aquatic animal health; Agricultural intensity and water quality

Howard, Allan, Manager, Agriculture and Agri-Food Canada
Adaptation techniques for drought and conditions of extreme wetness; Best practices for monitoring soil moisture; Models for assessing drought and for forecasting regional scale crop yield; Develop systems for accessing local and regional scale information on climate impacts

Hudson, Jeff, Associate Professor, Biology
Biogeochemical cycles in aquatic ecosystems; Effects of food web structure, ultraviolet radiation, climate change and biodiversity on elemental cycling and energy flow

Ireson, Andrew, Assistant Professor, School of Environment and Sustainability
Climate change and water security; Land-water management and environmental change; Sustainable development of natural resources



Janz, David, Professor, Veterinary Biomedical Sciences

Climate change and water security; Land-water management and environmental change

Jardine, Tim, Assistant Professor, School of Environment and Sustainability

Freshwater food webs; Applications of stable isotope analysis in ecology; Tropical floodplain hydrology and ecology; Contaminant biomagnification in aquatic ecosystems; Sources and fate of trace metals; Fish migration; Land-water and river-ocean connectivity

Johnstone, Jill, Associate Professor, Biology

Climate change and water security

Jones, Paul, Associate Professor, School of Environment and Sustainability

Land-water management and environmental change; Naphthenic Acid

Kells, Jim, Professor and Head, Civil and Geological Engineering

Hydraulic Structures; Use of Rock in Hydraulic Engineering; Scour Processes in Cohesionless Materials; Water Quality of Stormwater Runoff; Ecologically Engineered Systems

Laroque, Colin, Professor, College of Agriculture and Biorsource

Climate change; Boreal ecosystems; Dendrochronology; Dendrochemistry; Dendrohydrology

Li, Yanping, Assistant Professor, School of Environment and Sustainability

Regional climate modelling; Mesoscale dynamics; Boundary layer meteorology; Air-sea interaction

Liber, Karsten, Professor and Director, Toxicology Centre

Bioavailability and toxicity of metals, including nanomaterials, in surface waters and sediments; Deriving environmental quality criteria (water, sediment, and tissue-based); Aquatic ecotoxicology; Aquatic paleoecotoxicology

Lindenschmidt, Karl-Eric, Associate Professor, School of Environment and Sustainability

Surface water quality modelling; River ice processes; Climate change and river morphology; Flood and flood risk management

Lindsay, Matt, Assistant Professor, Geological Sciences

Groundwater; Biogeochemistry; Mining management and reclamation

Loring, Philip, Assistant Professor, School of Environment and Sustainability

Rural water systems, Climate change, Food-water-energy nexus, Environmental health, Cumulative effects, adaptive capacity

Marsh, Phil, Canada Research Chair in Cold Regions Water, Wilfrid Laurier University

Hydrologic processes and modelling of snowmelt and rainfall runoff in cold environments; Impact of climate change on water resources of the Canadian Arctic



Martz, Lawrence, Professor, Geography and Planning

Soil erosion and sediment transport; Impacts of climate change on water use in the South Saskatchewan River Basin

McDonnell, Jeffrey, Professor and Associate Director, Global Institute for Water Security

Watershed hydrology; Runoff processes; Modelling, Isotope hydrology

McKenzie, Marcia, Associate Professor and Director, Sustainability Education Research Institute

Place, environment and sustainability

McPhedran, Kerry, Assistant Professor, Environmental Engineering

Municipal wastewater, Partitioning to organic matter, Stormwater runoff, Recreational water quality

Meda, Venkatesh, Associate Professor, Chemical and Biological Engineering

Water treatment system design and development

Morrissey, Christy, Assistant Professor, Biology

Ecotoxicology; Water pollution; River and wetland ecology; Freshwater biology; avian and aquatic ecotoxicology

Noble, Bram, Professor, Geography and Planning

Environmental impact assessment; Cumulative effects assessment; Strategic environmental assessment; Environmental planning and management; Environmental decision making

Patrick, Robert, Professor, Geography and Planning

Water Policy and Governance; Watershed Planning and Management; Source Water Protection; Integrated Water Resource Management; First Nations access to safe Drinking Water; Regional Planning; Urban Water Issues

Pennock, Dan, Professor Emeritus, Soil Science

Landscape-scale soil processes and the spatial pattern of soil properties

Pickering, Ingrid, Professor and Canada Research Chair in Molecular Environmental Science

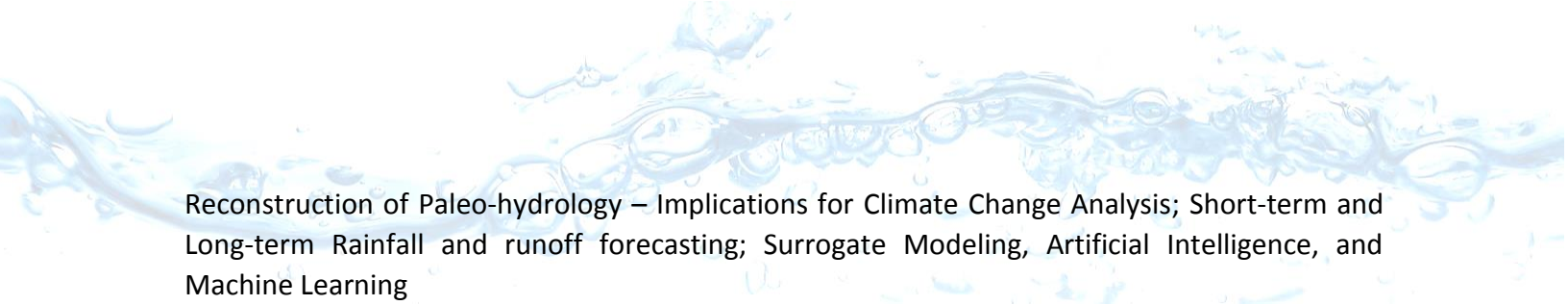
Development of new synchrotron radiation techniques; Metals and metalloids transformation in the environment; Identification of toxicologically significant compounds in vivo

Pomeroy, John, Professor and Canada Research Chair in Water Resources and Climate Change

Hydrological processes and modelling in mountain, prairie and arctic environments; Climate change, hydrology and water resources; Snow chemistry and ecology; Droughts in the Canadian Prairies; Cold regions hydrometeorological modelling and surface-atmosphere feedbacks

Razavi, Saman, Assistant Professor, School of Environment and Sustainability

Environmental and Water Resources Systems Planning and Management; Hydrologic and Groundwater Models Development and Calibration; Single- and Multi-objective Optimization and Uncertainty Analysis; Climate Change and Impacts on Hydrology and Water Resources;



Reconstruction of Paleo-hydrology – Implications for Climate Change Analysis; Short-term and Long-term Rainfall and runoff forecasting; Surrogate Modeling, Artificial Intelligence, and Machine Learning

Reed, Maureen, Professor, School of Environment and Sustainability

Environmental Governance; Sustainability of Rural Communities; Feminist and Gender-based Analysis; Social Resilience; Political Ecology; Forestry; Model Forests; Biosphere Reserves; National Parks

Shook, Kevin, Research Scientist and SGI Canada Research Fellow, Geography and Planning

Snowmelt modelling; Fractal analysis of hydrological phenomena; Flood modelling and extreme events analysis

Si, Bing, Professor, Soil Science

Understand the mechanisms of soil water dynamics and thermal regimes in non-level landscapes—at the pedon, hillslope (catchment) and landscape scale

Singh, Satya, Research Scientist, Geological Sciences

Environmental geochemistry particularly in trace metal biogeochemistry; geochemical cycling; Remediation of contaminated soils, sediment, surface and groundwater; Quantification of geochemical processes in wetlands and mining wastes

Soltan, Jafar, Associate Professor, Chemical and Biological Engineering

Emerging pollutants in water; ozone in water treatment; catalytic ozonation in water treatment; advanced oxidation; industrial wastewater treatment; environmental catalysis

Spence, Christopher, Research Scientist, Environment Canada

Hydrology and hydrometeorology of Canada's cold regions, especially the subarctic Canadian Shield; Hydrological processes in the Prairie Pothole region of Saskatchewan

St-Maurice, Jean-Pierre, Canada Research Chair in Environmental Sciences, Arts and Science

Atmospheric electricity; Space weather; Geophysical fluid dynamics; Atmospheric evolution; Climate change

Steelman, Toddi, Professor and Executive Director, School of Environment and Sustainability


Socio-hydrology: communication, knowledge co-production, knowledge mobilization, community involvement, science-policy interface, decision making

van der Kamp, Garth, Research Scientist, Global Institute for Water Security

Impacts of climate changes and land-use changes on prairie wetlands and lakes; Evaluation of groundwater availability and sustainability; Impacts of groundwater withdrawals on aquatic ecosystems; Groundwater flow and solute transport in low -permeability formations; Study of the hydrology of peatlands

van Rees, Ken, Professor, Soil Science

Agroforestry and biomass energy systems and their impacts on soils



Westbrook, Cherie, Associate Professor, Geography and Planning
Wetland Ecohydrology; Effect of beavers and humans on pathways between surface and ground waters; Transport of water and nutrients from wetlands and riparian areas

Wheater, Howard, Professor, Canada Excellence Research Chair in Water Security, and Director, Global Institute for Water Security
Hydrological processes and modelling, with applications to the management of flood risk, water resources, water quality, wastes and climate change adaptation

Wheaton, Elaine, Senior Research Scientist, Saskatchewan Research Council
Climatology; Climate impacts and adaptation; Climate change; Hazards climatology

Whitfield, Colin, Assistant Professor, School of Environment and Sustainability
Atmospheric pollution, Hydrochemistry, Catchment modelling, Hydrology, Biogeochemistry

Wilson, Lee, Associate Professor, Chemistry
Water, Solution Chemistry, Hydration Phenomena, Polymers, Biomaterials, Membranes, Porous Materials, Colloids & Surfactants, Materials & Environmental Science, and Chemical Separations

Wittrock, Virginia, Research Scientist, Saskatchewan Research Council
Climatology; Climate impacts and adaptation; Climate change; Hazards climatology


Yang, Daqing, Research Scientist, Environment Canada
Global water resources and availability; Climate change; Extreme hydrological events; Human impact on water systems; Arid and cold region hydrology

Associate Members: Individuals who are making a significant contribution to water research or who are providing support for water research activities in areas relevant to GIWS. This may include, but is not limited to UofS research staff (e.g. Research Associates, Research Assistants, Research officers or Postdoctoral fellows); Research staff from recognized national or international research institutions who are affiliated with a member of the Institute; and Professional affiliates – professional individuals who may not hold a PhD, but who can serve on graduate student advisory committees and/or teach graduate courses.

Abbasi, Soroush, Postdoctoral Fellow, Environment Canada
Water resources management; water quality; hydrology; hydrogeology

Ali, Melkamu, Postdoctoral Fellow, Global Institute for Water Security
Hydrology, Subsurface, Solute transport, Groundwater, Physically based model, Snowmelt, Surface flow

Alimezelli, Hubert Tote, Postdoctoral Fellow, Integrated Training Program in Infectious Diseases, Food Safety and Public Policy



Water quality, water safety, water security, and health implications in First Nation communities in Saskatchewan and the Yukon

Anis, Muhammad Rehan, Postdoctoral Fellow, Global Institute for Water Security

Climate change impact, Distributed hydrological modelling, Statistical downscaling, Disaggregation of climate variables, Sensitivity and uncertainty analysis

Apples, Willemijn, Postdoctoral Fellow, Global Institute for Water Security
Vadose zone; groundwater; infiltration; recharge; solute transport

Asong, Zilefac Elvis, Postdoctoral Fellow, Global Institute for Water Security

Physical and regional climatology; the impact of climate change on hydrological regimes and water resources under non-stationarity; development of statistical downscaling models for downscaling of AOGCM output; regional flood frequency and risk analysis; seasonal hydrological forecast; analysis of drought characteristics; weather generation for water and agricultural applications

Bradford, Lori, Research Associate, School of Public Health

Social psychological and social determinates of health including policy analysis which supports the Institute's goals of improving understanding of societal controls of water management

Chen, Liang, Postdoctoral Fellow, Global Institute for Water Security

Comparing the changes in the synoptic preconditions for the extreme convective events that may lead to flooding over east of the Canadian Rockies (Sask. River Basin)

Chu, Thuan, Postdoctoral Fellow, Global Institute for Water Security

Remote sensing and GIS techniques; climate change and land use practices; model river ice processes and flood risk

Chu, Yin, Visiting Scholar, Civil and Geological Engineering

Watershed Modeling; Water Quality; Hydrology; Forest Watershed; Water Pollution Control

Chun, Kwok Pan, Assistant Professor, Department of Geography, Hong Kong Baptist University

Hydrology; Statistics; Climate change

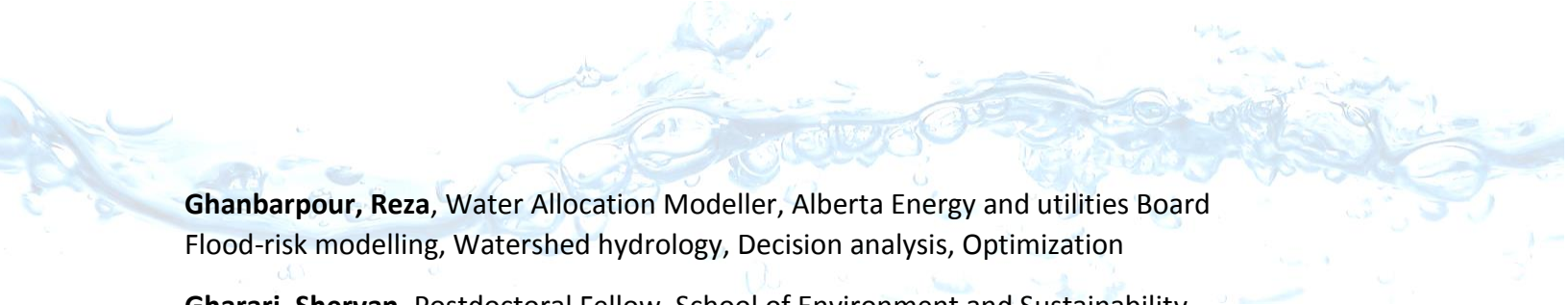
Da Costa, Diogo Andre Pinho, Postdoctoral Fellow, Department of Geography and Planning

Agricultural land management in the Canadian Prairies

Dumanski, Stacey, Coordinator Changing Cold Regions Network, Global Institute for Water Security

Elshamy, Mohamed, Research Associate, Global Institute for Water Security

Climate change, Satellite hydrology, Water resources modelling, Flood forecasting, Downscaling, Land surface schemes



Ghanbarpour, Reza, Water Allocation Modeller, Alberta Energy and utilities Board
Flood-risk modelling, Watershed hydrology, Decision analysis, Optimization

Gharari, Shervan, Postdoctoral Fellow, School of Environment and Sustainability
How information is translated into the model via assumptions on model structure, model parameterization and model parameters.

Gooding, Raea, Research Assistant, College of Agriculture and Bioresources

Haghnegahdar, Amin, Postdoctoral Fellow, School of Environment and Sustainability
Land surface-Hydrological Modeling, Model Sensitivity and Uncertainty Assessment, Model Calibration/Validation

Hosseini, Nasim, Research Associate, Global Institute for Water Security
Water quality modelling of surface water, model calibration, model validation, and sensitivity analysis

Janzen, Kim, Research Associate, Global Institute for Water Security
Analysis and post processing of stable isotope data

Kehoe, Michael, Postdoctoral Fellow, School of Environment and Sustainability
Water quality; Ecological modeling; Toxic cyanobacteria blooms; Monitoring; Data mining

Keim, Dawn, Postdoctoral Fellow, Global Institute for Water Security
Recharge processes; hydrogeology; unsaturated flow processes; contaminant transport

Kinar, Nicholas, Postdoctoral Fellow, Centre for Hydrology
Use of electronic circuits to collect data; forward and inverse mathematical models; measure environmental phenomena


Li, Zhi, Professor, Northwest A&F University, China
Impact assessment of climate change on streamflow, Weather generator, Groundwater recharge, Isotope hydrology

Mahmood, Taufique, Assistant Professor, University of North Dakota
Hydrology; water quality; remote sensing

Mamet, Steven, Postdoctoral Fellow, Department of Biology
Effect of climate and environmental change on tree line dynamic

Mantyka-Pringle, Chrystal, Postdoctoral Fellow, School of Environment and Sustainability
Conservation planning; biodiversity; Land-use change; Climate change; Environmental decision-making; Prioritization; Water management

Mohamed, Mohamed, Research Associate, Department of Chemistry
Oil sands process water remediation, Sequestration of agrochemicals from environmental waters, Removal of organic pollutants from aqueous media



Musselman, Keith, Postdoctoral Fellow, Centre for Hydrology, University of Saskatchewan
Hydrology; Water Resources; Snow; Hydrometeorology

Nachshon, Uri, Research Scientist, The Jacob Blaustein Institute for Desert Research, Ben-Gurion University of the Negev, Israel
Hydrology, Vadose zone, Salinization, Land-atmosphere interaction, Salt dynamics, Evaporation

Nazemi, Ali, Assistant Professor, Concordia University, Montreal
Water resources modelling and management under climate change conditions

North, Rebecca, Research Associate, Global Institute for Water Security
Eutrophication issues; Phytoplankton physiology and ecology; Land use practices and nutrient bioavailability; Nutrient limitation of algae; Aquatic biogeochemistry

Pan, Xicai, Postdoctoral Fellow, Global Institute for Water Security
Hydrology; Cryosphere; Climate; Soil physics; Hydrogeophysics

Pedinotti, Venessa, Postdoctoral Fellow, Global Institute for Water Security
Using modelling to better understand the large scale interactions between the multiple components of the water cycle

Pernica, Patricia, Postdoctoral Fellow, Global Institute for Water Security
Lake-atmosphere interaction; physical limnology; modelling; mixing dynamics

Raja, Bharat, Postdoctoral Fellow, Civil and Geological Engineering
Impacts of climate variability on water-related ecosystem functions

Ryan, Christopher, Visiting Scientist & Director, Operations, Environment Canada and Tundra Energy Marketing Limited
Environmental forensics; Athabasca oils sands; Synchrotron radiation; Absorption spectroscopy; Naphthenic acids; Petroleum Coke; Mine drainage; Industrial effluent

Sagin, Jay, Assistant Professor, Nazarbayev University, Kazakhstan
Remote Sensing and GIS applications; Hydrology; Hydrogeology; Modelling; Trans-boundary basins

Strickert, Graham, Assistant Professor, School of Environment and Sustainability
Complex human-environmental systems; Socio-hydrology; Mixed-methods; Fuzzy cognitive maps

Wayand, Nicholas, Postdoctoral Fellow, Centre for Hydrology, Department of Geography and Planning
Vetting and diagnosing current issues in model representation of critical snowpack processes that impact the hydrology of Canada

Wong, Jeff, Postdoctoral Fellow, Global Institute for Water Security
Development of large-scale hydrological models

Yeteman, Omer, Lecturer, Environmental Engineering, The University of Newcastle, Australia
Ecohydrology; Geomorphology; Vegetation dynamics; Landscape evolution

Affiliates: Distinguished individuals who have a demonstrable commitment to the goals and objectives of GIWS's SaskRB program. Affiliates are generally positioned outside traditional research environments.

Halliday, Bob, Senior Vice President, Chief Financial Officer, Applied Materials, Inc.

Lamb, Susan, Chief Executive Officer, Meewasin Valley Authority and Chair of VIDO/Intervac liaison Committee

Sanford, Bob, EPCOR Chair of the Canadian Partnership Initiative in support of United Nations "Water for Life" Decade, Director of the Western Watersheds Research Collaborative

Student Members: Students registered at a postsecondary institution who are engaged in water-related research activities, and who are under the supervision or co-supervision of a GIWS member, or any graduate or undergraduate student registered at the University of Saskatchewan.

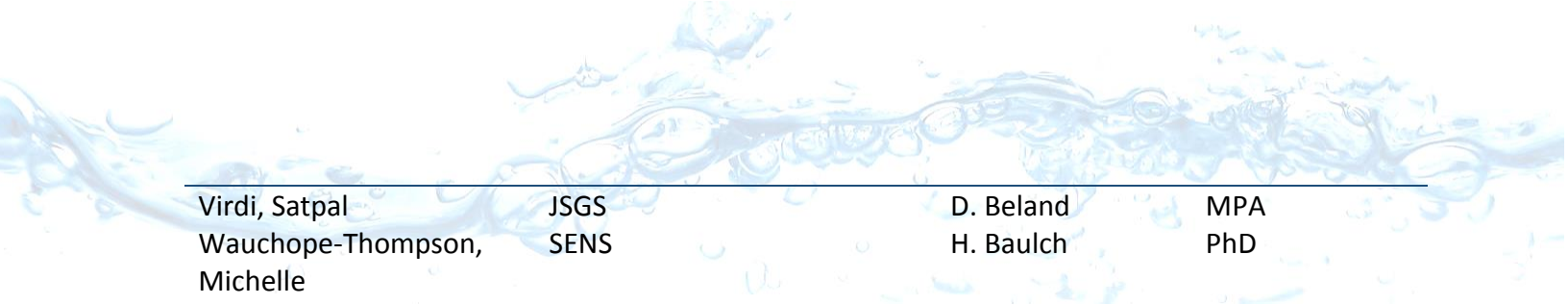
Glossary: MSc – Master of Science; PhD – Doctor of Philosophy; MSEM – Master in Sustainable Environmental Management; MPP – Master of Public Policy; MES – Master of Environment and Sustainability; MPH – Master of Public Health; MPA – Master of Public Administration; SENS – School of Environment and Sustainability; JSGS – Johnson Shoyama Graduate School of Public Policy; SPH – School of Public Health

Name	College/ School	Supervisor	Degree
Abirhire, Oghenemise	Biology	J. Hudson	Masters
Abu, Razak	SENS	M. Reed	PhD
Adesokan, Adedoyonsola	SENS	n/a	MSEM
Aghbolaghy, Mostafa	Chemical & Biological Engineering	J. Soltan	PhD
Ahmed, Hafiz	Chemical & Biological Engineering	W. Helgason	MSc
Akomeah, Eric	SENS	K. Lindenschmidt	PhD
Aksamit, Nikolas	Centre for Hydrology	J. Pomeroy	PhD
Alam, Md. Shahbul	Civil & Geological Engineering	A. Elshorbagy	MSc
Amin, Mahmud Rashedul	Civil & Geological Engineering	K. Mazurek	MSc
Amos, Mike	Civil & Geological Engineering	L. Barbour	
Anderson, Emily	Geography	J. Pomeroy	MSc
Annand, Holly	Geography & Planning	J. Pomeroy	PhD

Armstrong, James	Biology	N. Chilton	MSc
Armstrong, Maria	Geography	H. Baulch	MSc
Awume, Bennet	SENS	n/a	MSEM
Baer, Thomas	Civil & Geological Engineering	L. Barbour	MSc
Bagatim, Tabata	SENS	M. Hecker	MSc
Baijius, Warrick	Geography & Planning	R. Patrick	MA
Bam, Edward	SENS	A. Ireson	PhD
Beitel, Shawn	Toxicology	P. Jones	MSc
Berry, Pamela	SENS	K. Lindenschmidt	MES
Bihum, Samantha	Arts & Science	n/a	Undergraduate
Brannen, Rosa	SENS	A. Ireson	MES
Brown, Robin	Soil Sc.	A. Bedard-Haughn	MSc
Brown, Robyn	Arts & Science	n/a	Undergraduate
Bruce, Kristin	JSGS	P. Gober	MPP
Buchanan, Astri	SENS	M. Reed	MES
Budhathoki, Sujata	SENS	A. Ireson	MES
Burke, Amanda	SENS	H. Wheeler	MES
Burlock, David	Arts & Science	n/a	Undergraduate
Carr, Meghan	SENS	K-E. Lindenschmidt	MES
Cavaliere, Emily	SENS	H. Baulch	PhD
Chowdhury, Rocky	Civil & Geological Engineering	K. Mazurek	MSc
Coles, Anna	SENS	J. McDonnell	PhD
Cronmiller, Josh	Geography & Planning	B. Noble	MSc
D'Silva, Lawrence	Toxicology	K. Liber	MSc
Das, Apurba	SENS	K-E. Lindenschmidt	MES
David, Cody	Soil Science	W. Helgason	MSc
DeMars, Shelby	Civil & Geological Engineering	A. Ireson	MSc
Demuth, Brandon	Biology	D. Chivers	PhD
Dobrovolskaya, Yekaterina	SENS	B. Si	MES
Doering, Jonathon	Toxicology	M. Hecker	PhD
Dompiere, Kathryn	Civil & Geological Engineering	L. Barbour	PhD
Dylla, Nicholas	SENS	H. Baulch	PhD
Dudiak, Scott	Arts & Science	n/a	Undergraduate
Evaristo, Jaivime	SENS	J. McDonnell	PhD
Ferdous, Jannatul	Chemical & Biological Engineering	W. Helgason	PhD
Ford, Lorelei	SENS	L. Bharadwaj	MES
Franco, Jorge Garcia	GIWS	A. Ireson	Visiting UG
Gabrielli, Chris	SENS	J. McDonnell	PhD
Garvey, Phillip	Soil Science	S. Siciliano	PhD

Gibb, Josh	SENS	K. Mazurek	PhD
Gilmour, Kim	Arts & Sc.	n/a	Undergraduate
Gillio Meina, Esteban	Toxicology Centre	K. Liber	PhD
Gonda, Jordan	Civil & Geological Engineering	A. Elshorbagy	MSc
Gooding, Raea	SENS	H. Baulch	MES
Green, Derek	Toxicology Centre	D. Janz	MSc
Hehar, Gurdeep	SENS	K. Lindenschmidt	MSEM
Hamisi Karoyo, Abdalla	Chemistry	L. Wilson	PhD
Harder, Phillip	Geography & Planning	J. Pomeroy	MSc
Hassanzadeh, Elmira	Civil & Geological Engineering	A. Elshorbagy	PhD
Hatzel, Kayla	Arts & Science	n/a	Undergraduate
Head, Kerry	Biology	J. Hudson	MSc
Hermann, Kristian	Geological Sciences	J. Hendry	MSc
Hoemsen, Brittney	Biology	D. Chivers	MSc
Hossain, Md. Kamrul	Civil & Geological Engineering	A. Elshorbagy	PhD
Howitt, Nicholas	SENS	n/a	MSEM
Hueser, James	Arts & Science	n/a	Undergraduate
Hunter, Kristine	Biology	J. Hudson	M.Sc.
Jafri, Syed	SPH	A. Backman	MPH
Javid, Hammad	SENS	K. Lindenschmidt	PhD
Jeirani, Zahra	Chemical & Biological Engineering	J. Soltan	PhD
Johansson, Jess	Biology	J. Hudson	MSc
Kardas, Jeffrey	Geography & Planning	n/a	Undergraduate
Karran, Daniel	Geography	n/a	Undergraduate
Kurkute, Sopan	SENS	Y. Li	PhD
Lakhanpal, Anchit	Civil & Geological Engineering	Elshorbagy/Razavi	PhD
Lakken, Nils	SENS	D. Clark	MES
Leach, Nigel	Environmental Engineering	???	???
Leroux, Nicolas	Geography & Planning	J. Pomeroy	PhD
Li, Yiwen	SENS	Y. Li	MSc
Liu, Ning	SENS	K. Lindenschmidt	PhD
Lokken, Torbjom	RRM	n/a	Undergraduate
Lucas, Brett	Toxicology	K. Liber	MSc
Madaeni, Fatemeh	Civil & Geological Engineering	A. Elshorbagy	PhD
Mahmood, Fazilatun	Geological Sciences	J. Hendry	PhD
Mamo, Moges	Civil & Geological Engineering	A. Ireson	MSc
Marsh, Chris	Geography	Pomero/	
Masse, Anita	Toxicology	D. Janz	MSc
Masud, Badrul	SENS	N. Khaliq	PhD
Meissner, Anna	SENS	K. Lindenschmidt	MES
Mekonnen, Balew	Civil & Geological Engineering	K. Mazurek	PhD
Memon, Sameer	SENS	K. Lindenschmidt	MSEM
Mercer, Jason	Geography & Planning	C. Westbrook	MSc

Miller, Cody	SENS	J. McDonnell	MES
Mohamadmahdi, Kowsari	Chemical & Biological Engineering	J. Soltan	MSc
Morrison, Alasdair	Geography & Planning	C. Westbrook	MSc
Mulhall, Liam	SENS	H. Baulch	MSEM
Nazarbakhsh, Mahtab	SENS	A. Ireson	PhD
Nehmey, Magali	SENS	C. Laroque	MES
Parratt, Toomas	Civil & Geological Engineering	G. Putz	PhD
Payton, Diana	JSGS	P. Gober	MPP
Perry, Tom	Arts & Science	n/a	Undergraduate
Peterson, Amber	Civil & Geological Engineering	A. Ireson	MSc
Phillips, Iain	Biology	D. Chivers	PhD
Pradhananga, Dhiraj	Centre for Hydrology	J. Pomeroy	PhD
Prestie, Chance	Biology	J. Hudson	MSc
Qin, Kaixuan	Geological Sciences	M. Lindsay	MSc
Rahimova, Nargiz	SENS	H. Hessel	MES
Rasouli, Kabir	Geography & Planning	J. Pomeroy	PhD
Rokaya, Prabin	SENS	Razavi/ Lindenschmidt	PhD
Roste, Jennifer	Geography & Planning	H. Wheeler/J. Pomeroy	MSc
Rozon, Jordan Hilare	Geography & Planning	J. Pomeroy	MSc
Sadeghi, Azam	Chemical & Biological Engineering	J. Soltan	MSc
Sadeghian, Amir	SENS	K. Lindenschmidt	PhD
Safaei, Sahar	SENS	S. Razavi	MSc
Saunders, David	Toxicology	J. Giesy	MSc
Scaff, Lucia	SENS	Y. Li	PhD
Schabert, Marcie	Arts & Science	n/a	Undergraduate
Shafiei, Farshad	Biology	J. Hudson	PhD
Shahariar, Md Shayeb	Soil Science	A. Bedard- Haughn	PhD
Sheikholeslami, Razi	GIWS	S. Razavi	PhD
Sizo, Anton	Geography & Planning	B. Noble	PhD
Steeves, Joel	Civil & Geological Engineering	L. Barbour	MSc
Stetkiewicz, Maciej	SENS	K. Lindenschmidt	MSEM
Terry, Juli	SENS	H. Baulch/ K. Lindenschmidt	PhD
Tendler, Brett	Toxicology Centre	J. Geisy	MSc
Tootoosis, Mylan	Native Studies	R. Innes	PhD
Tipman, James	Civil & Geological Engineering	L. Barbour	MSc
Tritschler, Felix	SENS	J. McDonnell	MSc
Tse, Timothy	Toxicology	P. Jones	MSc
Ufodu, Lotanna	Civil & Geological Engineering	G. Ferguson	PhD



Viridi, Satpal	JSGS	D. Beland	MPA
Wauchope-Thompson, Michelle	SENS	H. Baulch	PhD
Weber, Darian	Arts & Science	n/a	Undergraduate
Yassin, Faud	SENS	H. Wheeler	PhD
Yee, Briana	Arts & Science	n/a	Undergraduate
Yip, Hayden	Biology	J. Hudson	MSc
Younes, Firas	SENS	R. Patrick	MSEM
Yuan, Hongda	Toxicology Centre	M. Hecker	MSc
Zhang, Fan	SENS	K. Lindenschmidt	PhD
Zee, Jenna	SENS	M. Hecker	MES

APPENDIX B – GIWS Employees and Students 2015-2016

The following table provides information on GIWS employees and students funded during the period of 2015-16. A total of 156 personnel were funded during this period, including 7 GIWS faculty members, 9 administrative staff, 39 research assistant/technicians, 13 research associates/scientists/specialists, 30 postdoctoral fellows, 30 doctoral students, and 27 masters' students.

