

CGU-HS Committee Reports (2018-19)

Northern Research Basins

1. Committee Description, Background and Objectives

The overall objective of the NRB Working Group is to encourage research in hydrological basins in cold regions where snow, ice and frozen ground have a dominant role in the hydrological cycle.

Over the years, the objectives of the NRB Working Group have evolved to include the following:

1. Gain a better understanding of hydrological processes, particularly those in which snow, ice, and frozen ground have a major influence on the hydrological regime, and to determine the relative importance of each component of the water balance.
2. Provide data for the development and testing of transposable models which may be applied to regional, national, and international water and land resource programmes.
3. Relate hydrological processes to the chemical and biological evolution of northern basins.
4. Assess and predict the effect of human activities on the hydrological regime in northern environments.
5. Encourage the exchange of personnel (technicians, scientists, research officers, students, and others) among participating countries.
6. Provide information for the improvement and standardisation of measurement techniques and network design in northern regions.
7. Encourage exchange of information on a regular basis, and
8. Set up task forces to promote research initiatives on topics of special interest to northern research basins.

Each of the 8 circumpolar nations who are members of the NRB maintains a delegation of researchers to participate in the bi-annual NRB symposia. In Canada, the head of the Northern Research Basins committee is the Chief Delegate, who reports to the CGU-HS.

2. Committee Membership

William Quinton (Laurier), Kathy Young (York), M-K Woo (McMaster), P. Marsh (Laurier).

3. Committee Activities

a. Major Areas of research:

Improving the understanding and numerical description of cold regions hydrological processes, including how such processes are changing with climate warming.

b. Science-Industry collaborations:

None

c. Training and networking initiatives geared towards young and emerging scientists

The NRB meetings are bi-annual. Students and other HQP account for about 50% of the participants, and take on leadership roles in the planning and execution of the meetings.

4. Major Publications

No record of this is made as the membership of the national delegations changes every two years.

Permafrost - Hydrogeology Interactions

1. Committee Description, Background and Objectives

Permafrost – Hydrogeology Interactions to the Canadian Geophysical Union - Hydrology Section facilitates scientific advancement, interdisciplinary collaboration and knowledge transfer with respect to the relations between permafrost and hydrogeology in varying circumpolar landscapes, and the responses with climate change. These poorly understood relations are critical knowledge gaps, as climate change impacts on permafrost are likely to alter hydrologic cycles, groundwater flow networks, and surface water supplies in Canada's North. Communities, governments, regulators, industry, and academics are noting process changes in northern Canada. Regulators need guidance on how to scope groundwater and permafrost issues as they affect economic development, and Northern capacity is needed to address issues facing Northern communities. The knowledge must come through extended collaborations and engagement. The committee was established according to consensus at a meeting of 27 government, academic, and industry researchers and practitioners held to address these issues in Yellowknife, NT, 14 November 2016 (Morse, 2017).

Objectives:

1. Establish a collaborative research and development network to improve knowledge transfer and educational opportunities by facilitating scientific sessions and short courses in association with the Canadian Geophysical Union annual meeting and other with other scientific societies.
2. Prepare a White Paper synthesizing pan-Canadian perspectives on the state of knowledge of permafrost-hydrogeology interactions. Use this White Paper to develop a conceptual framework to guide future Canadian research.
3. Collate this White Paper with case studies and process research to publish a special journal issue on permafrost – hydrogeology interactions.
4. Report annually on progress to the Canadian Geophysical Union – Hydrology Section.
5. Follow-up on the conceptual framework and special issue by facilitating subsequent scientific sessions in association with the Canadian Geophysical Union annual meeting and other with other scientific societies.

2. Committee Membership

Geological Survey of Canada: Research Scientist: 1

Environment and Climate Change Canada: Research Scientist: 1

3. Committee Activities

a. Major Areas of research:

1. Permafrost control on hydrogeology;
2. Permafrost control on surface - subsurface linkages;
3. Implications of climate change on permafrost extent and subsequent impacts on water resources;
4. Implications for northern communities

e. Summary of areas of challenges and achievements

Members have been involved in creating the Permafrost Partnership Network for Canada (PermafrostNet) which has a goal of boosting Canada's ability to adapt to permafrost thaw; Members are involved in creating the Canadian Permafrost Association

7. Other major achievements

Members of the committee are part of the development of an index of water resource vulnerability to permafrost loss.

Urban Hydrology

1. Committee Description, Background and Objectives

This committee was formed in 2016 to promote and advance understanding of the importance and role of hydrology in urban environments.

