

# KENNETH HUGHES

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## PROFILE

A process-oriented physical oceanographer combining observations with numerical modelling

## EDUCATION AND POSITIONS

Postdoctoral research scientist	Oregon State University, USA	Jul 2018–present
PhD in Physical Oceanography	University of Victoria, Canada	2018
MSc in Physics	University of Otago, New Zealand	2013
BSc (Hons) in Physics	University of Otago, New Zealand	2011

## PEER-REVIEWED PUBLICATIONS

Under review: **Turbulence data reduction scheme for vertically profiling autonomous floats deployed in the ocean**

Hughes, K.G., J. N. Moum, and D. L. Rudnick  
*J. Atmos. Oceanic Tech.*

Under review: **Pathways, form drag, and turbulence in simulations of an ocean flowing through an ice mélange**

Hughes, K.G.  
*J. Geophys. Res. Oceans*

Under review: **Deep cycle turbulence in Atlantic and Pacific cold tongues**

Moum, J. N., K.G. Hughes, E. L. Shroyer, W. D. Smyth, D. A. Cherian, S. J. Warner, B. Bourlès, P. Brandt, and M. Dengler  
*Geophys. Res. Lett.*

**Stratified shear instabilities in diurnal warm layers**

Hughes, K.G., J. N. Moum, E. L. Shroyer, and W. D. Smyth  
*J. Phys. Oceanogr.*, 51, 2583–2598, doi:10.1175/JPO-D-20-0300.1

**Heat transport through diurnal warm layers**

Hughes, K.G., J. N. Moum, and E. L. Shroyer (2020)  
*J. Phys. Oceanogr.*, 50, 2885–2905, doi:10.1175/JPO-D-20-0079.1

**Evolution of the velocity structure in the diurnal warm layer**

Hughes, K.G., J. N. Moum, and E. L. Shroyer (2020)  
*J. Phys. Oceanogr.*, 50, 615–631, doi:10.1175/JPO-D-19-0207.1

**Tidal conversion and dissipation at steep topography in a channel poleward of the critical latitude**

Hughes, K.G. and J. M. Klymak (2019)  
*J. Phys. Oceanogr.*, 49, 1269–1291, doi: 10.1175/JPO-D-18-0132.1

**Tidally modulated internal hydraulic flow and energetics in the central Canadian Arctic Archipelago**

Hughes, K.G., J. M. Klymak, W. J. Williams and H. Melling (2018)  
*J. Geophys. Res.*, 123, 5210–5229, doi:10.1029/2018JC013770

**Brine convection, temperature fluctuations and permeability in winter Antarctic land-fast sea ice**

Wongpan, P, K. G. Hughes, P. J. Langhorne and I. J. Smith (2018)  
*J. Geophys. Res.*, 123, 216–230, doi:10.1002/2017JC012999

**Water mass modification and mixing rates in a 1/12° simulation of the Canadian Arctic Archipelago**

Hughes, K. G., J. M. Klymak, X. Hu and P. G. Myers (2017)  
*J. Geophys. Res.* 122, 803–820, doi:10.1002/2016JC012235

**Measurements of Ice Shelf Water beneath the front of the Ross Ice Shelf using gliders**

Nelson, M. J. S., B. Y. Queste, I. J. Smith, G. H. Leonard, B. G. M. Webber and K. G. Hughes (2017)  
*Ann. Glaciol.* 58, 41–50, doi:10.1017/aog.2017.34

### Observed platelet ice distributions in Antarctic sea ice: an index for ocean–ice shelf heat flux

Langhorne, P. J., **K. G. Hughes**, A. J. Gough and 10 others (2015)

*Geophys. Res. Lett.* 42, 5442–5451, doi:10.1002/2015GL064508

### Extension of an Ice Shelf Water plume model beneath sea ice with application in McMurdo Sound, Antarctica

**Hughes, K. G.**, P. J. Langhorne, G. H. Leonard and C. L. Stevens (2014)

*J. Geophys. Res.* 119, 8662–8687, doi:10.1002/2013JC009411

### Towards a process model for predicting potential anchor ice formation sites in coastal Antarctic waters

Leonard, G. H., S. M. Mager, A. G. Pauling, **K. G. Hughes** and I. J. Smith (2014)

*J. Spat. Sci.* 59, 297–312, doi:10.1080/14498596.2014.913271

### Estimates of the refreezing rate in an ice-shelf borehole

**Hughes, K. G.**, P. J. Langhorne and M. J. M. Williams (2013)

*J. Glaciol.* 59, 938–948, doi:10.3189/2013JoG12J117

## THESES AND OTHER PUBLICATIONS

### Crystal orientation in ice frozen from fresh and brackish water.

Grothe, S., **K.G. Hughes**, and P. J. Langhorne (2014)

In *Proceedings of the 22nd IAHR International Symposium on Ice*, 743–750, doi:10.13140/RG.2.1.4390.3206

