Jérémie Bonneau

HE/HIM

418-953-4375 | JEREMIE.BONNEAU@GCI.ULAVAL.CA

Current Position

ASSITANT PROFESSOR
Department of Civil Engineering and Water Engineering
Université Laval, Quebec City

Education

PHD IN CIVIL ENGINEERING | 2020-2025
The University of British Columbia | Vancouver, BC
Completed in the Environmental Fluid Mechanics Group
Supervised by Dr. Laval (UBC) and Dr. Mueller (Carleton)
Thesis: Physical Oceanography of a Canadian Arctic Glacial Fjord: Circulation, Oceanic Heat Flux and Interactions with Cryospheric Features
Topic: Physical Oceanography, 3-D numerical modeling, Observations

MASC IN CIVIL ENGINEERING | 2018-2020
The University of British Columbia | Vancouver, BC
Research Master's in Environmental Fluid Mechanics
Supervised by Dr. Laval (UBC) and Dr. Mueller (Carleton)
Thesis: Winter Dynamics in an Epishelf Lake
Topic: Physical Limnology/Oceanography, 1-D Model, Inverse Methods

B.ENG. IN AGRO-ENVIRONMENT ENGINEERING | 2013-2017
Université Laval | Quebec City, QC
Engineering degree with a curriculum that is a blend between civil, chemical and mechanical engineering as well as agronomy. Similar to the more common agriculture, bio-system and environmental engineering programs.
Capstone project: Machine learning to enhance lowbush blueberry yields.
GPA: 4.14/4.33

Scholarships & Awards

- Killam Doctoral Scholarship | 2022-2023 | $62,000
- UBC Four Year Doctoral Fellowship (4YF) | 2021-2023 | $58,000
- Northern Scientific Training Program | 2019-2024 | 5 x $3500
- British Columbia Graduate Scholarship | 2021 | $10,000
- FRQNT Master's Scholarship | 2019 | $19,000
- NSERC Master's Scholarship | 2018 | $17,500

Teaching

- Fluid Mechanics 1 (Civil Eng.) | 2023 | Tutorials and Marking
- Hydrology and Open Channel Flow (Civil Eng.) | 2018-2024 | Tutorials, Laboratories and Marking

- Fluid Mechanics 2 (Civil Eng.) | 2018-2024 | Tutorials, Laboratories and Marking

Fieldwork

AMUNDSEN SEA RESEARCH CRUISE (West Antarctica) | 2020 & 2024

- 2020: Microstructure measurements in front of Dodson Ice Shelf to estimate turbulence and vertical mixing. From R/V Araon (Korea)
- 2024: Deployment of a Slocum glider equipped with a LISST particle sizer in Pine Island Bay to characterize glacial and organic particles in relations to ice shelf meltwater. From R/V Araon (Korea)

MILNE FIORD EXPEDITION (Nunavut, Canada) | 2018, 2019, 2022, 2023 (lead), 2024 (lead)

- Maintenance of moorings, weather stations and camera network.
- Water profiling with different instruments (CTD, current meter, LISST)
- Ice Penetrating Radar and seismic surveys
- Under-ice ROV exploration
- Logistics, safety and funding

JONES SOUND AND NARES STRAIT (Nunavut, Canada) | 2021

- Mooring recovery and deployment, bathymetry, CTD profiling and water samples (nutrients, trace metal, DNA). From the S/Y Vagabond research sailboat.

QUESNEL LAKE (BC) | 2019

- Recovery, maintenance and deployment of Quesnel Lake moorings.

DEEKS LAKE | 2018-2024

- Annual recovery, maintenance and deployment of Deeks Lake (BC) mooring and weather station, CTD profiling. Hiking accessed.

Engineering Experience

LORAX ENVIRONMENTAL SERVICES | 2024-2025
Vancouver | Project Engineer – Numerical Modeler

- Pit lake modeling for mine water quality assessments
- Evaluation and preparation of climactic datasets for environmental assessments
- Modeling of jets and plumes for water quality assessments

ENVIRONMENTAL FLUID MECHANICS GROUP (UBC) | 2025
Vancouver | Postdoctoral Research Assistant

- Research on physical limnology, Arctic coastal oceanography and ice-ocean interactions

NUMERICAL FLUID MECHANICS LAB (Université Laval) | 2016-2017
Québec City | Research Assistant

- Numerical simulation of climate, flow and vapor transfer inside a greenhouse
- Database of drag, lift and pitching moment coefficients of ellipsoids for a custom hydro-turbine fish mortality software

SOIL AND AGRI-FOOD ENGINEERING DEPARTMENT (Université Laval) | 2017
Québec City | Research Assistant

- Literature review for a new course on soil conservation (wind and water erosion, soil treatment and regeneration)
- Drafted course notes, exercises and final project

Graduate Coursework All at UBC

- Environmental Fluid Mechanics (Dr. Lawrence)
- Environmental Hydraulics (Dr. Yonemitsu)
- Advanced Geophysical Fluid Dynamics (Dr. Waterman)
- Seminar in Physical Oceanography (Dr. Allen)
- Turbulence (Dr. Laval)
- Physical Limnology (Dr. Lawrence)
- Numerical Analysis of Partial Differential Equations (Dr. Wachs)
- Computational Fluid Dynamics (Dr. Ollivier-Gooch)
- Estuary Hydraulics (Dr. Lawrence)

