



WATER RESEARCH CAPACITY

Directory of University of Alberta Water Researchers

The University of Alberta Water Initiative brings together researchers from across campus to participate in multi-disciplinary water projects funded by grants, donations or sponsored contracts. We also work with institutions around the world.

The multi-disciplinary approach is enabled by the UofA's extensive water research capacity. We have researchers from engineering, nanotechnology, public health, environmental and natural resource economics, law and business, and scientists in biology, chemistry, geology and hydrology all working on water-related issues.

The following directory of water researchers is organized by department. To contact or learn more about a specific researcher visit ualberta.ca and use the search feature at the top right of the screen, or click on the researcher's name in the electronic version of this document to go directly to their website (if available). If you are using a PC, you may need to hold down the control key before clicking.

BIOLOGICAL SCIENCES

- **Suzanne Bayley:** Biogeochemistry, ecology and management of wetlands and lakes; interaction between hydrology and nutrient cycling in northern and prairie wetlands and lakes; use of wetlands for wastewater treatment; effects of fire and climate change in wetlands and streams; alternative trophic states in shallow lakes. s.bayley@ualberta.ca
- **Mike Belosevic:** Parasitology; comparative molecular immunology; environmental monitoring; drinking water; water quality. Also cross-appointed in Public Health Sciences and Agriculture, Food & Nutritional Science. mike.belosevic@ualberta.ca
- **Stan Boutin:** Forestry-wildlife interactions in the boreal mixed woods of northeastern Alberta; cumulative effects; integrated landscape management; population ecology of boreal mammals, emphasizing the relationship between behaviour and resources. Also Alberta Biodiversity Conservation Chair. stan.boutin@ualberta.ca
- **Mark Boyce:** Mathematical and simulation models of ecological systems (population level) for conservation and management; population viability analysis, resource selection functions, time series, and predator-prey models; life history evolution and sexual selection of birds and mammals. Also Alberta Conservation Association Chair in Fisheries and Wildlife. mark.boyce@ualberta.ca
- **Kevin Devito:** Landscape eco-hydrology; forest and wetland hydrology and biogeochemistry; ground-surface water interactions; land use and climate impacts; hydrogeology frameworks; influence of climate and geology on the susceptibility of boreal ecosystems to disturbance; watershed management. kevin.devito@ualberta.ca
- **Julia Foght:** Environmental microbiology; anaerobic hydrocarbon biodegradation and methane biogenesis, particularly in oil sands tailing ponds, using microbial metagenomic analysis and analytical chemistry; the role of microbes in accelerating the settling of solids and recovery of pore water in oil sands tailings ponds (biodesulfurization); bacterial communities living underneath and within glaciers. julia.foght@ualberta.ca



- **Greg Goss:** Aquatic toxicology; comparative physiology; genomics and proteomic techniques; effects of nanoparticles exposure on fish. Also Research Director and Steering Group Member, University of Alberta Water Initiative. greg.goss@ualberta.ca
- **Sally Leys:** Evolutionary of animal body plans; developmental mechanisms in basal metazoans; mechanisms of cell-cell communication in sponges; in situ hybridization; high end microscopy. Also Canada Research Chair in Evolutionary Developmental Biology. sleys@ualberta.ca
- **Vincent St. Louis:** Whole-ecosystem experimentation; biogeochemical cycling of elements in the environment and human disruptions of cycles; reservoir impact studies; methylmercury bioaccumulation; effects of accelerated climate change in polar regions on terrestrial and aquatic ecosystem productivity, greenhouse gas emissions, water quality, contaminant loadings, and biomagnification. vince.stlouis@ualberta.ca
- **Suzanne Tank:** Arctic and boreal aquatic biogeochemistry; river-ocean linkages in the Arctic; carbon cycling and metabolism in aquatic ecosystems; aquatic ecosystem science. Also Campus Alberta Innovates Program (CAIP) Chair in Aquatic Ecosystem Health. suzanne.tank@ualberta.ca
- **Rolf Vinebrooke:** Alpine, arctic and boreal ecology; cumulative impacts of multiple environmental stressors on biodiversity and functioning of freshwater ecosystems; ecosystem resistance and recovery from climate change, acidic nitrogen deposition, ozone depletion, increased ultraviolet-B radiation, and invasive species. rolf@ualberta.ca