2. Committee Membership

Ryerson University; Profs: 2, PhD: 2, MSc: 4

University of Toronto Mississauga; Profs: 1, MSc: 1

University of Toronto Scarborough; Profs: 1, PhD: 1, MSc: 2

3. Committee Activities

a. Major Areas of research:

Urban hydrological processes; urban geospatial landscape analysis; urban water quality

b. Science-Industry collaborations:

None

c. Training and networking initiatives geared towards young and emerging scientists

Ryerson University members hosted the 2019 CGU Eastern Student conference on April 13th.

Attendees had some exposure to the urban hydrology focused research happening at Ryerson.

All committee members attended.

e. Summary of areas of challenges and achievements

Typically this committee organizes a special session (urban(izing) and/or human-dominated landscapes focus) at the annual conference each year. Given the unique organization of the IUGG symposia this year, we did not submit a session proposal. I expect our committee will propose one for the 2020 conference.

One of our major challenges is developing initiatives outside of the special session. At our upcoming conference we will be speaking to the group about developing a review paper.

4. Major Publications

Oswald, C.J., Rinner, C., and Robinson, A.* (2019) Applications of 3D printing in physical geography education and urban geovisualization. *Cartographica*, In Press.

Lichtblau, E.* and Oswald, C. (2019) Classification of impervious land-use features using object-based image analysis and data fusion. *Computers, Environment and Urban Systems*, 75, 103-116.

Oswald, C.J., Giberson, G.*, Nicholls, E., Wellen, C., and Oni, S. (2019) Spatial distribution and extent of urban land cover control watershed-scale chloride retention. *Science of the Total Environment*, 653, 1445-1457.

Duval, T.P. (2018) Effect of residential development on stream phosphorus dynamics in headwater urbanizing watersheds of southern Ontario, Canada. *Science of the Total Environment*, 637-638, 1241-1251.

Parajulee, A.*; Wania, F.; Mitchell, C.P.J. (2019) Hydrological transit times in nested urban and agricultural watersheds in the Greater Toronto Area, Canada. *Hydrological Processes*, 33, 350-360.

Kayembe, A.*; Mitchell, C.P.J. (2018) Determination of subcatchment and watershed boundaries in a complex and highly urbanized landscape. *Hydrological Processes*, 32, 2845-2855.

Parajulee, A.*; Lei, Y.D.; Cao, X.; McLagan, D.S.*; Yeung, L.W.Y.; Mitchell, C.P.J.; Wania, F. (2018) Comparing herbicide behavior and exports in urban, rural, and mixed-use watersheds. *Environmental Science: Processes & Impacts*, 20, 767-779.

Parajulee, A.*; Lei, Y.D.; Kananathalingam, A.; Mitchell, C.P.J.; Wania, F. (2018) Investigating the sources and transport of benzotriazole UV stabilizers during rainfall and snowmelt across an urbanization gradient. *Environmental Science & Technology*, 52(5), 2595-2602.

Strickman, R.J.*; Mitchell, C.P.J. (2018) Mercury methylation in stormwater retention ponds at different stages in the management lifecycle. *Environmental Science: Processes & Impacts*, 20, 595-606.

5. Scientific conferences/workshops/sessions hosted by members; attended by members (Canada, and abroad)

At the 2018 CGU conference in Niagara Falls, the urban hydrology committee convened the 'Hydrological and Biogeochemical Behaviour in Urban(izing) Landscapes' session.

At the 2018 International Association of Great Lakes Research conference in Toronto, Claire Oswald co-convened the 'Cities on the Shore: Urbanization as a Growing Threat to Nearshore Ecosystem Health' session.

6. Awards received by members

Claire Oswald: (1) Ryerson University - YSGS Outstanding Contribution to Graduate Education Award (Interdisciplinary); (2) Water Canada - Water's Next Award (Academia).

Isotope Tracers

1. Committee Description, Background and Objectives

The CGU - HS Committee on Isotopic Tracers was originally established in 1997 to support and facilitate information exchange between isotope specialists and hydrologists both within Canada and internationally, and to address issues of importance to isotopic investigations including integration within broadly-based hydroscience research programs. In 2014, CGU Hydrology Section dissolved all sub-committees, and re-established only those who were active, including the Isotope Tracer Committee. Recognizing and supporting promising applications of isotopic tracers, promoting cooperative research, providing information resources, and articulating research and educational needs to government agencies, universities, and the general hydrology community are the fundamental aims of the Committee.

