Daniel M. Robb

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Current Position

Postdoctoral Fellow 2023–Present
Queen's University, Department of Civil Engineering
Advisor: Jason Olsthoorn

Education

University of British Columbia 2016–2023
PhD Civil Engineering

Thesis: *Physical processes affecting turbidity in a glacier-fed hydroelectric reservoir*
Advisors: Gregory A. Lawrence and Roger Pieters
Research Fields: Environmental Fluid Mechanics, Physical Limnology

McGill University 2010–2013
MEng Civil Engineering

Thesis: *Smoothed particle hydrodynamics applied to river ice dynamics*
Advisor: Susan J. Gaskin
Research Fields: Hydraulic and Water Resources Engineering, Computational Fluid Dynamics

University of British Columbia 2004–2010
BASc Civil Engineering

Journal Articles

[J1] **Robb, D. M.**, Pieters, R., and Lawrence, G. A. (2025). The bathymetric effect and epilimnetic turbidity in a glacier-fed hydroelectric reservoir. *ARC Geophysical Research*, 1(1), 6. doi.org/10.5149/ARC-GR.1365

[J2] Olsthoorn, J., Kaminski, A. K., and **Robb, D. M.** (2023). Dynamics of asymmetric stratified shear instabilities. *Physical Review Fluids*, 8(2), 024501. doi.org/10.1103/PhysRevFluids.8.024501

[J3] **Robb, D. M.**, Pieters, R., and Lawrence, G. A. (2021). Fate of turbid glacial inflows in a hydroelectric reservoir. *Environ. Fluid Mech.*, 21(6), 1201–1225. doi.org/10.1007/s10652-021-09815-4

[J4] **Robb, D. M.**, Gaskin, S. J., and Marongiu, J.-C. (2016). SPH-DEM model for free-surface flows containing solids applied to river ice jams. *Journal of Hydraulic Research*, 54(1), 27–40. doi.org/10.1080/00221686.2015.1131203

Invited Talks

[I1] **Robb, D. M.**, Pieters, R., and Lawrence, G. A. (2023). Physical processes affecting turbidity in the epilimnion of a glacier-fed reservoir. AGU Fall Meeting 2023. San Francisco, CA. Abstract H51E-01

Conference Proceedings

[C1] **Robb, D. M.**, and Olsthoorn, J. (2025). Numerical investigation of sediment resuspension beneath internal solitary waves (poster). 27th Workshop on Physical Processes in Natural Waters. Kingston, ON.

[C2] **Robb, D. M.**, and Olsthoorn, J. (2024). Sediment resuspension beneath periodic internal solitary waves of depression over a flat bottom (oral). APS Division of Fluid Dynamics Abstracts. Salt Lake City, UT.

[C3] **Robb, D. M.**, Pieters, R., and Lawrence, G. A. (2022). Seiching, upwelling and particle settling in a stratified reservoir (poster). IX International Symposium on Stratified Flows, Cambridge, UK.

[C4] **Robb, D. M.**, Pieters, R., and Lawrence, G. A. (2022). Epilimnetic turbidity in a glacier-fed reservoir (oral). 24th Workshop on Physical Processes in Natural Waters, Vancouver, BC.

[C5] **Robb, D. M.**, Pieters, R., and Lawrence, G. A. (2020). Transport of glacial meltwater to the surface layer of a stratified reservoir (oral). AGU Fall Meeting 2020, H125-06. Online.

[C6] Kaminski, A. K., Olsthoorn, J., **Robb, D. M.**, and D'Asaro, E. (2019). Overturning structures in symmetric and asymmetric shear instabilities (oral). APS Division of Fluid Dynamics Abstracts. Seattle, WA.

[C7] **Robb, D. M.**, Pieters, R., and Lawrence, G. A. (2019). Glacial inflows in a hydroelectric reservoir (oral). 22nd Workshop on Physical Processes in Natural Waters, Yichang, China.

[C8] **Robb, D. M.**, Pieters, R., and Lawrence, G. A. (2018). Effects of hydropower operation on turbidity in a glacially-fed reservoir (oral). 21st Workshop on Physical Processes in Natural Waters, Solothurn, Switzerland.