CHEMICAL AND MATERIALS ENGINEERING

- **Thomas Thundat:** Micro and nanomechanical sensors; nano interfaces; biophysics; scanning probes; nanoscale phenomena; quantum confined atoms; development of energy efficient oil sands extraction techniques. Also Canada Excellence Research Chair in Oil Sands Molecular Engineering. thundat@ualberta.ca
- **Zhenghe Xu:** Engineering of nano particles and composites for bio and environmental applications; interfacial phenomena in minerals and materials processing; industrial effluent management; oil sands processing. Also NSERC Industry Research Chair in Oil Sands Engineering; Canada Research Chair in Mineral Processing. zhenghe.xu@ualberta.ca
- **Tony Yeung:** Mechanics and thermodynamics of fluid-fluid interfaces; two-dimensional transport phenomena; microscopic deformable surfaces; industrial and biological applications of microinterfacial study (emulsions, oil sands processing, macromolecules at fluid-fluid interfaces). Also NSERC/Imperial Oil/Alberta Ingenuity/AERI Industrial Research Chair in Non-Aqueous Bitumen Extraction. tony.yeung@ualberta.ca

CHEMISTRY

- **Michael J. Serpe:** Polymer-based photonic materials and sensors; polymer assisted water remediation; polymer-based triggered/controlled drug delivery systems; novel micro and nanoparticle synthesis; analytical instrument design; responsive polymers; nanoscience. michael.serpe@ualberta.ca
- **Jonathan Veinot:** Nanoparticle synthesis and derivatization (fabrication of monodispersed nanoparticles via solution borne chemistry); polymer-based organic light-emitting diodes; organic functional materials. jveinot@ualberta.ca



- **Roderick Wasylishen:** Nuclear magnetic resonance (NMR) spectroscopy; solid-state NMR; NMR applications; water management in operating fuel cells. Also Canada Research Chair in Physical Chemistry. roderick.wasylishen@ualberta.ca
- **Yunjie Xu:** Chirality; chiral discrimination; spectroscopic and theoretical study of chiral molecules; hydrogen-bonding interactions between chiral solute and water molecules. Also Canada Research Chair in Chirality and Chirality Recognition. yunjie.xu@ualberta.ca

CIVIL AND ENVIRONMENTAL ENGINEERING

- **Ian Buchanan:** Environmental engineering; industrial and municipal wastewater treatment process development, modeling, and optimization; municipal systems; biological wastewater treatment. ian.buchanan@ualberta.ca
- **Evan Davies:** Water resources engineering; systems thinking and modeling of water resources and their socio-economic and environmental context; assessing climate change impact; sustainable development. evan.davies@ualberta.ca
- **Mohamed Gamal El-Din:** Environmental engineering; application of ozonation and advanced oxidation processes for water and wastewater treatment (oil refinery and municipal wastewater); application of AI techniques in modeling natural environmental systems. Also NSERC Senior Industrial Research Chair in Oil Sands Tailings Water Treatment; Steering Group Member, University of Alberta Water Initiative. mgamalel-din@ualberta.ca
- **Thian Gan:** Water resources engineering; hydroclimatology; deterministic hydrology; climate change; applications of remote sensing and geographic information system in hydrology and water resources; snow hydrology; stochastic processes. tgan@ualberta.ca
- **Selma Guigard:** Environmental engineering; supercritical fluid extraction (SFE); soil remediation (hydrocarbon and metal contaminated soils); remediation and treatment of contaminated wastes; tailings management for oil sands; use of SFE for non-environmental applications. selma.guigard@ualberta.ca
- **Faye Hicks (Professor Emeritus):** Water resources engineering; river ice processes and hydraulics; ice jam flood forecasting; numerical modelling of ice jam formation and release; environmental impacts of river ice. faye.hicks@ualberta.ca
- **Yang Liu:** Environmental engineering; nanotechnology; microbiology; molecular biology; colloid chemistry; environmental and medical biofilms and EPS; biological wastewater treatment processes; desalination processes and water reuse. yang.liu@ualberta.ca
- **Mark Loewen:** Water resources engineering; air-sea interactions; environmental fluid mechanics; hydraulics of ice covered rivers; frazil ice detection; infrared remote sensing of ocean surface; air-water gas transfer; wave breaking; physical limnology; wind wave mechanics; air entrainment; mixing in water treatment reactors. mrlowen@ualberta.ca
- **Leonidas Pérez-Estrada:** Environmental engineering; analytical evaluation of physicochemical processes used for the treatment of emerging pollutants in water, soil, and air; alternative water treatment processes (AOPs, Chemox); high-resolution mass spectrometry to characterize and quantify pollutants. leonidas.perez@ualberta.ca