Name	Title/Area	Supervisor/Unit
CERC Faculty		
Baulch, Helen	Assistant Professor	SENS
Ireson, Andrew	Assistant Professor	SENS
Li, Yanping	Assistant Professor	SENS
Lindenschmidt, Karl-Erich	Associate Professor	SENS
Razavi, Saman	Assistant Professor	SENS
McDonnell, Jeffrey	Professor and Associate Director	SENS
Wheater, Howard	Professor and Director	SENS
Administrative Staff		
Adapa, Phani	Assistant Director	H. Wheeler
Hinther, Meagan	Communications Specialist - 0.5 FTE	H. Wheeler
Morin, Chris	Communications Specialist – 0.5 FTE	H. Wheeler
Glazebrook, Henry	Communications Coordinator – 0.25 FTE	H. Wheeler
McDonnell, Veva	Business Development Officer - 0.6 FTE	H. Wheeler
Olauson, Sherry	Clerical Assistant	H. Wheeler
Martel-Andre, Michelle	Executive Assistant	H. Wheeler
Zagozewski, Tim	Financial Officer	H. Wheeler
Zdravkovic, Branislav	IT Administrator – Data	H. Wheeler
Technical Support		
Abbasi, Soroush	Research Associate	K. Lindenschmidt
Annand, Holly	Research Assistant	J. Pomeroy
Barr, Alan	Research Technician	H. Wheeler
Bauer, Jay	Research Technician	Baulch/Bedard-Haughn
Bayne, Dell	Research Technician	W. Helgason
Berry, Pamela	Research Assistant	K. Lindenschmidt
Brenna, Britni	Research Assistant	H. Baulch
Das, Apurba	Research Associate	K. Lindenschmidt
DeBeer, Chris	Research Associate	H. Wheeler
Doig, Lorne	Research Technician	K. Liber
Duncan, Angus	Research Technician	J. Pomeroy
Elshamy, Mohamed	Research Associate	H. Wheeler
Esfahbod, Bahareh	Data Visualization Specialist	S. Razavi
Fang, Xing	Research Officer	J. Pomeroy
Gilmour, Kimberly	Research Assistant	H. Baulch

Gooding, Raea	Research Assistant	H. Baulch
Guan, Juan	Research Officer	J. Pomeroy
Helme, Richard	Undergraduate Student Assistant	C. Westbrook
Hosseini, Nasim	Research Associate	K. Lindenschmidt
Hunter, Kristine	Lab Technician	J. Hudson
Janzen, Kimberly	Research Associate	J. McDonnell
Johnson, Bruce	Research Technician	Helgason/ Wheeler/ McDonnell
Kambietz, Alyse	Research Assistant	H. Baulch
Kaur, Navjot	Research Assistant	H. Baulch
Kelly, Tess	Research Assistant	H. Baulch
Kiss, Jeremy	Research Assistant	Baulch/Bedard-Haughn
Knuston, Brooke	Research Assistant	J. McDonnell
Millar, Cody	Research Assistant	J. McDonnell
Meissner, Anna	Research Assistant	J. Hudson
Mock, Tyler	Undergraduate Student Assistant	J. Hudson
Mamo, Moges	Research Assistant	A. Ireson
Mosaffa, Mahtab	Research Associate	K. Lindenschmidt
Moradi, Laleh	Research Assistant	B. Zdravkovic
Mowat, Aiden	Research Assistant	C. Whitfield
Murray, Carolyn	Research Assistant	C. Whitfield
Nazemi, Ali	Research Associate	Wheater/ Elshorbagy
North, Rebecca	Research Associate	H. Baulch
Parker, Elisabeth	Research Assistant	J. Hudson
Pratt, Dyan	Research Assistant	L. Barbour
Princz, Dan	Research Assistant	H. Wheeler
Rodriguez-Prado, Arcadio	Research Associate	J. McDonnell
Shook, Kevin	Research Scientist	J. Pomeroy
Smith, Lukas	Undergraduate Student Assistant	A. Bedard-Haughn
Smith, Paul	Undergraduate Student Assistant	A. Wheeler
Snarr, Kyle	Research Assistant	Helen Baulch
Strickert, Graham	Research Associate	Wheater/ Clark
Theoret, Curtis	Undergraduate Student Assistant	A. Ireson
Tomchuk, Patricia	Research Assistant	J. Hudson
Weber, Darian	Undergraduate Student Assistant	K. Lindenschmidt
Whitfield, Colin	Research Scientist	H. Wheeler
Wilson, Heather	Research Technician	Bedard-Haughn/Spence
Yassin, Fuad	Research Assistant	K. Lindenschmidt
Yip, Hayden	Research Technician	J. Hudson
Postdoctoral Fellows		
Alebachew Ali, Melkamu	Postdoctoral Fellow	Ireson/Ferguson/McKay
Ameli, Ali	Postdoctoral Fellow	J. McDonnell
Anis, Muhammad Rehan	Postdoctoral Fellow	H. Wheeler
Appels, Willemijn	Postdoctoral Fellow	J. McDonnell

Asong, Elvis	Postdoctoral Fellow	H. Wheeler
Bradford, Lori	Postdoctoral Fellow	L. Bharadwaj
Carr, Meghan	Postdoctoral Fellow	K. Lindenschmidt
Chen, Liang	Postdoctoral Fellow	Y. Li
Chu, Thuan	Postdoctoral Fellow	K. Lindenschmidt
Chun, Kwok Pan	Postdoctoral Fellow	H. Wheeler
Conway, Jonathan	Postdoctoral Fellow	Pomeroy/Helgason
Hassanzadeh, Elmira	Postdoctoral Fellow	K. Lindenschmidt
Karoyo, Abdalla	Postdoctoral Fellow	L. Wilson
Kehoe, Michael	Postdoctoral Fellow	H. Baulch
Keim, Dawn	Postdoctoral Fellow	Ireson/Ferguson/McKay
Kinar, Nicholas	Postdoctoral Fellow	J. Pomeroy
Mahmood, Taufique	Postdoctoral Fellow	Wheater/Pomeroy
Mantyka-Pringle, Chrystal	Postdoctoral Fellow	Jardine/Bedard-Haughn/Baulch
Morales Marin, Luis	Postdoctoral Fellow	Lindenschmidt/Wheater
Musselman, Keith	Postdoctoral Fellow	J. Pomeroy
Orlowski, Natalie	Postdoctoral Fellow	J. McDonnell
Pan, Xicai	Postdoctoral Fellow	Ireson/ Helgason
Pedinotti, Vanessa	Postdoctoral Fellow	H. Wheeler
Peng, Hui	Postdoctoral Fellow	Giesy/Jones
Pernica, Patricia	Postdoctoral Fellow	Wheater/McKay
Pinho da Costa, Diogo	Postdoctoral Fellow	Pomeroy/Wheater
Saprizza Azuri, Gonzalo	Postdoctoral Fellow	H. Wheeler
Wayand, Nicolas	Postdoctoral Fellow	Pomeroy/Wheater
Wong, Jeff	Postdoctoral Fellow	H. Wheeler
Yetemen, Omer	Postdoctoral Fellow	Ireson/Johnstone
Graduate Students		
Bam, Edward	Doctoral Student	A. Ireson
Carr, Meghan	Doctoral Student	K. Lindenschmidt
Cavaliere, Emily	Doctoral Student	H. Baulch
Chilima, Jania	Doctoral Student	L. Bharadwaj
Coles, Anna	Doctoral Student	J. McDonnell
Dompierre, Kathryn	Doctoral Student	Wheater/Barbour
Evaristo, Jaivime	Doctoral Student	J. McDonnell
Faizen Ahmed, Hafiz	Doctoral Student	W. Helgason
Gabrielli, Chris	Doctoral Student	J. McDonnell
Hammad, Javid	Doctoral Student	Lindenschmidt/Wheater
Hossain, Kamrul	Doctoral Student	Wheater/Elshorbagy
Kurkute, Sopan	Doctoral Student	Y. Li
Lakhanpal, Anchit	Doctoral Student	G. Ferguson
Liu, Ning	Doctoral Student	K. Lindenschmidt
Maillett, Jason	Doctoral Student	Johnstone/Laroque
Masud, Mohammed	Doctoral Student	Wheater/Khaliq

Morandi, Garrett	Doctoral Student	J. Giesy
Nazarbakhsh, Mahtab	Doctoral Student	A. Ireson
Rokaya, Prabin	Doctoral Student	K. Lindenschmidt
Sadeghian, Amir	Doctoral Student	K. Lindenschmidt
Scaff, Lucia	Doctoral Student	Y. Li
Shafiei, Farshad	Doctoral Student	J. Hudson
Sheikholeslami, Seyed	Doctoral Student	S. Razavi
Terry, Julie	Doctoral Student	Lindenschmidt/Baulch
Tse, Timothy	Doctoral Student	P. Jones
Ufondu, Lotanna	Doctoral Student	G. Ferguson
Wang, Xiaoyue	Doctoral Student	A. Bedard-Haughn
Wauchope, Michelle	Doctoral Student	H. Baulch
Yassin, Fuad	Doctoral Student	H. Wheeler
Zilefac, Ason	Doctoral Student	Wheater/Khaliq
Abirhire, Oghenemise	Masters Student	J. Hudson
Armstrong, Marie	Masters Student	C. Westbrook
Aume, Obadiah	Masters Student	Patrick/Wheater
Berry, Pamela	Masters Student	K. Lindenschmidt
Budathoki, Sujata	Masters Student	A. Ireson
Carr, Meghan	Masters Student	K. Lindenschmidt
Das, Apurba	Masters Student	K. Lindenschmidt
Demars, Shelby	Masters Student	A. Ireson
D'Silva, Lawrence	Masters Student	Liber/Doig
Gonda, Jordan	Masters Student	Wheater/Elshorbagy
Hewitt, Kelsey	Masters Student	G. Ferguson
Li, Yiwen	Masters Student	Y. Li
Meissner, Anna	Masters Student	K. Lindenschmidt
Mercer, Jason	Masters Student	C. Westbrook
Nehemy, Magali	Masters Student	C. Laroque
Pettem, Connor	Masters Student	Janz/Wheater
Prestie, Chance	Masters Student	J. Hudson
Roste, Jennifer	Masters Student	Wheater/Baulch
Hosseini Safa, Hamideh	Masters Student	Wheater/Elshorbagy
Safaei, Sahar	Masters Student	S. Razavi
Schiffer, Stephanie	Masters Student	K. Liber
Steeves, Kean	Masters Student	N. Hogan
Tendler, Brett	Masters Student	P. Jones
Watts, Christena	Masters Student	P. Jones
Willness, Ross	Masters Student	K. Belcher
Wu, Hongye	Masters Student	C. Westbrook
Zhang, Fan	Masters Student	M. Hecker

APPENDIX C – Students and Highly Qualified Personnel Not Funded by CERC

The following table provide information on students and highly qualified personnel not funded by the CERC program. It was determined that a total of 166 graduate students (PhD 62 and Masters 104) were funded by our members during the period 2015-16. In addition, our members supported and trained 91 highly qualified personnel, including 25 postdoctoral fellows and research associates, 18 research technicians, 6 research scientists, 19 Visiting Scholars (including 8 Distinguished Lecturers) and 31 Research Assistants, Research Engineers and Summer Students.

Glossary: MSc – Master of Science; PhD – Doctor of Philosophy; MSEM – Master in Sustainable Environmental Management; MPP – Master of Public Policy; MES – Master of Environment and Sustainability; MPH – Master of Public health; MPA – Master of Public Administration; SENS – School of Environment and Sustainability; JSGS – Johnson Shoyama Graduate School of Public Policy; SPH – School of Public Health

Students

Student	Supervisor/ Co-Supervisor	Degree	Department	Subject Area
Abirhire, O.	Hudson	PhD	Biology	Limnology
Abirhire, O.	Hudson	MSc	Biology	Limnology
Abdelkader, A.	Elshorbagy	PhD	Civil & Geo	Water Resources
Agbovi, H.	Wilson	PhD	Chemistry	Biopolymer
Aghbolaghi, M.	Soltan	PhD	Chemical & Biological Eng.	Ozonation
Akhov, L.	Liber	MSEM	SENS	Weed and Pest Control
Aksamit, N.	Pomeroy	PhD	Geography	Hydrology
Alam, S.	Barbour	PhD	Civil & Geo	Geoenviron.
Al-Harbi, H.	Giesy	PhD	Toxicology	Enviro. Tox.
Al-Ibrahim, A.	Patrick	MA	Geography	Urban Water
Al-Zahrani	Wilson	MSc	Chemistry	Biopolymer
Annand, H.	Pomeroy	PhD	Geography	Hydrology
Anderson, E.	Pomeroy	MSc	Geography	Hydrology
Andrews, E.	Steelman	MES	SENS	Sustainability
Armstrong, M.	Baulch/ Westbrook	MSc	Geography	Nutrient Chemistry
Awume, O.	Patrick	MSc	Geography	First Nations water governance
Bagonluri, M.	Loring	MSEM	SENS	Food Waste
Baijius, W.	Patrick	PhD	Geography	Watershed Planning
Bains, S.	Bharadwaj/ Steelman	MSc	SENS	Water Policy
Balladares, O.	Soltan	MSc	Chemical & Biological Eng.	Degradation of Antibiotics

Bangsund, A.	Barbour/ Hendry	MSc	Geological Sc	Hydrogeology
Basdeo, M.	Bharadwaj	MSc	SENS	Impact of Water Regulation
Bhalkaran, S.	Wilson	MSc	Chemistry	Biopolymer
Binsted, G.	Ferguson	PhD	Civil & Geo. Eng.	Hydrogeology
Bissonnette, J.	Hendry	MSc	Geological Sc.	
Brown, R.L.	Bedard-Haughn	MSc	Soil Sc.	Surface drainage and soil properties
Bruce, K.	Fulton	MPP	Public Policy	
Buchynski, M.	Barbour	MSc	Civil & Geo. Eng.	Geochemistry
Bulla, B.	Steelman	PhD	North Carolina State Univ.	Forestry and Env.
Carlson, A.	Patrick	MNGD	ICNGD	Water Palnning
Carlson, H.	Fulton	MPP	Public Policy	
Cavallaro, M.	Liber/ Morrissey	PhD	Toxicology	Aquatic Toxicology
Chad, S.	Barbour	MSc	Civil & Geo Eng	Geoenviron Eng
Chuhaniuk, S.	Barbour	MSc	Civil & Geo Eng	Geoenviron Eng
Chilima J.	Bharadwaj	PhD	SENS	Community-based Approach
Cilia, C.	Lindsay	MSc	Geological Sc.	Geochemistry
Choudhury, S.	Pickering	PhD	Geological Sc.	Confocal X-ray fluorescence
Conway, A.	Johnstone	PhD	Biology	Plant ecology
Cowan, B.	Patrick	MNGD	ICNGD	Northern Recycling
Crawford, S.	Liber	PhD	Toxicology	Uranium Toxicity
Currie, Z.	Hogan	MSc	Toxicology	Photo-induced toxicity of PAHs
D'Silva, L.	Liber	MSc	Toxicology	Phosphorous Loading
Daigle, J.	Bharadwaj	MPH	SPH	Water Risk
Danquah, M.	Wilson	MSc	Chemistry	Cyclodextrin Polymers
Deen, S.	Barbour/ Hendry	MSc	Civil & Geo. Eng.	Geochemistry
Debusschere, A.	Barbour	MSc	Soil Science	Geology, statistics
Dehabadi, L.	Wilson	PhD	Chemistry	Design
Dexu, K.	Wilson	MSc	Chemistry	Polysaccharides Cellulose
				Adsorption Studies
Doering, J.	Giesy/ Hecker	PhD	Toxicology	Enviro. Tox.

Dolatkhah, A.	Wilson	MSc	Chemistry	Synthetic and Biopolymers
Dompierre, K.	Barbour/ Lindsay	PhD	Civil & Geolog. Engrg.	Environ. Engrg - Hydrogeol.
Durado, C.	Barbour	MSc	Civil & Geo Eng	Geoenviron Eng
Dumanski, S.	Pomeroy/ Westbrook	MSc	Geography	Hydrology
Ford, L.	Bharadwaj	MSc	SENS	Human Health Risk Assessment
Gallant, M.	Hogan	PhD	Toxicology	Immunotox
Gannon, G.	Loring	MES	SENS	Community responses to fisheries collapse
Gillio Meina, E.	Liber	PhD	Toxicology	Vanadium Toxicity
Gonda, J.	Elshorbagy	MSc	Civil & Geo	Water Resources
Goulet, F.	Patrick	MNGD	ICNGD	Diamond Mining
Grant, K.	Patrick	MA	Geography	Source Water Protection
Green, D.	Janz/ Jardine	MSc	Toxicology	Ecoepidemiology
Greuel, R.	Johnstone	MSc	Biology	Plant Ecology
Guenther, G.	Bharadwaj	MSc	Toxicology	Endocrine Disruptors
Guo, J.	Liber	MSc	Shanxi Univ	Coal Waste Piles
Hassanzadeh, E.	Elshorbagy	PhD	Civil & Geo	Water Resources
Harder, P.	Pomeroy	PhD	Geography	Hydrology
Harley, R.	Barbour	PhD	Q. U.Belfast (N.Ireland)	Slope Stability
Heaton, K.	Lindsay	MSc	Geological Sc.	Geochemistry
Hewitt, K.	Ferguson	MSc	Civil & Geo	Hydrogeology
Hinzman, M.	Loring	MES	SENS	Indigenous Fisheries & Co- management
Hoksbergen, K.	Ferguson	MSc	Civil & Geo	Hydrogeology
Horachek, M.	Johnstone/ Laroque	MSc	Biology	Plant ecology
Hossain, Md K.	Elshorbagy	PhD	Civil & Geo	Flood Modeling
Hunter, K.	Hudson	MSc	Biology	Limnology
Huynh, M.	Bharadwaj	PhD	Community Health and Epidemiology	Public Health Risks
Imtiaz, N.	Hudson	MSc	Biology	Limnology
James, A.	Pickering	PhD	Toxicology	Organomercury in zebrafish
Jean, M.	Johnstone	PhD	Biology	Plant ecology

Jeirani, Z.	Soltan	PhD	Chemical Eng	Catalytic Ozonation
Johansson, J.	Hudson	MSc	Biology	Limnology
Johnson, M.	Barbour	MSc	Soil Science	Soil Physics
Kambeitz, Alyse	Baulch	Honours	Biology	Prediction of Algal Toxicity
Karran, D.	Westbrook	PhD	Geography	
Kiss, J.	Bedard-Haughn	MSc	Soil Science	Predictive Digital Soil Mapping
Klemmer, S.	Ferguson	MSc	Civil & Geo	Rock Mechanics
Koehler, B.	Barbour/ Ferguson	MSc	Civil & Geo Engrg.	Geo-Enviro. Engrg.
Koonkoon, R.	Ferguson	PhD	Civil & Geo	Geological
Krogh, S.	Pomeroy	PhD	Geography	Hydrology
Kuzyk, T.	Barbour/ Hendry	MSc	Civil & Geo. Eng.	Geochemistry
Lakhanpal, A.	Elshorbagy/ Razavi	PhD	Civil & Geo Eng.	Flood Risk Analysis
Leroux, N.	Pomeroy	PhD	Geography	Hydrology
Li, M.	Liber	MSc	Shanxi Univ	Coal Gob Piles
Li, Y.	Liber	MSc	Shanxi Univ	Ecological Adaptability
Liu, Q.	Lindsay	MSc	Geological Sc.	Geochemistry
Lv, Z.	Pomeroy	PhD	Geography	Hydrology
Lynch, K.	Barbour	PhD	Q. U.Belfast (N.Ireland)	Geotech. Engrg
MacDonald, M.	Pomeroy	PhD	Geography	Hydrology
MacDonald, G.Z.	Hogan	MSc	Biology	Pulp mill effluent
Madaeni, F.	Barbour	PhD	Civil & Geo. Eng.	Geo. Enviro. Eng.
Mafar, M.	Bharadwaj	PhD	SENS	Inter-culturality
Mahmood, N.	Barbour/ Hendry	PhD	Geological Sc	Geochemistry
Maloney, E.	Liber/Morrissey	MSc	Toxicology	Aquatic Ecotoxicology
Markwart, B.	Liber	MSc	Toxicology	Inorganic Selenium
Marsh, C.	Pomeroy/ Wheater	PhD	Geography	Hydrology
Massé, A.	Janz	MSc	Toxicology	Aquatic Toxicology
McLaughlin, K.	Bharadwaj	MSc	Geography and Planning	Trucking of Potable water
Mercer, J.	Westbrook	MSc	Geography	

Mihalicz, J.	Jardine/ Baulch	MES	SENS	Aquatic Toxicology
Moate, A.	Hecker/ Jardine	MSc	Toxicology	Emerging Contaminants
Morandi, G.	Giesy	MSc	Toxicology	Enviro. Tox.
Morrison, A.	Noble/ Westbrock	PhD	Geography	Flood Risk
Muldoon, B.	Hogan	MSc	Toxicology	Aquatic Toxicology
Nehzati, S.	Pickering	MSc	Geological Sc.	Mercury custom chelators
Nesbitt, J.	Hendry	MSc	Geological Sc.	Geochemistry
Neufeld, H.	Loring	MES	SENS	Collaboration in environmental governance
Ochoa, C.	Hogan	MSc	Animal & Poultry Sc.	Detoxification
Penrod, D.	Ferguson/ Lindsay	MSc	Geological Sc.	Hydrogeology
Peterson, A.	Helgason	MSc	Civil & Geo Eng	Soil Moisture
Pettem, C.	Janz	MSc	Toxicology	Zebrafish
Phillips, D.	Ferguson	MSc	Civil & Geo	Hydrogeology
Pradhananga, D.	Pomeroy	PhD	Geography	Hydrology
Prestie, C.	Hudson	MSc	Biology	Limnology
Qin, K.	Lindsay	MSc	Geological Sc.	Geochemistry
Rasouli, R.	Pomeroy	PhD	Geography	Hydrology
Rohanizadegan, M.	Pomeroy	MSc	Geography	Hydrology
Roson, K.	Barbour	MSc	Geological Sc.	Hydrogeology
Roste, J.	Pomeroy	MSc	Geography	Hydrology
Sabzevari, M.	Wilson	PhD	Chemistry	Graphene
Sadeghi, A.	Soltan	MSc	Chemical Eng	Water Treatment
Santafé, V.	Loring	PhD	SENS	Ecotourism & Food Sovereignty
Saunders, D.	Giesy	PhD	Toxicology	Enviro. Tox.
Schabert, M.	Barbour/ Hendry	MSc	Geological Sciences	Geochemistry
Schenn, W.	Jardine/ Janz	PhD	SENS	Aquatic Toxicology
Schiffer, S.	Liber	MSc	Toxicology	Vanadium Toxicity
Schultz, D.	Hecker/ Janz	MSc	Toxicology	Aquatic Toxicology
Safa, H.	Elshorbagy	MSc	Civil & Geo	Water Resources
Shafiei, F.	Hudson	PhD	Biology	Limnology

Shahadu, H.	Reed/ Steelman	PhD	SENS	Policy innovation and wildfire
Shahariar, S.	Bedard-Haughn	PhD	Soil Sc.	Land-use management
Shahkarami, S.	Dalai/ Soltan	PhD	Chemical & Biological Eng.	CO2 Capture
Shaw, A.	Steelman	MES	SENS	
Shenoy, A.	Johnstone	PhD	Biology (Alaska)	Plant ecology
Siemens, E.	Pomeroy	MSc	Geography	Hydrology
Smith, L.	Barbour/ Hendry	PhD	Geological Sciences	Geochemistry
Srayko, S.	Jardine/ Chivers	MSc	Biology	Toxicology
Steele, C.	Ferguson	MSc	Civil & Geo	Hydrogeology
Steeves, J.	Barbour/ Ferguson	MSc	Civil & Geo Engrg.	Hydrogeology
Steeves, K.	Hogan	MSc	Toxicology	Endocrine potential
Summers, K.	Pickering	PhD	Chemistry	Copper in health and disease
Swerhone, L.	Lindsay	MSc	Geological Sciences	Geochemistry
Szmigielski, J.	Barbour/ Hendry	MSc	Geological Sciences	Geochemistry
Thiruparanathan, M.	Steelman	MSEM	SENS	
Tipman, J.	Barbour	MSc	Civil & Geo. Eng.	Geo. Enviro. Eng.
Toews, H.	Westbrook	PhD	Geography	
Udoetok, I.A.	Wilson	PhD	Chemistry	Polysaccharides
Ufondu, L.	Ferguson	PhD	Civil & Geo	Geological
Videa Giering, Y.	Pomeroy	PhD	Geography	Hydrology
Viekle, D.	Lindsay	MSc	Geological Sc.	Geochemistry
Vogel, T.	McPhedran			
Wang, A.	Hogan	PhD	Animal & Poultry Sc.	Mycotoxins
Wang, X.	Bedard-Haughn	PhD	Soil Sc.	Mountain peatland
White, K.	Liber	MSc	Toxicology	Oil Sands Process Water
Wu, H.	Westbrook	MSc	Geography	
Xue, C.	Wilson	PhD	Chemistry	Biopolymers
Zhang, R.	Liber	MSc	Shanxi Univ	Ecological Adaptability

Highly Qualified Personnel

Glossary: Postdoctoral Fellow – PDF; Visiting Scholar – VS; Research Engineer – RE; Research Assistant – RA; Research Associate – RAsso; Research Technician – RT; Summer Student – SS; Research Scientist – RS

Research Personnel	Supervisor	Position	Department	Subject Area
Ali, M.	Lindsay/ Ferguson/ Ireson	PDF	GIWS	Groundwater
Alimezeli, A.	Bharadwaj/ Waldner	PDF	SPH	First Nations
Anand, A.	Soltan	SS	IIT-Kharagpur, India	Emerging Pollutants
Annand, H.	Pomeroy	RA	Geography	Hydrology
Aruei, R.	Wilson	SS	Chemistry	Adsorption Kinetics
Beaudry, C.	Pomeroy	RT	Geography	Hydrology
Blazek, K.	Johnstone	RA	Biology	Ecology
Brown, T.	Pomeroy	RT	Geography	
Bradford, L.	Bharadwaj	PDF	SPH	Water for Health
Cattet, G.	Janz	SS	Toxicology	Hair Cortisol
Chen, C.	Giesy	VS – Nanchang Univ	Toxicology	Enviro. Tox.
Chen, I.	Liber	RT	Toxicology	Tox Center
Cilia, C.	Lindsay	SS	Geological Sc.	Geochemistry
Colville, C.	Jardine	RT	Toxicology	Ecotoxicology
Conway, J.	Pomeroy	PDF	Geography	Hydrology
Costa, D.	Pomeroy	PDF	Geography	Hydrology
Cowell, M.	Lindsay	SS	Geological Sc.	Geochemistry
Cotelesage, J.	Pickering	RA	Geological Sc.	Biomolecule Structure
Crawford, A.	Pickering	PDF	Geological Sc.	Advanced imaging
Cruz-Hernández, P.	Lindsay	VS - PhD	Universidad de Huelva, Spain	Departamento de Geología
Das, S.	Hendry/ Lindsay	RAsso	Geological Sc	Geochemistry
Doig, L.	Liber	RS	Toxicology	Tox Center
Dolgova, N.	Pickering	RAsso	Geological Sc.	Selenium in Zebrafish
Duncan, A.	Pomeroy	RT	Geography	
Elliott, C.	Elliott	RT	AAFC	
Fang, X.	Pomeroy	RT	Geography	Hydrology
Flahr, L.	Jardine	RT	Toxicology	Ecotoxicology
Fulmes, E.	Janz	SS	Toxicology	Selenium
Gallagher, T.	Janz	SS	Toxicology	Hair Cortisol

Gallagher, T.	Jardine/ Hecker	RT	Toxicology	Environmental Toxicology
Gallen, D.	Elliott	RT	AAFC	
Galloway, G.	Pomeroy	RT	Geography	Hydrology
Galuschik, N.	Lindsay	RA	Geological Sc.	Geochemistry
Gao, C.	Elliott	PDF	AAFC Brandon	
Garzon, L.P.V.	Soltan	VS - PhD	National Univ of Colombia	Emerging Contaminants
Georget, C.	Janz	SS	Toxicology	Zebrafish
Gerhart, A.	Jardine/ Hecker	SS	Toxicology	
Guan, X.J.	Pomeroy	RT	Geography	Hydrology
Hackett, M.	Pickering	PDF	Geological Sc	Sulfur Speciation
Halyk, L.	Hogan	RA	Animal & Poultry Sc.	
Hamoon, M.	Wilson	SS	Chemistry	Biopolymers
Han, J.	Li	SS	UofT	Atmospheric Measurements
Hart, S.	Johnstone	PDF	Biology	Ecology
Hodgson, A.	Janz	SS	Toxicology	Hormones
Iannucci, Y.	Johnstone	RA	Biology	Ecology
Janzen, D.	Pomeroy	PDF	Geography	Hydrology
Karoyo, A.H.	Wilson	PDF	Chemistry	Polymers
Kinar, N.	Pomeroy	PDF	Geography	
Lallemond, L.	Janz	VS - Université Pierre et Marie Curie	Toxicology	Selenium in Zebrafish
MacDonald, T.	Pickering	RA	Geological Sc.	Mercury in zebrafish
McPhee, L.	Hogan	RT	Toxicology	Aquatic Toxicology
McKay, E.	Bharadwaj	RASso	Fort Resolution – First Nation	SWEEP Project
Mohamed, M.H.	Wilson	RASso	Chemistry	Sorbent Materials
Mowat, A.	Whitfield	RA	SENS	
Murray, C.	Whitfield	RA	SENS	
Musselman, K.	Pomeroy	PDF	Geography	Hydrology
North, R.	Lindsay	RASso	Geological Sc.	Chemical Mass Balance Modeling
Okpalauwaekwe, U.	Bharadwaj	RA	MPH	First Nations
Peng, H.	Giesy	PDF	Toxicology	Enviro. Tox.