[C9] **Robb, D. M.**, Pieters, R., and Lawrence, G. A. (2018). The effect of hydropower operation on turbidity in a fast-flushing reservoir (oral). 8th International Symposium on Environmental Hydraulics. University of Notre Dame, IN.

[C10] **Robb, D. M.**, Gellis, M. S., Vasquez, J. A., and Wang, E. C. (2017). Tunnel replacement project: morphodynamic modelling of trench migration (oral). 23rd Canadian Hydrotechnical Conference, Vancouver, BC.

[C11] **Robb, D. M.**, and Vasquez, J. A. (2015). Numerical simulation of dam-break flows using depth-averaged hydrodynamic and three-dimensional CFD models (oral). 22nd Canadian Hydrotechnical Conference, Montreal, QC.

[C12] Henscheid, P. J., Hughes, B. H., Schwall, D., **Robb, D. M.**, and Hurtig, K. I. (2014). Nine Mile Dam: Sediment Bypass Tunnel Rehabilitation (oral). HydroVision International. Nashville, TN.

[C13] **Robb, D. M.**, Gaskin, S. J., Marongiu, J.-C., and Villeneuve, M. (2013). Smoothed particle hydrodynamics simulations of freely moving solid objects in a free-surface flow with applications to river ice dynamics (oral). 21st Canadian Hydrotechnical Conference. Banff, AB.

Book Chapters

[B1] Neuhauser, M., Leboeuf, F., Marongiu, JC., Parkinson, E., **Robb, D. M.** (2014). Simulations of Rotor–Stator Interactions with SPH-ALE. In: Gourbesville, P., Cunge, J., Caignaert, G. (eds) Advances in Hydroinformatics. Springer, Singapore. doi.org/10.1007/978-981-4451-42-0_29

Technical Reports

[R1] Perrin, C. J., Pieters, R., Harding, J., **Robb, D. M.**, and Bennet, S. (2018). Carpenter Reservoir Productivity Model (BRGMON-10). Prepared for BC Hydro.

[R2] Pieters, R., **Robb, D. M.**, Lawrence, G. A., and Bray, K. (2011). Hydrology of Kinbasket and Revelstoke Reservoirs, 2010 (CLBMON-3). Prepared for BC Hydro.

[R3] Pieters, R., **Robb, D. M.**, Lawrence, G. A., and Bray, K. (2010). Hydrology of Kinbasket and Revelstoke Reservoirs, 2009 (CLBMON-3). Prepared for BC Hydro.

Projects

[P1] Fraser River Tunnel Project, British Columbia. Analysis of field data collected in the Fraser River Delta to investigate the hydrodynamics and sedimentation patterns in the vicinity of a proposed eight-lane tunnel to replace the existing George Massey Tunnel. Data included time series measurements of water level, temperature, electrical conductivity, and turbidity from a variety of sources. Northwest Hydraulic Consultants (NHC) 2023.

[P2] Skagit River Hydroelectric Project, Water Quality Model, Washington. Hydrodynamic and water quality modelling (CE-QUAL-W2) to evaluate the effects of cold-water releases from upstream reservoirs (Ross, Diablo, and Gorge lakes) on water temperatures in the Skagit River downstream of Gorge Dam. NHC (2023).

[P3] Bridge River Water Use Plan, British Columbia. Field observations and numerical modelling (CE-QUAL-W2) to investigate the potential effects of changes in reservoir operation on turbidity and primary productivity in a glacier-fed hydroelectric reservoir. University of British Columbia in collaboration with Limnotek Research, BC Hydro, and St'át'imc Eco Resources (2016–2018).

[P4] Kinbasket and Revelstoke Reservoirs Ecological Productivity Monitoring, British Columbia. Field observations to investigate the physical limnology and nutrient dynamics in Kinbasket and Revelstoke Reservoirs.

Work included deploying moorings, collecting profiles of water column properties, and servicing weather stations. University of British Columbia in collaboration with BC Hydro (2017).