- **Yuntong She:** Water resources engineering; computational hydraulics; river ice processes; river ice jam flood forecasting; sediment transport; urban drainage system; oil pipeline system. yuntong.she@ualberta.ca
- **Ania Ulrich:** Environmental/geoenvironmental engineering; transformation of organic compounds by microorganism for bioremediation of contaminated aquifers; characterization and remediation of soil and groundwater systems impacted by tailings ponds; chemical and biological remediation for wastewater. aulrich@ualberta.ca
- **Tong Yu:** Environmental engineering; biofilm processes in wastewater treatment, drinking water distribution systems, river sediment, and oil sands tailing water; development and application of microsensor techniques for environmental applications. tong.yu@ualberta.ca
- **David Zhu:** Water resources engineering; hydrodynamics and mixing of density stratified flows; urban hydraulics; turbulent jets and plumes; multiphase flows (air/water, sand/water two-phase flows); habitat structures, fish passes, and fish entrainment risk assessment; water quality modeling of rivers, lakes, and reservoirs. Also Associate Chair, Graduate Students. david.zhu@ualberta.ca

EARTH & ATMOSPHERIC SCIENCES

- **Daniel Alessi:** Low temperature geochemistry; water resources; environmental geomicrobiology; assessing and improving the water cycle and environmental monitoring practices in unconventional energy recovery; modelling the adsorption and transport behaviour of metals and organic contaminants in geologic media; characterizing the mechanisms and products of in situ bioremediation of heavy metals. Also Encana Chair in Water Resources. alessi@ualberta.ca
- **Duane Froese:** Quaternary stratigraphy, paleoclimates, and natural hazards, particularly in late Cenozoic history of the upper Yukon basin (Beringia); tephrochronology; cryostratigraphy and permafrost studies. Also Canada Research Chair in Northern Environmental Change. duane.froese@ualberta.ca
- **John Gamon:** Exchange of carbon and water between the ecosystem and atmosphere that determine ecosystem productivity and help regulate atmosphere and climate; optical sampling methods to study ecological questions; eco-informatics and cyberinfrastructure for ecosystem monitoring. Also cross-appointed in Biological Sciences. gamon@ualberta.ca
- **Christian Haas** (currently at York University): Sea ice and snow thickness; ocean-ice-atmosphere interaction; Arctic climate change; airborne geophysics; electromagnetic induction sounding; sensor development; satellite remote sensing; ice engineering. Also Canada Research Chair in Arctic Sea Ice Geophysics at York University. christian.haas@ualberta.ca
- **Ben Rostron:** Petroleum hydrogeology; regional hydrochemistry; stable isotope geochemistry; numerical modeling of petroleum generation and migration; numerical simulation of the effects of gas saturation; modelling thermal and reflux dolomite formation. Also Steering Group Member, University of Alberta Water Initiative. ben.rostron@ualberta.ca
- **Martin J. Sharp:** Glaciology and glacier hydrology; glacier-climate interactions in the Canadian high Arctic; hydrology and dynamics of ice cap tidewater outlet glaciers; glaciological remote sensing; biogeochemistry, chemical weathering, and carbon cycling in glacial environments; behaviour of persistent organic pollutants in alpine and glacial environments. martin.sharp@ualberta.ca



- **Alexander Wolfe:** Paleobiology; paleoenvironmental reconstruction; Cenozoic lake sediments; biotic responses to climate change and pollution; fossil conifer resins; ecological problems requiring a historical perspective. Also cross-appointed in Biological Sciences. awolfe@ualberta.ca

ELECTRICAL & COMPUTER ENGINEERING

- **Petr Musilek:** Effects of weather on power systems; meteorological and environmental modelling and forecasting; use of intelligent techniques to interpret modelling results. petr.musilek@ualberta.ca

LABORATORY MEDICINE & PATHOLOGY

- **X. Chris Le:** Chemical speciation of trace elements, primarily metalloids and metals; exposure and metabolism of arsenic species; health effects of human exposure to trace elements; DNA damage and cellular repair, biomarkers; nucleic acids affinity probes. Also cross-appointed in Chemistry and Public Health Sciences; Director of Division of Analytical & Environmental Toxicology; Canada Research Chair in Bioanalytical Technology and Environmental Health. xc.le@ualberta.ca
- **Xing-Fang Li:** Drinking water disinfection by-products and health effects; drinking water quality and safety; analytical chemistry; environmental chemistry; clinical chemistry; in vitro toxicology; protein-drug interactions; pathogen detection; biotransformation of drug and environmental contaminants; cell electronic sensing. xingfang.li@ualberta.ca
- **Jonathan Martin:** Environmental analytical chemistry; toxicology; public health; sources of exposure to environmental contaminants; global chemical transport pathways; effects of in utero chemical exposures; oil sands monitoring and remediation of oil sands process affected water. jon.martin@ualberta.ca