Pomonarenko, O.	Pickering	RAsso	Geological Sciences	Metals in Biology
Prestie, K.	Jardine	RT	Toxicology	
Raja, B.	Elshorbagy	PDF	Civil & Geo	Water Resources
Raine, J.	Liber	RS	Toxicology	Tox Center
Raes, K.	Liber	RT	Toxicology	Tox Center
Richards, G.	Steelman	PDF	SENS	
Sass, J.	Janz	SS	Toxicology	Hair Cortisol
Schiffer, S.	Liber	RT	Toxicology	Tox Center
Schirmer, M.	Pomeroy	RS	Geography	Hydrology
Selvam, G.	Soltan	SS	IIT-Madras, India	Lincomycin Degradation
Sergiel, A.	Janz	VS - PDF	University of Krakow	
Shook, K.	Pomeroy	RS	Geography	
Si, Y.	Soltan	SS	Chemical & Biological Eng.	Catalytic Ozonation
Singh, K.	Johnstone	PDF	Biology	Ecology
Singh, S.	Hendry/ Pickering	RAsso	Geological Sc	Mercury in amalgam
St. Yves, A.	Geisy	RT	Toxicology	Enviro. Tox.
Stang, T.	Hogan	RA	Animal & Poultry Sc.	
Sun, J.	Giesy	PDF	Toxicology	Enviro. Tox.
Tkatchuk, D.	Hogan	RA	Animal & Poultry Sc.	
Truchon-Savard, A.	Johnstone	RT	Biology	Ecology
Van der Kamp, G.	Johnstone	RA	Biology	Ecology
Vessey, C.	Lindsay	SS	Geological Sc.	Geochemistry
Viczko, E.	Hogan	RA	Animal & Poultry Sc.	
Wayand, N.	Pomeroy	VS - PDF	University of Washington	Hydrology
Whitfield, P.	Pomeroy	RS	Geography	Hydrology
Wiseman, S.	Giesy	RS	Toxicology	Enviro. Tox.
Zagozewski, R.	Bharadwaj	RA	SPH	Water Regulations
Student (one)	Martz	VS - MSc	The Nelson Mandela African Institution of	



Students (four)

Martz

VS - PhD

Science and
Technology
The Nelson
Mandela African
Institution of
Science and
Technology

APPENDIX D – GRANTS 2015-2016

Following table shows ongoing and new grants received by members of GIWS during the period of 2015-16. The GIWS membership received a total funding of \$90,001,370 of which core GIWS faculty secured \$79,480,978, which is in addition to the base operating funding of \$30 million from CERC program and \$68 million from GIWS membership from 2011-15. To avoid double counting of total grant value, we have listed amounts in *Italics* that were either previously reported or are co-led by investigators.

Baulch, Helen	
\$880,000	Undertaking lake metabolism and algal blooms: New tools for the management of potable water sources, Natural Sciences and Engineering Research Council (NSERC) Strategic Project Grant (Co-I: J.P. Giesy, R. Leavitt, P. Jones, K. Liber, K-E. Lindenschmidt)
\$130,000	Biogeochemistry of lakes in winter and the implications of declining ice cover, NSERC Discovery Grant
\$411,158	Identifying flood- and food-related limits to fish and wildlife production in the Saskatchewan River Delta, NSERC Collaborative Research and Development Grant – SaskPower (PI: T. Jardine)
\$309,478	A water quality modelling system of the Qu'Appelle River catchment for long-term water management policy development, Environment Canada Environmental Damages Fund (PI: Lindenschmidt, Co-Is: Noble, Strickert)
\$36,100	Detecting hot spots and hot moments in river health by combining real-time water quality monitoring and citizen science, NSERC Research Tools and Instrumentation Grant (PI: T. Jardine)
\$400,000	Centennial Enhancement Chair, University of Saskatchewan
\$2,250	Nitrification responses to a changing sewage load, U of S Undergraduate Summer Research Assistantship
\$12,000	Oxygen and hypoxia risk in prairie systems, Environment Canada Science Horizons
\$4,500	Nitrogen removal in cold climates -- does sediment freezing affect denitrification? NSERC Undergraduate Summer Research Assistantship funding
\$4,500	Lags in ecosystem recovery -- in-lake processes mediating response to nutrient control, NSERC Undergraduate Summer Research Assistantship funding
Bedard-Haughn, Angela	
\$190,000	Hydric Soils of the Prairie Pothole Region, NSERC Discovery grant
\$125,077	Lake Winnipeg Basin Stewardship Fund (LWBSF), Environment Canada
\$200,934	Enhanced Saskatchewan Soil Data for Sustainable Land Management, Co-Funded by Saskatchewan Ministry of Agriculture – Agriculture Development Fund, Saskatchewan Canola Development Commission, and Saskatchewan Pulse Growers (Co-I: Van Rees)
\$24,062	Integrating Soil Property Surveys and Soil Landscape Models in the Development of a Habitat Suitability Model for Dakota Skipper, a Threatened

Butterfly Species, Natural Sciences and Engineering Research Council of Canada Engage Grant

Barbour, Lee

\$259,071	Characterization of controls on mass loading to an oil sands End Pit Lake, Syncrude Canada Ltd., (Co-I: M. Lindsay)
\$85,731	An evaluation of the controls on salt release from oil sands reclamation covers, Syncrude Canada Ltd., (Co-Is: J. McDonnell, A. Ireson)
\$1,735,695	UofS Research Proposal for Teck Coal's Applied Research and Development Program on Selenium and Watersheds - Y2-4", TECK Coal Ltd. (Co-I: J. Hendry)
\$130,000	Multiscale soil water and temperature monitoring and stochastic simulation in semiarid farmlands", Chinese National Natural Science Foundation, \$130,000 (PI: Bing Si)
\$1,298,392	Evaluation and Modeling of Soil Water Dynamics to Determine Land Capability of Coarse Textured Hydrocarbon Affected Reclamation Soils - Aurora Capping Study", CONRAD (sponsors: Shell Canada Energy, CNRL, IORL, Suncor, Syncrude, TEPCA), Industry Contract (PI: Bing Si)
\$1,305,800	Hydrogeological Characterization of Oil Sands Mine Closure Landforms", NSERC Industrial Research Chair - Syncrude Canada Ltd portion
\$1,305,800	Hydrogeological Characterization of Oil Sands Mine Closure Landforms", NSERC Industrial Research Chair - NSERC portion
\$135,000	Large scale mine cover monitoring and mine cover design for cold regions", NSERC, Discovery Grant
\$122,305	An evaluation of the controls on salt release from oil sands reclamation covers, Syncrude – NSERC Collaborative Research and Development Grant (Co-Is: A. Ireson, J. McDonnell)
\$1,845,000	Mine Overlay Site Testing (MOST) Facility, Western Economic Diversification (Co-PI: J. McDonnell, J. Hendry, A. Ireson)
\$1,650,000	Water Security – Collaborative Research and Training Experience (CREATE) Program, NSERC CREATE Grant (PI: C. Westbrook; Co-I: H. Baulch, H. Wheeler, J. Pomeroy, J. McDonnell, P. Gober, B. Noble, K. Belcher, A. Bedard-Haughn)
\$449,408	Characterization of controls on mass loading to an oil sands End Pit Lake, Syncrude – NSERC Collaborative Research and Development Grant (Co-I: M. Lindsay)
\$151,819	Development of a Local Meteoric Water Line (LMWL) and a Stable Isotope of Water Catalogue for the Aurora North Mine Site", Syncrude Canada Ltd.
\$54,692	Evaluation of the 2014 and 2015 Mass Balances for BML", Syncrude Canada Ltd., Addendum to SCL-BML Industry Contract (PI: Hendry)
\$58,249	Determining the Sorbing Capacity of a Fill (Se Lab Testing)", TECK Coal Ltd., Industry Contract (PI: Hendry)
\$7,500	Real Time Monitoring of Water Content in Reclaimed Mine Waste Using Cone Penetration – TDR", Mitacs Accelerate Grant, O'Kane Portion (Co-I: Elwood)
\$7,500	Real Time Monitoring of Water Content in Reclaimed Mine Waste Using Cone Penetration – TDR", Mitacs Accelerate Grant, Mitacs portion (Co-I: Elwood)

**Bharadwaj, Lalita**

\$48,948	Beyond Physical, Impacts of Water Resource management in Saskatchewan First Nations Communities, SSHRC, WEPGN Partnership grant
\$199,882	Delta Dialogue Network, SSHRC Partnership Development Grant (PI: Steelman, T.; Co-Is: Fresque-Baxter, J.A., McLachlan, S.M., Jardine, T., Bradford, L.E.A., Jones, P.D., Lindenschmidt, K.-E., Poelzer, G.M., Reed, M.G., and Strickert, G.E.H.)
\$117,715	Geospatial models and isotope tracers to identify key fish and animal habitats along the Slave River, NWT Cumulative Impact Monitoring Program (Co-Is: Doig, L., Lindenschmidt, K., Jones, P., and Doig, L.)
\$300,000	Water Security for Rural Saskatchewan, Saskatchewan Health Research Foundation (Co-PI: C. Waldner)
\$40,000	A Social Network Analysis for Extension and Integration of Knowledge, SSHRC Water Economics Policy Governance Network (WEPGN)
\$7,500	Spirit, Safety and a Stand-off, SSHRC WEPGN Knowledge Mobilization Project
\$10,000	Saskatchewan Health Research Foundation Connections grant

Chang, Won Jae

\$115,000	Remediation in Challenging Environments: A New Approach for Accelerating Bioremediation in Cold Climates, NSERC Discovery Grant
\$99,245	Microbial Assessment and Bioremediation Feasibility for Petroleum Hydrocarbon Contaminated Soils, Husky Oil Operations - NSERC-CRD Grant
\$365,000	Development of Functionalized Clay-Based Reactive Media for Removal of Cationic Salts from Brine Effluent, International Minerals Innovation Institute (Agrium, Mosaic, and PotashCorp), IMII-Mitacs Accelerate Cluster Grant
\$208,897	Geoenvironmental Engineering Laboratory for Contaminated Site Remediation Research, Canada Foundation for Innovation

Doig, Lorne

\$117,715	Geospatial models and isotope tracers to identify key fish and animal habitats along the Slave River, NWT Cumulative Impact Monitoring Program (Co-Is: Doig, L., Lindenschmidt, K., Jones, P., and Bharadwaj, L.)
\$500,000	SWEEP – The Slave Watershed Environmental Effects Program, Canadian water Network (Co-Is: Lindenschmidt, K., P.D. Jones, T. Jardine, and Bharadwaj, L.)

Elshorbagy, Amin

\$280,000	Co-Leader Theme 4 - Canadian FloodNet, NSERC Strategic Network Grant
\$105,000	Sustainability-oriented Water Resources Allocation, Management, and Planning, NSERC Discovery Grant

Ferguson, Grant

\$865,735	Probabilistic Risk Assessment of Groundwater Flow and Contaminant Transport, Sylvia Fedoruk Canadian Centre for Nuclear Innovation and Atomic Energy of Canada Limited (Co-I: A. Ireson, M. Lindsay)
\$525,000	Hydrogeological Research for Saskatchewan's Potash Industry, International Minerals Innovation Institute (Co-I: M. Lindsay, B. Eglington, C. Hawkes, J. Hendry)
\$22,052	Developing sustainable non-potable groundwater resources for oil field operations in Shaunavon, Saskatchewan, NSERC Engage Grant with Crescent Point Energy

Giesy, John

\$429,253	Great Lakes Restoration Initiative, Toxic Substances and Areas of Concern, Program: I-A-6 Great Lakes Sediment Core Surveillance Program, US EPA
\$200,000	Novel Natural and Synthetic Brominated Compounds in the Environment, NSERC Discovery
\$2,000,000	Saskatchewan River Basin: a large-scale observatory for new interdisciplinary water science, Canada Foundation for Innovation (PI: H. Wheeler, Co-I: J. Pomeroy)
\$202,496	Aquatic Impact Assessment of Municipal Effluents (AIME), Canadian Water Network (Co-Is: M. Hecker, P. Jones, K. Liber, S. Wiseman)
\$961,000	Analytical Toxicology Base in Support of Economic Development, Western Economic Diversification (PI: K. Liber; Co-I: P.D. Jones, M. Hecker)
\$880,000	Undertaking lake metabolism and algal blooms: New tools for the management of potable water sources, Natural Sciences and Engineering Research Council (NSERC) Strategic Project Grant (PI: H. Baulch; Co-I: R. Leavitt, P. Jones, K. Liber, K-E. Lindenschmidt)
\$272,382	CREATE Training Program in Human and Ecological Risk Assessment (HERA), NSERC (Co-I: S.D. Siciliano, L. Bharadwaj)
\$265,375	The Base Mine Lake Toxicity Identification and Evaluation Study; Advancing knowledge for water reclamation and return, Syncrude Canada Limited and NSERC Collaborative Research and Development grant, total funding of \$1,061,500
\$142,180	Marine Biogeochemistry and Ecotoxicology Program of Introducing Talents of Discipline to Universities, Ministry of Education and the State Administration of Foreign Experts, China to State Key Lab of Marine Environmental Science, Xiamen University, total funding \$710,900
\$75,545	Toxico-genomic Assessment of Emerging Environmental Pollutants Using Novel Functional Genomic and High Throughput Technologies, European Commission, Directorate for Innovation and Research, Directorate I Environment, total funding \$453,270 (Co-PI: X. Zhang)
\$1,999,566	Facility for Applied Avian Research, Canada Foundation for Innovation (PI: C. Morressey, Co-I: K. Machin)
\$491,180	Emission, Diffusion and Environmental Effects of Emerging Pollutants from Rapid Urbanization, National Science Foundation of China (Co-I: X. Zhang)

\$444,998	Assessing the Adverse Effects of Emerging Chemical Contaminants on Fishes of Commercial, Aboriginal and Recreational value to Canadians (Co-I: M. Hecker, P. Jones, S. Wiseman)
\$1,400,000	Canada Research Chair Program
\$530,000	Institutional Support from University of Saskatchewan for Canada Research Chair
\$14,000	Effects on Pesticides on Honey Bees in Egypt and Canada, Egyptian Cultural Exchange Program
\$24,000	The Saskatraz Honey Bee Project, Meadow Ridge Enterprises
\$20,060	Sources of Organo-bromine Compounds in Sediments, University Faculty Research Investment Program, funded by the Baylor Office of the Vice Provost for Research

Hecker, Markus

\$575,000	Predictive Aquatic Ecotoxicology, Canada Research Chair Program
\$402,261	Predictive Aquatic Eco-Toxicology Facility, CFI Infrastructure Grant for Canada Research Chairs
\$200,000	Predictive Aquatic Ecotoxicology, Provincial Support for Canada Research Chair Program
\$75,000	Predictive Aquatic Eco-Toxicology Facility, Institutional Support for Canada Research Chair Program
\$36,203	Predictive Aquatic Eco-Toxicology Facility, CFI Institutional Operation Fund
\$444,998	Assessing the Adverse Effects of Emerging Chemical Contaminants on Fishes of Commercial, Aboriginal and Recreational Value to Canadians (AECCO), Fisheries and Oceans Canada
\$299,140	Safe Water for Health Research Team (SWHRT), Saskatchewan Health Research Foundation (PI: L. Bharadwaj and others)
\$202,496	Aquatic impact assessment of municipal effluents, Canadian Water Networks
\$200,000	Functional Transcriptomics of Native Canadian Fish Species; NSERC Discovery
\$961,000	Analytical Toxicology Base in Support of Economic Development, Western Economic Diversification (PI: K. Liber; Co-I: J.P. Giesy, P.D. Jones)
\$402,261	Predictive Aquatic Ecotoxicology Facility; CFI and matching CRC portion
\$29,530	Application of environmental DNA to detect aquatic invasive species. Fish and Wildlife Development Fund (Co-I: Jardine)
\$725,070	Advancing environmental risk assessment of selenium (ERASe). NSERC Strategic Project Grant (Co-PIs K. Liber and D. Janz)
\$444,998	Assessing the Adverse Effects of Emerging Chemical Contaminants on Fishes of Commercial, Aboriginal and Recreational value to Canadians (Co-I: M. hecker, P. Jones, S. Wiseman)

Helgason, Warren

\$988,149	Improved water and nutrient use efficiency to maximize the net greenhouse gas balance in irrigated production systems, Agriculture and Agri-Food Canada (Co-I: R. Farrell)
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\$114,250	Evaporation Field study For the Prairie Provinces Water Board, Saskatchewan Water Security Agency
\$148,340	Improved variable rate irrigation prescription development, Saskatchewan Agriculture Development Fund

Hendry, Jim

\$525,000	Hydrogeological Research for Saskatchewan's Potash Industry, International Minerals Innovation Institute (Co-I: G. Ferguson, M. Lindsay, B. Eglington, C. Hawkes)
\$1,735,695	UofS Research Proposal for Teck Coal's Applied Research and Development Program on Selenium and Watersheds - Y2-4", TECK Coal Ltd. (Co-I: J. Hendry)
\$150,000	Towards Environmentally Responsible Resource Extraction (TERRE), NSERC CREATE Program, \$1,650,000 (PI: D.W. Blowes; Co-I: 9 Co-Applicants, 20 Collaborators)
\$1,113,725	Cameco Industry Research Chair in Environmental and Aqueous Geochemistry, \$222,745 per year for 5 years
\$1,189,500	NSERC Industry Research Chair in Environmental and Aqueous Geochemistry, \$237,900 per year for 5 years
\$90,000	Saskatchewan Potash Producers Grant

Hogan, Natacha

\$903,925	Fate and toxicity of lubricating oils across Canadian ecoprovinces, TransCanada Corp – NSERC Collaborative Research and Development Grant (PI: S. Siciliano; Co-I: E. Farrell)
\$172,235	Strategies to mitigate the negative effects of deoxynivalenol (DON) in nursery pigs. Agricultural Development Fund (PI: D. Beaulieu; Co-I: L. Eastwood, H. Wilson, T.A. Scott)
\$196,000	The impact of reducing mycotoxins in poultry feed on the natural defense against disease. NSERC Collaborative Research and Development Grant, Canadian Poultry Research Council, Canadian Bio-Systems. (Co-I: T.A. Scott)
\$176,500	Using toxicogenomics in amphibians and the adverse outcome pathway for environmental effects monitoring of oil sands industrial development. Strategic Technology Applications of Genomics in the Environment (STAGE), Environment Canada (PI: B. Pauli, Co-I: V.L. Trudeau, D. Schock)
\$24,500	Systemic human toxicity assessment of pesticide mixtures. NSERC Engage Grant

Hudson, Jeff

\$218,930	Lake Diefenbaker water quality assessment, Saskatchewan water Security Agency
\$4,000	University Undergraduate Student Research Assistantships Grant
\$4,500	Summer Undergraduate Research Internship Award, Dept. of Biology
\$13,328	CFI infrastructure operating fund

Ireson, Andrew

\$85,731	An evaluation of the controls on salt release from oil sands reclamation covers, Syncrude Canada Ltd. (Co-Is: J. McDonnell, L. Barbour)
\$110,000	Groundwater-surface water interactions in the prairies, NSERC Discovery Grant
\$393,795	Causes and health impacts of saline intrusion into drinking water ponds in Bangladesh, Leverhulme Trust, England
\$865,735	Probabilistic Risk Assessment of Groundwater Flow and Contaminant Transport, Sylvia Fedoruk Canadian Centre for Nuclear Innovation and Atomic Energy of Canada Limited (Co-I: G. Ferguson, M. Lindsay)
\$1,846,000	The Mine Overlay Site Testing (MOST) Facility, Western Economic Diversification (Co-I: Barbour, Hendry and Ireson)
\$122,305	An evaluation of the controls on salt release from oil sands reclamation covers, Syncrude – NSERC Collaborative Research and Development Grant (Co-Is: J. McDonnell, L. Barbour)
\$25,000	Improving and benchmarking models for snowmelt infiltration in seasonally frozen soils, NSERC Engage Grant with Geo-slope International Ltd
\$2,250	An assessment of flooding at Beardys and Okemasis First Nation, U of S Undergraduate Summer Research Assistantship

Janz, David

\$235,000	Mechanisms of Developmental Toxicity and Metabolic Disruption in Fishes Exposed to Selenium, NSERC Discovery Grant. 2016-2021
\$616,622	Grizzly-PAW: Grizzly Population Assessment in yellowhead: Integrated Approaches Toward Conserving Grizzly Bears on a Human-Dominated Landscape of Western Alberta. NSERC, Collaborative Research and Development Grants Program. Total funding is \$1.8 million
\$725,070	Advancing environmental risk assessment of selenium (ERASe). NSERC Strategic Project Grant (Co-PIs M. Hecker and K. Liber)
\$411,158	Identifying flood- and food-related limits to fish and wildlife production in the Saskatchewan River delta, NSERC Collaborative Research and Development Grant – SaskPower (PI: T. Jardine; Co-I: H. Baulch, and K. Hobson)
\$124,000	Development of a fish biomonitoring program for northern Saskatchewan. Environmental Damages Fund (Co-I: Jardine)
\$35,000	Bioaccumulation and biological effects of PBDEs and priority emerging flame retardants in two marine mammal species from the St. Lawrence Estuary, Fisheries and Oceans Canada, total grant \$292,100 (Co-Is: Houde, M., Lesage, V., Michaud, R., Zbinden, D.)