The long-term objectives of the committee are to:

- o promote and advance the understanding and application of isotopic tracer techniques in hydrology and related sciences
- o initiate and participate in research and education programs, maintain contact with relevant organizations, report on national and international research activities, information sources, isotope monitoring networks, and databases
- o establish working groups and/or subcommittees to assess specific, high-priority topics for research, monitoring and/or development, and
- o disseminate current research and important findings to the scientific community via discussion, meetings and conferences, and publications

2. Committee Membership

3. Committee Activities

a. Major Areas of research:

Operationalizing National isotope networks (CNIR, CNIP)

Regional isotope monitoring programs

Isotope Tracing of Human Impacts on Water Balance and Nutrient Dynamics of Large Canadian River Basins

c. Training and networking initiatives geared towards young and emerging scientists

ENVS 898 – Isotope Tracers in Catchment Hydrology Graduate Course

In 2019, this course took a 1 year hiatus due to Coordinator, Jeff McDonnell's sabbatical leave. Talks with the Canadian Society for Hydrological Sciences and the Canadian Water Resource Association have been on-going to establish this as one their core National courses and professional certifications. The plan is to offer the course through CSHS in May 2019, and to continue to support the WebEx offering for the course. The course will remain available to graduate students from outside U of S via the Western Canadian Dean's Agreement (<http://wcdgs.ca/western-deans-agreement.html>). For more information, or if you are interested, contact Jeff McDonnell (jeffrey.mcdonnell@usask.ca).

d. Regional, national and international advisory efforts

National and international isotope networks

IAEA working groups

e. Summary of areas of challenges and achievements

National: Water Survey of Canada Isotope Network

The Water Survey of Canada, in cooperation with the University of Manitoba, University of Victoria, and Innotech Alberta, continues to support the national pilot of an operational isotope network in conjunction with their hydrometric network, similar the existing isotope-hydrometric network in the United States. The goal is to demonstrate the value in systematic collection of river discharge in tandem with analysis for oxygen-18 and deuterium across Canada.

A wrap up report for the pilot phase was submitted to Environment and Climate change Canada in September 2018, and the project is now moving toward operational phase. Efforts are on-going to secure a permanent network, as part of the hydrometric database and hydrologic services. Data will be released publically from the pilot phase by the end of 2019. The activities form part of Canada's contribution to the Global Network of Isotopes in Rivers, a network coordinated by the International Atomic Energy Agency.

Also on-going are efforts to re-establish the Canadian Network for Isotopes in Precipitation. For the past three years, the network has been run through a pilot program with the IAEA and Health Canada's radiation network. The goal is to find a permanent program to support the CNIP network since it is a valuable part of the IAEAs GNIP program. For further information please contact John Gibson, jjgibson@uvic.ca

International: Isotope Tracing of Human Impacts on Water Balance and Nutrient Dynamics of Large Canadian River Basins

A team of members of the Isotope Tracer Committee of the Canadian Geophysical Union is participating in an International Atomic Energy Agency (IAEA) Coordinated Research Project (CRP F33021) entitled: Application and Development of Isotope Techniques to Evaluate Human Impacts on Water balance and Nutrient Dynamics of Large River Basins. The Canadian project, initiated in April 2014 and entitled Isotope Tracing of Human Impacts on Water Balance and Nutrient Dynamics of Large Canadian River Basins, is Coordinated by Jean-François Hélie (Geotop-UQAM) and supported by John Gibson (University of Victoria & AITF). Six teams from across Canada support this Canadian CRP and are led respectively by Jean-François Hélie (Eastern), John Gibson (Western), Trish Stadnyk (Prairies), Ian Clark (Northern), Fred Longstaffe (Great Lakes) and David Soto (Maritimes). The CRP aims at coordinating Canadian efforts in assessing human impacts on large river systems using isotope tracers. Now that almost all the respective networks are operational, we hope to expand from tier 1 to tier 2 sampling in the coming months for some targeted sites. We also hope to strengthen the interactions between the teams by organizing an informal meeting and create a database of published Canadian river isotopic data.

For information contact Jean Francois Hélie (helie.jean-francois@uqam.ca).

5. Scientific conferences/workshops/sessions hosted by members; attended by members (Canada, and abroad)

IUGG, Montreal (2019)

9. Additional information the committee would like on file

Committee Coordination

Though progress is being made on National scale networks and collaborations, the committee would like to hold more formal activities beginning in 2019-20. The executive will reach out to committee membership in 2019-20 to decide what directions the membership would like to proceed in.