LAW

- **David R. Percy:** Natural resources law; water rights legislation; water policy; water regulation; allocation of rights to divert and consume water; distribution of water allocations during times of scarcity; tradeable water allocations; groundwater law and regulation; regulation of interjurisdictional waters. Also Borden Ladner Gervais Chair of Energy Law and Policy. dpercy@ualberta.ca

MECHANICAL ENGINEERING

- **Morris Flynn:** Buckling of thin, viscous films; continuum models of traffic flow; gravity current and intrusions; internal gravity waves; natural ventilation/architectural fluid mechanics; plastron respiration by aquatic insects. mr-flynn@ualberta.ca
- **Amit Kumar:** Integrated energy and environmental modeling; life cycle assessment of energy systems; techno-economic assessment of energy systems; bioenergy and biofuels. Also NSERC/Cenovus/Alberta Innovates Associate Industrial Research Chair in Energy and Environmental Systems Engineering; Cenovus Energy Endowed Chair in Environmental Engineering. amit.kumar@ualberta.ca



PHYSICS

- **Douglas Schmitt:** Geophysics; rock physics and geomechanics with an emphasis on field, borehole and laboratory measurements (surface seismic, geophysical logging and stress measurements). Also Canada Research Chair in Rock Physics. dschmitt@ualberta.ca

RENEWABLE RESOURCES

- **David Chanasyk** (Professor Emeritus): Hydrology; applied soil physics; land reclamation in oil sands tailings regions; water quality; soil water irrigation. david.chanasyk@ualberta.ca
- **Scott Chang:** Forest soil processes; soil microbial ecology; carbon sequestration; application of N-15 tracer in forest soils research; forest fertilization; tree nutrition; forest ecophysiology; silviculture-soil management interactions; land use and plant water use efficiency. scott.chang@ualberta.ca
- **Lee Foote:** Waterfowl habitat creation; disturbance and reclamation using adaptive management; wildlife habitat manipulation and using natural processes; sustainable use of boreal wildlife; social sustainability in African savannah ecosystems; trophic dynamics in wetlands. Also Director, Devonian Botanic Gardens. lee.foote@ualberta.ca
- **Uwe Hacke:** Functional plant biology; plant responses to environmental stress, particularly moisture stress; crop production; forest health under drought conditions; water use in different biomes; aquaporins. Also Canada Research Chair in Functional Plant Biology. uwe.hacke@ualberta.ca
- **Andreas Hamann:** Ecological genetics of western North American tree species; climate change adaptation strategies for the forestry sector; conservation genetics; dendrochronology; ecophysiology; phenology of tree species in boreal and tropical ecosystems. Also Associate Department Chair (Research/Programs). andreas.hamann@ualberta.ca
- **Simon Landhäusser:** Applied forest ecology; forest land reclamation; ecophysiology of boreal forest species in response to different abiotic and biotic factors; effects of forest practices on aspen regeneration and boreal forest vegetation management; role of disturbance on forest establishment and tree species distribution. Also NSERC Industrial Chair in Forest Land Reclamation and Applied Forest Ecology. simon.landhausser@ualberta.ca
- **M. Anne Naeth:** Land reclamation; revegetation; soil reconstruction; accelerating soil-plant community development; plant species selection and establishment; impacts of non-native species on native plant communities; bioengineering; native plants, their mycorrhizae and microbial communities; soil remediation, bioremediation and phytoremediation; soil amendments. Also Director of Land Reclamation International Graduate School; Associate Chair Land Reclamation and Agriculture. anne.naeth@ualberta.ca