Jardine, Tim

\$411,158	Identifying flood- and food-related limits to fish and wildlife production in the Saskatchewan River delta, NSERC Collaborative Research and Development Grant – SaskPower (Co-I: H. Baulch, K. Hobson, D. Janz)
\$135,000	Ecological benefits and toxicological consequences of flooding in river ecosystems, NSERC Discovery Grant

\$500,000	SWEEP – The Slave Watershed Environmental Effects Program, Canadian water Network (Co-Is: Lindenschmidt, K., P.D. Jones, Bharadwaj, L., and Doig, L.)
\$117,715	Geospatial models and isotope tracers to identify key fish and animal habitats along the Slave River, NWT Cumulative Impact Monitoring Program (Co-Is: Lindenschmidt, K., Jones, P.D., Bharadwaj, L., and Doig, L.)
\$1,742,735	Biodiversity and Biological Interactions in Singapore’s Reservoirs and Waterways—A study of Food Web and Trophic Structure, and Implications for Environmental and Water Quality Management (Phase 2). Public Utilities Board of Singapore (Co-PIs: Yeo, D., Hui, T.H., and Lu, J.)
\$199,882	Delta Dialogue Network, SSHRC Partnership Development Grant (PI: Steelman, T.; Co-Is: Fresque-Baxter, J.A., McLachlan, S.M., Bharadwaj, L.A., Bradford, L.E.A., Jones, P.D., Lindenschmidt, K.-E., Poelzer, G.M., Reed, M.G., and Strickert, G.E.H.)
\$48,344	Building bridges between deltas: crossing knowledge and cultural divides. SSHRC Connection Grant (PI: Steelman; Co-I: Strickert, Fresque-Baxter, Reed and Shantz)
\$36,100	Detecting hot spots and hot moments in river health by combining real-time water quality monitoring and citizen science, NSERC Research Tools and Instrumentation Grant (Co-I: Baulch)
\$124,000	Development of a fish biomonitoring program for northern Saskatchewan. Environmental Damages Fund (Co-I: Janz)
\$29,530	Application of environmental DNA to detect aquatic invasive species. Fish and Wildlife Development Fund (Co-I: Hecker)

Johnstone, Jill

\$539,000	Population dynamics and critical habit of woodland caribou in the boreal shield of Saskatchewan, NSERC Collaborative Research and Development Grant (Co-I: McLoughlin, P.D.)
\$150,000	Regional consequences of changing climate-disturbance interactions for the resilience of Alaska’s boreal forest: Bonanza Creek LTER, U.S. National Science Foundation, Long-Term Ecological Research program (Co-I: Ruess, R., and 24 others)
\$105,000	Resistance, resilience, and vulnerability of boreal forests to environmental change, NSERC Discovery Grant

Jones, Paul

\$250,000	SWEEP – The Slave Watershed Environmental Effects Program, Canadian water Network, total \$500,000 (Co-Is: Lindenschmidt, K., T. Jardine, Bharadwaj, L., and Doig, L.)
\$880,000	Undertaking lake metabolism and algal blooms: New tools for the management of potable water sources, Natural Sciences and Engineering Research Council (NSERC) Strategic Project Grant (PI: H. Baulch; Co-I: P. Giesy, R. Leavitt, K. Liber, K-E. Lindenschmidt)

\$199,882	Delta Dialogue Network, SSHRC Partnership Development Grant (PI: Steelman, T.; Co-Is: Fresque-Baxter, J.A., McLachlan, S.M., Bharadwaj, L.A., Bradford, L.E.A., Jardine, T., Lindenschmidt, K.-E., Poelzer, G.M., Reed, M.G., and Strickert, G.E.H.)
\$961,000	Analytical Toxicology Base in Support of Economic Development, Western Economic Diversification (PI: K. Liber; Co-I: J.P. Giesy, M. Hecker)
\$117,715	Geospatial models and isotope tracers to identify key fish and animal habitats along the Slave River, NWT Cumulative Impact Monitoring Program (Co-Is: Lindenschmidt, K., T. Jardine, Bharadwaj, L., and Doig, L)
\$149,996	Aquatic Impact Assessment of Municipal Effluents (AIME), Canadian Water Network (Co-Is: M. Hecker, P. Jones, K. Liber, S. Wiseman)
\$444,998	Assessing the Adverse Effects of Emerging Chemical Contaminants on Fishes of Commercial, Aboriginal and Recreational value to Canadians (Co-I: M. Hecker, P. Jones, S. Wiseman)

Li, Yanping

\$24,500	Cold region hydroclimatology in <i>Northwestern Canada</i> , Environment Canada
\$24,500	Examine projected changes of extreme rainstorms over Western Canada in a warmed climate. Research Grant from Environment Canada (Ontario), Environment Canada
\$6,000	Study of 4-km regional climate simulation over the continental United States (CONUS) and southern part of Canada, National Center for Atmospheric Research (NCAR), United States of America

Liber, Karsten

\$35,000	Quantifying and modeling the bioavailability and toxicity of sediment-associated uranium to the freshwater midge <i>Chironomus dilutus</i> . AREVA Resources Canada Ltd.
\$232,000	Neonicotinoid insecticide toxicity to aquatic organisms: Addressing key knowledge gaps on toxicity thresholds, mixtures and mitigation strategies using buffer zones. Dept of Fisheries and Oceans, National Contaminants Advisory Group (Co-I: K. Liber)
\$880,000	Undertaking lake metabolism and algal blooms: New tools for the management of potable water sources, Natural Sciences and Engineering Research Council (NSERC) Strategic Project Grant (PI: H. Baulch; Co-I: P. Giesy, R. Leavitt, P. Jones, K-E. Lindenschmidt)
\$961,000	Analytical Toxicology Base in Support of Economic Development, Western Economic Diversification (PI: K. Liber; Co-I: J.P. Giesy, P.D. Jones)
\$200,000	Assessment of metal contamination of rivers in Shanxi Province, P.R. China, associated risk to environmental and human health, and recommendation of options for environmental restoration. 100 Talents Program, Shanxi Province, P.R. China. Principal Investigator
\$725,070	Advancing environmental risk assessment of selenium (ERASe). NSERC Strategic Project Grant (Co-PIs M. Hecker and D. Janz)

\$19,230	Bioaccumulation of trace metals in dragonflies of Saskatchewan's northern boreal forest. Saskatchewan Ministry of Environment, Regina, SK (Co-PI D. Halstead, Saskatchewan Polytechnic)
\$116,850	Characterization of extra fine processed kimberlite tailings from the Diavik diamond mine processed kimberlite containment pond. Diavik Diamond Mines Inc., Calgary, AB.
\$289,973	Vanadium toxicity to aquatic organisms representative of the Athabasca oil sands region. Syncrude Canada Ltd., Edmonton, AB.
\$320,329	Distribution and impact of neonicotinoid insecticides on agricultural wetlands and water birds of Prairie Canada. NSERC Strategic Project Grant (Co-PI)

Lindenschmidt, Karl-Eric

\$117,715	Geospatial models and isotope tracers to identify key fish and animal habitats along the Slave River, NWT Cumulative Impact Monitoring Program. (Co-Is: Jardine, T., Jones, P., Bharadwaj, L., and Doig, L.)
\$880,000	Undertaking lake metabolism and algal blooms: New tools for the management of potable water sources, NSERC Strategic Project Grant (PI: H. Baulch)
\$199,882	Delta Dialogue Network, SSHRC Partnership Development Grant (PI: Steelman, T.; Co-Is: Fresque-Baxter, J.A., McLachlan, S.M., Bharadwaj, L.A., Bradford, L.E.A., Jardine, T., P.D. Jones, Poelzer, G.M., Reed, M.G., and Strickert, G.E.H.)
\$125,000	Ice jam flood forecasting and ice jam flood risk assessment, NSERC Discovery Grant
\$309,478	A water quality modelling system of the Qu'Appelle River catchment for long-term water management policy development, Environment Canada Environmental Damages Fund (Co-Is: Baulch, Noble, Strickert)
\$50,000	Research (SOAR) for RADARSAT-2: Interferometry (InSAR) program, Canadian Space Agency's Science (CSA) and Operational Applications
\$3,000	Geospatial modelling to forecast ice jamming along the Oder River, Germany. DAAD – German Academic Exchange Service
\$1,500	Visiting Lecturer Fund to invite Derek Armitage to give a keynote lecture at SENS Symposium Day in March 2017
\$1,000	UofS Publications Fund to cover the costs of publishing the journal article

Loring, Phil

\$180,000	Dimensions of Sustainability in Haida Gwaii. Parks Canada 2015-2017
\$75,000	Early Career Faculty Grant: Linking Ocean Health and Human Health in Haida Gwaii. MEOPAR, Tri-council NCE 2015-2017
\$32,000	Changing Inner City Food Environments: Interventions to Address Nutritional Health Inequities. CIHR. Total funding \$285,000
\$1,600,000	Sustainable Futures North: Food, Water and Energy Security in a Changing Arctic. US National Science Foundation. Total grant is \$2.9 million. 2013-2017.
\$178,000	Climate Change Adaptation, Sustainable Energy Development, and Comparative Agricultural and Rural Policy. US Department of Agriculture. Total grant is \$913,000 USD. 2013-2017

\$37,000 Rural Policy Learning Commons: Building Rural Policy through International Comparative Analysis. SSHRC Partnership. Total grant is \$2.7 million. 2014-2021

Lindsay, Matt

\$140,000 Biogeochemical and Mineralogical Processes in Redox Dynamic Groundwater Systems, NSERC Discovery Grant

\$694,136 Mine Closure Geochemistry, Associate Industrial Research Chair, NSERC Industrial Research Chairs Program

\$694,136 Mine Closure Geochemistry, Associate Industrial Research Chair, Syncrude Canada Ltd., Industry Contribution

\$33,000 Towards Environmentally Responsible Resource Extraction (TERRE), NSERC CREATE Program, \$1,650,000 (2% available to M. Lindsay) (PI: D.W. Blowes; Co-I: 9 Co-Applicants, 20 Collaborators)

\$865,735 Probabilistic Risk Assessment of Groundwater Flow and Contaminant Transport, Sylvia Fedoruk Canadian Centre for Nuclear Innovation and Atomic Energy of Canada Limited (Co-I: G. Ferguson, A. Ireson)

\$259,071 Characterization of controls on mass loading to an oil sands End Pit Lake, Syncrude Canada Ltd., (Co-I: M. Lindsay)

\$8,335 Portable Gas Chromatography to Support Biogeochemical Investigations of Closure Technologies for Oil Sands Mines, CFI - John R. Evans Leaders Operating Fund

\$50,000 Toward Environmentally Responsible Resource Extraction Network (NSERC-TERRE-NET), \$5,500,000. Natural Sciences and Engineering Research Council of Canada – Strategic Partnership Grants for Networks Program, June 30, 2016 – June 29, 2021, year 1 of 5, \$1,000,000 (\$50,000 available to MBL)

\$283,663 Geochemical Potential of Site Materials, \$283,663. Syncrude Canada Limited, April 1, 2016 – March 31, 2018, year 1 of 2, \$133,295

\$43,750 Assessing the Sodium Buffering Capacity of Reclamation Materials in Sandhill Fen, \$43,750. Syncrude Canada Limited, May 1, 2015 – June 30, 2016, year 2 of 2, \$6,250

\$449,408 Examining controls on mass loading to an oil sands end pit lake, \$449,408 (50% available to MBL). Natural Sciences and Engineering Research Council of Canada – Collaborative Research and Development Grants, June 1, 2015 – May 31, 2018, year 1 of 3, \$88,934 (\$44,467 available to MBL)

Mantyka-Pringle, Chrystal

\$140,000 Mitacs Elevate Fellowship to Chrystal Mantyka-Pringle

McDonnell, Jeffrey

\$150,000 Impacts of biofuel production in forested watersheds, US Dept. of Energy

\$425,000 How do watersheds store and release water? NSERC Discover Grant

\$120,000 How do watersheds store and release water? NSERC Accelerator Award

\$108,300 Hydrological impacts of biofuel production. US Dept of Energy

\$208,512	Eucalyptus plantation impacts on catchment water balance, US Dept. of Energy
\$143,855	Sustainable Water Use and Bioenergy: Application of Isotopic Tracers techniques to Improve Methods for Estimating Water Use in Intensively Managed Woody Crop Systems, Su-contract, University of Georgia, USA
\$85,731	An evaluation of the controls on salt release from oil sands reclamation covers, Syncrude Canada Ltd (Co-Is: A. Ireson, L. Barbour)
\$1,846,000	The Mine Overlay Site Testing (MOST) Facility, Western Economic Diversification (Co-I: Barbour, Hendry and Ireson)

McPhedran, Kerry

\$150,000	Investigation of the role of organic matter in partitioning of chemicals in the municipal wastewater treatment process, NSERC Discovery Grant
\$85,000	Clean water for Indigenous communities in Saskatchewan, RBC Blue Water Project Leadership Grant Program

Morrissey, Christy

\$1,999,566	Facility for Applied Avian Research, Canada Foundation for Innovation (Co-I: J.P. Giesy, K. Machin)
\$232,000	Neonicotinoid insecticide toxicity to aquatic organisms: Addressing key knowledge gaps on toxicity thresholds, mixtures and mitigation strategies using buffer zones. Dept of Fisheries and Oceans, National Contaminants Advisory Group (Co-I: K. Liber)
\$320,000	Distribution and Impact of Neonicotinoid Insecticides on Prairie Wetlands and Waterbirds, NSERC Strategic Project Grant (Co-I: K. Liber)
\$140,000	Effect of endocrine disrupting chemicals on avian life cycles, NSERC Discovery Grant

Noble, Bram

\$309,000	A water quality modelling system of the Qu'Appelle River catchment for long-term water management policy development. Environment Canada Disaster Management Fund (PI: K-E. Lindenschmidt, Co-I: H. Baulch, G. McMaster)
\$23,900	What is known about the impacts of alternative energy development? Social Sciences and Humanities Research Council of Canada, Knowledge Synthesis Grant (PI: K. Hanna, Co-I: J. Parkin)
\$148,452	Assessing regulators' information needs to make decisions regarding cumulative effects under the Mackenzie Valley Resource Management Act. Northwest Territories Cumulative Impact Monitoring Program (Co-I: K. Hanna)

Patrick, Robert

\$100,000	Canadian Pacific Railway Partnership Program in Aboriginal Development
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Pickering, Ingrid

\$425,000	Canada Research Chair Operational Support, University of Saskatchewan (OVRP, College, Department)
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\$2,358,200	CIHR-Training grant in Health Research Using Synchrotron Techniques (THRUST), Canadian Institutes of Health Research (CIHR) Strategic Training Initiative in Health Research (STIHR) Training Grant (23 Co-applicants)
\$1,759,500	HSFC/CIHR Team in Synchrotron Medical Imaging, Canadian Institutes of Health Research (CIHR) Team Grant - Clinical Imaging (PI: H. Nichol, Co-I: 9 applicants)
\$250,000	Support for Canada Research Chair, Province of Saskatchewan
\$112,000	Selenium Fortified Table Salt to Treat Arsenic Poisoning in Bangladesh, Grand Challenges Canada – Stars of Global Health, Round 7, Stage 1 (Co-I: G. George)
\$3,000	CIHR-THRUST 6th Annual Retreat, Saskatchewan Health Research Foundation (SHRF) Research Connections Grant (Co-I: A.K. James, S. Caine)
\$300,000	Synchrotron studies of selenium environmental chemistry, Natural Sciences and Engineering Research Council (NSERC) Discovery Grant
\$296,000	Analyzing Crude Oils for Sulfur Species and Oxygen Speciation, Chevron Energy Technology Company, Richmond California, USA (PI: G.N. George)

Pomeroy, John

\$360,000	Snow Hydrology, Discovery Grant, NSERC
\$1,400,000	Canada Research Chair in Water Resources and Climate Change
\$11,935	Canada Research Chair Operating Grant
\$350,000	Highly Qualified Personnel, Canada Research Chair
\$140,065	Canada Research Chair Research Grant
\$2,000,000	Saskatchewan River Basin: a large-scale observatory for new interdisciplinary water science, CFI (Co-I: J. Giesy, H. Wheeler)
\$374,000	Changing Cold Regions Network, NSERC FCAR
\$60,000	Alberta Environment and Sustainable Resource Development
\$350,000	NSERC CREATE in Water Security
\$100,527	Canada Foundation for Innovation – Infrastructure Operating Fund
\$50,000	Recommendations for Saskatchewan Hydrological Modelling, Sask. Water Security Agency
\$550,000	Rocky Mountain Water Supply Resilience and Vulnerability Evaluation, Alberta Innovates
\$77,640	Sensitivity of Dempster Highway Hydrological Response to Climate Warming, Yukon Government
\$50,000	Watershed Study to Assess the Impacts of Large-Scale Forest Cover Changes on Snow Hydrology and Stream Flow Generation in Mountain Headwater Watershed, Alberta Environment and Sustainable Resource Development
\$381,900	Expanded Testing and Development of the Prairie Hydrological Model in Three Prairie Pothole Watersheds, Ducks Unlimited Canada

Razavi, Saman

\$125,000	Development of a New Framework for Watershed Systems Analysis and Modelling under Climate and Environmental Changes, NSERC Discovery Grant
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\$42,000 North Slave Hydrology Study, Northwest Territories Power Corporation (PI: H. Wheeler, Co-I: C. Spence)

Soltan, Jafar

\$25,000 Treatment of membrane concentrate by advanced oxidation processes for blending with permeate water, NSERC Engage Grant

\$254,207 Analytical Infrastructure for the Catalytic Ozonation Laboratory, John R. Evans Leaders Fund, Canada Foundation for Innovation CFI

\$22,879 Analytical Infrastructure for the Catalytic Ozonation Laboratory, John R. Evans Leaders Fund, Canada Foundation for Innovation

\$10,000 Sonication of micropollutants, Emerging Leaders in Americas Program (ELAP) fellowship by Canadian Bureau of International Education (CBIE) on behalf of Foreign Affairs and International Trade Canada (DFAIT)

Steelman, Toddi

\$199,882 Delta Dialogue Network, SSHRC Partnership Development Grant (Co-Is: Fresque-Baxter, J.A., McLachlan, S.M., Bharadwaj, L.A., Bradford, L.E.A., Jardine, T., Jones, P.D., Lindenschmidt, K.-E., Poelzer, G.M., Reed, M.G., and Strickert, G.E.H.)

\$350,716 A Pre/Post Disaster Investigation of the Effect of Network Capacities on Disaster Response, National Science Foundation Award, United States of America. (Co-I: B. Nowell)

\$364,344 Relational Risk Assessment and Management: Investigating Local Capacity in Wildfire Response Networks, Joint Fire Science Award/US Department of the Interior. (Co-I: B. Nowell)

\$73,428 Northern Governance Innovation and Development for Socially Resilient Boreal Communities, SSHRC Insight Development Grant (PI: R. Bullock; Co-I: K. Coates, G. Broad)

\$6,984 The Next Generation of Delta Stewards, President's SSHRC Fund, University of Saskatchewan.

\$48,344 Building bridges between deltas: crossing knowledge and cultural divides. SSHRC Connection Grant (Co-I: Strickert, Fresque-Baxter, Reed and Shantz)

Strickert, Graham

\$199,882 Delta Dialogue Network, SSHRC Partnership Development Grant (PI: Steelman, T.; Co-Is: Fresque-Baxter, J.A., McLachlan, S.M., Bharadwaj, L.A., Bradford, L.E.A., Jardine, T., Jones, P.D., Lindenschmidt, K.-E., Poelzer, G.M., and Reed, M.G.)

\$239,525 The Human Dimensions of Permafrost Thaw. College and Community Social Innovation Fund, Partnership Development Grant, Social Science and Humanities Research Council of Canada (Co-Is: Bell, S., Clark, D., Calmels, F., Collins, C., Jinnear, L.)

Westbrook, Cherie

\$1,650,000 Water Security – Collaborative Research and Training Experience (CREATE) Program, NSERC CREATE Grant (Co-I: H. Baulch, L. Barbour, H. Wheeler, J. Pomeroy, J. McDonnell, P. Gober, B. Noble, K. Belcher, A. Bedard-Haughn)

Wheater, Howard

\$528,772 Water Cycle Prediction in Western and Northern Canada, Environment Canada
\$2,850 Water Knowledge Application Network (WatKAN), Canadian Water Network
\$30,000,000 Canada Excellence Research Chair in Water Security: Sustainable freshwater resources and environmental change, Government of Canada, Government of Saskatchewan and University of Saskatchewan
\$5,000,000 Chasing Cold Regions network, Climate Change and Atmospheric Research, NSERC (36 Canadian Scientists and 15 International Collaborators),
\$2,000,000 Saskatchewan River Basin: a large-scale observatory for new interdisciplinary water science, CFI (Co-I: J. Giesy, J. Pomeroy)
\$1,059,806 Hydrological extremes and feedback in the changing water cycle, Natural Environment research Council, UK
\$475,000 Water Sciences research in Western Canada, Environment Canada
\$30,000 Saskatchewan River Basin: A Large-scale Observatory Videos, Curriculum Innovation Fund, Gwenna Moss Centre for Teaching Effectiveness, University of Saskatchewan
\$34,000 Water Security – Environmental Impact and Modelling, Curriculum Innovation Fund, Gwenna Moss Centre for Teaching Effectiveness, University of Saskatchewan
\$240,000 Saskatchewan River Basin: a large-scale observatory for new interdisciplinary water science, CFI Infrastructure Operating Fund (Co-I: J. Giesy, J. Pomeroy)
\$140,000 Mitacs Elevate Fellowship to Chrystal Mantyka-Pringle
\$475,000 Environment and Climate Change Canada grant 2016-2021
\$77,840,000 Global Water Futures: Solutions to Water Threats in an Era of Global Change, Canada First Research Excellence Fund, Tri-Agency 2016-2023

Whitfield, Colin

\$3,500 Plain language summary of boreal and taiga soils of SK for Boreal Watershed Initiative Report, Saskatchewan Environment

Wilson, Lee

\$175,000 NSERC Discovery Grant
\$25,000 Natural Resources Canada Contract
\$40,000 International Flagship Partnership Research Grants, University of Saskatchewan (shared 50% with the Beijing Institute of Technology)
\$1,000 Shastri Indo-Canadian Faculty Travel Award

APPENDIX E – Publications, Conference Proceedings and Presentations

Journal Publications - 2016

- Abirhire, O., R. North, K. Hunter, D. Vandergucht, and J. Hudson. 2016. Do human activities affect phytoplankton biomass and composition in embayments on Lake Diefenbaker? *Freshwater Ecology*. Accepted 17 May 2016, Published Online August 9, 2016. <http://dx.doi.org/10.1080/02705060.2016.1205526>.
- Abuelela, A.M., Mohamed, T.A., Wilson, L.D., W.M. Zoghaib. 2016. Raman and infrared spectra, normal coordinate analysis and ab initio calculations of 4-Amino-2-chloropyrimidine-5-carbonitrile. *J. Molecular Structure*, 115, 85-93.
- Al Harbi, H.A., D.M.V. Saunders, A.-Mousab, J. Alcorna, A.S. Pereira; J.W. Martin, J.P. Giesy and S.B. Wiseman. 2016. Inhibition of ABC Transport Proteins by Oil Sands Process Affected Water. *Aquatic Toxicol.* 170: 81–88. DOI: [org/10.1016/j.aquatox.2015.11.013](http://dx.doi.org/10.1016/j.aquatox.2015.11.013)
- Al Naggar, Y. Y. Tan, C. Rutherford, W. Connore, P. Griebel, J.P. Giesy and Albert J. Robertson. 2016. Effects of Treatments with Apivar® and Thymovar® on *V. destructor* Populations, Virus Infections and Indoor Winter Survival of Canadian Honey Bee (*Apis mellifera* L.) Colonies. *J. Apicult. Res.* 54: DOI:10.1080/00218839.2016.1186917
- Alexander, A.C., Culp, J.M., Baird, D.J., and Cessna A.J. 2016. Nutrient-contaminant interactions decouple density-dependent responses in aquatic and emergent insects. *Freshwater Biology* (in press).
- Amarakoon, I., Zvomuya, F., Sura, S., Larney, F.J., Cessna, A.J., Xu, S., and McAllister, T.A. 2016. Dissipation of antimicrobials in feedlot manure compost after oral administration versus fortification after excretion. *The Journal of Environmental Quality* 45:503-510.
- Amarakoon, I., Sura, S., Zvomuya, F., Cessna, A.J., Larney, F.J., and McAllister, T.A. 2016. Dissipation of antimicrobials in a seasonally frozen soil following beef cattle manure application. *The Journal of Environmental Quality* (in press).
- Ameli, A.A., N. Amvrosiadi, T. Grabs, I. Creed, H. Laudon, K. Bishop and J.J. McDonnell. 2016. Assessment of controls on travel time distribution and flow pathways in till catchments. *Journal of Hydrology*, in press.
- Ameli, A., J.J. McDonnell and K. Bishop, 2016. The exponential decline in saturated hydraulic conductivity with depth and its effect on water flow paths and transit time distribution. *Hydrological Processes*, DOI: 10.1002/hyp.10777.
- Barbour, S.L., Hendry, M.J., Carey, S.K. 2016. High-Resolution Profiling of the Stable Isotopes of Water in Unsaturated Coal Waste Rock. *J. Hydrol.*, 534: 616-629.
- Bartlett, M., J.J. McDonnell and A. Porporato. 2016. A probabilistic storage framework for semi-distributed modeling that unifies the SCS-CN method, VIC, PDM, and TOPMODEL. *Water Resources Research*, in press.
- Bartlett, M., E. Daly, J.J. McDonnell and A. Porporato. 2016. Excess over a threshold in stochastic jump processes: theory and application to rainfall-runoff modeling. *Proceedings Royal Society A*, in press.
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- Zhu, Y. X.-F. Ma, G.-Y. Su, L.-Q. Yu, R.J. Letcher, J. Hou, H.-X. Yu, J.P. Giesy and C.-S. Liu. 2015. Environmentally Relevant Concentrations of the Flame Retardant tris(1,3-dichloro-2-propyl) Phosphate (TDCIPP) Inhibits Growth of Female Zebrafish and Decreases Fecundity. *Environ. Sci. Technol.* 49:14479-14587. DOI: 10.1021/acs.est.5b03849

Conference Proceedings and Presentations - 2016

- Abirhire O., and J. Hudson. 2016. Do changes in hydrologic flow affect summer algal biomass? Assessment of a changing climate on Lake Diefenbaker. Annual meeting of the Association for the Sciences of Limnology and Oceanography (ASLO), Santa Fe, United States. June 5-10.
- Abu, R., M.G. Reed and T. Jardine. 2016. Understanding socio-ecological change through two-eyed seeing: bringing together traditional and scientific knowledge to understand long-term change in the Saskatchewan River Delta. Paper presented at the International Symposium for Society and Resource Management in Houghton, Michigan, USA, June 22-26.
- Aghbolaghy M., and J. Soltan, 2016, Reduction in energy consumption and GHG emissions associated with air ventilation by advanced indoor air treatment technology, Graduate Research Conference, Saskatoon, Saskatoon, SK, March 2-4.
- Aksamit N. and Pomeroy J. 2016. High Frequency Near-Surface Snow Transport Response to Alpine Turbulence. American Meteorological Society 17th Conference on Mountain Meteorology. Burlington, Vermont, June 2016.
- Alharbi, H.A., A.S. Pereira, J.W. Martin, S.B. Wiseman and J. Giesy. 2016. "Simultaneous Isolation of Acidic, Basic and Neutral Compounds from Oil Sands Process Affected Water (OSPW) using Mixed Mode Solid Phase Extraction (SPE)". 51st Canadian Trace Organic Workshop, May 15-17, 2016. Saskatoon, Saskatchewan, Canada.
- Alharbi, H.A., S.B. Wiseman and J. Giesy. 2016. "A Quantitative Analysis of the Internal Concentration of Organophosphate Pesticides in Whole Larvae Tissue of Japanese Medaka using LC-QqQ-MS without clean-up step". 51st Canadian Trace Organic Workshop, May 15-17, 2016, Saskatoon, Saskatchewan, Canada.
- Anderson E., Pomeroy J., Demuth M.N., Pradhananga D., Atkinson D.E. and Courtin E. 2016. Modelling changes in multi-decadal streamflow contributions – Bologna Glacier, Selwyn Mountains, NWT. Canadian Geophysical Union Joint Annual Meeting with CMOS. Fredericton, NB May 2016.
- Armstrong M, Westbrook C, Baulch H. "Drivers of Under-ice Phosphorus Increases in Shallow Eutrophic Lakes". CGU, Fredericton, Canada, May 29 - June 2, 2016.
- Armstrong M, Westbrook C, Baulch H. "Wetland Drainage, climate change and water quality in the Prairie Pothole Region". CWRA, Montreal, Canada, May 25 - 27, 2016.
- Armstrong, M., Westbrook, C., & Baulch, H. (2016, March). Wetland Drainage, Climate, and Water Quality in the Prairie Pothole Region. Poster presented at the World Water Day Water Leaders Lecture Series held by the University of Saskatchewan's Global Institute for Water Security, Saskatoon, Saskatchewan.
- Asong, Z.E., Razavi, S., and Wheeler, H. 2016. Validation of Integrated Multi-satellite Retrievals for GPM (IMERG) over Canada against Ground Precipitation Observations, The 69th National

- Conference of the Canadian Water Resources Association (CWRA), May 25-27, 2016, Montreal, Canada (Oral Presentation).
- Baulch, H.M., North, R.L., Armstrong, M., Casson, N., Cavaliere, E., Hudson, J., Orihel, D., Seckar, D., Westbrook, C. 2016. Winter, water chemistry and the potential implications of declining periods of ice cover. Association for the sciences of limnology and oceanography. Santa Fe New Mexico. June 2016.
- Baulch, H.M., Armstrong, M., Cavaliere, E., Gilmour, K. and R.L. North. 2016. Biogeochemical consequences of shorter winters. Society of Canadian Limnologists. January. St John's Newfoundland.
- Baulch, H., D. Orihel, N. Casson, R. North, C. Parsons, D. Seckar, J. Venkiteswaran. Internal phosphorus loading in Canadian freshwaters. Society of Canadian Limnologists. January. St. John's Newfoundland.
- Bedard-Haughn, A. 2016. Canadian Digital Soil Data Consortium: Big Data for a Big Country. Joint meeting of Canadian Society of Soil Science & Pacific Regional Society of Soil Science, Kamloops, BC.
- Bradford, L., Bharadwaj, L.A. 2016. SWEEP Framework. SWEEP project final workshop and hand-off. Fort Smith, NWT, January 25th – 29th 2016.
- Brown, R., Bedard-Haughn, A. 2016. Benefits and Implications of Agricultural Drainage in Southeast Saskatchewan. Soils and Crops 2016 Workshop, Saskatoon, SK
- Casson, N.J., Orihel, D.M., Parsons, C.T., Baulch, H.M., Venkiteswaran, J.J., Seckar, D., North, R.L. 2016. Patterns of internal phosphorus loading across Canadian water bodies. Canadian Geophysical Union. June 2016.
- Chen, L., Y. Li, F. Chen, and M. Barlage. 2016. High resolution WRF urban/agriculture simulations, NCAR 16th Annual WRF Users' Workshop, Boulder, United States, June 2016
- Currie Z and NS Hogan. 2016. Investigating the phototoxicity of polycyclic aromatic hydrocarbons and a petroleum-based lubricating oil in larval amphibians. Prairie Northern Chapter of the Society of Environmental Toxicology and Chemistry Annual Meeting. June 17, Winnipeg, MB.
- Currie Z, McPhee DL, Halyk L, Bresee K, Semper C, Siciliano S and NS Hogan. 2016. Effects of water accommodated fractions of a hydraulic lubricating oil on aquatic organisms. Prairie Northern Chapter of the Society of Environmental Toxicology and Chemistry Annual Meeting. June 17, Winnipeg, MB.
- D'Silva, L., Liber K., Baulch H., and L. Doig. 2016. Identifying physicochemical mechanisms affecting internal phosphorus loading in Buffalo Pound Lake, SK, using sediment fractionation extractions and in situ water chemistry. Society of Environmental Toxicology and Chemistry, Prairie Northern Regional Chapter, 7th Annual Meeting, Winnipeg, June 16–17, 2016. (**Platform presentation award 3rd place**)
- Elshorbagy, A., Wagener, T., Razavi, S., and D. Sauchyn. 2016. Reconstruction of paleohydrology in semi-arid regions for water resources management: Opportunities and challenges, European Geosciences Union (EGU) General Assembly, April 17-22, 2016, Vienna, Austria (Poster Presentation).
- Gallant M and NS Hogan. 2016 Developmental expression profiles and thyroidal regulation of cytokines during metamorphosis in *Xenopus laevis*. North American Comparative Immunology Workshop. June 21-14, Charlottetown, PE.

