

# Samuel D. Brenner

Postdoctoral Research Associate at Brown University

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## Summary

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My research uses a combination of *in situ* measurements and idealized modelling to understand the dynamic and thermodynamic processes linking sea ice and the upper ocean, and how those links impact – and are impacted by – the changing Arctic climate.

## Research experience

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- Brown University, Department of Earth, Environmental, and Planetary Sciences** Providence, RI, USA  
Postdoctoral Research Associate Jul. 2022–Present  
• Advisor: Christopher Horvat
- University of Washington, Applied Physics Laboratory** Seattle, WA, USA  
Graduate Research Assistant Sep. 2017–Jun. 2022  
• Advisors: Luc Rainville and Jim Thomson  
• PhD Dissertation: *The role of sea ice in mediating atmosphere-ice-ocean momentum transfer.*  
<http://hdl.handle.net/1773/49108>
- University of British Columbia, Environmental Fluid Mechanics** Vancouver, BC, Canada  
Graduate Research Assistant Sep. 2015–Aug. 2017  
• Advisor: Bernard Laval  
• MSc Thesis: *The free oscillatory response of fjord-type multi-armed lakes.*  
[doi:10.14288/1.0353196](https://doi.org/10.14288/1.0353196)
- Undergraduate Research Assistant Jun. 2013–Jun. 2014

## Education

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- University of Washington** Seattle, WA, USA  
PhD in Oceanography Jun. 2022  
Masters of Science in Oceanography Jun. 2019
- University of British Columbia** Vancouver, BC, Canada  
Masters of Applied Science in Civil Engineering Aug. 2017  
Bachelors of Applied Science in Civil Engineering Jun. 2015
- Camosun College** Victoria, BC, Canada  
Advanced Diploma in Civil Engineering Technology Bridge Jun. 2013  
Diploma in Civil Engineering Technology Jun. 2010

## Teaching experience

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- University of Washington**  
Guest Lecturer  
• Field Measurements (CEWA590): “Measuring sea ice” May., 2022  
• Hydrodynamics (CEWA570): “Wind-driven flow in a lake” Feb., 2022  
Teaching Assistant  
• Coastal Engineering (CEE473/CEWA573) Spring 2021  
• Foundations of Ocean Sensors (OCEAN351) Winter 2019
- University of British Columbia**  
Teaching Assistant  
• Fluid Mechanics I (CIVL215) Spring 2016  
• Environmental Hydraulics (CIVL416) Fall 2016  
• Fluid Mechanics II (CIVL315) Fall 2015 & Fall 2016

## Scientific contributions

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### Publications

1. **Brenner, S.**, Horvat, C., Hall, P., Lo Piccolo, A., Fox-Kemper, B. Labbé, S., Dansereau, V. [Submitted]. Scale-dependent air-sea exchange in the polar oceans: floe-floe and floe-flow coupling in the generation of ice-ocean boundary layer turbulence
2. **Brenner, S.**, Rainville, L., Thomson, J., Crews, L., and Lee, C., 2023. Wind-driven motions of sea ice and the ocean surface mixed layer in the Western Arctic. *J. Phys. Oceanogr.*, 53(7), 1787–1804. doi:10.1175/JPO-D-22-0112.1
3. **Brenner, S.**, Thomson, J., Rainville, L., Torres, D., Doble, M., Wilkinson, J., and Lee, C., 2023. Acoustic sensing of ocean mixed layer depth and temperature from uplooking ADCPs. *J. Atmos. Oceanic Technol.*, 40(1), 53–64. doi:10.1175/JTECH-D-22-0055.1
4. Cooper, V., Roach, L., Thomson, J., **Brenner S.**, Smith, M., Meylan, M., Bitz, C., 2022. Wind waves in sea ice of the western Arctic and a global coupled wave-ice model. *Phil. Trans. Roy. Soc. A.*, 380(2235), p. 19. doi:10.1098/rsta.2021.0258
5. MacKinnon, J., et. al, [including **Brenner, S.**], 2021. A warm jet in a cold ocean. *Nat. Comm.*, 12(1) p. 12 doi:10.1038/s41467-021-22505-5
6. **Brenner, S.**, Rainville, L., Thomson, J., Cole, S. and Lee, C., 2021. Comparing observations and parameterizations of ice-ocean drag through an annual cycle across the Beaufort Sea. *J. Geophys. Res. Oceans.* 126(4), p. 29. doi:10.1029/2020JC016977
7. **Brenner, S.**, Rainville, L., Thomson, J., and Lee, C., 2020. The evolution of a shallow front in the Arctic marginal ice zone. *Elem. Sci. Anth.*, 8(1), p. 17. doi:10.1525/elementa.413/
8. **Brenner, S.**, and Laval, B. 2018. Seiche modes in multi-armed lakes. *Limnol. Oceanogr.*, 63: 2717-2726 doi:10.1002/lno.11001