- **David Olefeldt:** Links between terrestrial and aquatic carbon cycling, wetland biogeochemistry, impacts of disturbances such as wildfire and permafrost thaw. Also Campus Alberta Innovates Program (CAIP) Chair in Watershed Management and Wetland Restoration. olefeldt@ualberta.ca
- **William Shotyk:** Geochemistry of the soil environment; archives of environmental change; isotope geochemistry; analytical geochemistry; sedimentary geochemistry; agriculture and the environment. Also Bocock Chair in Agriculture and the Environment. shotyk@ualberta.ca
- **Tariq Siddique:** Soil chemistry; environmental microbiology; speciation of heavy metals in soil, sediment and water; characterization of microbial populations involved in transformational processes; pore-water chemistry and clay mineralogical properties to understand mechanisms of oil sands tailings densification. tariq.siddique@ualberta.ca
- **Uldis Silins:** Forest hydrology, including effects of natural and human land disturbance on hydrology, biogeochemistry, and aquatic ecology in riverine environments; evapotranspiration dynamics with emphasis on atmospheric/vegetative controls on transpiration, interception, and forest water balance; eco-hydrologic controls on forest stand dynamics; watershed management. uldis.silins@ualberta.ca

RESOURCE ECONOMICS & ENVIRONMENTAL SOCIOLOGY

- **Victor Adamowicz:** Environmental economics; natural resource economics; applied econometrics; forest economics and management; consumer demand and behaviour. Also Steering Group Member, University of Alberta Water Initiative. vic.adamowicz@ualberta.ca
- **Peter Boxall:** Environmental and resource economics; environmental valuation; development and analysis of environmental and conservation policy; public involvement processes in natural resource management; human dimensions of fish and wildlife management issues. Also Department Chair. peter.boxall@ualberta.ca
- **Debra Davidson:** Natural resource politics and governance; social dimensions of global environmental change; environmental risk; urban agriculture and food security; energy and society relations; historical impacts of natural resource extraction. debra.davidson@ualberta.ca
- **Lars Hallstrom (Augustana Campus):** Comparative public and environmental policy addressing climate change, water supply and wetlands; health and public health policy addressing contaminants and water supply; environmental, health and social equity; integration of environmental, social and health policy; knowledge transfer and evidence-informed policy; rural policy; the role of science and citizen engagement in public policy. Also Director of the Alberta Centre for Sustainable Rural Communities. lars.hallstrom@ualberta.ca
- **Naomi Krogman:** Social organization and policy development associated with integrated resource management and planning; alternative institutions of forest management; local control of mills and forest management in Canada. Also Academic Director, Office of Sustainability. naomi.krogman@ualberta.ca
- **Brenda Parlee:** Local community responses to sub-arctic and arctic ecosystem change; local and traditional ecological knowledge systems; health and well-being of Aboriginal communities; community-based monitoring and indicators. Also Native Studies Faculty; Canada Research Chair in Social Responses to Ecological Change. brenda.parlee@ualberta.ca



- **Brent Swallow:** Environment and development economics; climate change mitigation in agriculture and forestry; rural poverty and economic development; water and watershed management; market-based instruments for environmental management; land tenure and property rights.
brent.swallow@ualberta.ca

SCHOOL OF BUSINESS

- **Joseph Doucet:** Energy and regulatory economics; energy policy. Also Stanley A. Milner Chair in Leadership; Dean of the School of Business. joseph.doucet@ualberta.ca
- **Joel Gehman:** Corporate sustainability; social perception of hydraulic fracturing; organization theory; technology innovation; strategic management. jgehman@ualberta.ca

SCHOOL OF PUBLIC HEALTH

- **Nicholas Ashbolt:** Next-generation municipal water services and resource recovery; quantitative microbial risk assessment; system component work (treatment performance, use of urine and compost) from a public health perspective. Also Steering Group Member, University of Alberta Water Initiative. ashbolt@ualberta.ca
- **Patrick Hanington:** Biological hazards; environmental health; prevention of schistosomiasis transmission from snail hosts to humans; global health; immunology; epidemiology; infectious disease; parasite transmission; health promotion and education in endemic communities.
pch1@ualberta.ca
- **Norman Neumann:** Public health; waterborne pathogens; drinking water; molecular epidemiology; development of novel approaches and tools for detecting, tracking, and assessing human health risks associated with biological hazards in the environment (viruses, bacteria, protozoans, prions). Also cross-appointed in the Provincial Laboratory for Public Health. nfneuman@ualberta.ca

WATER INITIATIVE

- **Monireh Faramarzi:** Quantitative and qualitative assessment of water resources through utilizing the process-based large-scale hydrological models; analyzing and linking findings from natural science studies to the policy arena, with a special focus on global water-food-energy interactions in the face of climate change. Also scientific leader of the Predicting Alberta's Water Future (PAWF) project. faramarz@ualberta.ca