Hydro-Climatic Impacts and Adaptations

1. Committee Description, Background and Objectives

Background

Established in May 2016 to provide a platform for researchers engaged in hydro-climatic, hydrologic and hydro-ecological impacts and adaptation, and promote the development of new methods and tools to address the challenges. The committee is active in the advancement of knowledge on the implications of climate variability/change on planning, allocation and operations of water resources, and adaptation/mitigation measures that address the potential impacts. Engagement of multidisciplinary scientists included organizing special sessions at national/international conferences

Objectives:

To advance the development of methods and tools for better understanding of the hydrologic and aquatic ecosystem impacts of climate variability and change, and developing adaptation measures to mitigate the potential impacts.

2. Committee Membership

Research Scientists: 3, PDFs: 2.

3. Committee Activities

a. Major Areas of research:

- Analysis of historical variability and trends in snow, streamflow, water quality and freshwater ice regimes.
- Future projections of changes in climate (e.g, precipitation, temperature) and hydrologic (snow, streamflow, etc.) regime.

c. Training and networking initiatives geared towards young and emerging scientists

- Trained several co-op students in geography and engineering departments.
- Supervised graduate students working on hydro-climate impact studies.

d. Regional, national and international advisory efforts

- Served as federal Government reviewers of environmental impact studies of water resources related projects

4. Major Publications

Abe, C., F. de Lucia Lobo, E.M.L. de Moraes Novo, M. Costa, and Y. Dibike, 2019. Modeling the effects of land cover change on sediment concentrations in a gold-mined Amazonian basin. *Regional Environmental Change*, pp.1-13.

Abe, C., F. Lobo, Y. Dibike, M. Costa, V. Dos Santos, and E. Novo, 2018. Modelling the effects of historical and future land cover changes on the hydrology of an Amazonian basin. *Water*, 10(7), p.932.

Bonsal B.R., D.L. Peters, F. Seglenieks, A. Rivera, A. Berg. 2019. Changes in Freshwater Availability across Canada. Chapter 6 in: Canada's Changing Climate Report, E. Bush and D Lemmen (Editors), Government of Canada, Ottawa, Ontario, Canada

Dibike, Y., H.I. Eum, and T.D. Prowse, 2018. Modelling the Athabasca watershed snow response to a changing climate. *Journal of Hydrology: Regional Studies*, 15, pp.134-148.

Dibike, Y., A. Shakibaeinia, H.I. Eum, T.D. Prowse, and I. Droppo, 2018. Effects of projected climate on the hydrodynamic and sediment transport regime of the lower Athabasca River in Alberta, Canada. *River research and applications*, 34(5), pp.417-429.

Rokaya P., D.L. Peters, B. Bonsal, H. Wheeler, K.-E. Lindenschmidt, 2019. Modelling the effects of flow regulation on ice-affected backwater staging in a large northern river, *River Research and Application*, doi.org/10.1002/rra.3436

Shrestha, R.R., A.J. Cannon, M. Schnorbus and H. Alford. 2019. Climatic controls on future hydrologic changes in the subarctic river basin in Canada, *Journal of Hydrometeorology* (in press), doi:10.1175/JHM-D-18-0262.1.

Werner, A.T., M.A. Schnorbus, R.R. Shrestha, A.J. Cannon, F. Zwiers, G. Dayon, F. Anslow, 2019. A long-term, temporally consistent, gridded daily meteorological dataset for northwest North America, *Nature Scientific Data* 6, 180299, doi:10.1038/sdata.2018.299.

5. Scientific conferences/workshops/sessions hosted by members; attended by members (Canada, and abroad)

- Served in the scientific organizing committee and chaired a special session on "Climate Change Detection, Impacts and Adaptation", and presented research papers at the CWRA meeting, Victoria, BC, 2018.
- Co-convended a special session on "Water Cycle Prediction System for the Great Lakes" at the CWRA Annual meeting, Collingwood, ON, 2019.
- Presented research papers at the CGU annual meeting, Niagara Falls, ON, 2019.
- Presented research papers at the 27th IUGG General Assembly, Montréal, Québec, Canada, 2019.
- Proposed a scientific session on "Changing Snow Regime and Hydrologic Extremes in Alpine Dominated Watersheds" at the AGU 2019 Fall Meeting, San Francisco, USA, 2019.

Large Scale Watershed Modeling and Analysis

1. Committee Description, Background and Objectives

Objectives:

To promote and advance fundamental and applied research for large scale watershed modelling and analysis, with a focus on Canada. Activities are aimed at addressing current and future challenges facing water quantity and quality for humans and nature at large scales, under a changing climate and environment, in Canada and across the globe.