### Conference presentations (first-author only)

1. Brenner S.. The role of sea ice in mediating atmosphere-ice-ocean momentum transfer. Presented at: Physical Oceanography Doctoral Symposium; 2022 Oct. 17–21; Kona, HI.
2. Brenner S., L. Rainville, J. Thomson, L. Crews, C. Lee. Seasonal variations of inertial velocities of sea ice and ocean surface layer in the Beaufort Sea. Presented at: Ocean Sciences Meeting; 2022 Feb. 27–Mar. 04; virtual.
3. Brenner S., L. Rainville, J. Thomson, C. Lee. In-situ observations to validate (and invalidate) model parameterizations of the ice-ocean drag coefficient. Presented at: 10th IICWG-DA Workshop 2021 Oct. 26–28; virtual.
4. Brenner S., L. Rainville, J. Thomson, C. Lee. Distributed and year-long observations of ice-ocean drag across a range of ice morphologies in the Beaufort Sea. Presented at: AGU Fall Meeting 2020 Dec. 01–17; virtual.
5. Brenner S., L. Rainville, J. Thomson, J. MacKinnon, C. Lee. Momentum fluxes across the air-ice-ocean interface in the Beaufort Sea. Poster presented at: Ocean Sciences Meeting; 2020 Feb. 17–21; San Diego, CA.
6. Brenner S., L. Rainville, J. Thomson, C. Lee. The evolution of an Arctic meltwater front. Poster presented at: Liège Colloquium on Ocean Dynamics; 2019 May. 6–9; Liège, Belgium
7. Brenner S., L. Rainville, J. Thomson, C. Lee. Small scale upper-ocean variability in the Arctic. Poster presented at: Ocean Sciences Meeting; 2018 Feb. 11–16; Portland, OR
8. Brenner S., B. Laval, J. Shore, S. Vagle. Surface Seiching in Quesnel Lake, British Columbia. Poster presented at: Canadian Meteorological and Oceanographic Society Congress; 2017 Jun. 4–8; Toronto, ON

## Service

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### Committee work

School of Oceanography “Graduate Applications Mentorship Program” (DEI subcommittee)

- Program aimed at demystifying the graduate application process for prospective students:

[https://www.ocean.washington.edu/story/Graduate\\_Application\\_Mentorship\\_Program](https://www.ocean.washington.edu/story/Graduate_Application_Mentorship_Program)

- Assisted in program development, initial roll-out, and post-program assessment
- Mentor for a prospective graduate student

2020–2022  
Fall, 2021

### Reviews

Journal articles:

- Ocean Modelling (1); Journal of Geophysical Research: Oceans (2); Ocean Science (1); Aquatic Sciences (1); The Cryosphere (1)

Proposals:

- National Science Foundation (1)

### Outreach

Frontier School Division: Churchill Climate Summer School

June 2023

- Instructor and lesson organizer

Pacific Science Center: Climate Change Curiosity Expo

annually, 2018–2020

University of Washington Engineering Discovery Days

annually, 2018–2019

Science World: “Meet a Scientist” days

various dates, 2015–2017

## Fieldwork

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### Research cruises

Norwegian Sea: NORSE pilot/process cruise (R/V Neil Armstrong; 35 days at sea)

Sep.–Oct. 2021

Beaufort Sea: SODA recovery cruise (USCGC Healy; 42 days at sea)

Sep.–Oct. 2019

Beaufort Sea: SODA deployment cruise (USCGC Healy; 36 days at sea)

Sep.–Oct. 2018

### Other oceanography/limnology fieldwork

San Juan Channel, WA (mooring deployment/recovery and CTD sections)

Aug. 2019

Cultus Lake, BC (CTD sections)

various dates, 2015–2017

Deeks Lake, BC (mooring deployment and CTD sections)

various dates, 2015–2017

Quesnel Lake, BC (mooring recovery/servicing and CTD sections)

Sep. 26–30, 2016

Resolute Bay, NU (water sample collection and CTDs)

Aug. 2014

### Field camps

Milne ice shelf, NU (ice shelf GPR, CTDs, mooring service, glacier ablation stakes)

Jul.–Aug. 2014

## Other courses and training

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### Atmosphere-Ocean-Ice Winter School

*Longyearbyen, Svalbard, Norway*

May. 2022

### Estuarine & Coastal Fluid Dynamics Summer School

*Friday Harbor, WA, USA*

Jul.–Aug. 2019

### Instructional Skills Workshop

*Vancouver, BC, Canada*

UBC Centre for Teaching, Learning and Technology

Jul.–Aug. 2016

## Research awards

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NSERC Canada Graduate Scholarships-Master’s (CGS M)

Apr. 2016

NSERC Undergraduate Student Research Award

May 2014

Northern Scientific Training Program (NSTP) Funding

May 2014

## Non-academic professional work experience

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### **AECOM**

Civil Engineering Student Intern

*Burnaby, BC, Canada*

May – Sep. 2015

### **Canadian Sewage Solutions Inc.**

Junior Engineering Technologist

*Langford, BC, Canada*

Dec. 2011 – Nov. 2012

### **Kiewit Construction**

Purchasing Engineer (co-op student)

Field Engineer (co-op student)

*Kearl Lake Oilsands, AB, Canada*

Aug. 2010 – Jan. 2011

Aug. – Dec. 2009

### **District of North Saanich**

Drafting Assistant (co-op student)

*North Saanich, BC, Canada*

Dec. 2008 – Mar. 2009