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**Global Water Futures**
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**GLOBAL WATER FUTURES**

**9 Postdoctoral Positions – Core Modelling & Forecasting Team**

Global Institute for Water Security, University of Saskatchewan, Canada

**Context and Purpose:** Global Water Futures (GWF) is a transformative pan-Canadian research programme, led by the University of Saskatchewan (U of S), which aims to place Canada as a global leader in water science for the world's cold regions and to address the strategic needs of the Canadian economy in adapting to change and managing the risks of uncertain water futures, including extreme events. GWF is transdisciplinary, working with a wide range of users and integrating the natural, social, health and engineering sciences to provide disaster warning, improved prediction of climate and water futures, and the decision support tools needed to inform adaptation to change and risk management.

This 7 year, $143million program builds on the expertise of the U of S and 3 key partner universities (McMaster, Waterloo, Wilfrid Laurier), faculty from 14 other universities, and 8 federal agencies, with strong international collaboration. To enhance the UofS' and Canada's capability to deliver transformative water modelling science, the Global Institute for Water Security (GIWS) at U of S invites applications from outstanding candidates for the following 9 postdoctoral fellowship (PDF) positions listed below:

**1. Hydrological & Water Quality Forecasting:** The purpose is to enhance capability for real-time forecasting of streamflow, lake levels, snowpack, soil moisture, drought and flood, water quality episodes at multiple scales across Canada.  We are recruiting the following 5 PDFs to work as part of a larger team to address the above issues:

- **Flood Forecasting –** The PDF will work closely with the Canadian Meteorological Centre - Dorval group at the Environment and Climate Change Canada (ECCC), Quebec and will focus on real-time forecasting systems and developments in GEM-Hydro.
- **Seasonal and Drought Forecasting** – The PDF will work closely with ECCC to enhance the skill of seasonal forecasts. Work will include analysis of tele-connectivity and the potential of data assimilation, e.g. of snow-cover and soil moisture.
- **Data Assimilation** – The PDF will work on GRACE, SWOT, drone-based observations, ground and satellite derived snow data and other relevant products in support of land surface and  large scale hydrological modelling.
- **River Ice Modelling** – The PDF will focus on forecasting river ice processes and their effect on flooding.
- **Water Quality –** The PDF will focus on forecasting nutrient and contaminant runoff in prairie environments and river and lake water quality, including the effects of point source spills.

**2. Climate and Diagnostic Hydrological & Water Quality Modelling:** New high resolution atmospheric modelling of water futures will provide a) a new paradigm for modelling climate using dynamical downscaling, including for the first time realistic convection-explicit future precipitation, and b) a new era of coupled hydrological-atmospheric modelling of cold region processes in complex terrain. In parallel, hydrology/water quality modelling will deliver a multi-model framework that will enable unified pan-Canadian modelling to build on existing regional efforts and tools. A new state-of-the-art modelling system will build on advanced computer systems, data assimilation and user-focussed cloud-based outputs. We are recruiting the following 2 PDFs to work as part of a larger team to address these issues:

- **Climate Change** – The PDF will work mostly on dynamic downscaling using WRF in collaboration with the National Center for Atmospheric Research, USA and will focus on pan-Canadian high resolution WRF simulations (4km or better).
- **Hydrological Modelling** – The PDF position will be part of a pan-Canadian team that will focus on development of a modular multi-model system to include enhanced capability for the ECCC MESH model, including linkage to the Cold Regions Hydrological Model (CRHM) tools and enhanced water quality modelling capability.

**3. Water Resources Modelling:** We envision the emergence of a new paradigm of water resource systems modelling, which integrates water quality and quantity, addresses environmental flow needs, and economic valuations and trade-offs. We also see a new era of stakeholder engagement whereby public participation in water resources modeling is an iterative, collaborative, two-way exchange, and scientific knowledge is co-produced. There is a clear need to address the human dimensions that will determine water futures by: (1) integrating human behaviour, economic valuation, and policy decisions into water resource models, (2) building adaptive governance models to deal with problems of uncertainty, (3) developing and testing economic tools and incentives for managing water futures, (4) conducting basic social science research into the social processes and learning embedded in stakeholder engagement, and (5) building an indicator system that enables benchmarking performance for governance deficiencies, policy transfer, and social learning. Therefore, we are recruiting the following 2 PDFs as part of a larger team to address above issues:

- **Water Resources** – This PDF will develop a framework to address areas such as decision making under uncertainty, water quality and environmental flow needs, and hydro-economics.
- **Water Resources** – This PDF will focus on decision making under uncertainty, water quality and environmental flow needs

**Qualifications:** Outstanding applicants are sought, with demonstrable ability to undertake internationally-leading research and a record of world class publications. They must have: Relevant post-graduate training (Ph.D. or previous PDF) in areas outlined above; a PhD awarded within the five years immediately preceding the appointment; a proven track record of

modeling/numerical simulation research and experience in supervising students. Expertise in integrated modelling, high performance computing and large dataset analysis and manipulation is desirable. An ability to work in a highly collaborative, multidisciplinary team environment must be demonstrated. Evidence or leading-edge publications in the scientific literature is required as are strong written and oral communication skills in the English language.

**Salary Information:** The salary offered will be in the range of $45,000-$60,000 CAD, and will be based on training, education, and experience.

**Duration:** This term position will be for up to three years, commencing as soon as possible.

**Application Procedure:** To be considered for this opportunity, please submit the following documents via email:
- 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

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Prospective candidates are encouraged to visit the following websites for details:
- Global Institute for Water Security: http://www.usask.ca/water/
- Global Water Futures: http://gwf.usask.ca/

The U of S 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, http://tourismsaskatoon.com and http://www.downtownsaskatoon.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**

*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.*