Chairs:

Amin Haghnegahdar (University of Saskatchewan), Bruce Davidson (Environment and Climate Change Canada) and Saman Razavi (University of Saskatchewan)

Background:

The committee was formed in May 2017 at CGU/CSAFM annual meeting. There was several invitation calls to join the committee via CGU-Hydrology mailing list in the beginning and in other meetings throughout the year. The committee currently has 20 members across Canada and continues to invite and accept new members.

2. Committee Membership

Univ. Saskatchewan: Profs: 1, RS: 1, RA:1, PDF: 2, PhD: 2

ECCC: REng: 2, RS: 2

U Waterloo: Prof/CRC: 1, RA: 2

Waterloo/Aquanty: scientists: 3

University of Sherbrooke: PhD: 1

UNBC: Prof/CRC: 1, RA: 1

PCIC: Scientist: 1

3. Committee Activities

a. Major Areas of research:

MPC: One of the main programs many of our members are involved with is the Integrated Modelling Program for Canada (IMPC) funded under the Global Water Futures (GWF) program. IMPC is a transdisciplinary research program that aims to develop integrated modelling capability for the prediction and management of water resources under climate and environment change in Canada's seven major river basins. The program is led by Saman Razavi at the Global Institute for Water Security (GIWS). The first phase of the program started June 2017 and will end August 2020 and will focus on Nelson-Churchill, McKenzie, and Great Lakes river basins. Models such as MESH, VIC, and HYPE are considered in IMPC program. More info can be found at <http://gwf.usask.ca/impc>. Amin Haghnegahdar is IMPC manager. 2nd annual meeting for IMPC was held in 12-13 June 2019, Saskatoon.

ECCC/GIWS and MESH model: Bruce Davison & Dan Princz from ECCC along with many of our members at GIWS are actively involved in development of MESH modelling system and is pursuing the idea of using MESH for the purpose of streamflow forecasts in various regions in Canada.

U Waterloo and Raven: Our members from University of Waterloo (Craig and Shafiee) are mainly involved in development and application of the Raven hydrologic model in Canada and Grand River Basin and for large scale application across Canada.

b. Science-Industry collaborations:

Members of our committee or actively engaged with various stakeholder collaborations. For example: Aquanty at Waterloo is a research-based company and fairly active in various projects. Raven is being used by various provincial hydro-power users.

As a mandate for IMPC, this program is engaged with more than 10 local, provincial, and federal stakeholders.

e. Summary of areas of challenges and achievements:

This year we did not even get a chance to propose our official sessions at CGU (as part of IUGG), something we hoped to have as a minimum activity.

We are looking for strategies to boost our activities. This can include a change in the chairs. Some candidates are being considered.

4. Major Publications

Sheikholeslami, R., Razavi, S., Haghnegahdar, A., What Do We Do with Model Simulation Crashes? Recommendations for Global Sensitivity Analysis of Earth Systems Models, submitted to Geoscientific Model Development.

Yassin, F., Razavi, S., Elshamy, M., Davison, B., and Wheeler, H., Representation of Water Management in Hydrological and Land Surface Models, submitted to Hydrology and Earth System Sciences.

Sheikholeslami, R., and Razavi, S., (2018), Avoiding the Guise of an Anonymous Review, Eos, 99, Transactions of American Geophysical Union. <https://doi.org/10.1029/2018EO098217>.

Razavi, S., Gupta, H. V., (2019), A Multi-Method Generalized Global Sensitivity Matrix Approach to Accounting for the Dynamical Nature of Earth and Environmental Systems Models, Environmental Modelling & Software.

Maier H.R., Razavi S., Kapelan, Z., Matott L.S., Kasprzyk J., and Tolson, B.A., (2019), Introductory Overview: Optimization using Evolutionary Algorithms and other Metaheuristics, Environmental Modelling & Software (Invited Contribution).

Razavi, S., Sheikholeslami, R., Gupta, H. V., Haghnegahdar, A., (2019), VARS-TOOL: A Toolbox for Comprehensive, Efficient, and Robust Sensitivity and Uncertainty Analysis, Environmental Modelling & Software.

Sheikholeslami, R., Razavi, S., Gupta, H. V., Becker, W., and Haghnegahdar, A., (2019), Global Sensitivity Analysis for High-Dimensional Problems: How to Objectively Group Factors and Measure Robustness and Convergence while Reducing Computational Cost, Environmental Modelling & Software. <https://doi.org/10.1016/j.envsoft.2018.09.002>.

