11 new research positions in the Global Water Futures program

The Global Water Futures (GWF) program is the largest university-led climate and freshwater research program in the world. GWF currently has several new employment opportunities to advance mechanistic model simulations of hydrological processes across Canada and the world. Current opportunities include two research scientists, six postdoctoral fellows, and three PhD students.

USask's Peyto Glacier Research Site in Banff, AB

Successful candidates will have the opportunity to work for the largest water modelling project ever conducted in Canada, with global scope, working with GWF Director John Pomeroy, GWF Core Modelling Co-leads Al Pietroniro and Martyn Clark, and other faculty across the GWF partner universities. Even though these are primarily modelling positions, researchers will be encouraged to become involved in field studies in well-instrumented research basins that are located in the spectacular landscapes of western Canada. Work locations include the Canmore Coldwater Laboratory in the Canadian Rocky Mountains and Innovation Place on the University of Saskatchewan campus in Saskatoon.

Currently, the GWF program consists of more than 500 stakeholders/users, 190 funded faculties from 18 Canadian universities and over 900 research personnel working on 51 projects, and core teams, including modelling and forecasting, computer science, knowledge mobilization, data and technical teams. Additional information is available at: https://www.globalwaterfutures.ca/

Positions:

- **2 Research scientists**. Two research scientist positions are available to accelerate progress on continental-domain hydrological prediction capabilities. The first research scientist position is on *Next-generation Land Modelling Capabilities*, focussing on advanced modelling of biogeophysical and biogeochemical water processes. The second research scientist is on *New Capabilities for Continental-domain Hydrological Prediction*, focussing on advancing model representations of coupled thermodynamic and hydrological processes across land, rivers, and lakes. In addition to conducting their own research, it is expected that the incumbents will also have a role within GWF to help supervise postdoctoral fellows, including managing collaborative approaches to the development, review, and testing of new modelling capabilities. The incumbents will report to Prof. Martyn Clark; work locations could include the Canmore Coldwater Laboratory in the Canadian Rockies, University of Saskatchewan, Saskatoon and the University of Calgary.

- **3 Postdoctoral Fellows in Planetary Water Prediction**. Three postdoctoral fellowships (PDFs) are available to advance capabilities in planetary water prediction. These positions will be part of the new GWF Planetary Water Prediction Initiative (PWPI), to advance the computational infrastructure (datasets, modeling capabilities) that are necessary to produce simulations and predictions of hydrological risks across the globe. The PWPI initiative will be focussed around two inter-related research pillars: in one pillar, we will build the computational infrastructure (models, data) to enable state-of-the-art hydrological simulations anywhere on the planet. In the second pillar, the incumbents will develop regional models in key regions to address pressing societal needs (Arctic, Himalayas, Andes, central Asia). The regional models will be constructed as cut-outs from the global-scale fabric; the global instantiations will used as a baseline to systematically evaluate the benefits of more detailed regional information and user engagement. The incumbents will work with GWF Director John Pomeroy along with GWF core modelling co-leads Al Pietroniro and Martyn Clark; work locations include the Canmore Coldwater Laboratory in the Canadian Rockies and the University of Calgary.

- **3 Postdoctoral Fellows in multi-physics land modelling.** Three postdoctoral fellowships are available to accelerate advances in multi-physics land models. Two positions will focus on advancing model representations of biophysical and biogeochemical processes in hydrological models, with a particular focus on ecology-hydrology interactions in cold regions. For these two positions interest and experience in frozen ground and permafrost processes is highly desirable. The third position will focus on advancing computational infrastructure for multi-physics land models, with a particular focus on hierarchal coupling strategies to manage interactions among model components with different levels of granularity. The incumbents will work with GWF Director John Pomeroy along with GWF core modelling co-leads Al Pietroniro and Martyn Clark; the work locations will be the Canmore Coldwater Laboratory in the Canadian Rocky Mountains and the University of Calgary.

- **3 PhD students in computational hydrology.** Three PhD positions are available in the general area of computational hydrology, to build tools to simulate and predict hydrologic processes. The research can span spatial scales from hillslopes to continents and time scales from seconds to centuries. Some potential contributions include ensemble forcing data for large-domain hydrological models, multi-scale hydrological models, continental-domain network routing models, ensemble methods for data assimilation, and process-based methods for model

benchmarking and model evaluation. Model development work is targeted toward applications in streamflow forecasting, water security assessments, and improving the representation of hydrological processes in Earth System models. Successful candidates will become experts in process-based hydrological modelling, gaining the understanding and tools that are necessary to develop and apply models across a broad range of landscapes. The PhD students will be supervised by Prof. Martyn Clark and enrolled in the University of Saskatchewan; work locations include the Canmore Coldwater Laboratory in the Canadian Rocky Mountains and the University of Saskatchewan.

USask PhD Candidate Caroline Aubry-Wake at the Marmot Creek Research Site in Kananaskis, AB

Expectations: The applicants should have experience and expertise with developing and applying complex process-based models, the use and analysis of big data, and comprehensive model evaluation. Applicants should have a background in physical hydrology, hydrometeorology, or water resources engineering. The applicants should also have experience with software configuration management (e.g. git, svn), experience with effective model testing protocols, experience with programming in multiple programming/scripting languages, experience with creating effective documentation, and experience with parallel computing. Successful applicants will be comfortable working in a team environment and highly engaged in collaborative model development activities. They will be expected to publish regularly in peer-reviewed international journals and present their work at international science meetings.

Duration: These are term positions up until August 31, 2023, commencing as soon as possible.

Application Procedure: To be considered for this opportunity, please submit the following documents to Dr. Prabin Rokaya, Manager, Core Modelling and Forecasting Team, GWF via email (prabin.rokaya@usask.ca), specifying in subject line which post you are applying to:

- a statement of purpose (3-5 pages) that details relevant academic excellence, research abilities, communication, interpersonal and leadership qualities
- an updated curriculum vitae (max. 10 pages)
- evidence of previous research productivity as demonstrated by authorship of refereed journal publications and conference presentations/publications
- names of three referees

Prospective candidates are encouraged to visit the following websites for details:

- Global Institute for Water Security: https://water.usask.ca/
- Global Water Futures: https://gwf.usask.ca/

The USask is located in Saskatoon, Saskatchewan, a city with a diverse and thriving economic base, a vibrant arts community and a full range of leisure opportunities. The University, a member of the U15 group comprising Canada's leading research-intensive universities, has a reputation for excellence in teaching, research and scholarly activities and offers a full range of undergraduate, graduate, and professional programs to a student population of over 23,000. Information about the University, and the City of Saskatoon can be found at www.usask.ca and https://tourismsaskatoon.com.

We thank all applicants for their interest; however, only candidates selected for an interview will be contacted.

Closing date: Open until all positions are successfully filled; review to begin by January 31, 2020

The University of Saskatchewan is strongly committed to a diverse and inclusive workplace that empowers all employees to reach their full potential. All members of the university community share a responsibility for developing and maintaining an environment in which differences are valued and inclusiveness is practiced. The university welcomes applications from those who will contribute to the diversity of our community. All qualified candidates are encouraged to apply; however, Canadian citizens and permanent residents will be given priority.

Researchers (l-r) Phani Adapa (USask), Joe Shea (UNBC), John Pomeroy (Usask), and on the Athabasca Glacier Research Site in Jasper, AB

Contact Information:

Prabin Rokaya, PhD
Manager, Core Modelling and Forecasting Team
Global Water Futures Program
National Hydrology Research Centre
11 Innovation Blvd, Saskatoon, SK S7N 3H5

Phone: 306-966-7226; Email: prabin.rokaya@usask.ca