- Gharari, S., Hrachowitz, M., Fenicia, F., Matgen, P., Razavi, S., Savenije, H., Gupta, H., and Wheeler, H. 2016. How certain are the process parameterizations in our models?, European Geosciences Union (EGU) General Assembly, April 17-22, 2016, Vienna, Austria (Poster Presentation).
- Green, D., D.M. Janz and T. Jardine. 2016. The effect of hydropeaking on energy stores and mercury concentrations in shoreline dwelling spottail shiner (*Notropis hudsonius*). Prairie Northern SETAC Regional Meeting, Winnipeg, MB.
- Green, D., M. Duffy, D.M. Janz, K. McCullum, G. Carriere, and T. Jardine. 2015. Contamination and multi-decadal decay of reservoir-liberated mercury in a downstream Fishery: Effects of fish trophic level, size and age. Society of Environmental Toxicology and Chemistry, Salt Lake City, UT.
- Greuel, R. and J.F. Johnstone. 2016. Abundance of forage lichens for woodland caribou in a fire-prone region of the Boreal Shield. North American Caribou Workshop, Thunder Bay, ON, May 2016 (poster presentation).
- Gunn, J., C. Crowley, J. Jaeger, and B.F. Noble. 2016. Improving uncertainty communication in EA. Resilience and Sustainability – AGM of the International Association for Impact Assessment. 11-14 May. Aichi-Nagoya, Japan.
- Haghnegahdar, A., and Razavi, S. 2016. An Efficient Approach to Analyze the Behavior of Hydrological Models Using Global Sensitivity Analysis, The 2016 Joint Scientific Congress of the CMOS (Canadian Meteorological and Oceanographic Society) and CGU (Canadian Geophysical Union), May 29 – June 2, 2016, Fredericton, New Brunswick (Oral Presentation).
- Haghnegahdar, A., and Razavi, S. 2016. A Multi-criteria Assessment of Sensitivity in Environmental Models, American Society of Civil Engineers (ASCE)-Environmental and Water Resources Institute (EWRI)'s World Environmental & Water Resources Congress, May 22-26, 2016, West Palm Beach, Florida (Poster Presentation.)
- Haghnegahdar, A., Razavi, S., Wheeler, H., Gupta, H.V. 2016. A multi-model multi-objective study to evaluate the role of metric choice on sensitivity assessment, European Geosciences Union (EGU) General Assembly, April 17-22, 2016, Vienna, Austria (Poster Presentation).
- Haghnegahdar, A., and Razavi, S. 2016. How to assess the Efficiency and “Uncertainty” of Global Sensitivity Analysis?, European Geosciences Union (EGU) General Assembly, April 17-22, 2016, Vienna, Austria (Poster Presentation).
- Hanson, H., T. Bagatim, K. Steeves, S. Wiseman, N. Hogan, A. Hontela, P.D. Jones, M. Hecker and J. Giesy. 2016. “Reproductive health assessment of fathead minnow (*Pimephales promelas*) populations inhabiting an effluent-dominated stream, Wascana Creek, SK, Canada”. 7th Annual SETAC Prairie Northern Chapter Meeting, June 17, 2016, Winnipeg, MN, Canada.
- Harder P., Helgason W. and Pomeroy J. Observing the Heterogeneity of Snow-Atmosphere Interactions over Wheat Stubble and Patchy Snowcover during melt. American Meteorological Society Boundary Layer and Agricultural and Forest Meteorological Conference. Salt Lake City, Utah, June 2016.
- Hodgson, A., L. Kapronczai and D.M. Janz. 2016. Progesterone and testosterone concentrations in northern elephant seal (*Mirounga angustirostris*) vibrissae. Prairie Northern SETAC Regional Meeting, Winnipeg, MB.

- Horachek, M., J.F. Johnstone, and C. Laroque. Detecting divergence: Severe dwarf mistletoe infection in the Boreal Plains Ecozone of Saskatchewan. Canadian Association of Geographers, Halifax, NS, June 2016 (oral presentation).
- Hudson, J., K. Hunter and P. Tomchuk . 2016. Lake Diefenbaker interim water Quality report. Pages 32. Prepared for the Saskatchewan Water Security Agency. Moose Jaw, SK. April 2016
- Hudson, J., K. Hunter, P. Sutey and D. Evans. 2016. A comparison of spectrophotometric techniques for nitrate analyses in prairie and Precambrian Shield lakes and ponds. Annual meeting of the Association for the Sciences of Limnology and Oceanography (ASLO), Santa Fe, United States. June 5-10.
- Karoyo, A.H. and L.D. Wilson. 2016. Investigation of the Adsorption Processes of Fluorocarbon and Hydrocarbon Anions at the Solid-solution Interface of Macromolecular Imprinted Materials, CSC, Halifax, NS.
- Karoyo, A.H. and L.D. Wilson. 2016. Preparation and Characterization of a Polymer-based "Molecular Accordion", CSC, Halifax, NS.
- Kiss, J. and Bedard-Haughn, A. 2016. Predicting Spatial Distributions of Wetland Types and Associated Soils in the Prairie Pothole Region of Canada through Digital Elevation Model Analysis. Joint meeting of Canadian Society of Soil Science & Pacific Regional Society of Soil Science, Kamloops, BC.
- Kiss, J., and Bedard-Haughn, A. 2016. Predictive Mapping of Wetlands and Wetland Soils in the Canadian Prairie Pothole Region. Soils and Crops 2016 Workshop, Saskatoon, SK
- Krogh S.A. and Pomeroy J.W. 2016. Modelling changes Physically based modelling of a tundra-taiga basin in the continuous permafrost region for hydrological change diagnosis. Canadian Geophysical Union Joint Annual Meeting with CMOS. Fredericton, NB May 2016.
- Kurkute, S., and Y. Li. 2016. The remote moisture sources for precipitation over Saskatchewan River Basin, 50th CMOS Congress & joint CGU Annual Meeting, Fredericton Convention Centre, Fredericton, NB, Canada, May 2016.
- Lane, T, D.M. Janz, K. Liber and M. Hecker. 2016. Validation of in ovo embryo microinjections using selenomethionine to simulate maternal transfer of selenomethionine in the fathead minnow (*Pimephales promelas*). Prairie Northern SETAC Regional Meeting, Winnipeg, MB.
- Leung, W., and B.F. Noble. 2016. Taking the pulse on uncertainty in EA: Perspectives about uncertainty location and consideration. Resilience and Sustainability: Conference proceedings of the International Association for Impact Assessment, IAIA 2016 Japan. Fargo, ND: International Association for Impact Assessment.
- Leung, W., B.F. Noble, J. Jaeger, and J. Gunn. 2016. Assessing environmental impacts with compliance gaps. Resilience and Sustainability – AGM of the International Association for Impact Assessment. 11-14 May. Aichi-Nagoya, Japan.
- Li, Y., K. K. Szeto, R. Stewart, J. M. Thériault, L. Chen, B. Kochtubajda, A. Liu, S. Boodoo, R. Goodson, and C. J. Mooney. 2016. The June 2013 flood-producing extreme rainstorm over southern Alberta 17th Conference on Mountain Meteorology, Burlington, VT, USA, June, 2016
- Li, Y., L.Chen, F. Chen, A. Barr, M. Barlage, and B. Wan. 2016. The incorporation of an organic soil layer in the Noah-MP Land Surface Model and its evaluation over a Boreal Aspen Forest, 50th CMOS Congress & joint CGU Annual Meeting, Fredericton Convention Centre, Fredericton, NB, Canada, May 2016.

- Li, Y., and R.E. Carbone. 2016. Tropical Oceanic Rainfall and Sea Surface Temperature Structure: Parsing Causation from Correlation in the MJO, 50th CMOS Congress & joint CGU Annual Meeting, Fredericton Convention Centre, Fredericton, NB, Canada, May 2016.
- Li, Y., Y. Li, and D. Yang. 2016. Investigation of Discontinuity in Precipitation Measurements Across Canada and U.S. Border, 50th CMOS Congress & joint CGU Annual Meeting, Fredericton Convention Centre, Fredericton, NB, Canada, May 2016.
- Lindenschmidt, K.-E., Das, A., Zhang, F., and Chu, T. (2016) Monitoring and characterizing ice-cover behavior along the Slave River in the Northwest Territories, Canada. 23rd IAHR International Symposium on Ice. Ann Arbor, Michigan USA, May 31 to June 3, 2016.
- Lindenschmidt, K.-E. and Hosseini, N. (2016) Numerical modelling of surface water quality under river ice conditions. 23rd IAHR International Symposium on Ice. Ann Arbor, Michigan USA, May 31 to June 3, 2016.
- Lindenschmidt, K.-E., Evans, E., Das, A. and Chu, T. (2016) Observations of large air pockets within the Slave River ice cover. 23rd IAHR International Symposium on Ice. Ann Arbor, Michigan USA, May 31 to June 3, 2016.
- Liu, N., Kells, J. and Lindenschmidt, K.-E. (2016) One-way coupled fluid structure interaction analysis of shallow hydropeaking wave propagation in a partially ice-covered river channel. 23rd IAHR International Symposium on Ice. Ann Arbor, Michigan USA, May 31 to June 3, 2016.
- Loring, P.A., and M. Hinzman. 2016. Prioritizing well-being and sustainability in Haida Gwaii: different strategies and different solutions for shared problems. Society for Applied Anthropology, Vancouver, BC.
- Loring, P.A. 2016. Community Impacts of Gear Bans in Florida and Alaska Fisheries. Society for Applied Anthropology, Vancouver, BC.
- Marsh C., Pomeroy J. and Wheeler H. 2016. Testing warranted model complexity using a multiscale, variable complexity hydrological model. Canadian Geophysical Union Joint Annual Meeting with CMOS. Fredericton, NB May 2016.
- Mihalicz, J., T. Jardine, H. Baulch, I. Phillips. Effects Of A Hydropeaking Dam On Downstream Benthic Macroinvertebrate Communities And Implications For River Health. Society for Freshwater Science. 2016 Annual Conference. Sacramento, CA.
- Mohamed, M. H., and L.D. Wilson. 2016. Tuning the Physicochemical Properties Polysaccharides via Cross-linking Conditions, CSC, Halifax, NS.
- Morandi, G.D., S.B. Wiseman, C. Sun, J.W. Martin, and J. Giesy. 2016. "Assessing effects of dissolved organic chemicals in OSPW by use of the fathead minnow reproductive bioassay". 7th Annual SETAC Prairie Northern Chapter Meeting. June 17, 2016, Winnipeg, MB, Canada.
- North, R.L., Barbour, S.L., Carey, S., Lindsay, M., Dompierre, K. (2016). "Lakes from Waste: Are freshwater-capped tailings ponds sources or sinks for Major Ions?", ASLO 2016 Summer Mtg, Santa Fe, New Mexico, Poster Presentation (Abstract published), Session #: CS10 Aquatic Sciences in the Anthropocene, June 7 (Accepted).
- North R., J. Venkiteswaran, P. Pernica, M. Kehoe, G. Silsbe, S. Guildford, J. Sereda, J. Hudson, and H. Baulch. 2016. Metabolism under ice: the rest of the story. Annual meeting of the Association for the Sciences of Limnology and Oceanography (ASLO), Santa Fe, United States. June 5-10.

- Pan, X., Y. Li, Q. Yu, X. Shi, D. Yang, and K. Roth. 2016. Effects of Stratified Active Layers on the High-Altitude Permafrost Warming: A Case Study on the Qinghai-Tibet Plateau, XI. International Conference on Permafrost, Potsdam, Germany, June 2016
- Pettem, C., L.P. Weber and D.M. Janz. 2016. Metabolic and cardiovascular effects of dietary selenomethionine exposure in adult zebrafish (*Danio rerio*). Prairie Northern SETAC Regional Meeting, Winnipeg, MB. **(3rd Place, Best Student Poster Presentation)**.
- Pomeroy J.W. 2016. Hydrological impacts of climate change in cold regions of the North American Cordillera. Canadian Geophysical Union Joint Annual Meeting with CMOS. Fredericton, NB, May 2016.
- Rasouli K., Gutmann E.D. and Pomeroy J.W. 2016. Precipitation downscaling using the Intermediate Complexity Atmospheric Research model (ICAR) in Western Canada. The International Conference on Regional Climate (ICRC)-CORDEX 2016. Stockholm, Sweden, May 2016.
- Razavi, S., and Gupta, H.V., and Haghnegahdar, A. 2016. What Constitutes a “Good” Sensitivity Analysis? Elements and Tools for a Robust Sensitivity Analysis with Reduced Computational Cost, The 2016 Joint Scientific Congress of the CMOS (Canadian Meteorological and Oceanographic Society) and CGU (Canadian Geophysical Union), May 29 – June 2, 2016, Fredericton, New Brunswick (Poster Presentation).
- Razavi, S., and Gupta, H.V. 2016. A New Framework for Effective and Efficient Global Sensitivity Analysis of Hydrologic and Environmental Systems Models, American Society of Civil Engineers (ASCE)-Environmental and Water Resources Institute (EWRI)’s World Environmental & Water Resources Congress, May 22-26, 2016, West Palm Beach, Florida (Oral Presentation.)
- Razavi, S., and Haghnegahdar, A. 2016. Rigorous Evaluation of a New Framework for Sensitivity and Uncertainty Analysis: Variogram Analysis of Response Surfaces (VARS), American Society of Civil Engineers (ASCE)-Environmental and Water Resources Institute (EWRI)’s World Environmental & Water Resources Congress, May 22-26, 2016, West Palm Beach, Florida (Oral Presentation.)
- Razavi, S., and Gupta, H.V., and Haghnegahdar, A. 2016. What Constitutes a “Good” Sensitivity Analysis? Elements and Tools for a Robust Sensitivity Analysis with Reduced Computational Cost, European Geosciences Union (EGU) General Assembly, April 17-22, 2016, Vienna, Austria (Oral Presentation).
- Samuel J., Kavanaugh J., Pomeroy J., Fang X., Pradhananga D. and Brown T. 2016. Responses of river flow and glacier cover to climate change in the Atlin River basin (BC-Yukon, Canada). Cold Regions Hydrology and Hydrometeorology 50th CMOS Congress & Joint CGU Annual Meeting. Fredericton, NB, June 2016.
- Scaff, L. Y. Li. 2016. Diurnal convective precipitation in lee side of the Canadian Rockies, 17th Conference on Mountain Meteorology, Burlington, VT, USA, June, 2016.
- Scaff, L., and Y. Li. 2016. Diurnal cycle of summer precipitation east of the Rocky Mountain, 50th CMOS Congress & joint CGU Annual Meeting, Fredericton Convention Centre, Fredericton, NB, Canada, May 2016
- Schirmer M., Harder P. and Pomeroy J. 2016. Impact of spatial variation in snow water equivalent and snow ablation on spring snowcover depletion over an alpine ridge. European Geosciences Union General Assembly. Vienna, Austria, April 2016.

- Schultz, D., S. Tang, S. Beitel, B. Sarauer, S. Hanson, J.P. Giesy, D.M. Janz, S.B. Wiseman, P.D. Jones and M. Hecker. 2016. Determination of acute and sub-chronic toxicity of emerging contaminants in early life stages of rainbow trout (*Oncorhynchus mykiss*). Prairie Northern SETAC Regional Meeting, Winnipeg, MB.
- Schultz, D., S. Tang, S. Beitel, B. Sarauer, S. Hanson, J.P. Giesy, D.M. Janz, S.B. Wiseman, P.D. Jones and M. Hecker. 2016. Determination of acute and sub-chronic toxicity of emerging contaminants in early life stages of rainbow trout (*Oncorhynchus mykiss*). Society of Environmental Toxicology and Chemistry, Salt Lake City, UT.
- Schultz, D., S. Tang, S. Beitel, Eisner, J. Alcaraz, D. Janz, S. Wiseman, P.D. Jones, M. Hecker and J. Giesy. 2016. "Determination of acute and sub-chronic toxicity of emerging contaminants in early life stages of rainbow trout (*Oncorhynchus mykiss*)". 7th Annual SETAC Prairie Northern Chapter Meeting, June 17, 2016, Winnipeg, MN, Canada.
- Sergiel, A., K.A. Hobson, D.M. Janz, M.R.L. Cattet, L. Kapronczai, C. Gryba, A. Zedrosser and N. Selva. 2016. Testing the compatibility of laboratory procedures: Stable isotopes and cortisol analysis in brown bear hair. International Conference on Bear Research and Management, Anchorage, AK.
- Shahariar, M.S., Soolanayakanahally, R., Schroeder, W., and Bedard-Haughn, A. 2016. Using Short Rotation Willow as a Management Practice for Wetland Riparian Zones: Effects on Macronutrient Status. Joint meeting of Canadian Society of Soil Science & Pacific Regional Society of Soil Science, Kamloops, BC.
- Shahariar, S., Soolanayakanahally, R., Schroeder, W., Bedard-Haughn, A. 2016. The Impact of Short Rotation Willow on Soil Nutrients in Riparian Zones of the Prairie Pothole Region. Soils and Crops 2016 Workshop, Saskatoon, SK
- Bedard-Haughn, A. 2016. Wetlands in Agro-ecosystems: A Mixed Blessing. Saskatchewan Soil Conservation Association (SSCA) Annual Conference, Saskatoon, SK.
- Shahkarami, S., J. Soltan, A. Dalai, 2016, Selective CO₂ adsorption on activated carbons, 24th Canadian Symposium on Catalysis, Ottawa, May 8-11.
- Soltan, J., M. Hecker, P. Jones, B. Predicala, L. Rosengren, 2016, Degradation of antibiotics in wastewater from animal production industries, GIWS (Global Institute of Water Security) Workshop, Saskatoon, SK, June 13, 14, 2016.
- Sumaila, S., Warner, J.A., Clay, J., Hendry, M.J. and J.M. McBeth. 2016. Mineralogical characterization of aquifer samples from Smith Ranch-Highland Uranium Mine Site, Wyoming, USA. Western Inter-University Geosciences Conference, January 7-10, 2016, Saskatoon, Saskatchewan.
- Tse, T., T. Song, S. Wiseman, L. Doig, M. Hecker, Jones, P. D. and J. Giesy. 2016. "Reconstructing cyanobacterial population trends in freshwater lakes using metagenomic techniques and physicochemical analyses." 43rd Annual Meeting, September 25-28, 2016, Edmonton, AB, Canada.
- Tse, T., T. Song, S. Wiseman, M. Hecker, L. Doig, P.D. Jones and J. Giesy. 2016. "Paleogenomic Techniques: Using Next-generation Sequencing to Map Historical Trends within the Cyanobacteria Communities in Freshwater Lakes." World water Day, University of Saskatchewan, March 23, 2016, Saskatoon, SK.
- Udoetok, I.A., L.D. Wilson, and J.V. Headley. 2016. Chitosan-cellulose on the Sorption Properties of its Cross-linked Polymers, 99th CSC, Halifax, NS.

- Wang A and NS Hogan. 2016. Effects of feed-borne fusarium mycotoxins on performance and intestinal histology in broiler chickens depends on timing of exposure. World Mycotoxin Forum. June 6-9, Winnipeg, MB
- Wang A, Scott T and NS Hogan. Effects of fusarium mycotoxins and feed restriction on broiler growth performance and immune response. World Mycotoxin Forum. June 6-9, Winnipeg, MB.
- Wang, X., Westbrook, C., Helgason, B., and Bedard-Haughn, A. 2016. Response of CO₂, N₂O, and Microbial Community to Increasing Temperature in Two Mountain Peatland Profiles. Joint meeting of Canadian Society of Soil Science & Pacific Regional Society of Soil Science, Kamloops, BC.
- Watts, C., H. Peng, P.D. Jones, S. Wiseman and J. Giesy. 2016. Untargeted screening of brominated disinfection by-products in drinking water by DIPIC-frag method". 7th Annual SETAC Prairie Northern Chapter Meeting, June 17, 2016, Winnipeg, MN, Canada.
- Whitfield P., Shook K. and Pomeroy, J. Changes to Streamflow Peaks at the fall-winter transition in the Rocky Mountains of North America. 13th International Meeting on Statistical Climatology. Canmore, AB, June 2016.
- Whitfield P. and Pomeroy J. 2016. Assessing the quality of the streamflow record for a long term reference hydrometric station: Bow River at Banff. The 69th National Conference of the Canadian Water Resources Association. Montreal, QC May 2016.
- Whitfield P. and Pomeroy J. 2016. Changes to the hydrological regime of the Upper Bow River affecting flood peaks: implications for analysis of the 2013 flood. The 69th National Conference of the Canadian Water Resources Association. Montreal, QC May 2016.
- Wilson, L.D., and A. Dolatkhah. 2016. Binary Magnetic PANI Nanoparticles Prepared via Polymerization Induced Self-assembly and Uptake Affinity toward Organic Dyes, 99th CSC, Halifax, NS.
- Wilson, L.D., and A. Dolatkhah. 2016. pH-responsive Magnetite/Polymer Brush Nanocomposites with Switchable Uptake Behavior toward Methylene Blue, CSC 2016, Halifax, NS.
- Wong, J., Razavi, S., and Wheeler, H. 2016. Assessment of model-derived precipitation products over Canada, The 2016 Joint Scientific Congress of the CMOS (Canadian Meteorological and Oceanographic Society) and CGU (Canadian Geophysical Union), May 29 – June 2, 2016, Fredericton, New Brunswick (Oral Presentation).
- Yassin, F. A., Razavi, S., and Wheeler, H. 2016. Enhanced identification of hydrologic models using streamflow and satellite water storage data: a multi-objective calibration approach, The 2016 Joint Scientific Congress of the CMOS (Canadian Meteorological and Oceanographic Society) and CGU (Canadian Geophysical Union), May 29 – June 2, 2016, Fredericton, New Brunswick (Oral Presentation).
- Zhou, G.-J., K.K.Y. Ho, J.C.H. Ip, S. Liu, J.Y. Hu, K.M.Y. Leung and J. Giesy. 2016. "Retinoic Acids Produced by Marine Cyanobacteria Trigger Sex Change in Female Gastropod, *Reishia clavigera*. 8th Marine Pollution Conference, June 21-24, 2016, Hong Kong, SAR, China.

Conference Proceedings and Presentations - 2015

- Aksamit N.O. and Pomeroy J.W. 2015. Saltating Snow Mechanics: Three Species Classification from High Speed Videography. Proceedings, 72nd Eastern Snow Conference, pp. 56-77.

- Alharbi, H., and J. Giesy. 2015. "Effect of Dissolved Organic Compounds from Oil Sands Process Affected Water (OSPW) on Toxicity of 7-isopropyl-1-methylphenanthrene (retene) to Early Life-stages of Japanese Medaka (*Oryzias latipes*).” 42nd Annual Meeting, October 4-7, 2015, Saskatoon, SK, Canada.
- Alharbi, H., and J. Giesy. 2015. "Effect of Dissolved Organic Compounds from Oil Sands Process Affected Water (OSPW) on Toxicity of 7-isopropyl-1-methylphenanthrene (retene) to Early Life-stages of Japanese Medaka (*Oryzias latipes*).” 36th Annual Meeting, November 1-5, 2015, Salt Lake City, UT.
- Al Naggar, Y., Y. Tan, C. Rutherford, W. Connor, P. Griebel, J.P. Giesy and A.J. Robertson. 2016. "Effects of Treatments with Apivar® and Thymovar® on V. destructor populations, Virus Infections and Indoor Winter Survival of Canadian Honey Bee Colonies (*Apis mellifera* L.)” Canadian Association of Professional Apiculturists Annual Meeting, December 1, 2015 Saskatoon, Saskatchewan, Canada.
- Anderson, D.W. and Bedard-Haughn, A. 2015. Soil, an early and important component of river systems. From Rivers to Oceans, Conference of Partnerships for the Saskatchewan River Basin, Winnipeg, MB.
- Aghbolaghy M., and J. Soltan. 2015, Catalytic ozonation of mixture of benzene and acetone on MnOx/c-Al₂O₃, The 65rd Canadian Chemical Engineering Conference, Calgary AB, October 4-7
- Aghbolaghy M., and J. Soltan. 2015, Catalytic oxidation of toluene by ozone on MnOx/c-Al₂O₃, The 65rd Canadian Chemical Engineering Conference, Calgary AB, October 4-7
- Appels WM, Ireson, AMI, Barbour SL. (2016). "Impact of textural and structural heterogeneity on unsaturated flow and transport through mine waste rock”, EGU General Assembly 2016, Vienna, Austria, Ap.18, Poster in: Transfer processes in soil-plant-atmosphere systems.
- Bagatim T, Hanson S, Yuan H, Steeves S, Wiseman S, Hogan NS, Hontela A, Jones P, Giesy J, Bragg L, Dhiyebi H, Servos M, Gauthier C, Gagné F, and M Hecker. 2015. Characterization of the endocrine potencies of municipal effluents across Canada using in vitro bioassays. Canadian Ecotoxicity Workshop. Oct 4-7, Saskatoon, SK.
- Bagatim T, Hanson S, Yuan H, Steeves S, Wiseman S, Hogan NS, Hontela A, Jones P, Giesy J, Bragg L, Dhiyebi H, Servos M, Gauthier C, Gagné F, and M Hecker. 2015. Characterization of the endocrine potencies of municipal effluents across Canada using in vitro bioassays. North American Meeting of the Society of Environmental Toxicology and Chemistry. Nov 1-5, Salt Lake City, Utah.
- Bagatim, T., S. Hanson, H. Yuan, K. Steeves, S. Wiseman, N. Hogan, A. Hontela, P. Jones, L. Bragg, H. Dhiyebi, M. Servo, C. Gauthier, F. Gagne, M. Hecker and J. Giesy. 2015. "Characterization of the Endocrine Potencies of Municipal Effluents across Canada using in vitro Bioassays.” 42nd Annual Meeting, October 4-7, 2015, Saskatoon, SK, Canada.
- Bagatim, T., S. Hanson, H. Yuan, K. Steeves, S. Wiseman, N. Hogan, A. Hontela, P. Jones, L. Bragg, H. Dhiyebi, M. Servo, C. Gauthier, F. Gagne, M. Hecker. 2015. "Characterization of the Endocrine Potencies of Municipal Effluents across Canada using in vitro Bioassays.” 36th Annual Meeting, November 1-5, 2015, Salt Lake City, UT.
- Beitel, S., J. Doering, B. Eisner, T. Heide, H. Hollert, M. Hecker, S. Wiseman and J. Giesy. 2015. 42nd Annual Meeting, October 4-7, 2015, Saskatoon, SK, Canada.

- Bedard-Haughn, A., Zhang, Z., and Brown, R. 2015. Does drainage duration affect wetland and ditch soil properties? A case study from southeast Saskatchewan. Soil Science Society of America (SSSA) International Annual Meeting. Minneapolis, MN.
- Bharadwaj, L., C. Waldner, P. Johnston, and R. Zagozewski. 2015. Water Regulations: Impacts on First Nations Health and Equity and Promotion. Touchwood Agency Tribal Council March 16, 2015.
- Bradford, L., Bharadwaj L.A. 2015. School of Public (SPH) Health Research, Teaching and Outreach Social Networks. Compiled and analyzed at the request of the SPH program review committee. October 2015.
- Bradford, L., Bharadwaj, L.A. 2015. Elder's Voices and Socio-Ecological Determinants of Health for Elder's Voice conference, Vancouver Island, B.C. September 19-22nd, 2015.
- Bresee K, Semper C, Siciliano S and NS Hogan. 2015. Human health and ecological impacts from pipeline valve staining: risk assessment coupled with research. North American Meeting of the Society of Environmental Toxicology and Chemistry. Nov 1-5, Salt Lake City, Utah.
- Brown, R. and Bedard-Haughn, A. 2015. Agricultural surface drainage and changes in soil properties in eastern Saskatchewan. Joint Meeting of IUSS 2.5, CSSS, and AQSSS. Montreal, QC.
- Buchynski, M., Barbour, S.L., and Hendry, M.J. 2015. Characterizing the transport of the stable isotopes of Water in unsaturated mining waste. In: Mining Waste Management and Environmental Geotechnology: Mine Waste Disposal, GeoQuebec 2015, 68th Canadian Geotechnical Conference, Quebec City, Sept. 20-23, 2015.
- Cattet, M.R.L., R.I. Carlson, B. Macbeth, D.M. Janz, B. Sarauer, L. Kapronczai, G.B. Stenhouse, A. Zedrosser, J. Swenson, J.A. Erlenbach, H.T. Jansen, L.O. Nelson and C.T. Robbins. 2015. Innovative approaches to detecting impaired health in wild animals facing human-caused environmental change: Illustrations with brown bears (*Ursus arctos*). International Conference on Behaviour, Physiology and Genetics of Wildlife, Berlin, DE.
- Cavallaro, M.C., C. Morrissey, J. Headley, K. Peru and K. Liber. 2015. Chronic, comparative toxicity of imidacloprid, clothianidin and thiamethoxam to aquatic macroinvertebrates in laboratory and field settings. Society of Environmental Toxicology and Chemistry 36th Annual Meeting, Salt Lake City, UT, USA, November 1-5, 2015.
- Cavallaro, M.C., C. Morrissey, J. Headley, K. Peru and K. Liber. 2015. Platform. Impacts of neonicotinoid insecticides on aquatic insect emergence in Prairie wetlands using in-situ limnocorrrals. 42nd annual Canadian Ecotoxicology Workshop, Saskatoon, SK, October 4-7, 2015.
- Conway, A.J. and J.F. Johnstone. 2015. Moose (*Alces alces*) browsing has different effects on trembling aspen (*Populus tremuloides*) growth depending on fire severity. 2015 ACUNS Due North: Next Generation Arctic Research & Leadership student conference, Calgary, AB, November 2015 (oral presentation).
- Conway, A.J. and J.F. Johnstone. 2015. A three-pronged approach to understanding how fire and mammalian herbivory interact to influence post-fire forest growth and composition in interior Alaska. Long-Term Ecological Research All Scientists Meeting, Estes Park, CO, USA, September 2015 (poster presentation).