Gupta, H.V., and Razavi, S., (2018), Revisiting the Basis of Sensitivity Analysis for Dynamical Earth Systems Models, Water Resources Research, 54. <https://doi.org/10.1029/2018WR022668>.

Gharari, S., and Razavi, S. (2018), Review and Synthesis of Hysteresis in Hydrology and Hydrological Modelling: Memory, Path-Dependency, or Missing Physics?, Journal of Hydrology, 566, 500-519.

Sapriza-Azuri, G., Gamazo, P., Razavi, S., and Wheeler, H. (2018), On the Appropriate Definition of Soil Profile Configuration and Initial Conditions for Land Surface-Hydrology Models in Cold Regions, *Hydrology and Earth System Sciences*, 22, 3295-3309, <https://doi.org/10.5194/hess-22-3295-2018>.

5. Scientific conferences/workshops/sessions hosted by members; attended by members (Canada, and abroad)

IUGG 2019: H26 – HYDROLOGIC TIME SERIES WITH CONTRIBUTIONS ON METHODOLOGIES, APPLICATIONS, ASSESSMENT AND ALTERNATIVES FOR NONSTATIONARITY, AND ASSESSMENT OF UNCERTAINTY

Lead convener: Saman Razavi (Canada)

AGU 2018: H43D: Diagnostics, Sensitivity, and Uncertainty Analysis of Earth and Environmental Models Posters

Saman Razavi: co-convener

EGU 2019: Advances in Inference, Sensitivity, and Uncertainty Analysis of Earth and Environmental Systems Models

Lead Convener: Amin Haghnegahdar

6. Awards received by members

Saman Razavi: CGU 2019 Young Scientist Award

9. Additional information the committee would like on file

It would be great to be informed and involved in proposing annual session as a minimum activity we committed to do.

Canadian Young Hydrology Society

1. Committee Description, Background and Objectives

The Young Hydrologic Society (YHS) is an international initiative that facilitates the interaction of young hydrologists within the hydrological community. These activities include pop-up sessions at large national conferences, seminars, and social nights.

2017-2018 was the third year of the Canadian Young Hydrologic Society (CYHS). 2017-2018 succeeded in establishing the CYHS in the Canadian hydrology community as a national branch of the international YHS and as a staple of the CGU-HS by organizing a pre-conference workshop, social event and within-conference seminar. These events were geared towards promoting career options for young hydrologists both within and beyond academia and provided many opportunities for early career scientists to interact and network.

2018-2019 CYHS Executive:

Chair: Nadine Shatilla, PhD Candidate, School of Geography and Earth Sciences, McMaster University

Co-chair: Kelly Biagi, PhD Candidate, School of Geography and Earth Sciences, McMaster University

Secretary: Cody Ross, PhD Candidate, Centre for Earth Observation Science, University of Manitoba

Treasurer: Sophie Wilkinson, PhD Candidate, School of Geography and Earth Sciences, McMaster University

Social media/Communications: Lauren Somers, PhD Candidate, Dept. Earth and Planetary Sciences, McGill University

Members at large:

Pierrick Lamontagne-Hallé, PhD Candidate, Dept. Earth and Planetary Sciences, McGill University

Caroline Aubry-Wake, PhD Candidate, Centre for Hydrology, University of Saskatchewan (Additional role: YHS-YESS ECR workshop organiser)

2. Committee Membership

CYHS does not have an annual membership but we do keep track of workshop/seminar attendees.

Numbers for 2017-2018 are as follows:

Brandon University: 1

Concordia University: 2

Dalhousie University: 1

Keele University: 1

McGill University: 5

McMaster University: 9

Memorial University: 1

Ryerson University: 1

Syracuse University: 1

University of Laval: 2

University of Manitoba: 3

University of Reading: 1

University of Saskatchewan: 3

University of Toronto: 7

University of Victoria: 2

University of Waterloo: 25

Western University: 1

Wilfred Laurier University: 2

PDF: 6

PhD: 30

MSc/MSA: 31

UG: 2

Prof: 1

N/A: 1

TOTAL: 71

3. Committee Activities

e. Summary of areas of challenges and achievements:

In previous years, funding has been the primary challenge to provide a high quality workshop with limited funding in conference centers with high catering costs or in cities with expensive venues for social events. As of now, CYHS has kept workshops economical and has primarily relied on funding from CGU-HS with recent inputs of external funding from individual lab groups (2018) or cooperation with other early career researcher (ECR) organizations (2018, 2019). Currently, CYHS has partnered with GWF-YP on several events throughout the academic year (Inaugural GWF ASM YP seminar and social events in 2018; McMaster Water Week in 2018).