[P5] Site C Hydroelectric Project Fish Habitat Mitigation, British Columbia. Hydrodynamic modelling (Telemac-2D) of four reaches on the Peace River downstream of the Site C Dam. The modelling supported the evaluation and design of in-stream channel works for improving fish habitat in side-channels downstream of the dam. NHC (2016).

[P6] Dam-Break Inundation Study for Proposed Hydroelectric Facility, Peru. Dam-break modelling (Telemac-2D) for a proposed 115-m tall hydroelectric dam on the Marañon River, the main stem of the Amazon River. The modelling provided data for flood-inundation and flood-hazard mapping to evaluate the consequences of a potential dam failure and to support emergency response planning. NHC (2015).

[P7] George Massey Tunnel Replacement Project, British Columbia. Hydrodynamic and morphodynamic modelling (Telemac-3D) of the lower Fraser River to evaluate the effects of the proposed removal of the George Massey Tunnel on the hydraulic and sedimentation conditions in the study area. NHC (2015).

[P8] Salmon River Highway Crossing, British Columbia. Hydrodynamic modelling (Telemac-2D) to evaluate erosion protection design alternatives for a highway crossing over Salmon River, BC. NHC (2015).

[P9] Kingsclear Foreshore Repair, New Brunswick. Hydrodynamic modelling (Telemac-2D) to evaluate erosion protection design alternatives downstream of Mactaquac Dam on the Saint John River. NHC (2015).

[P10] Marina Floating Breakwater, British Columbia. Conceptual design of a floating breakwater for a marina expansion. The project included a site survey, wind and wave data analysis, two-dimensional wave generation modelling (SWAN), and floating breakwater attenuator sizing. NHC (2014).

[P11] Pattullo Bridge Seismic Upgrades, British Columbia. Hydrodynamic-morphodynamic modelling (Telemac-3D / Sisyphe) of a reach on the lower Fraser River containing two bridges to evaluate the effects of proposed seismic upgrades to the Pattullo Bridge piers on the hydraulic and morphological conditions in the study area. NHC (2014).

[P12] Iowa Hill Pumped Storage Project, California. Computational fluid dynamics modelling (OpenFOAM) of an inlet/outlet structure for a proposed pumped storage facility. NHC (2014).

[P13] North Thompson Bank Erosion Protection, British Columbia. Hydrodynamic modelling (Telemac-2D/3D) to evaluate design alternatives for erosion protection on an outside bend of the North Thompson River near a railway. NHC (2014).

[P14] Toba Montrose Hydroelectric Project: Montrose Coanda Screen Testing, British Columbia. Project engineer for a test section (physical model) used to evaluate the effectiveness of five Coanda screen designs across a range of design parameters (slot spacing, wire size, wire tilt angle, and screen wear) on the hydraulic capacity, sediment exclusion, and debris exclusion of the different Coanda screens. NHC (2013).

[P15] Skookumchuck Bank Erosion Protection, British Columbia. Hydraulic modelling (HEC-RAS) to determine design velocities and water levels for bank protection design on the Lillooet River. NHC (2013).

[P16] Nine Mile Hydroelectric Project: Sediment Bypass Improvements, Washington. Project engineer for a 1:30 scale, mobile-bed physical hydraulic model study aimed to reduce the volume of sediment passing through the powerhouse intakes by evaluating design alternatives including modifications to an existing sediment bypass tunnel. NHC (2013).

[P17] Smoothed Particle Hydrodynamics applied to river ice jams. Adapted an existing computational fluid dynamics code, originally used for turbo-machinery applications, to model open-channel flows containing solids with applications to river ice jams. McGill University in collaboration with Andritz Hydro, Vevey, Switzerland (2011–2013).