- Conway J.P., Helgason W., Pomeroy J.W. and Sicart J. 2015. Poster: Mesoscale Icefield Breezes over Athabasca Glacier. American Geophysical Union Fall Meeting. San Francisco, CA, Dec 2015.
- Chilima, J. and L. Bharadwaj. 2015. Presentation Title: Exploring Water Resources Management with Community of Water Users: Lake Diefenbaker. School of Environment and Sustainability, Student Symposium, University of Saskatchewan, Saskatoon, SK, March 27th, 2015.
- Crawford S.E., S. Lofts and K. Liber. 2015. Bioavailability of sediment-associated uranium to the freshwater midge, *Chironomus dilutus*: lessons learned from sediment physicochemical properties. 42nd annual Canadian Ecotoxicology Workshop, Saskatoon, SK, October 4-7, 2015. **(Honorable mention, student poster competition).**
- Cruz-Hernández, P., A. Parviainen, R. Pérez-López, M.B.J. Lindsay and J.M. Nieto. 2015. Behavior of trace elements during aging of acid drainage precipitates. Proceedings of the 25th V.M. Goldschmidt Conference, August 16–21, Prague, Czech Republic.
- Cruz-Hernández, P., R. Pérez-López, A. Parviainen, M.B.J. Lindsay and J.M. Nieto. 2015. Behavior of trace metals during aging Fe beaker acid drainage. Proceedings of the XXXV Reunión Científica de la Sociedad Española de Mineralogía, June 30 – July 3, Huelva, Spain.
- DeBeer C.M., Wheeler H.S., Pomeroy J.W., Stewart R.E., Szeto K., Brimelow J., Chun K.P., Masud M.B. and Bonsal B.R. 2015. Past and future hydro-climatic change and the 2015 drought in the interior of western Canada. American Geophysical Union Fall Meeting. San Francisco, CA, Dec 2015.
- Doering, J., and J. Giesy. 2015. "Can Identities of Key Amino Acids in the Ligand Binding Domain of the AhR Be Used to Predict the Sensitivity of Endangered Sturgeons to Dioxins?." 36th Annual Meeting, November 1-5, 2015, Salt Lake City, UT.
- Doering, J., S. Tang, S. Wiseman, H. Peng, B. Eisner, J. Sun, M. Hecker and J. Giesy. 2015. "Characterization of Toxicity Pathways of 2,3,7,8-TCDD, PCB 77, and Benzo[a] pyrene in White Sturgeon using Whole Transcriptome and Proteome Analyses." 42nd Annual Meeting, October 4-7, 2015, Saskatoon, SK, Canada.
- Doering, J., S. Tang, S. Wiseman, H. Peng, B. Eisner, J. Sun, M. Hecker and J. Geisy. 2015. "Characterization of Toxicity Pathways of 2,3,7,8-TCDD, PCB 77, and Benzo[a] pyrene in White Sturgeon using Whole Transcriptome and Proteome Analyses." 36th Annual Meeting, November 1-5, 2015, Salt Lake City, UT.
- Doig, L.E., V. Pittet, B. Markwart, M. Haakensen and K. Liber. 2015. Community composition matters: Selenium accumulation in periphyton and trophic transfer to the freshwater snail, *Stagnicola elodes*. 42nd annual Canadian Ecotoxicology Workshop, Saskatoon, SK, October 4-7, 2015.
- Dompierre, K., Barbour, S.L. (2015). "Characterization of physical mass transport through oil sands fluid fine tailings in an end pit lake: a multi-tracer study", IAH – CNC 2015 Waterloo Conference, Waterloo, ON, 27-30 October, 2015.
- Dompierre, K., Barbour, S.L. (2015). "Evaluation of thermal properties of oil sand fluid fine tailings". In: 'Mining Waste Management and Environmental Geotechnology: Mine Waste Disposal', GeoQuebec 2015, 68th Canadian Geotechnical Conference, Quebec City, Sept. 20-23.

- D'Silva, L., Liber K., Baulch H., and L. Doig. 2015. Mechanisms affecting arsenic flux rates from prairie reservoir sediments, Buffalo Pound Lake, SK, Canada. Canadian Ecotoxicology Workshop, Saskatoon, SK, October 5–8, 2015. (**Platform presentation award 2nd place**)
- D'Silva, L.P., K. Liber, H. Baulch and L.E. Doig. 2015. Factors affecting arsenic mobilization from sediments collected from a prairie reservoir, Buffalo Pound Lake, Saskatchewan, Canada. Society of Environmental Toxicology and Chemistry 36th Annual Meeting, Salt Lake City, UT, USA, November 1-5, 2015.
- D'Silva, L., Liber K., Baulch H., Doig L. 2015. Relative importance of different phosphorus efflux mechanisms from prairie reservoir sediments, Buffalo Pound Lake, Saskatchewan, Canada. Global Institute of Water Security, World Water Day Poster Competition, March 23, 2015. (**Poster presentation award 3rd place**)
- Ford, L. and L. Bharadwaj. 2015. Unregulated Groundwater Consumption in Rural Communities: Impact of Risk Perception and Use on Human Health Risk. 17th Canadian National Conference on Drinking Water. October 17, 2015.
- Ford, L. and L. Bharadwaj. 2015. Groundwater Consumption in Rural Communities: Impact of Risk Perception on Human Health Risk. World Water Day 2015, at University of Saskatchewan. Poster. March 20, 2015.
- Ford, L. and L. Bharadwaj. 2015. Groundwater Consumption in Rural Communities: Impact of Risk Perception on Human Health Risk. Connecting Water Resources 2015: From Knowledge to Action, Canadian Water Network, Ottawa. Poster. March 10-12,
- Gallant M and NS Hogan. 2015. Is the development of the innate immune system in *Xenopus laevis* regulated by thyroid hormone? Canadian Ecotoxicity Workshop. Oct 4-7, Saskatoon, SK.
- Gallant M, Baldwin N, Bilodeau J, Blais J, Pauli B and NS Hogan. 2015. Acute effects of exposure to oil sands impacted sediments on the early life stages of *Xenopus laevis*. Canadian Ecotoxicity Workshop. Oct 4-7, Saskatoon, SK.
- George, G. N., S. I. Yang and I. J. Pickering. 2016. "The chemical form of selenium in dietary supplements" (Conference venue and dates: Sao Paulo, Brazil; 18-21 October 2015) Global Advances in Selenium Research from Theory to Application - Proceedings of the 4th International Conference on Selenium in the Environment and Human Health, 2015 (G. S. Banuelos, M. F. de Moraes, L. R. G. Guilherme, Z.-Q. Lin, A. R. dos Reis, Editors; CRC Press/Balkema, Publisher), pp 43-44 (2016).
- Gillio Meina, E., S. Niyogi and K. Liber. 2015. A mechanistic investigation of the influence of water chemistry on vanadium toxicity to *Daphnia* sp. Society of Environmental Toxicology and Chemistry 36th Annual Meeting, Salt Lake City, UT, USA, November 1-5, 2015.
- Gillio Meina, E. and K. Liber. 2015. The influence of water chemistry on the acute aqueous toxicity and speciation of vanadium. 42nd annual Canadian Ecotoxicology Workshop, Saskatoon, SK, October 4-7, 2015.
- Gilmour, K. and H. Baulch. Effects of Freeze-Thaw Cycles on Denitrification Rates. 2015. USRA poster symposium. University of Saskatchewan. August.
- Green, D., M. Duffy, D.M. Janz, K. McCullum, G. Carriere, and T. Jardine. 2015. Contamination and multi-decadal decay of reservoir-liberated mercury in a downstream Fishery: Effects of fish trophic level, size and age. Canadian Ecotoxicity Workshop, Saskatoon, SK.

- Haghnegahdar, A., Razavi, S., Wheeler, H., and Gupta, H. 2015. Sensitivity Analysis and Insights into Hydrological Processes and Uncertainty at Different Scales, American Geophysical Union (AGU) Meeting, December 14-18, 2015, San Francisco, CA (Poster Presentation).
- Hanson S, Bagatim T, Steeves S, Wiseman S, Hogan NS, Hontela A, Jones P, Giesy J, and M Hecker. Assessing potential endocrine disrupting effects of municipal effluents on fathead minnow (*Pimephales promelas*) populations in Southern Saskatchewan. Canadian Ecotoxicity Workshop. Oct 4-7, Saskatoon, SK.
- Hanson S, Bagatim T, Steeves S, Wiseman S, Hogan NS, Hontela A, Jones P, Giesy J, and M Hecker. 2015. Assessing potential endocrine disrupting effects of municipal effluents on fathead minnow (*Pimephales promelas*) populations in Southern Saskatchewan. North American Meeting of the Society of Environmental Toxicology and Chemistry. Nov 1-5, Salt Lake City, Utah.
- Hanson, S., T. Bagatim, K. Steeves, S. Wiseman, N. Hogan, A. Hontela, P. Jones, M. Hecker and J. Giesy. 2015. "Reproductive and General Health Assessment of Fathead Minnow (*Pimephales promelas*) populations inhabiting an effluent-dominated stream, Wascana Creek, SK, Canada." 42nd Annual Meeting, October 4-7, 2015, Saskatoon, SK, Canada.
- Hanson, S., T. Bagatim, K. Steeves, S. Wiseman, N. Hogan, A. Hontela, M. Hecker and J. Giesy. 2015. "Assessing Potential Endocrine Disrupting Effects of Municipal Effluents on Fathead Minnow (*Pimephales promelas*) Populations in Southern Saskatchewan." 36th Annual Meeting, November 1-5, 2015, Salt Lake City, UT.
- Harder P., Pomeroy J.W. and Helgason W. 2015. Poster: Unmanned Aerial Vehicle Remote Sensing of Shallow Snow: Assessment and Possibilities for Improved Snow Depletion Prediction. American Geophysical Union Fall Meeting. San Francisco, CA, Dec 2015.
- Harley, R., Bergamo, P., Hughes, D., Donohue, S., Carse, L., Barbour S.L. (2015). "Estimation of the small strain stiffness of glacial till using geophysical methods and barometric loading response". In: 'Soil and Terrain Characterization: In situ Testing', GeoQuebec 2015, 68th Canadian Geotechnical Conference, Quebec City, Sept. 20-23.
- Heaton, K.K., J. Vyskocil, J.M. McBeth and M.B.J. Lindsay. 2015. Biogeochemical characteristics of centrifuged fine tailings at an oil sands mine in northern Alberta, Canada. Saskatchewan Geological Open House, November 30–December 2, Saskatoon, Canada.
- Hecker M, Bagatim T, Codling G, Giesy JP, Hanson S, Hogan NS, Hontela A, Jones P, Peng H, Sarauer B, Steeves K and S Wiseman. 2015. Aquatic impact assessment of municipal effluents (AIME): A toolbox approach. 17th International Symposium on Toxicity Assessment. Aug 2-7, Bellingham, WA.
- Helgason, W., R. Farrell, J. Ens, R. Lemke, and C. David. 2015. Snowcover influences upon episodic release of nitrous oxide from agricultural soils during thaw. American Geophysical Union Fall Meeting, San Francisco, CA Dec 14-18.
- Hendry, M.J., Schmeling, E., Barbour, S.L., Harrington, G., and L.I. Wassenaar. 2015. Application of high-resolution profiles of naturally-occurring tracers to define the hydrogeology of thick Cretaceous shales across the Williston Basin, Canada. International Association of Hydrogeologists, In: 'Hydrogeology of aquitards: flow and transport' session, September 13-18, 2015, Rome, Italy.
- Hill, M., Jakeman, J., Razavi, S., and Tolson, B. 2015. Beauty and the beast: Some perspectives on efficient model analysis, surrogate models, and the future of modeling, American

- Geophysical Union (AGU) Meeting, December 14-18, 2015, San Francisco, CA (Invited, Oral Presentation).
- Horn, S., R. Pieters, T. Böhn and J. Giesy. 2015. "Investigating possible risks of crop applied herbicide mixtures using in vitro assays". 7th SETAC Africa Conference, Oct. 5-8, 2015, Langebaan South Africa.
- Huyhn, M., and L. Bharadawaj. 2015. Cyanotoxin at Saskatchewan Lakes in 2013– Canadian Water Network – From Knowledge to Action; Connecting water resources conferences, March 10-12, 2015, Ottawa ON.
- Jean, M.J., M.C. Mack and J.F. Johnstone. 2015. Spatial and temporal variation in feather moss associated nitrogen fixation in coniferous and deciduous dominated Alaskan boreal forests. American Geophysical Union Fall Meeting, San Francisco, CA, Dec 2015 (oral presentation).
- Jones, P., A. Hill, B. Tendler, E. Ohiozebau, E. Kelly and J. Giesy. 2015. "Health Status of Fishes from the Athabasca and Slave River System, Northern Canada." 42nd Annual Meeting, October 4-7, 2015, Saskatoon, SK, Canada.
- Kuzyk, T., Barbour, S.L., and Hendry. M.J. 2015. A Conceptual Model for Pore Water Release from Coal Waste Rock Piles in the Elk Valley, British Columbia, Canada, IAH – CNC 2015 Waterloo Conference, Waterloo, ON, October 27-30, 2015.
- Leroux N.R. and Pomeroy J.W. 2015. A Dual Pathway Heterogeneous Flow through Snow Model. Proceedings, 72nd Eastern Snow Conference, pp. 3-14.
- Leroux N., Pomeroy J.W. and Kinar N.J. 2015. Field Evaluation of a Novel 2D Preferential FlowSnowpack Hydrology Model. American Geophysical Union Fall Meeting. San Francisco, CA, Dec 2015.
- Li, Y., K. Sezto, R. Stewart, J. Theriault, B. Kochtubajda, S. Boodoo, R. Goodson, and A. Liu. 2015. The June 2013 Alberta Catastrophic Flooding: Water vapor transport analysis by WRF simulation. 49th CMOS Congress and 13th AMS Conference on Polar Meteorology and Oceanography, Whistler, Canada.
- Liang, C., Y. Li, F. Chen, A. Barr, M. Barlage, and B. Wan. 2015. The incorporation of organic layer in Noah–MP LandSurface Model and its evaluation over Boreal Old Aspen Forest flux site. NCAR 16th Annual WRF Users' Workshop, Boulder, United States.
- Loring, P.A. 2015. Revisiting Parametric Management: Opportunities and Challenges for EBFM. American Fisheries Society. Portland, OR.
- Mahmood T.H., Pomeroy J.W., Wheeler H.S., Elliott J.A., Baulch H.M. and Lindenschmidt K.E. 2015. Poster: Nutrient Models Developments Using Runoff-Nutrient Relationships in an Agricultural Prairie Basin, Manitoba. American Geophysical Union Fall Meeting. San Francisco, CA, Dec 2015.
- Maloney, E., C. Morrissey, K. Peru, J. Headley and K. Liber. 2015. Neonicotinoid insecticide mixtures: Characterizing the cumulative toxicity of binary mixtures under acute exposure scenarios. Society of Environmental Toxicology and Chemistry 36th Annual Meeting, Salt Lake City, UT, USA, November 1-5, 2015. **(3rd place, student poster competition)**
- Maloney, E., C. Morrissey, K. Peru, J. Headley and K. Liber. 2015. Neonicotinoid insecticides: Characterizing the cumulative toxicity of mixtures under acute exposure scenarios. 42nd annual Canadian Ecotoxicology Workshop, Saskatoon, SK, October 4-7 2015.

- Masse, A.J., D.M. Janz and J.R. Muscatello. 2015. Assessing the effects of chronically elevated dietary selenium exposure on the fitness of the model amphibian *Xenopus laevis*. Canadian Ecotoxicity Workshop, Saskatoon, SK. **(1st Place, Best Student Platform Presentation)**.
- McPhee L, Halyk L, Bresee K, Semper C, Siciliano S, and NS Hogan. 2015. Effects of water accommodated fractions of a hydraulic lubricating oil on larval amphibians. Canadian Ecotoxicity Workshop. Oct 4-7, Saskatoon, SK.
- Morandi, G., S. Wiseman, J. Martin, A. Pereira, R. Mankidy, M. Guan, X. Zhang and J. Giesy. 2015. "Assessing the Mechanistic Toxicity of Oil Sands Process Affected Waters (OSPW)." 42nd Annual Meeting, October 4-7, 2015, Saskatoon, SK, Canada.
- Morandi, G., and J. Giesy. 2015. "Predicting Acute Toxicity of Oil Sands Process Affected Waters." 36th Annual Meeting, November 1-5, 2015, Salt Lake City, UT.
- Muldoon B and NS Hogan. 2015. Developing the brook stickleback (*Culaea inconstans*) as a novel bioindicator for exposure to endocrine disrupting compounds using (anti-)androgen and estrogen responsive biomarkers. Canadian Ecotoxicity Workshop. Oct 4-7, Saskatoon, SK.
- Musselman K.N. and Pomeroy J. 2015. Poster: The influence of tree temperature on potential snowmelt energy in a discontinuous coniferous forest. American Geophysical Union Fall Meeting. San Francisco, CA, Dec 2015.
- Ohiozebau, E., B. Tendler, G. Codling, E. Kelly, P. Jones and J. Giesy. 2015. "Exposure of Fish in the Athabasca and Slave Rivers to PAHs Potentially Derived from Petrogenic Activities." 42nd Annual Meeting, October 4-7, 2015, Saskatoon, SK, Canada.
- Peng, H. and J. Giesy. 2015. "Untargeted Strategy for Identification of Toxic Chemicals in OSPW." 36th Annual Meeting, November 1-5, 2015, Salt Lake City, UT.
- Pettem, C., L.P. Weber and D.M. Janz. 2015. Potential metabolic and cardiovascular effects of dietary selenomethionine exposure in adult zebrafish (*Danio rerio*). Canadian Ecotoxicity Workshop, Saskatoon, SK.
- Pickering, I. J., G. N. George, T. C. MacDonald, P. H. Krone and M. Korbas. 2016. "Synchrotron studies of selenium interactions with heavy elements" (Conference venue and dates: Sao Paulo, Brazil; 18-21 October 2015) Global Advances in Selenium Research from Theory to Application - Proceedings of the 4th International Conference on Selenium in the Environment and Human Health, 2015 (G. S. Banuelos, M. F. de Moraes, L. R. G. Guilherme, Z.-Q. Lin, A. R. dos Reis, Editors; CRC Press/Balkema, Publisher), pp 43-44 (2016).
- Pomeroy J.W., Fang X., and Rasouli, K. 2015. Sensitivity of snow processes to warming in the Canadian Rockies. Proceedings, 72nd Eastern Snow Conference, pp. 22-33.
- Razavi, S., and Gupta, H.V. 2015. Variogram Analysis of Response surfaces (VARS): A New Framework for Global Sensitivity Analysis of Earth and Environmental Systems Models, American Geophysical Union (AGU) Meeting, December 14-18, 2015, San Francisco, CA (Oral Presentation).
- Razavi, S. 2015. Sensitivity Analysis and Insights for Model Parametrization, Changing Cold Regions Network's Watershed Modelling Workshop, September 29, 2015, Saskatoon, Saskatchewan (Oral Presentation).
- Lucia, S., D. Yang, Y. Li, and E. Mekis. 2015. Inconsistencies in Precipitation Measurements across Alaska and Yukon Border. 49th CMOS Congress and 13th AMS Conference on Polar Meteorology and Oceanography, Whistler, Canada

- Sadeghi A. and J. Soltan, 2015, Atrazine removal from aqueous solution by using different particle size of nano-ZnO in catalytic ozonation, The 65rd Canadian Chemical Engineering Conference, Calgary AB, October 4-7.
- Saunders, D., S. Wiseman and J.P. Giesy. 2015. "The brominated flame retardant TBCO affects fecundity and transcript profiles of the HPGL-axis in Japanese medaka." 42nd Annual Meeting, October 4-7, 2015, Saskatoon, SK, Canada.
- Saunders, D., H. Peng, J. Sun, S. Wiseman and J. Giesy. 2015. "Temporal Comparison of Concentrations and the Bioaccessibilities of Novel Brominated Flame Retardants in Dust Collected From Daycares in Saskatchewan, Canada." 36th Annual Meeting, November 1-5, 2015, Salt Lake City, UT.
- Schabert, M., Hendry, J., Barbour, S.L. (2015). "Application of Push-Pull Tests to Define Biogeochemical Controls on Selenium and Nitrate Attenuation in Saturated Coal Waste Rock ", In Session: 'Innovation in the remediation of contaminated sites', IAH – CNC 2015 Waterloo Conference, Waterloo, ON, 27-30 October, 2015, Schabert presenting.
- Schiffer, S. and K. Liber. 2015. Estimation of vanadium guidelines for the protection of aquatic life relevant to the Canadian Oil Sands region. Society of Environmental Toxicology and Chemistry 36th Annual Meeting, Salt Lake City, UT, USA, November 1-5, 2015.
- Schiffer, S.R., L.E. Doig and K. Liber. 2015. Toxicity of aqueous vanadium to aquatic organisms relevant of the Athabasca Oil Sands region for use in development of water quality guidelines. 42nd annual Canadian Ecotoxicology Workshop, Saskatoon, SK, October 4-7, 2015.
- Schultz, D., S. Tang, S. Beitel, B. Sarauer, S. Hanson, J.P. Giesy, D.M. Janz, S.B. Wiseman, P.D. Jones and M. Hecker. 2016. Determination of acute and sub-chronic toxicity of emerging contaminants in early life stages of rainbow trout (*Oncorhynchus mykiss*). Canadian Ecotoxicity Workshop, Saskatoon, SK.
- Schultz, D., S. Tang, S. Beitel, B. Sarauer, S. Hanson, D. Janz, S. Wiseman, P. Jones, M. Hecker. 2015. "Determination of Acute and Sub-Chronic Toxicity of Emerging Contaminants to Early Life Stages of Rainbow Trout (*Oncorhynchus mykiss*)." 42nd Annual Meeting, October 4-7, 2015, Saskatoon, SK, Canada.
- Schultz, D., S. Tang, S. Beitel, B. Sarauer, S. Hanson, D. Janz, S. Wiseman, P. Jones, M. Hecker and J. Giesy. 2015. "Determination of Acute and Sub-Chronic Toxicity of Emerging Contaminants to Early Life Stages of Rainbow Trout (*Oncorhynchus mykiss*)." 36th Annual Meeting, November 1-5, 2015, Salt Lake City, UT.
- Shahariar, S.D., Soolanayakanahally, R., Schroeder, B., and Bedard-Haughn, A. 2015. Effects of Short Rotation Willow on Soil Hydrology and Salinity in the Riparian Zones of Wetlands of Prairie Pothole Region. Poplar and Willow Council of Canada Annual Meeting, Abitibi-Témiscamingue, QC.
- Shahariar, S., Schroeder, B. and Bedard-Haughn, A. 2015. Impact of short rotation willow on prairie wetland soil hydrology and salinity. Joint Meeting of IUSS 2.5, CSSS, and AQSSS. Montreal, QC.
- Shahkarami, S., A. K. Dalai and J. Soltan, 2015, CO₂ capture on bio-based activated carbons, Biorefinery I: Chemicals and Materials From Thermo-Chemical Biomass Conversion and Related Processes, Crete, Greece, September 27-October 2

- Shahkarami, S., A. K. Dalai and J. Soltan, 2015, Surface modification of activated carbon for CO₂ capture, The 65rd Canadian Chemical Engineering Conference, Calgary AB, October 4-7
- Shahkarami, S., A. K. Dalai and J. Soltan, 2015, Selective CO₂ Capture on Activated Carbon, 3rd Post Combustion Capture Conference and SaskPower Symposium, Regina, Canada, 8th-11th September.
- Sheikholeslami, R., and Razavi, S. 2015. On the Impact of Uncertainty in Initial Conditions of Hydrologic Models on Prediction, American Geophysical Union (AGU) Meeting, December 14-18, 2015, San Francisco, CA (Oral Presentation).
- Schabert, M., Hendry, M.J., and Barbour, S.L. 2015. Application of Push-Pull Tests to Define Biogeochemical Controls on Selenium and Nitrate Attenuation in Saturated Coal Waste Rock, In Session: 'Innovation in the remediation of contaminated sites. IAH – CNC 2015 Waterloo Conference, Waterloo, ON, October 27-30, 2015.
- Smith, L.A., Hendry, M.J., Barbour, S.L., Novakowski, K., and van der Kamp, G. 2015. An alternative method to determine in situ hydraulic conductivity of claystone aquitards using pore pressure responses from grouted-in pressure transducers. International Association of Hydrogeologists, In: 'Hydrogeology of aquitards: flow and transport' session, September 13-18, 2015, Rome, Italy.
- Steele, C., Ferguson, G. and Ireson, A. 2015. Hydrogeological characterization of a waste site at Chalk River, Ontario. IAH-CNC 2015, Waterloo, ON, October 2015.
- Steeves KB, Hanson S, Bagatim T, Wiseman SB, Jones P, Giesy JP, Hecker M, Hontela A and NS Hogan. 2015. Reproductive and histopathological effects of municipal wastewater effluent exposure in male and female fathead minnows. Canadian Ecotoxicity Workshop. Oct 4-7, Saskatoon, SK.
- Steeves KB, Hanson S, Bagatim T, Wiseman SB, Jones P, Giesy JP, Hecker M, Hontela A and NS Hogan. 2015. Reproductive and histopathological effects of municipal wastewater effluent exposure in male and female fathead minnows. North American Meeting of the Society of Environmental Toxicology and Chemistry. Nov 1-5, Salt Lake City, Utah.
- Steeves, K., S. Hanson, T. Bagatim, S. Wiseman, P. Jones, M. Hecker, A. Hontela, N. Hogan and J. Giesy. 2015. "Reproductive and Histopathological Effects of Municipal Wastewater Effluent Exposure in Male and Female Fathead Minnows." 42nd Annual Meeting, October 4-7, 2015, Saskatoon, SK, Canada.
- Steeves, K., S. Hanson, T. Bagatim, S. Wiseman, P. Jones, M. Hecker, A. Hontela, N. Hogan and J. Giesy. 2015. "Reproductive and Histopathological Effects of Municipal Wastewater Effluent Exposure in Male and Female Fathead Minnows." 36th Annual Meeting, November 1-5, 2015, Salt Lake City, UT.
- Strickert, G.E.H., Nazemi, A., and Bradford, L.E. 2015. A stochastic modelling framework for the Invitational Drought Tournament. MODSIM 2015, Non-conventional data acquisition and modelling of hydrological extremes in data sparse environments (UNESCO Session) Gold Coast, Queensland, Australia, December 1st, 2016.
- Strickert, G.E., Ross, J., Bradford, L.E. & Gober, P. 2015. The Effects of Policy on Water Allocation: Results from a Decision Experiment. 68th National Canada Water Resources Association Conference Policy, Planning and Management. Session 2. Winnipeg, Canada. June 2nd, 2015.

