



Biosketch

Name/Affiliation: Howard Simon WHEATER, FEng, University of Saskatchewan

Education/Training

1977 PhD University of Bristol
1974 MA University of Cambridge
1971 BA 1st Class Honours, Engineering Sciences, University of Cambridge

Employment/Affiliations

2010-Present Canada Excellence Research Chair in Water Security, University of Saskatchewan (UofS)
2010-Present Full-time, tenured Professor, School of Environment and Sustainability, UofS
2011-Present Director, Global Institute for Water Security, UofS
2008-2009 Director, Imperial College Environmental Forum, Imperial College London, UK
1995-2008 Head, Environmental and Water Resources Engineering, Imperial College London, UK
1993-2010 Professor of Hydrology, Imperial College London, UK

KEY AWARDS: 2010 Fellow of the American Geophysical Union; 2006 Prince Sultan bin Abdulaziz International Prize for Water; 2004 Baker Medal of the Institution of Civil Engineers; 2003 Fellow of the Royal Academy of Engineering; 1999 Life Member of International Water Academy, Oslo; 1996 President's Prize, British Hydrological Society

DISTINCTION: Dr. Wheeler has authored more than 200 peer-reviewed journal papers, more than 7161 citations and an h-index of 43 (i10-index of 151) (Google Scholar®); he has supervised more than 160 graduate students. In the UK he led national research programs, was a member of the Foresight Future Flooding teams (2004, 2008) and a 2008 Cabinet Office flood enquiry, and chair of a government review panel on siting criteria for nuclear waste disposal. In Canada he chaired the Council of Canadian Academies expert panel on Water and Agriculture in Canada. Dr. Wheeler has advised governments and international agencies in the Middle East, Far East, Africa and South America, as well as Europe and the USA. He represented Hungary and Argentina at the International Court of Justice, and was recently a member of a Court of Arbitration in The Hague in a dispute between Pakistan and India concerning the Indus Waters Treaty. He is Chair of UNESCO's G-WADI Steering Committee and past Vice-Chair of the World Climate Research Program's (WCRP) Global Energy and Water Experiment (GEWEX).

Research Funding

Dr. Wheeler has been responsible for research grants totaling nearly \$40M over the last four years.

- Canada Excellence Research Chair in Water Security, University of Saskatchewan, 2010-17, \$30M
- Changing Cold Regions Network, Climate Change and Atmospheric Research, NSERC, 2013-18, \$5M
- Water Cycle Prediction in Western and Northern Canada, Environment Canada, 2015-17, \$0.5M
- Sask. River Basin - A Large Scale Observatory, Canada Foundation for Innovation, 2012, \$2M
- Tobacco Creek Watershed Program, Canadian Water Network, 2012-14, \$128K
- Hydrological Extremes and feedbacks in the changing water cycle, Changing Water Cycle, Natural Environment Research Council, UK, 2011-14, £1.06M
- Water Security, Environment Canada, 2011-16, \$0.5M
- Knowledge & Information Community for Climate Change, European Institute of Technology, 2010-13, Euro 90M

Most Significant Contributions (up to five)

Dr. Wheeler is a Canada Excellence Research Chair in Water Security and a world-leading expert in hydrology and sustainable water resource management. His research focuses on the development of new hydrological science, combining modelling and experimentation, to address water-related societal challenges, including climate and land use change, and flood, water resource, water quality and waste management. He has initiated and led national (UK and Canada) and international (World Climate Research Program, UNESCO) research and development programs and advised governments on flood, water resource and water quality issues. He is the Science Director for the GWF and will use both his research experience and leadership track record to advance the goals of Pillar 3 – Delivering Risk Management Solutions of the Scientific Strategy and provide leadership to the Institutional Strategy.

1. RAINFALL-RUNOFF MODELLING, REGIONALIZATION AND LAND USE CHANGE: He has contributed for more than 40 years to the theory and application of hydrological models. Important contributions include the provision of new modelling tools and development of methods that have resolved key areas of model limitation. These include the modelling of ungauged basins and prediction of the effects of land use and land management change. His UK research into the effects of rural land management change on flood risk, and the potential for flood risk remediation, supported government foresight studies and a Cabinet Office flood enquiry. His arid zone research led to the award of the Prince Sultan International Prize for Water.

2. RAINFALL MODELLING, CLIMATE MODELS AND STATISTICAL DOWNSCALING: His work on stochastic rainfall modelling provided new methods to address flood risk management under climate change, and for the downscaling of climate models for climate change impacts assessment. Point process modelling was developed to support a new paradigm for continuous simulation to support flood design, now applied in the UK and Europe. His work on Generalized Linear Models has been widely applied for spatial rainfall modelling and statistical downscaling, with applications in the UK, Canada, Middle East and Africa.

3. WATER QUALITY MODELLING AND POLLUTION RISK ASSESSMENT: Dr. Wheeler led development of phosphorus modelling of eastern England and initiated and led a national research program into groundwater dominated catchments in which his research focused on nitrate transport in Chalk catchments. His research led to new insights into fractured porous media, identified a decadal nitrate ‘time–bomb’ and developed new models for nitrate management. His research into radionuclide transport supported a national UK research program for safety assessment of the deep disposal of nuclear waste, which he advised. He currently advises Nevada on the Yucca Mountain waste repository.

4. CLIMATE CHANGE AND WATER SECURITY: As CERC, Dr. Wheeler proposed a new paradigm for transdisciplinary research to address water security under environmental change and established the Global Institute for Water Security. He developed the Saskatchewan River Basin and Mackenzie River Basin as large-scale observatories, endorsed by the World Climate Research Programme as a Regional Hydroclimate Project. Observatories in the key biomes, including collaboration with the Canadian Space Agency and NASA, support improved process understanding and modelling across multiple scales. His research has developed new methods of vulnerability analysis for complex water resource systems, and systems dynamic simulation tools for scenario-based economic analysis of water futures, supported by new downscaling tools for climate model outputs. Water quality research has focused on hydro-ecological response to nutrient loading, the analysis of anthropogenic loads and beneficial management practices. New algorithms have been developed to support large scale hydrological modelling and fine resolution atmospheric modelling is providing new insights into fine scale precipitation, extreme events and the impacts of future warming.