### Tidal flows, sill dynamics, and mixing in the Canadian Arctic Archipelago

PhD Thesis: <https://dspace.library.uvic.ca//handle/1828/10367>

### Propagation of an ice shelf water plume beneath sea ice in McMurdo Sound, Antarctica

Master's Thesis: <http://hdl.handle.net/10523/4325>

### On the rate of refreezing in a bore hole in an ice shelf

Honours Dissertation

## FUNDING AND PI OR CO-PI ROLES

### Cold tongue mixing

Moum, J. N., **K. G. Hughes**, D. A. Cherian, E. L. Shroyer, and D. M. Gibson

*National Science Foundation*. Status: Funded. Mar 2021–Feb 2026. Total: \$2.1M

### Float array for submesoscales and turbulence in ARCTERX

Moum, J. N., **K. G. Hughes**, T. M. S. Johnston, and D. L. Rudnick

*Office of Naval Research*. Status: Funded. Apr 2021–Mar 2026. Total: \$970k

### Eyes at the front: a megasite project at Helheim Glacier

Adopted PI role in May 2021

## TEACHING AND OTHER PAST EMPLOYMENT

### Teaching assistant

University of Victoria

2014, 2016, 2017

Independently lead weekly first-year labs and mark lab tests and exams (instructed five times)

### Substitute lecturer

Universities of Otago and Victoria

2014, 2016, 2017

Lecture second-, third-, and fourth-year physical oceanography, time series analysis, and environmental physics courses

### Research assistant

University of Otago

Aug 2013–May 2014

Collect and reduce data and prepare figures and reports

### Lab demonstrator

University of Otago

2012, 2014

Demonstrate practical science methods and explain various software for second-year physics course

### Study coach

Big Picture Learning, Dunedin

2009–2012

Tutor science and study skills for high school students and help develop an interactive, online learning tool

## SOFTWARE

**Extensive experience:** Python, Matlab, Linux, Numerical ocean modelling (MITgcm), LaTeX, and Inkscape

**Other:** Mathematica, Bash, Fortran, Git, and NetCDF tools

**Observational Datasets:** Brooke Ocean Moving Vessel Profiler, Seabird and RBR CTD Profilers, RDI ADCPs, Simrad Echosounder, and various turbulence sensors developed by the Oregon State University Ocean Mixing Group

## SERVICE, OUTREACH, AND TRAINING

Blog about presenting science: [brushingupscience.com](http://brushingupscience.com)

Chair of weekly physical oceanography and atmospheric science seminars at Oregon State University (Sep 2019–Oct 2021)

Reviewer for Journal of Geophysical Research (×5), Journal of Physical Oceanography (×3), Geophysical Research Letters (×2), Journal of Glaciology, Journal of Climate, Ocean Modelling, The Cryosphere (×2), Journal of Oceanology and Limnology, and the National Science Foundation

Named in AGU's 2019 list of outstanding reviewers

Four presentations in 2016 to 8–10 year olds about oceanography at a science camp at the University of Victoria

Participant in OSU's Social Justice Education Initiative tier 1 and 2 workshops

## FIELD WORK EXPERIENCE

### Western Pacific

Making open ocean measurements using specially built turbulence profilers and platforms Aug–Oct 2018, Sep 2019

### Oregon Coast

Week-long cruise testing new free-rising turbulence profilers May 2019

### Canadian Arctic Archipelago

Two weeks as a scientist aboard a Canadian Coastguard ship Sep 2015

### McMurdo Sound, Antarctica

Measuring sea ice and ocean properites while working in approximately  $-10^{\circ}\text{C}$  conditions Nov 2011

## PRESENTATIONS

Banse Seminar series, University of Washington	Oral	Dec 2021
Physical oceanography seminar series, University of Alaska Fairbanks	Virtual	Apr 2021
Physics of Oceans and Atmosphere seminar, Oregon State University	Virtual	Apr 2020
Ocean Sciences Meeting, San Diego	Poster	Feb 2020
PISTON team meeting, Colorado State University	Oral	Nov 2019
Ocean Sciences Meeting, Portland	Poster	Feb 2018
Physics of Oceans and Atmosphere seminar, Oregon State University	Oral	Dec 2017
Canadian Meteorological and Oceanographic Society Congress, Toronto	Oral	Jun 2017
Munk Centennial Symposium, San Diego	Poster	May 2017
American Geophysical Union Fall Meeting, San Francisco	Oral	Dec 2016
ArcticNet Annual Science Meeting, Winnipeg	Oral	Dec 2016
Department Student Workshop, University of Victoria	Oral	Nov 2016
Canadian Meteorological and Oceanographic Society Congress, Whistler	Oral	May 2015
New Zealand Sea Ice Symposium, Otago	Oral	Feb 2014
Gordon Research Seminar on Polar Marine Science, Ventura	Oral	Mar 2013
Gordon Reseach Conference on Polar Marine Science, Ventura	Poster	Mar 2013
Antarctica New Zealand, Annual Antarctic Conference, Christchurch	Oral	Oct 2012
New Zealand Sea Ice Symposium, Otago	Oral	Feb 2012
Snow and Ice Research Group Annual Workshop, Twizel	Oral	Feb 2012

## OTHER INTERESTS

Secretary and Instructor for the University of Victoria Kayak Club	2015–2018
Lead organizer of Blissfest 2013: whitewater kayaking competition in Dunedin, New Zealand	2013
President of Otago University Canoe Club	2010–2012