There is some concern that CYHS workshops are not self-sufficient with costs fluctuating between years as the scope of workshops, venue/location and attendance varies. A parallel concern is that some external funding resulted from existing committee members leveraging their university affiliations to improve the scope of workshops, which may not be sustainable in future years.

One of the areas where CYHS has succeeded is in anticipating and meeting hydrology ECR needs in terms of more accessible scientific talks, possible career paths and improved research cooperation among ECRs e.g. upcoming CYHS ECR workshop in July.

CYHS would like to propose a 2-3 year cycle of larger, more intensive workshops with smaller workshops or seminars in between. A timeline combining more frequent smaller events with larger events occurring less often (to be submitted after the 2019 ECR workshop in July) will limit financial need while ensuring that CYHS is able to best serve the young hydrologist (and other ECRs) community.

Future goals also involve the opportunity to have external speakers (offering some form of invitation and travel reimbursement) who introduce a new perspective to ECRs. Essentially, introduce a perspective that is not traditionally present at CGU to early stage ECRs. To meet these goals, CYHS would appreciate some guidance from CGU or CGU-HS members on how to develop a longer-term plan and what is feasible (in line with future venues, etc). CYHS will also search out grants aimed at ECRs.

CYHS aims to provide an intellectually stimulating environment for ECR attendees to workshops, seminars and events while demonstrating a clear commitment to representation (i.e. career stage, career type, gender, background, study area/field) in both invited speakers and attendees. We would like to collect and analyze these metrics in combination with feedback from attendees once there is an established protocol for anonymizing demographic data.

4. **Scientific conferences/workshops/sessions hosted by members; attended by members (Canada, and abroad)**

Conferences:

AGU 2018: Washington D.C.

Aubry-Wake, C., Biagi, K. M., Lamontagne-Hallé, P., Ross, C., Shatilla, N., Somers, L., & Wilkinson, S. (2018). The Canadian Young Hydrologic Society: the growth and development of a national YHS branch.

Workshops:

2016: “Challenges and opportunities in Canadian hydrology” workshop, CGU Fredericton, NB

Invited Workshop Speakers: Dr. Genevieve Ali, Dr. Sean Carey, Dr. Merrin Macrae, Dr. Phil Marsh, Dr. Claire Oswald & Dr. Howard Wheeler (attendance: 50 ECRs)

Social event held after the workshop at a local pub where 75 ECRs attended.

2017: “Progression of a scientific career in academia” seminar, CGU, Vancouver, BC

Invited Workshop Speakers: Dr. Nora Casson, Dr. Andrew Ireson, Nicola Jones, Dr. Barret Kurylyk, Dr. Jeff McKenzie & Dr. Ming-ko (Hok) Woo (attendance: 65 ECRs).

A social event was held in the evening after the workshop on the UBC campus where we had 100 attendees.

2018:

1) “Careers in hydrology: Options and insights” workshop and panel discussion, CGU, Niagara Falls, ON

Invited Speakers: Simon Gautrey, Dr. Christa Kelleher, Dr. Joseph Shea & Dr. Chris Spence (attendance: 45 ECRs)

A social event was held in the evening after the workshop in Niagara Falls where we had 100 attendees.

2) “Tips and tricks for publishing in hydrology” workshop

Invited Speakers: Dr. Laura Lautz & Dr. Mike Waddington (attendance: 47 ECRs)

3) Inaugural GWF Young Professionals workshop and social events (GWF Annual Science Meeting in collaboration with GWF YP group)

Invited Speaker: Dr. Jeff McDonnell ‘Professional Development Workshop: The Art of Scientific Investigation’ (attendance: ~80 ECRs)

Invited Speaker: Dr. John Pomeroy ‘Role of YPs Within Larger GWF Context’ (attendance: 90 ECRs)

4) Water Week Poster Session and award for “Most Innovative Research” awarded to Anjali Narayanan (Undergraduate student)

7. **Other major achievements**

The Canadian Young Hydrologic Society (CYHS), has organized a three day workshop to synthesize ECR perspectives on the current state, challenges and opportunities in Canadian hydrology. The workshop will host early career researchers (ECRs) from across the country including graduate students and postdoctoral fellows in hydrology. We will discuss the different themes, sites, and study methods that make up the Canadian hydrological research landscape, the common challenges and opportunities arising from these different projects, and the different roles that ECR play in these

projects. These structured discussions will lay the groundwork for a white paper to be submitted for publication to a peer-reviewed journal following the workshop.