Honours and Awards

- Queen's Vice-Principal Research Postdoctoral Fellowship ($100,000) 2023
- NSERC Alexander Graham Bell CGS D, Doctoral Program ($105,000) 2017
- UBC Faculty of Applied Science Graduate Award ($10,000) 2017
- NSERC Alexander Graham Bell CGS M, Masters Program ($17,500) 2010
- McGill Provost's Graduate Fellowship ($4,500) 2010, 2011
- NSERC Undergraduate Student Research Awards Program ($4,500) 2009

Previous Employment

Northwest Hydraulic Consultants — Vancouver, BC
Project Engineer (contract, 6 months) — 2023

University of British Columbia Environmental Fluid Mechanics — Vancouver, BC
Graduate Research Assistant — 2016–2023

Northwest Hydraulic Consultants — Vancouver, BC
Project Engineer (full-time) — 2013–2016

McGill University Civil Engineering — Montreal, QC
Graduate Research Assistant — 2010–2013

Andritz Hydro Research and Development — Vevey, Switzerland
Intern, Computational Fluid Dynamics (9 months) — 2011–2012

Coanda Research and Development — Vancouver, BC
Co-op Student (4 months) — 2010

University of British Columbia Environmental Fluid Mechanics — Vancouver, BC
Undergraduate Research Assistant (4 months) — 2009

Klohn Crippen Berger — Vancouver, BC
Co-op Student (8 months) — 2008

Worley Parsons — Singapore
Co-op Student (4 months) — 2007

Douglas Partners — Sydney, Australia
Co-op Student (8 months) — 2006

Teaching

Queen's University
Guest Lecturer, Hydrodynamic Modelling (CIVL 851), for J. Olsthoorn — 2023

University of British Columbia
Guest Lecturer, Fluid Mechanics (CIVL 215), for G. A. Lawrence — 2019
Teaching Assistant, Environmental Fluid Mechanics (CIVL 541), for G. A. Lawrence — 2023
Teaching Assistant, Environmental Hydraulics (CIVL 416), for G. A. Lawrence — 2020
Teaching Assistant, Fluid Mechanics (CIVL 215), for G. A. Lawrence — 2017–2019

McGill University
Teaching Assistant, Dynamics (CIVE 206), for S. J. Gaskin — 2012
Teaching Assistant, Hydraulic Engineering (CIVE 428), for S. J. Gaskin — 2011

Graduate Courses Taken

University of British Columbia — 2016–2023
Environmental Fluid Mechanics (CIVL 541)
Physical Limnology (CIVL 598)
Estuary Hydraulics (CIVL 547)
Numerical Techniques for Ocean, Atmosphere and Earth Scientists (EOSC 511)
Advanced Geophysical Fluid Dynamics (EOSC 512)

McGill University — 2010–2013
Computational Hydraulics (CIVE 572)
Advanced Fluid Mechanics (MECH 562)
Applied Mathematics (MECH 605)
Fundamentals of Turbulent Flow (MECH 656)
Atmospheric and Oceanic Dynamics (ATOC 512)

Technical Training and Professional Development

- Certificate in Professional Development for Postdoctoral Researchers, Queen's University 2023
- Turbulence and Mixing, L. Armi (Scripps Oceanography) and G. A. Lawrence (UBC) 2019
- Physical Limnology, B. Boehrer (Helmholtz Centre for Environmental Research) Magdeburg, Germany 2019
- Gerhard Jirka Summer School on Environmental Fluid Mechanics, Lucerne, Switzerland 2012

Open Source Software Projects

Freshwater: Python module for estimating the thermodynamic properties of lake water

Computer Skills

- Programming: Python (advanced), Matlab (advanced), C/C++ (intermediate), Fortran (intermediate)
- Python libraries (daily use): NumPy, Pandas, Xarray, Matplotlib
- High-Performance computing: SLURM workload manager, Bash scripting, parallel computing with MPI
- Hydrodynamic and water quality modelling: CE-QUAL-W2, Telemac-2D/3D, HEC-RAS
- Computational fluid dynamics: OpenFOAM, Flow-3D
- Data visualization software: ParaView
- Version control: Git

Professional Service

- Peer Reviewer for the *Journal of Hydraulic Research* (2024, 2025)
- Reviewer for the AGU23 Outstanding Student Presentation Awards (Dec 2023)
- Organizer for the UBC Physical Oceanography Seminar Series (Jan–Aug 2018)

Professional Registration

- Registered Professional Engineer in British Columbia, Licence 43785 (2016–Present)

Personal

- Languages: English (native), French (fluent)
- Citizenship: Canadian