- Sun, J., H. Alharbi, H. Peng, S. Wiseman and J. Giesy. 2015. "In vitro and In vivo Oxidative Stress Responses of Oil Sands Process-affected Water." 42nd Annual Meeting, October 4-7, 2015, Saskatoon, SK, Canada.
- Sun, J., S. Tang, H. Peng, D.M.V. Saunders, J. Doering, M. Hecker, P. Jones, S. Wiseman and J. Giesy. 2015. "A Combined Transcriptomic and Proteomic Approach to Elucidate Adverse Effects of the Brominated Flame Retardant TBCO on Early-Life Stages of Japanese Medaka". 36th Annual Meeting, November 1-5, 2015, Salt Lake City, UT.
- Tang, S., X. Zhang, M. Wang, Y. Xie, W. Sun, H. Liu, M. Hecker and J. Geisy. 2015. "Diversity of Sediment Microbial Community in Response to Acid Mine Drainage Pollution in Hengshi River (Southeast China)." 36th Annual Meeting, November 1-5, 2015, Salt Lake City, UT.
- Tang, S. and J. Giesy. 2015. "Mechanistic Investigations into Life-Sage Specific Differences in Sensitivity of White Sturgeon (*Acipenser transmontanus*) to Copper and Cadmium." 36th Annual Meeting, November 1-5, 2015, Salt Lake City, UT.
- Tendler, B., A. Hill, E. Ohiozebau, P. Jones. 2015 and J. Giesy. "Chemodynamic Behavior of Thallium in the Slave River, Northwest Territories, Canada." 42nd Annual Meeting, October 4-7, 2015, Saskatoon, SK, Canada.
- Tse, T., M. Hecker, L. Doig, H. Wheeler, P. Jones and J. Giesy. 2015. "Inferring Long-term Algal Dynamics in Prairie Reservoirs (Saskatchewan, Canada) through Environmental DNA in Cores of Sediments." 42nd Annual Meeting, October 4-7, 2015, Saskatoon, SK, Canada.
- Tolson, B., ..., Razavi S., Haghnegahdar, H., ...(11 authors). 2015. Parallel and Preemptable Dynamically Dimensioned Search Algorithms for Single and Multi-objective Optimization in Water Resources American Geophysical Union (AGU) Meeting, December 14-18, 2015, San Francisco, CA (Invited, Oral Presentation).
- Walker, X.W., M.C. Mack and J.F. Johnstone. 2015. Can tree ring analyses predict resilience of black spruce forests to fire in interior Alaska? American Geophysical Union Fall Meeting, San Francisco, CA, Dec 2015 (oral presentation).
- Wang A, Scott T, and NS Hogan. 2015. Evaluating the effects of feed restriction and timing of dietary exposure to fusarium mycotoxins on broiler growth performance. Western Nutrition Conference. Sept 29-30, Winnipeg, MB.
- Wang, X., Westbrook, C. and Bedard-Haughn, A. 2015. GHG emissions from a mountain peatland under a changing climate: A microcosm study. SSSA Annual Meeting. Minneapolis, MN.
- Wang, X., Westbrook, C., Helgason, B. and Bedard-Haughn, A. 2015. Assessing pedogenic controls on carbon mineralization, organic matter composition, and microbial community dynamics in a mountain peatland. Joint Meeting of IUSS 2.5, CSSS, and AQSSS. Montreal, QC.
- Watmough, S.A., A. McDonough, A. Bird, N. Melong, S. Berryman, J. Striker & C.J. Whitfield. Ecosystem Alkalization from Oil Sands Emissions. Acid Rain 2015, Rochester, NY, USA, October 2015.
- Wheater H., N. Khaliq, K. Chun, A. Barr, A. Ireson, P. Bartlett, M. MacKay, P. Pernica, and Y. Li. 2015. Improvement of Land Surface Schemes for Cold Region Processes: Recent Results from the Changing Cold Regions Network in Western Canada. 2015 CGU Annual Meeting, Joint Assembly of AGU/CGU, Montréal, Canada.
- White, K. and K. Liber. 2015. Partial lifecycle assessment of the effects of oil sands process-affected water on the survival, growth, and development of *Chironomus dilutes*. 42nd annual Canadian Ecotoxicology Workshop, Saskatoon, SK, October 4-7, 2015.

- Whitfield, C.J., A.C. Mowat, K.A. Scott & S.A. Watmough. Acid Rain 2015, Rochester, NY, USA, October 2015.
- Wilson L.D., M.H. Mohamed, and J.V. Headley. 2015. Cross-linked Polymers with Tunable Properties via Subtle Synthetic Conditions. 7th Pacific Basin Conference on Adsorption Science and Technology (PBAST), Xiamen, China. [poster]
- Wilson L.D., M.H. Mohamed, and J.V. Headley. 2015. Thermodynamic Studies of Inclusion Complexes Between β -Cyclodextrin Systems and Naphthenic Acid Fraction Components. 7th Pacific Basin Conference on Adsorption Science and Technology (PBAST), Xiamen, China. [poster]
- Wiseman, S., J. Sun, D. Saunders, J. Kuzma and J. Giesy. 2015. "Effects of the Novel Brominated Flame Retardant 1,2,5,6-tetrabromocyclooctane (TBCO) on Reproductive Capacity of 2 Generations of Japanese Medaka." 42nd Annual Meeting, October 4-7, 2015, Saskatoon, SK, Canada.
- Yassin, F., Razavi, S., Sapriza, G., and Wheeler, H. 2015. Enhanced Identification of hydrologic models using streamflow and satellite water storage data: a multi-objective calibration approach, American Geophysical Union (AGU) Meeting, December 14-18, 2015, San Francisco, CA (Poster Presentation).
- Zagozewski, R., L. Christensen, L. Bharadwaj, and S. Waldner. 2015. Accessibility, quality and safety of a First Nation's drinking water supply. Water, Economy, Policy, Governance Network, University of Calgary, Calgary, AB, Sept 3-4, 2015.
- Zagozewski, R., L. Bharadwaj, C. Waldner, P. Johnston. 2015. Water Regulations: Impacts on First Nations Health Equity and Promotion. Touchwood Agency Tribal Council Workshop, Punichy, SK, March 16, 2015.
- Zhang, Z., Brown, R., and Bedard-Haughn, A. 2015. Nutrient dynamics along drainage ditches under recent, medium and long-term drainage in the Black soil zone of southeastern Saskatchewan. Joint Meeting of IUSS 2.5, CSSS, and AQSSS. Montreal, QC.

Books and Book Chapters - 2016

- Bradford, L.E.A., Ovsenek, N., Bharadwaj, L.A. (2016). Indigenizing Water Governance in Canada. In Renzetti, S. and Duont, D. (eds) Water Policy in Canada. Springer. (in press).
- Cavallaro, M. C., M. Boucher, and T.A. Steelman. 2016. Sustainability champions: Role-models in sustainability graduate education. Eds. Walter Leal-Filho. Springer: Handbook of Theory and Practice of Sustainable Development in Higher Education. Paper 19.
- Fidler C, Noble BF. 2016. Advancing regional strategic environmental assessment in Canada's western Arctic: Implementation opportunities and challenges. In Fischer T (Ed.) Progress in Environmental Assessment Policy, and Management Theory and Practice. London: Imperial College Press, p 211-239. [This chapter is journal article reprint [Fidler and Noble 2013] adapted for book publication by the same publisher].
- Gupta, H., and Razavi, S. 2016. Challenges and Future Outlook of Sensitivity Analysis, In "Sensitivity Analysis in Earth Observation Modelling", Edited by Petropoulos and Srivastava, Elsevier.
- Mohammed, M., Walker, R., and P.A. Loring. In Press. "Perpetuation or Remediation of Structural Violence toward Aboriginal Peoples through Edmonton's Planning and Policy Processes – A

- Choice to be Made.” In Klodawsky, F., Andrew, C., and J. Siltanen (eds.) Seeking Equity and Inclusion in Canadian Municipalities. McGill-Queen’s University Press.
- Noble BF, Gunn J. 2016. Strategic environmental assessment. In K Hanna (Ed.) Environmental Assessment: Practice and Participation. Toronto: Oxford University Press, pp 96-121.
- Westbrook C.J., and B.F. Noble. 2016. Environmental assessment in Saskatchewan. In K Hanna (Ed.) Environmental Assessment: Practice and Participation. Toronto: Oxford University Press, pp. 340-353

Books and Book Chapters - 2015

- Elliott J.A. and R. McDowell. 2015. The Role of Soils in Ecosystem Services – Soils and the Water Cycle. In F. Nachtergaele (ed) Status of the World’s Soil Resources. United Nations Food and Agriculture Organization.
- Foster, S., Tyson, G., Ferguson, G., Younger, P., Bath, A., Evans, R., Scanlon, B. and Lakshmanan, E., 2015. The Energy Sector and Groundwater. International Association of Hydrogeologists Strategic Overview Series.
- Gober, P., and R. Quay. 2015. Harnessing urban water demand: The challenges ahead. In Handbook on Urbanization and Global Environmental Change, eds., K.C. Seto and W. Solecki. Taylor & Francis, pp. 93-105.
- Gunn J, Noble BF. 2015. Sustainability considerations in regional environmental assessment. In A Morrison-Saunders, J Pope, A Bond (Eds.) Sustainability Assessment Handbook. Cheltenham, UK: Edward Elgar, pp. 79-102.
- Noble BF 2015. Scoping out potentially significant impacts: Constraints of current regulatory-based cumulative effects assessment. In M Gillingham, C Johnson, M Parkes, G Halseth (Eds.) The Integration Imperative: Addressing the Cumulative Environmental, Community and Health Effects of Multiple Natural Resource Developments. New York, NY: Springer, pp. 176-181.
- Parkins J, Bullock R, Noble B, Reed M. 2015. Forests and communities on the fringe: An overview of community forestry in Alberta, Saskatchewan and Manitoba. In S Teitelbaum (Ed.) Community Forestry in Canada: Lessons from Policy and Practice. Vancouver: UBC Press, pp. 90-102.
- Steelman, T. 2015. Adaptive Governance. In: Handbook of Theories of Governance, Christopher Ansell and Jacob Torfin, eds. Edward Elgar Press.

Plenary, Key Note and Invited Lectures - 2016

- Abirhire O., and J. Hudson. 2016. Lake Diefenbaker research update from the Limnology Lab. Presented at the Global Institute of Water Security Annual Workshop. Park Town Hotel, Saskatoon, Canada. June 13-14.
- Barbour, S.L. Invited workshop presenter: "Geotechnical modeling using SLOPE/W, SEEP/W, SIGMA/W", GeoSlope International Geotechnical Modeling Workshop (May 16-18, 2016, Denver, CO).
- Baulch, H.M. Understanding nutrient impacts on environment. January 5, 2016. Saskatoon SK. Invited Seminar as a part of the program SUSTAIN which is a conservation training program for chemical suppliers and farmers aimed at improving land management practices. The

- January 2016 is the first (pilot) session in Canada before the program is extended more widely in western Canada
- Bedard-Haughn, A. 2016. Where do we put it all? The (proposed) Canadian Digital Soil Data Consortium (CSDSC). Digital Mapping of Forest Soils in Canada: A workshop. Laurentian Forestry Centre, Quebec City, QC.
- Bedard-Haughn, A. 2016. Wetlands in Agro-ecosystems: A Mixed Blessing. Saskatchewan Soil Conservation Association (SSCA) Annual Conference. Saskatoon, SK.
- Bedard-Haughn, A. 2015. Bringing it all together: the (proposed) Canadian Digital Soil Data Consortium. GlobalSoilMap International Consortium Workshop, Ottawa, ON.
- Chetkiewicz, C., and B.F. Noble. 2016. Regional strategic environmental assessment: Opportunities and challenges in northern Ontario and across Canada. Environmental Assessment Summit – West Coast Environmental Law. Ottawa, Ontario, May 1-3.
- Giesy, J. 2016. “China’s Role in the Canadian Oil Sands”. University of Hong Kong, Public Lecture Series, Hong Kong, PRC, March 2, 2016.
- Giesy, J. 2016. “Untargeted Screening of Environmental Samples for Novel Chemicals”. To: Nanjing University School of Environment, Nanjing, China, March 8, 2016.
- Giesy, J. 2016. “Pursuing the Chemical Culprits: What Organic Compounds are Responsible for Toxicity of Oil Sands Process-Affected Water?” To: Seoul National University. March 10, 2016.
- Giesy, J. 2016. “Identification and Quantification of Novel Contaminants in Food, Water, Human Tissues and Environmental Matrices”. To: Symposium on Environmental Health and Food Safety 2016. January 14, 2016.
- Giesy, J. 2016. “China’s Role in the Canadian Oil Sands”. To: Public lecture sponsored by the Faculty of Science, University of Hong Kong, March 1, 2016.
- Giesy, J. 2016. “Status and Trends of contaminants in the Yellow Sea: An International Perspective. To: 2nd Korea-China Symposium on Environmental Health and Ecotoxicology: The Yellow Sea Ecosystem, Pollution Ecosystem Threats and Environmental Health.
- Gober, P. 2016. What socio-hydrology means for the science and practice of water resource management. Peter Loucks Lecture, Seventh International Water Resources Management Conference of the International Association of Hydrological Sciences, Bochum, Germany, May 18-20.
- Gober, P. 2016. Urban adaptation to mega-drought: Anticipatory water modeling, policy, and planning for the urban Southwest. Institute of Australian Geographers, Adelaide, Australia, June 29.
- Hendry, M.J., Schmeling, E., Barbour, S.L., Harrington, G., Wassenaar, L.I., and Novakowski, K. 2016. Characterizing the Hydrogeology of Cretaceous Shale using High-resolution Profiling of Natural Tracers: the Williston Basin Example. GNS Wellington New Zealand February 26, 2016.
- Hendry, M.J., Schmeling, E., Barbour, S.L., Mundle, S., and Huang, M. 2016. Distribution, Origin, Fate, and Transport of Natural Gases in Cretaceous Shale: Baseline Characterization in the Williston Basin, Canada. Flinders University, Adelaide, Australia, February 2, 2016.
- Hendry, M.J., Schmeling, E., Barbour, S.L., Harrington, G., Wassenaar, L.I., and Novakowski, K. 2016. Application of High-resolution Profiling of Natural Tracers to Define the Hydrogeology of Cretaceous Shales: the Williston Basin Example. Intera Environmental Consultants, Austin, Texas, January 20, 2016.

- Hendry, M.J., Schmeling, E., Barbour, S.L., Mundle, S., and Huang, M. (2016). Distribution, Origin, Fate, and Transport of Natural Gases in Cretaceous Shale or Baseline Characterization of Natural Gases through Caprock in the Williston Basin, Canada, International Atomic Energy Agency (United Nations), Vienna, Austria, March 14, 2016
- Hogan, NS. 2016. Decontamination and detoxification of mycotoxins in grain to improve feed quality and animal health. World Mycotoxin Forum, June 8, Winnipeg, MB (Invited Speaker)
- Hogan, NS. 2016. Contaminants as important modulators of immunity in aquatic species. WildEcol Seminar Series, Jan 14, Environment Canada, Saskatoon, SK
- Jardine, T.D. 2016. Mercury in aquatic food webs: Using lessons from the past to inform the future of science and management. Department of Biological Sciences, University of North Texas, March 4, Denton, TX.
- Johnstone, J.F. 2016. Disturbing thoughts about the boreal forest. WildEcol seminar series, University of Saskatchewan, February 2016 (oral presentation).
- Li, Y. 2016. Regional climate simulation of western Canada using cloud-resolving model WRF, Univ of Manitoba, Winnipeg, MB, May 2016
- McDonnell, J.J. 2016. AGU Chapman Conference on Tropical Ecohydrology, Cuenca Ecuador, June 2016
- McDonnell, J.J. 2016. National Autonomous University of Mexico (UNAM), Mexico City, Mexico, May 2016
- McDonnell, J.J. 2016. University of Victoria, Dept. of Earth and Environmental Science, Wellington NZ, march 2016
- McDonnell, J.J. 2016. University of the Sunshine Coast, Sustainability Research Centre, Queensland, Australia, Feb 2016
- McDonnell, J.J. 2016. Institute for Geological and Nuclear Sciences, Lower Hutt, New Zealand, March 2016
- McDonnell, J.J. 2016. Gallagher Colloquium Lecture, Department of Geoscience, University of Calgary, Alberta
- McDonnell, J.J. 2016. American Geophysical Union, Session on Preferential flow and transport across scales in the Critical Zone, San Francisco
- McDonnell, J.J. 2016. Joint European Stable Isotopes User Group (JESIUM) Meeting, Ghent Belgium
- McDonnell, J.J. 2016. 3rd International Conference on Hydropedology, Beijing, China
- Molot, L., P. Dillon, P. Sun Loh, A. Medeiros, N. Kelton N, P. Porcal, G. Li, D. Findlay, S. Watson, S. Miller, I. Creed, C. Trick, J. Hudson, M. Verschoor, C. Powe, S. McCabe, S. Schiff and J. Venkiteswaran . 2016. Changing perspectives in the Iron Age. Annual meeting of the Association for the Sciences of Limnology and Oceanography (ASLO), Santa Fe, United States. June 5-10.
- Noble, B.F. 2016. The challenges and hope of regional cumulative effects assessment. Canadian Institute Energy Groups Cumulative Effects and the Future of Natural Resource Management. Vancouver, BC, March 2-3.
- Noble, B.F. 2016. The state of knowledge regarding significance determination. Invited presentation to the Yukon Environmental and Socioeconomic Assessment Board. Whitehorse, YT, February 2nd.

- Pomeroy, J.W. 2016. Pomeroy J. Mountains, Climate Change and Water Security. University of East Anglia. Norwich, UK, June 2016.
- Pomeroy, J.W. 2016. Westbrook C., Pomeroy J., McDonnell J., Helgason W., Ireson A., and Bedard-Haughn A. Canadian Rockies Hydrological Observatory. Global Institute for Water Security Workshop - Annual Progress and Plans. Saskatoon, SK, June 2016.
- Pomeroy, J.W. 2016. Helgason W., Ireson A., Pomeroy J., and Shook K. Bright Water Creek, Kenaston. Global Institute for Water Security Workshop - Annual Progress and Plans. Saskatoon, SK, June 2016.
- Pomeroy, J.W. 2016. Baulch H., Pomeroy J., Shook K., Westbrook C., and Wheeler H. Prairie Ag Water Quality: Smith Creek and Tobacco Creek. Global Institute for Water Security Workshop - Annual Progress and Plans. Saskatoon, SK, June 2016.
- Pomeroy, J.W. 2016. Shook K. and Pomeroy J. Prairie Modelling. Global Institute for Water Security Workshop – Annual Progress and Plans. Saskatoon, SK, June 2016.
- Pomeroy, J.W. 2016. Wheeler H., Pomeroy J., Fang, X., and Brown T. Introduction, CRHM module update. CCRN CRHM Expert Workshop. Saskatoon, SK. June 2016.
- Pomeroy, J.W. 2016. Pomeroy J. CHRM activities at the WECC observatories: Wolf Creek. Global Water CCRN CRHM Expert Workshop. Saskatoon, SK, June 2016.
- Pomeroy, J.W. 2016. Fang X. and Pomeroy J. Approaches for historical CRHM runs and analysis: Vegetation change and antecedent conditions. CCRN CRHM Expert Workshop. Saskatoon, SK. June 2016.
- Pomeroy, J.W. 2016. Pomeroy J. and Krogh S. Approaches for historical CRHM runs and analysis: Statistical analysis. CCRN CRHM Expert Workshop. Saskatoon, SK. June 2016.
- Pomeroy, J.W. 2016. Pomeroy J. Approaches for future CRHM runs and analysis: ICAR. CCRN CRHM Expert Workshop. Saskatoon, SK. June 2016.
- Pomeroy, J.W. 2016. Pomeroy J. Approaches for future CRHM runs and analysis; pseudo global warming approaches-NARCCAP. CCRN CRHM Expert Workshop. Saskatoon, SK, June 2016.
- Pomeroy, J.W. 2016. Pomeroy J. Rocky Mountain water supply resilience and vulnerability evaluation. Alberta Innovates Energy and Environment Solutions: Water Innovation Program Forum 2016. Edmonton, AB, May 2016.
- Pomeroy, J.W. 2016. Pomeroy J. Addressing the world climate research program grand challenges in high mountain Hydrology environments-progress by the International Network for Alpine Research Catchment. 6th Third Pole Environment (TPE) Workshop. Columbus, OH, May 2016.
- Pomeroy, J.W. 2016. Stewart R., Szeto K. and Pomeroy J. Objectives, work packages D1-4, status, questions, linkages to other Themes, transfer of models, uniqueness of AB flooding event. CCRN Theme D Synthesis Workshop. Winnipeg, MB, May 2016.
- Pomeroy, J.W. 2016. Pomeroy J.W. and Wheeler, H. The Changing Cold Regions Network: Observation, Diagnosis, and Prediction of Environmental Change in the Saskatchewan and Mackenzie River Basins. GEWEX Water Availability Grand Challenge for North America Workshop. Columbia, Maryland, USA, May 2016.
- Pomeroy, J.W. 2016. Pomeroy J.W. INARCH: International Network for Alpine Research Catchment Hydrology. GEWEX Water Availability Grand Challenge for North America Workshop. Columbia, Maryland, USA, May 2016.

Wilson LD. 2016. Design of Advanced Modified Biomaterials as Adsorbents for Applications in Advanced Water Treatment, Pollution Treatment and Technology 2016, Suzhou, China. [Plenary Invited]

Wilson LD. 2016. Aboriginal Initiatives in Chemistry at the University of Saskatchewan. 99th CSC 2016, Halifax, NS. [Invited, Equity Symposium]

Wilson LD. 2016. Synthetically Engineered “Smart” Biopolymers for Advance Drug Delivery Applications, International Symposium on Biomedical Engineering 2016 (ISBE 2016), Jakarta, Indonesia. [Keynote Invited]

Wheater, H.S. 2016. Environment Canada Seminar Series, Burlington, Ontario (January 2016)

Wheater, H.S. 2016. Globe 2016, Vancouver, British Columbia (March 2016)

Wheater, H.S. 2016. FSIN Water Regulations Forum, Saskatoon, Saskatchewan (March 2016)

Wheater, H.S. 2016. International Court of Justice 70th Anniversary Celebration, The Hague, Netherlands (April 2016)

Wheater, H.S. 2016. Canadian Network for Regional Climate and Weather Processes Annual Science Meeting, Montreal, Quebec (May 2016)

Wheater, H.S. 2016. Young Hydrologic Society Workshop – CGU CMOS 2016, Fredericton, New Brunswick (May 2016)

Wheater, H.S. 2016. Eric Wood Symposium, Princeton University, Princeton, New Jersey (June 2016)

Wheater, H.S. 2016. 2016 Orlob Symposium, UC Davis, California (June 2016)

Wheater, H.S. 2016. 2016 Schultz Oration, Flinders University, Adelaide, Australia (June 2016)

Plenary, Key Note and Invited Lectures - 2015

Barbour, S.L. Invited Presentation/Meetings - "IRC (Barbour) Research: Annual Syncrude Cda Ltd seminar/mtgs/discussions: for Barbour & his students/research staff (including Associate Chair Matt Lindsay and his students) to give presentations/updates on their IRC work/projects, as well as discuss other associated SCL/UofS research projects, Edmonton AB, Dec.11, 2015.

Barbour, S.L. "IRC (Barbour) Research: Site Visit to Aurora and Mildred Lake Mine research sites with Syncrude Research Leads (Dallas Heisler, Marty Yarmuch, Carla Wytrykush)", August 10-12, 2015.

Barbour, S.L. "Oil Sands Reclamation", presentation for Group of 30 Masters of Environmental Management Students visiting the U of S from Quito, Ecuador, UofS, Saskatoon, July 7, 2015.

Baulch, H.M. Eutrophication in the prairies – nutrient sources, and work towards solutions. Invited seminar. Lake Manitoba Workshop. December 10, 2015. Winnipeg, MB.

Baulch, H.M. The Future of Canada's Water Resources. Invited seminar. AgEx (Agricultural Excellence Conference). Nov 26, 2015. Regina, SK.


Baulch, H.M. Bloom affected source waters – tools to monitor, manage and adapt. Canadian Water and Wastewater Association. National Conference. October 28, 2015.

Blowes, D.W., M.B.J. Lindsay, R. Matthies, H. Veeramani, L. Kong, J. Eagling and C.J. Ptacek. 2015. Interpretation of Zn isotope ratio measurements in a complex geochemical system. Proceedings of the 25th V.M. Goldschmidt Conference, August 16–21, Prague, Czech Republic.

- Giesy, J. 2015. "China in the Canadian Oil Sands". Nanjing University School of Environment, Nanjing, China, July 6, 2015.
- Giesy, J. 2015. "Predicting the Toxicity of the over 250,000 Chemicals in Oil Sands Process Affected Water". Beijing Forestry University, Beijing China, July 10, 2015.
- Giesy, J. 2015. "Predicting the Toxicity of the over 250,000 Chemicals in Oil Sands Process Affected Water". Beijing Normal University, July 11, 2015.
- Giesy, J. 2015. "China's Role in the Canadian Oil Sands". Nankai University, Tianjin, China, July 11, 2015.
- Giesy, J. 2015. "Effects of Treatments with Apivar® and Thymovar® on V. destructor populations, Virus Infections and Indoor Winter Survival of Canadian Honey Bee Colonies (Apis mellifera L.)" With: Y. Al Naggar, Y. Tan, C. Rutherford, W. Connor, P. Griebel, J.P. Giesy and A.J. Robertson. To: Canadian Association of Professional Apiculturists Annual Meeting, December 1, 2015 Saskatoon, Saskatchewan, Canada.
- Giesy, J. 2015. "Untargeted Screening of Brominated Compounds in Sediments Using a Data Independent Precursor Isolation and Characteristic Fragment (DIPIC-Frag) Method". With: H. Peng, D. Saunders, S. Tang, G. Codling, M. Hecker, S. Wiseman, P. Jones, A. Li, N. Sturchio and K. Rockne. To: Symposium on Chemicals of Emerging Concern: A Global Perspective at the International Chemical Congress of Pacific Basin Societies, Honolulu, Hawaii, USA, December 15 - 20, 2015.
- Giesy, J. 2015. "Nontargeted Screening and Mapping the Distribution of Organo-brominated Compounds in sediments of Lake Michigan". With: H. Peng, C-L. Chen, J.-X. Sun, D. Saunders, G. Codling, M. Hecker, S. Wiseman and P.D. Jones. To: Symposium on Chemicals of Emerging Concern: A Global Perspective at the International Chemical Congress of Pacific Basin Societies, Honolulu, Hawaii, USA, December 15 - 20, 2015.
- Giesy, J. 2015. "Applications of Environmental Forensics for Chemicals of Emerging Concern". With: K. Rockne and G. Codling. To: Symposium on Chemicals of Emerging Concern: A Global Perspective at the International Chemical Congress of Pacific Basin Societies, Honolulu, Hawaii, USA, December 15 - 20, 2015.
- Giesy, J. 2015. "Detection, Identification, and Quantification of Novel Brominated Flame Retardants in Environmental Matrices". With: D. Saunders, H. Peng, J.-X. Sun, P.D. Jones and S. Wiseman. To: Symposium on Chemicals of Emerging Concern: A Global Perspective at the International Chemical Congress of Pacific Basin Societies, Honolulu, Hawaii, USA, December 15 - 20, 2015.
- Giesy, J. 2015. "Do Differences in Key Amino Acids in the Aaryl Hydrocarbon Receptor Explain Differences in Sensitivity of Fishes to Dioxin-like Compounds?" With: J. Doering, S. Wiseman, R. Farmahin, S. Beitel, S. Kennedy and M. Hecker. . To: Symposium on Environment Gene Interactions at the International Chemical Congress of Pacific Basin Societies, Honolulu, Hawaii, USA, December 15 - 20, 2015.
- Giesy, J. 2015. "Characterization of Adverse Outcome Pathways of Ethynylestradiol in Xenopus laevis". With: M. Hecker, A. Tompsett, S. Wiseman and E. Higley. To: Symposium on Environment Gene Interactions on the International Chemical Congress of Pacific Basin Societies, Honolulu, Hawaii, USA, December 15 - 20, 2015.
- Giesy, J. 2015. "Altered Reproductive Capacity of Japanese medaka Exposed to Maternally Transferred TBCO." With: D. Saunders, J.-X. Sun, H. Peng and S. Wiseman. To: Symposium

- on Environment Gene Interactions at the International Chemical Congress of Pacific Basin Societies, Honolulu, Hawaii, USA, December 15 - 20, 2015.
- Giesy, J. 2015. "Effect-directed Assessment of AhR-active PAHs in Oil-contaminated Sediments by the Hebei Spirit Oil Spill, South Korea". With: S.-G. Hong, S.-Y. Jeon, B.-O. Kwon, U. Yim, W.-J. Shim, and J.-S. Khim. To: Symposium on Status and Trends in Persistent Environmental Chemicals in the Environment to the International Chemical Congress of Pacific Basin Societies, Honolulu, Hawaii, USA, December 15 - 20, 2015.
- Giesy, J. 2015. "Persistent Toxic Substances in Estuarine and Coastal Areas of the Yellow Sea Regions: An International Perspective". With: J.-S. Khim, S.-G. Hong, B.-O. Kwon, T. Wang and Y.-L. Lu. To: : Symposium on Status and Trends in Persistent Environmental Chemicals in the Environment at the International Chemical Congress of Pacific Basin Societies, Honolulu, Hawaii, USA, December 15 - 20, 2015.
- Hudson, J. 2015. Lake Diefenbaker Research Update (2014-2105). Presented to the Saskatchewan Watershed Authority executive and the Global Institute of Water Security. Regina, Canada. December 11.
- Li, Y. 2015. 2013 Alberta flooding and 2015 Canadian Prairies drought, CCRN annual meeting, Saskatoon, SK, November, 2015
- Li, Y. 2015. The evaluation of coupled WRF+Noah-MP and offline Noah-MP at the FLUXNET sites, CCRN Modeling Workshop, Saskatoon, SK, September, 2015
- Li, Y. 2015. Future work for the Canadian part of continental WRF run. Research Applications Laboratory. Invited Seminar at Research Applications Laboratory, NCAR, Boulder, United States, July 2015
- McDonnell, J.J. 2015. American Geophysical Union, Session on DEMs in watershed modeling, San Francisco, Dec 2015
- McDonnell, J.J. 2015. American Geophysical Union, Session on Critical zone at large watershed scales, San Francisco, Dec 2015
- McDonnell, J.J. 2015. International Conference on Forests and Water, Kelowna, BC Canada, July 2015
- McDonnell, J.J. 2015. Workshop on Forest Hydrology: Future research questions and challenges, OSU Foundation, Portland OR, Dec 2015
- McDonnell, J.J. 2015. Workshop on Critical Puzzles about Trees, Water, and Soil, Penn State University, University Park, PA. Sept 2015
- McDonnell, J.J. 2015. Institute for Atmospheric and Climate Science, ETH Zurich, Switzerland, Nov 2015
- McDonnell, J.J. 2015. Faculty of Geo-information Science and Earth Observation, Twente University, The Netherlands, Oct 2015
- McDonnell, J.J. 2015. Dept. Civil Engineering, TU Delft, The Netherlands, Oct 2015
- McDonnell, J.J. 2015. State Key Laboratory for Soil Erosion, NW Agriculture and Forestry University, China, July 2015
- Nesbitt, J.A. and M.B.J. Lindsay. 2015. Geochemical characteristics of petroleum coke deposits at an oil sands mine, Alberta, Canada. Proceedings of the 25th V.M. Goldschmidt Conference, August 16–21, Prague, Czech Republic.
- Noble BF. 2015. Approaching climate change in strategic EA in Canada: Observations from practice. Ontario Association for Impact Assessment. Toronto ON, Oct 21-22.