Outreach & Service

- Undergraduate Research Mentor | 2023-2024
- Work with freelance journalist (D. Patar) on the Milne Ice Shelf breakup (Aired on CBC, written piece in Canadian Geographic)
- Mount Seymour Volunteer Ski Patrol | 2022
- Glacier travel and rescue instructor for the outdoor club | 2021-2024
- Media coverage of the Milne Ice Shelf 2020 breakup (CBC, Globe and mail, Radio-Canada, …)
- Member of UBC outdoor club trail and hut committee |2020-2021
- Member of the scientific committee for the UN's ocean decade | 2021
- Reviewer for the 6th assessment report of the IPCC | 2020-2021
- Reviewer for *Limnology and Oceanography, The Cryosphere* and *Geoscientific Model Development*

Training & Personal Development

- Advanced Glider Pilot Training | 2023
- Ice Rescue Technician | 2023
- STCW Basic Safety Training | 2023
- Remotely Operated Underwater Vehicle Training (Deep Trekker) | 2022
- Wilderness First Responder | 2021 and 2024 (recert.)
- Advanced Glacier Travel | 2019
- Glacier Travel and Rescue | 2019

Skills

Languages: French, English. Used to be fluent in Spanish… can learn again!
Programming: I mostly used Matlab during my PhD and MASc. I have also worked with Python, Fortran, C, C++, R and VBA, but less (beginner/ intermediate).
Software: I have worked with many different hydrodynamic software in my career (MITgcm, Star CCM+, Ansys Fluent, HEC-RAS, …) and built my own as well. I can learn any similar software rapidly and can parallelize code and setup software for high performance computing. I also have experience with QGIS, remote sensing (visual analysis, radar analysis, spectral analysis) and aerial imaging (structure from motion).

Peer-Reviewed Publication

- **Bonneau, J**., Friedrichs, A.M., Rajewicz, J.S.T., Mueller, D., Laval, B.E., Forrest, A.L., Hamilton, A. K., Antropova, Y. & Sepulveda-Steiner, O. (2025). Momentum, heat and salt budgets to estimate drag and transfer coefficients in an ice shelf basal channel. *Journal of Physical Oceanography*, 55 (9), 1353-1373
- **Bonneau, J**., Laval, B. E., Mueller, D., Hamilton, A. K., & Antropova, Y. (2025). The impact of ice structures and ocean warming in Milne Fiord. *The Cryosphere,* 19 (7), 2615-2633
- **Bonneau, J.**, Laval, B. E., Mueller, D., Hamilton, A. K., & Antropova, Y. (2024). Heat fluxes in a glacial fjord: The role of buoyancy-driven circulation and offshore forcing. *Geophysical Research Letters*, 51(22), e2024GL111242.
- **Bonneau, J**., Laval, B. E., Mueller, D., Hamilton, A. K., & Forrest, A. L. (2024). Unsteady circulation in a glacial fjord: A multiyear modeling study of Milne Fiord. *Journal of Geophysical Research: Oceans*, 129(6), e2023JC020140.
- **Bonneau, J**., Laval, B. E., Mueller, D., Hamilton, A. K., Friedrichs, A. M., & Forrest, A. L. (2021). Winter dynamics in an epishelf lake: Quantitative mixing estimates and ice shelf basal channel considerations. *Journal of Geophysical Research: Oceans*, 126(9), e2021JC017324.
- Antropova, Y., Mueller, D., Samsonov, S.V., Komarov, A.S. **Bonneau, J**. and Crawford, A.J. (2024). Grounding-line retreat of the Milne Glacier, Ellesmere Island, Canada over 1966- 2023 from satellite, airborne, and ground radar data. *Remote Sensing of the Environment,* 315, 114478

Conferences & Invited Talks (Presenter)

- **Bonneau, J.,** Rajewicz, J.S.T., Friedrichs, A.M., and others. (2024) Ice-ocean drag in the Milne Ice Shelf basal channel. Poster at AGU annual meeting, Washington DC.
- **Bonneau, J.**, Laval B.E., Mueller, D., Hamilton, A.K. and Forrest, A.L. (2023) The unsteady circulation of a glacial fjord. Poster at AGU annual meeting, San Francisco.
- **Bonneau, J.**, Laval B.E., Mueller, D., and others (2023) A hidden ecosystem inside Milne Ice Shelf basal channel. Invited talk at Université Laval (Quebec City).

- **Bonneau, J.**, Laval B.E. and Mueller, D., (2023) Circulation and heat fluxes in a Canadian Arctic glacial fjord. Presentation at Berkeley for the west coast collaboratorium seminar series.
- **Bonneau, J.**, Laval B.E., Mueller, D., and others (2022) Drainage of the Milne Fiord epishelf lake. Presentation at ArcticNet annual conference, Toronto.
- **Bonneau, J.**, Laval B.E., Mueller, D., Hamilton, A.K. (2022) Circulation and water properties in a Canadian Arctic glacial fjord. Poster at ArcticNet annual conference, Toronto.
- **Bonneau, J.**, Laval B.E., Mueller, D., (2022) Water properties and circulation in a Canadian Arctic glacial fjord. Poster at the International Glaciological Society meeting, Reykjavik.
- **Bonneau, J.**, Mueller, D., Laval, B.E., Hamilton, A.K. (2021) Development of a buoyancy corrected method for the estimation of meltwater fractions in glacial fjords. Presentation at ArcticNet annual conference, online.
- **Bonneau, J.**, Laval B.E., Mueller, D., Hamilton, A.K., Friedrichs, A.M. and Forrest, A.L. (2020) Winter Dynamics in the last Epishelf of the Canadian Arctic. Presentation at PPNW conference, online.
- **Bonneau, J.**, Laval B.E., Mueller, D. and Hamilton, A.K. (2019) Mixing in the last Arctic epishelf lake. Poster for ArcticNet annual conference, Halifax.
- **Bonneau, J.**, Laval B.E., Mueller, D., Hamilton, A.K. (2018) Physical study of the last Arctic epishelf lake. Poster for ArcticNet annual conference, Ottawa