Approximately 40 ECRs have been selected from institutions across Canada accounting for geographical distribution, scientific background, and gender balance. The workshop will serve to highlight the recent achievements of early career hydrologists in Canada and lay out how we can stimulate interaction, and foster collaborations across different institutions to build a stronger scientific community.

Logistical Information and Tentative Agenda

When: July 4-6, 2019, in the days preceding the IUGG-CGU General Assembly in Montreal.

Where: Thomson House on McGill University campus in downtown Montreal.

Who: 40 selected graduate students, postdoctoral fellows and early career faculty (<5 years since completion of PhD) from Canadian Universities working in hydrology.

Agenda: The workshop will be composed of three rounds of facilitated discussion where delegates will discuss key priorities and challenges they have encountered in working in Canadian hydrology, recent innovations, the role of ECR and the potential for enhanced knowledge exchange and collaboration. Participants will be grouped differently for each of the three rounds of discussion according to three different schemes:

- 1) the type of physical environment they study,
- 2) the research methods and data requirements of their work, and
- 3) the user engagement and knowledge dissemination strategies they employ.

A full report of the workshop will be summarized in the 2019-2020 annual report.



Committee on River Ice Processes and the Environment (CGU-HS)

May 31st, 2019

CRIPE OBJECTIVES

The main objectives of CRIPE are:

6. To identify specific high-priority river ice topics for research and development and promote the undertaking of relevant research programs;
- To facilitate information dissemination and exchange of ideas on river ice among practitioners, researchers, and resource managers; and
- To encourage the incorporation of pertinent river ice lectures or courses in undergraduate and graduate studies at Canadian Colleges and Universities.

RECENT ACTIVITIES

On June 13th 2018 at the Annual CGU conference in Niagara Falls CRIPE had its annual meeting. The meeting was attended by 8 CRIPE members in person and 4 members online. These smaller meetings occur on 'even' years, while our conference is held on 'odd' years.

Discussion items for the meeting included:

- Ongoing services provided by CRIPE, such as access to river ice literature and published books.
- Assisting with the development of a national ice jam database.
- Ongoing activities of our working groups on flood risk delineation as well as climate change impacts on ice.

Our financial position was reported and we have sufficient funds to support ongoing activities.

CRIPE members organized two river ice sessions at the 2018 CGU conference that were well-attended and considered successful.

FUTURE ACTIVITIES

CRIPE has several internal working groups to address specific issues related to river ice. Currently there are four working groups examining Flood Risk Delineation under the Influence of Ice (this working group has produced several scientific journal and conference papers), Effects of Climate Variability on River Ice, River Ice Safety and Education. The committee is planning on hosting its biennial workshop in Ottawa from May 14th to May 16th and is also organizing a short course on Reducing Ice Jam Flood Risks on May 17th.

CRIPE MEMBERSHIP

CRIPE currently has 16 Canadian members from various universities, hydro-electric facilities and government organizations, as well as 4 international members and 10 affiliate members. During the course of 2018 the Chair position changed from Mike Morris to Shawn Clark. A new Vice-Chair will be appointed at the 2019 CRIPE Workshop.

Members

Mike Morris, (Chair) Manitoba Hydro
Shawn Clark, (Vice-Chair) University of Manitoba
Martin Jasek, (Treasurer) BC Hydro
Benoit Turcotte, (Secretary) Université Laval
Robyn Andrishak, AMEC Earth & Environmental
Brian Burrell, R.V. Anderson Associates Limited
Joel Evans, BC Hydro
Yves Gauthier, INRS
Amir Ali Khan, Gov't of Newfoundland and Labrador
Nadia Kovachis, Government of Alberta
Karl-Erich Lindenschmidt, Univ. of Saskatchewan
Karen Dow, University of Manitoba
Mark Loewen, University of Alberta
Joe Groeneveld, Hatch Energy
Yuntong She, University of Alberta
Bernard Trevor, Government of Alberta

International Members

Knut Alfredsen, Norwegian Univ. of Science and Tech.
Mikko Huokuna, Finnish Environment Institute
Edward Kempema, University of Wyoming
Ian Knack, Clarkson University

Affiliate Members

Spyros Beltaos, Environment Canada
Rick Carson, KGS Group
Steven Daly, retired from ERDC/CRREL
Evan Friesenhan, Government of Alberta
Dan Healy, Northwest Hydraulic Consultants
Faye Hicks, retired from University of Alberta
Chris Katopodis, Katopodis Ecohydraulics Ltd.
Brian Morse, Université Laval
Terry Prowse, Environment Canada
Hung Tao Shen, Clarkson University