- Patrick, R. 2015. Prince Albert Model Forest. Workshop. Presentation title: "Cumberland House Water Stewardship Plan". Prince Albert, SK. December 2015.
- Patrick, R. 2015. Partners for the Saskatchewan River Basin. Annual Conference. Presentation title: "Cumberland House Water Stewardship Plan". Winnipeg, MB. Nov 2/3, 2015.
- Manitopyes, J. and R. Patrick 2015. Technical Services Advisory Group. Annual Conference. Presentation title: "Source Water Protection at Muskowekwan First Nation, SK." Edmonton, AB. October 28, 2015.
- Patrick, R. 2015. Canadian Institute of Planners. Annual Conference. Presentation title: Planning for source water protection with First Nations on the Canadian Prairie". Saskatoon, SK. July 2015.
- Patrick, R. 2015. Canadian Association of Geographers. Annual Conference. Presentation title: "First Nations and Source Water Protection Planning on the Canadian Prairie". Vancouver, BC. June 2015.
- Patrick, R. 2015. Canadian Water Resources Association. Annual Conference. Presentation title: "Source water protection with First Nations". Winnipeg, MB. June 2015.
- Pickering, I.J. 2015. Metals, X-rays, Life and Death. Public Lecture, Science and Environmental Studies Speakers Series, Lakehead University, Thunder Bay ON, November 4, 2015.
- Pickering, I.J., G. N. George, T. C. MacDonald, P. H. Krone and M. Korbas. 2015. Synchrotron studies of selenium interactions with heavy elements. 4th International Conference on Selenium in the Environment and Human Health, Sao Paulo, Brazil, October 18-21, 2015.
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- Pomeroy, J.W. 2015. Aksamit N.O. and Pomeroy J.W. Saltating Snow Mechanics: High Frequency Particle Response to Mountain Wind. American Geophysical Union Fall Meeting. San Francisco, CA, Dec 2015.
- Pomeroy, J.W. 2015. López J.I., Herrero J., Gascoin S., Sproles, E.A., Hanich L., Boudhar A., Pomeroy J.W. and Pons M. Different sensitivity of snowpack to climate warming in Mediterranean mountain areas. American Geophysical Union Fall Meeting. San Francisco, CA, Dec 2015.
- Pomeroy, J.W. 2015. Shook K. and Pomeroy J.W. Modelling the effects of Prairie wetlands on streamflow. American Geophysical Union Fall Meeting. San Francisco, CA, Dec 2015.
- Pomeroy, J.W. 2015. Pomeroy J. Dynamics of Snowcover in Mountain Terrain Seminar. NCAR Meeting. Boulder, CO Nov 2015.
- Pomeroy, J.W. 2015. Pomeroy J. Advances in Mountain Hydrology. Saskatchewan Flood Workshop. Saskatoon, SK Nov 2015.
- Pomeroy, J.W. 2015. Pomeroy J. Lessons from Smith Creek. Saskatchewan Flood Workshop. Saskatoon, SK Nov 2015.
- Pomeroy, J.W. 2015. Pomeroy J. INARCH: International Network for Alpine Research Catchment Hydrology. GEWEX Hydroclimatology Panel (GHP) Annual Meeting. Entebbe, Uganda, Nov 2015.
- Pomeroy, J.W. 2015. Wheeler H., J. Pomeroy and C. DeBeer. CCRN Observation, Diagnosis, and Prediction of Environmental Change in the Saskatchewan and Mackenzie River Basins. GEWEX Hydroclimatology Panel (GHP) Annual Meeting. Entebbe, Uganda, Nov 2015.

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- Pomeroy, J.W. 2015. Pomeroy J. Cold regions processes, multi-scale modelling and change diagnosis. CCRN Third Annual General Meeting. Saskatoon, SK, Nov 2015.
- Pomeroy, J.W. 2015. Pomeroy J. Theme B and diagnostic modelling activities on all WECC sites. CCRN Third Annual General Meeting. Saskatoon, SK, Nov 2015.
- Pomeroy, J.W. 2015. Stewart R., A. Pietroniro, J. Pomeroy and H. Wheeler. Theme D, activities and timelines. CCRN Third Annual General Meeting. Saskatoon, SK, Nov 2015.
- Pomeroy, J.W. 2015. Pomeroy J. and R. Stewart. Summary and update on the 2013 Alberta floods special topic and special issue of Hydrological Processes. CCRN Third Annual General Meeting. Saskatoon, SK, Nov 2015.
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- Pomeroy, J.W. 2015. Marshall S. and J. Pomeroy. Glaciers and snow. CCRN Third Annual General Meeting. Saskatoon, SK, Nov 2015.
- Pomeroy, J.W. 2015. Pomeroy J.W., X .Fang, K. Rasouli and D. Marks. Cold Regions Hydrological Model – background and modelled alpine snow and hydrological change in North America. INARCH Inaugural Workshop. Kananaskis Country, AB, Oct 2015.
- Pomeroy, J.W. 2015. Pomeroy J.W. Canadian Rockies Hydrological Observatory. INARCH Inaugural Workshop. Kananaskis Country, AB, Oct 2015.
- Pomeroy, J.W. 2015. Conway J., W. Helgason and J. Pomeroy. Glacier atmospheric boundary layer dynamics; drivers and implications for surface lapse rates. CCRN Modelling Change in Cold Regions Workshop. Saskatoon, SK, Sept 2015.
- Pomeroy, J.W. 2015. Pomeroy J. and M. Schirmer. Advances in mountain snow process modelling. CCRN Modelling Change in Cold Regions Workshop. Saskatoon, SK, Sept 2015.
- Pomeroy, J.W. 2015. Marsh C., J. Pomeroy and H Wheeler. Snow model robustness. CCRN Modelling Change in Cold Regions Workshop. Saskatoon, SK, Sept 2015.
- Pomeroy, J.W. 2015. Leroux N. and J. Pomeroy. A new dual pathway heterogeneous flow model for snow. CCRN Modelling Change in Cold Regions Workshop. Saskatoon, SK, Sep 2015.
- Pomeroy, J.W. 2015. Lv Z. and J. Pomeroy. Evaluation of SNODAS SWE data in Western Canadian environments and assimilation into a cold regions hydrological model. CCRN Modelling Change in Cold Regions Workshop. Saskatoon, SK Sept 2015.
- Pomeroy, J.W. 2015. Pradhananga D. and J. Pomeroy. Static energy and mass balance sensitivity of glaciers in the Canadian Rockies: a case study of Haig Glacier. CCRN Modelling Change in Cold Regions Workshop. Saskatoon, SK, Sept 2015.
- Pomeroy, J.W. 2015. Shook K. and J. Pomeroy. Variable contributing area, storage dynamics and synthesis of flow frequency. CCRN Modelling Change in Cold Regions Workshop. Saskatoon, SK, Sept 2015.
- Pomeroy, J.W. 2015. Pietroniro A., H. Wheeler, J. Pomeroy and R. Stewart. CCRN modelling strategy, Theme D modelling plans, and modelling feedbacks to other Themes. CCRN Modelling Change in Cold Regions Workshop. Saskatoon, SK, Sept 2015.
- Pomeroy, J.W. 2015. Rasouli K., J. Pomeroy, S Carey and R Janowicz. Diagnosing climate change impacts in sub-arctic and temperate mountains. CCRN Modelling Change in Cold Regions Workshop. Saskatoon, SK Sep 2015.

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- Pomeroy, J.W. 2015. Pomeroy J.W. New Research on Headwaters and Downstream Flow Implications. 9th Bow River Basin Council Quarterly Educational Forum. Calgary, AB, Sep 2015.
- Pomeroy, J.W. 2015. Pomeroy J., Essery R., Musselman K., Conway J., Schirmer M., Helgason W., Leroux N., Debeer C. and Ellis C. Advances in understanding and modelling mountain snow processes. International Conference on Alpine Meteorology. Innsbruck, Austria, Aug 2015.
- Westbrook, C.J. 2015. Hydrological processes in Rocky Mountain wetlands. Alberta Forestry Workshop, Alberta Environment and Parks, Calgary, 26 November 2015.
- Wilson LD. 2015. Investigation of Polysaccharide Adsorbent Materials. Beijing Institute of Technology (South Campus) Department of Chemistry, Beijing, China. [Invited]
- Wilson L.D., M.H. Mohamed, and J.V. Headley. 2015. Green Fractionation of Naphthenic Acids from Oil Sands Process-Affected Water with Carbonaceous Materials. SusChemE, Mumbai, India. [Invited Plenary]
- Wilson, L.D. 2015. Polysaccharide Adsorbent Materials for the Uptake of Waterborne Contaminants. 7th Pacific Basin Conference on Adsorption Science and Technology (PBAST), Xiamen, China. [Invited Plenary]
- Wilson L.D., M.H. Mohamed, and J.V. Headley. 2015. Tuning the Physicochemical Properties Polysaccharides via Cross-linking Conditions. 7th Pacific Basin Conference on Adsorption Science and Technology (PBAST), Xiamen, China. [Invited Plenary]
- Wilson L.D., M.H. Mohamed, and J.V. Headley. 2015. Fractionation of Naphthenic Acids from Oil Sands Process-Affected Water with Carbonaceous Materials. International Conference for Young Chemists (ICYC) 2015, Penang, Malaysia. [Invited Plenary]
- Wilson, L.D., and A.H. Karoyo. 2015. ¹⁹F NMR Studies of Perfluorocarbon Surfactants and Macromolecular Host Systems. 2nd Crystal Engineering and Emerging Materials Workshop of Ontario and Quebec, Guelph, Canada. [Invited Plenary]
- Wheater, H.S. 2015. University of Queensland (November 2015)
- Wheater, H.S. 2015. Plenary Address – International Congress on Modelling and Simulation, Broadbeach, Queensland (December 2015)
- Wheater, H.S. 2015. Australian Energy and Water Exchange Research Initiative, Broadbeach, Queensland (December 2015)
- Wheater, H.S. 2015. Saskatchewan Irrigations Projects Association Annual Irrigation Conference, Moose Jaw, Saskatchewan (December 2015)
- Wheater, H.S. 2015. American Geophysical Union Fall Meeting, San Francisco, California (December 2015)

Editorial Boards

Bedard-Haughn, Angela

- Associate Editor, Canadian Journal of Soil Science

Elshorbagy, Amin

- Associate Editor, Water Resources Research
- Editor, Journal of Hydroinformatics

Ferguson, Grant

- Associate Editor, Geofluids
- Associate Editor, Ground Water

Giesy, John

- Associate Editor Environmental Development – The Transdisciplinary Journal of Scientific Committee for Pollution in the Environment (SCOPE) of United Nations, 2011-Present
- Editor in Chief, J. Environmental Science Research. Chinese Research Academy of Science, Beijing, China. 2015-Present
- Editorial Board. Ecosystem Health and Sustainability. Published by Ecological Society of America and Ecological Society of China. 2013-Present
- Editorial Board Geochemistry and Environmental Health. 2006-Present
- Editorial Board Environmental Bioindicators. 2007-Present
- Editorial Board. Reviews in Environmental Contamination and Toxicology. 2007-Present
- Editorial Advisory Board: Toxicological and Environmental Chemistry. Gordon and Breach/Scientific Publishers. London. 1989-Present.
- Editorial Board: Environmental Toxicology and Pharmacology. 2006-Present
- Chair External Advisory Committee Food Safety Institute, Hong Kong Baptist University, 2013-2014
- Guest Editor: Proceedings of the National Academy of Science, USA. 2007-Present
- Editorial Board: Environmental Research: 2014-Present
- Editorial Board: Environmental Reviews. 2014-Present
- Editor Search Committee: Environmental Science & Technology. 2014
- Advisory Board The Handbook of Environmental Chemistry series. Springer - Verlag. 2004-Present.
- Editorial Board Handbook of Ecotoxicology, Lewis Publishers /CRC Press. 1992-Present

Hudson, Jeff

- Guest Editor and Coordinator, Special Journal issue on Lake Diefenbaker, Journal of Great Lakes Research

Li, Yangping

- Editor, Hydrology Current Research

Lindenschmidt, Karl-Erich

- Guest Editor for Special Issues - "River and Lake Ice Processes—Impacts of Freshwater Ice on Aquatic Ecosystems in a Changing Globe" in *Water*. (2016 – 2017) http://www.mdpi.com/journal/water/special_issues/RaLIP
- Guest Editor for Special Issues - "Geospatial Modeling of River Systems" in *Water*. (2015 – 2016) http://www.mdpi.com/journal/water/special_issues/Geospatial_River

McDonnell, Jeffrey

- Editorial Board, Rhizosphere, Elsevier.
- Editorial Board, Sustainable Water Developments (Book Series), CRC Press.
- Editorial Board, Ecohydrology, John Wiley and Sons.
- Editorial Advisory Board, Forest Science and Technology, Taylor and Francis Ltd
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- Associate Editor, Hydrological Processes, John Wiley and Sons.
- Editorial Board, Hydro-Science and Engineering, Nanjing Hydraulic Res. Institute, China
- Editorial Board, Advances in Water Science (China), UNESCO
- Editorial Board, Forest Research—Open Access, OMICS Publishing Group
- Associate Editor, Journal of Hydrology and Hydromechanics, Open access journal.
- Editorial Board, Asian Journal of Geosciences, Hindawi Publishers
- Editorial Board, Journal of Hydrogeology and Hydrologic Engineering, Sci-Technol.
- Editorial Board, Riparian Ecology and Conservation, Versita and Springer
- Editorial Board, Water, MDPI Publishers, Switzerland
- Editorial Board, International Journal of Hydrology Science and Technology, Inderscience Enterprises Ltd (UK).
- Guest Editor, Hydrological Processes, Special Issue on Isotope Tracers in Hydrology (co-edited with Kevin McGuire).
- Guest Editor, Hydrological Processes, Special Issue on Hydropedology (co-edited with Henry Lin, John Nimmo and Yakov Pachepsky)

McPhadren, Kerry

- Editorial Board - Bulletin of Environmental Contamination and Toxicology

Razavi, Saman

- Associate Editor, Journal of Hydrology, Elsevier, Jan, 2016 – present
- Editorial Board Member, Environmental Modelling & Software, Elsevier, May, 2015 - present
- Member of Surface Water Hydrology Technical Committee (SWHTC) of American Society of Civil Engineers (ASCE), 2016 present
- Member of Hydrologic Uncertainty Technical Committee of American Geophysical Union (AGU), 2016 – present
- Member of “Thirsty Future: Energy and Food Impacts on Water” working group of the IAHS (The International Association of Hydrological Sciences) scientific decade 2013–2022 (Panta Rhei: Everything Flows).

Steelman, Toddi

- Editorial Board, Policy Sciences, 2015

APPENDIX F – Collaborations and Outreach

Barbour, Lee

- Designing Oil Sands Hydrogeology To Release Fresh Water, Interview with Cheryl Croucher's 'Innovation Anthology' – Canada's Voice of Innovation (both text and the audio in mp3 format) - <http://www.innovationanthology.com> (program #73311/19/2015); © 2008 Porcupine Stone Productions
- Dr. Lee Barbour: Oil Sands Hydrogeology Runs Deep, Interview with Cheryl Croucher's 'Innovation Anthology' – Canada's Voice of Innovation (both text and the audio in mp3 format) - <http://www.innovationanthology.com> (program #73211/17/2015); © 2008 Porcupine Stone Productions
- Blue Is The New Green, Interview with Cheryl Croucher's 'Innovation Anthology' – Canada's Voice of Innovation (both text and the audio in mp3 format) - <http://www.innovationanthology.com> (program #73111/10/2015); © 2008 Porcupine Stone Productions

Bedard-Haughn, Angela

- Brown, R. and Bedard-Haughn, A. 2016. Duration of Agricultural Drainage Changes Soil Properties. Prairie Steward (Newsletter of Saskatchewan Soil Conservation Association).
- Bedard-Haughn, A. My N cycle has a leak: Denitrification in agro-ecosystems. Western Ag Annual Professional Development Conference, Saskatoon, SK, March 22, 2016
- Radio interview with Alice MacFarlane on CJVR Radio re: Enhanced Saskatchewan Soil Data for Sustainable Land Management (ADF grant, see above). Feb. 2, 2016

Bharadwaj, Lalita

- Bradford, L., Zagozewski, R., Bharadwaj, L.A. (2016). "Spirit, Safety, and a Stand-off". Animated video about Yellow Quill First Nation Water Security. Video produced at the request of Yellow Quill first Nation; funded by CIHR and WEPGN.
- Bradford, L., Bharadwaj, L.A. (2015) The Delta Ways Remembered. Video produced at the request of Slave River and Delta Partnership. <https://www.youtube.com/watch?v=XHjmcNwVpE> 14 minutes.
- Bradford, L.E.A., and Bharadwaj, L.A. (2016) Two-Eyed Seeing: Combining western and traditional knowledge in the Northwest Territories. Water Canada, March 2016.
- A. Morrison, L. Bradford and L. Bharadwaj (2015) Evaluating the First Nations Water Management Strategy Environmental Science & Engineering Magazine's inaugural First Nations Drinking Water Issues Special Section. https://issuu.com/esemag/docs/ese_sept.oct.15_issuu/40
- Zagozewski, R. Sept/Oct 2015, A special focus on First Nations drinking water challenges, Environmental Science & Engineering Magazine by Peter Davey, Assistant Editor.
- Bharadwaj, Lalita: Macleans Magazine Interview (October 2015)
- <http://www.macleans.ca/news/canada/why-cant-we-get-clean-water-to-first-nation-reserves/>

- Bharadwaj, L, (December 2015): Globe and Mail. Unresolved water advisories creating 'health emergency' for First Nations OTTAWA — The Globe and Mail. This story is part of Headwaters, a series on the future of our most critical resource.
- Bharadwaj, L., (October 2015) On Camera Interview CBC Saskatchewan Bad water: 'Third World' conditions on First Nations in Canada
- Bharadwaj, L., (January 2016) On Camera Interview Aboriginal Peoples Television Network

Doig, Lorne

- Deninu School, Fort Smith, NT, Canada - Working with Elaine Weng, science teacher in developing a class module to teach grade 10 to 12 students about the identification and ecology of aquatic invertebrates and how to use community composition to assess river health.

Elliott, Jane

- Alberta Environment Advisory Committee on the application of manure to frozen or snow-covered soils for Alberta Natural Resources regulators. Technical advisory committee for the development of AAFC indicator for risk of water contamination by P (IROWC-P) Manitoba Agriculture Food and Rural Development Factsheet – Perennial Forages Release Phosphorus during Snowmelt in Manitoba. <http://www.gov.mb.ca/agriculture/environment/nutrient-management/index.html>

Hudson, Jeff

- "The Current: Limnology of the Prairie Jewel: Lake Diefenbaker by Jeff Hudson." Describes my article in the Society of Canadian Limnologists publication "The Current", College of Arts and Science Website(University of Saskatchewan). May 30, 2016
- "Lake Study Needs Dry Year Data." Lake Diefenbaker Research Program, The Western Producer Magazine. November 19, 2015
- "Water Quality of Lake Diefenbaker May Go with the Flow." Lake Diefenbaker Research Program, On Campus News. November 20, 2015
- "Phosphorus Present in Lake Diefenbaker Reservoir." Lake Diefenbaker Research Program, Discover Moose Jaw Newspaper. November 17, 2015
- "Research Conducted at Lake Diefenbaker", West Central Online. November 11, 2015
- "Researchers Delve into Lake Diefenbaker's Health." Lake Diefenbaker Research Program, Star Phoenix Newspaper. November 9, 2015
- Lake Diefenbaker Research Program., Brent Lucas Show, CKOM 650. November 19, 2015
- "Climate Change Could Put Lake Diefenbaker Water Quality at Risk" On Lake Diefenbaker Research Program, Saskatoon Morning, CBC News Saskatoon (94.1 AM). November 11, 2015.

Jardine, Tim

- Interview with Bob Simpson of CTV Saskatoon about World Water Day, <http://regina.ctvnews.ca/video?binId=1.1165857>, Air date March 28th, 2016 (24 minute mark).



Johnstone, Jill

- Star Phoenix newspaper, “After the fire: What’s next for northern forests and communities?” by Kendall Latimer, 30 July 2015.
- Science magazine, “The New North: Stoked by climate change, fire and insects are remaking the planet’s vast boreal forests” by Tim Appenzeller, 21 August 2015.
- Radio interview (CJWW/98COOL FM/92.9 The Bull), “Aspen seeds: Snow in June at Lac La Ronge”, with Carol Thompson, 21 June 2016.
- Take Part magazine, “Last year’s devastating fire season was just the beginning”, by Zach St. George, 2 June 2016. <http://www.takepart.com/article/2016/06/01/last-years-devastating-fire-season-was-just-the-beginning>
- Radio interview (CBC Saskatchewan), “NASA and U of S teams research forests near La Ronge, SK one year after wildfires”, with Sheila Coles, 4 July 2016. <http://www.cbc.ca/news/canada/saskatchewan/research-la-ronge-forests-year-anniversary-1.3663798>
- CBC Radio-Canada Saskatchewan (French), “La forêt près de La Ronge, un an après les grands feux”, with Natalie Lavergne, 5 July 2016. <http://ici.radio-canada.ca/regions/saskatchewan/2016/07/04/001-laronge-feu-foret-scientifiques.shtml>

Li, Yanping

- CBC French in Regina, by Felix Morrisette Beaulieu, Nov 13, 2015 - Saskatchewan's issues to the International conference about climate Change in Paris 2015
- Rawlco radio, by Brent Bosker, Jan 19, 2016 - the impact climate change on northern ice roads in Saskatchewan

Loring, Phil

- P.A. Loring (Producer*), S.C. Gerlach (Producer), S. Betcher (Filmmaker). “Navigating Arctic Erosion: Tied to the Land Film Series.” <https://www.youtube.com/watch?v=eLSQqlvfepY>
- P.A. Loring (Producer*), S.C. Gerlach (Producer), S. Betcher (Filmmaker). “Gift of Resources: Tied to the Land Film Series.” <https://www.youtube.com/watch?v=WpMOeR6yf8s>

Mantyka-Pringle, Chrystal

- Mantyka-Pringle C, Rhodes J & Martin T. We all live downstream – it’s time to restore our freshwater ecosystems, Analysis article in The Conversation, May 9th (2,834 readers) (<http://theconversation.com/we-all-live-downstream-its-time-to-restore-our-freshwater-ecosystems-58934>)
- Mantyka-Pringle C, Schindler D, Westman C & Kythreotis A. Honour treaty rights, counter climate change Opinion article in Edmonton Journal, October 10th (722,454 weekly circulation) (<http://edmontonjournal.com/news/politics/honour-treaty-rights-counter-climate-change-opinion>)
- Mantyka-Pringle C, Martin T. A new plan needed for cattle grazing. Letter to the editor, Star Phoenix Newspaper, September 1st (316,452 weekly circulation)

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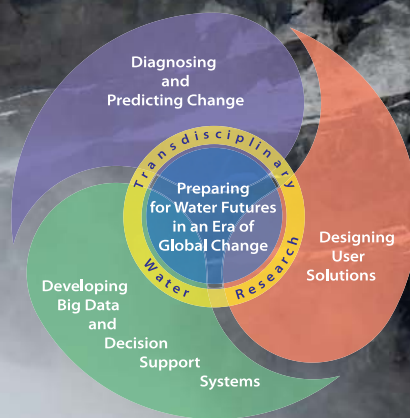
Pickering, Ingrid

- Canadian Light Source Tour for Alaa Murabit, UN High-Level Commissioner: Health Employment & Economic Growth. May 10, 2016
- Speech at Media Event for Federal Announcement of the John R. Evans Leaders Fund, Canada Foundation for Innovation representative, University of Regina, April 15, 2016.
- SLAC National Accelerator Laboratory News Feature: X-ray Duo's Research Helps Launch Human Trial for Treatment of Arsenic Poisoning. <https://www6.slac.stanford.edu/news/2015-08-20-x-ray-duos-research-helps-launch-human-trial-treatment-arsenic-poisoning.aspx>
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Pomeroy, John

- Calgary Herald June 18, 2016. Three years later, lessons being learned from the 2013 flood
- Rocky Mountain Outlook June 16, 2016. Snow studies examine causes of 2013 flood
- CJWW May 9, 2016: Mountain Runoff Weeks Early
- Global TV News May 5, 2016: Saskatchewan extends fire help to Alberta, but still needs resources at home
- Saskatoon Star Phoenix April 20, 2016: 'Desert-dry' Saskatchewan primed for wildfires
- Global News Saskatoon April 20, 2016: Red Cross gears up for 2016 Sask. forest fire season
- CTV News Saskatoon April 12, 2016: Warm winter could mean dry summer in Sask.
- Saskatoon Star Phoenix March 12, 2016: Insights on Wider Implications of Warm Spring Conditions
- The Star Phoenix March 10, 2016: The flipside of a warm spring: Prof warns of drought, fire and floods
- CKOM News Talk 650 March 10, 2016: *Forest fires, flooding could follow warm Sask. winter*
- National Post Feb 29, 2016: Droughts, downpours and diebacks: Scientists warn of new climate extremes for Canada in 2050
- Rocky Mountain Outlook Feb 17, 2016: *Valley warm and dry this winter*
- The Globe and Mail Feb 3, 2016: *Balmy in February: When puddles replace rinks, we all lose*

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- The Globe and Mail Jan 31, 2016: Snowmobilers attempted to save friend who died in B.C. avalanche
 - The Western Producer Dec 31, 2015: Caution: wild weather ahead
 - Radio Canada Channel -special issue of Découverte December 5, 2015: Vulnerability of Canadian water resources to climate-change
 - Globe and Mail *Headwaters* commentary November 29, 2015: Looking for leadership on water
 - Rocky Mountain Outlook November 18: International Kananaskis gathering a success
 - The Tyee November 17, 2015: Bracing for the Next Deluge
 - The Tyee November 15, 2015: Don't Tell These Ranchers Climate Change Isn't Real
 - Calgary Herald October 26, 2015: Scientists meet to discuss water resources in cold, alpine regions
 - Globe and Mail October 22, 2015: Disintegrating Rockies glacier sends 'strong message' on climate
 - Globe and Mail October 11, 2015: Protecting the health of Alberta's Bow River
 - Calgary Herald October 4, 2015: Western Canada's glaciers losing ice at near-record rates
 - Globe and Mail September 18, 2015: In Globe debate, leaders ignore Canada's No. 1 resource: water
 - CBC News, August 31, 2015: Selwyn Mountains site of researchers' melting glacier study
 - Yale University's *Environment360* magazine, Aug 27, 2015: In Northern Canada Peaks, Scientists
 - Are Tracking Impact of Vanishing Ice
 - Bloomberg Business News, 26th August 2015: Snowy Canada Suffers Drought, Heat, Fires as Earth Gets Warmer
 - Global news, 7th August 2015: Expert warns Alberta weather will intensify; Notley focuses on climate change
 - CBC Radio, CBC Edmonton and CBC news, 4th August 2015: Melting glaciers and drought in Alberta's future – Hydrologist warns of hotter, drier times with lack of mountain snow
 - Bow Valley Crag and Canyon, 29th July 2015: Mountain parks feeling effects from drought
 - Rocky Mountain Outlook, 29th July 2015: Researchers seek answers from Athabasca Glacier
 - The StarPhoenix, 27th July 2015: Wise to Plan for Drier West
 - Globe and Mail, 17th July 2015: Crop expert Norm Hall on how drought is hurting Prairie farmers
 - The StarPhoenix, 11th July 2015: River levels bottom-out
 - The Weather Network, 6th July 2015: Developing drought conditions
 - National Observer, 6th July 2015: Experts voice fears for B.C.'s climate future, as western wildfires rage



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Athabasca Glacier



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