

Curriculum Vitae of  
**BRUCE R. SUTHERLAND**  
July 2021

**Current Position:**

Professor  
Departments of Physics and of Earth & Atmospheric Sciences  
**Mail:** 4-181 CCIS, Dept. Physics, University of Alberta, Edmonton, AB, Canada T6G 2E1  
**Tel:** (780) 492-0573 **FAX:** (780) 492-0714 **E-Mail:** bruce.sutherland@ualberta.ca  
**Web:** <https://www.ualberta.ca/~bsuther>

**Education:**

- 1988–1994 Ph.D. in Physics, University of Toronto, Toronto, Ontario, Canada  
Thesis topic: “Mixing and internal wave generation in dynamically unstable stratified jets.”  
Supervisor: W. R. Peltier, University Professor.
- 1987–1988 M.Sc. in Physics, University of Toronto, Toronto, Ontario, Canada  
Master’s Report: “Photofield emission with semi-relativistic considerations”  
Supervisor: M.J.G. Lee, Professor
- 1983–1987 B.Math, University of Waterloo, Waterloo, Ontario, Canada  
Honours Applied Mathematics and Pure Mathematics Minor

**Career:**

- 2007- Professor, Depts. of Physics and of Earth & Atmospheric Sciences  
University of Alberta, Edmonton, AB
- 2012 Gladden Visiting Senior Fellow, University of Western Australia
- 2012 Churchill College Overseas Fellow, University of Cambridge
- 2003-2007 Professor, Dept. Mathematical and Statistical Sciences  
University of Alberta, Edmonton, AB
- 2003-2007 Associate Adjunct Professor, Dept. Earth and Atmospheric Sciences  
University of Alberta, Edmonton, AB
- 2000-2003 Associate Professor, Dept. Mathematical and Statistical Sciences  
University of Alberta, Edmonton, AB
- 1997-2000 Assistant Professor, Dept. Mathematical and Statistical Sciences  
University of Alberta, Edmonton, AB
- 1995-1997 Research Associate, Dept. Applied Mathematics and Theoretical Physics  
University of Cambridge, Cambridge, UK

**Areas of Specialization:**

geophysical and environmental fluid dynamics  
stratified fluids, internal waves, plumes, gravity currents  
particle transport, sedimentation and resuspension  
laboratory experiments, numerical simulations and mathematical modelling

**Recent Fellowships, Grants and Awards:** (for complete list, see appendix 1)

- 2020 Invited Visiting Scientist, École Normale Supérieure de Lyon
- 2019 Invited Visiting Scientist, Université Aix/Marseille
- 2016 Elected as a Fellow of the American Physical Society
- 2015–2022 NSERC Discovery grant, University of Alberta (\$70,384/year, PI)

**Recent Publications:** (for complete publication list, see appendix 2)

108 published refereed journal articles, 1 textbook, 10 refereed book chapters

Google Scholar: 3459 citations, h-index 31

‡undergraduate and †graduate students/RAs/PDFs supervised by Sutherland for the research in question

- B.R. Sutherland, Y. Ma<sup>†</sup>, M.R. Flynn, D. Frank, P.F. Linden, D. Lemasquierier, M. Le Bars, C. Pacary, T. Jamin, T. Dauxois and S. Joubaud, “Plumes in rotating fluid and their transformation into tornados”, *J. Fluid Mech.*, **in press**
- B.R. Sutherland, B. Mueller<sup>‡</sup>, B. Sjerve<sup>‡</sup>, and D. Deepwell<sup>†</sup>, “Particle settling from constant-flux surface gravity currents and a near-stationary particle-bearing layer”, *Phys. Rev. Fluids*, **6**, 063802 (2021)
- D. Deepwell<sup>†</sup>, R. Ouillon, E. Meiburg and B.R. Sutherland, “Settling of a particle pair through a sharp, miscible density interface”, *Phys. Rev. Fluids*, **6**, 044304 (2021)
- Y. Li<sup>†</sup>, B.R. Sutherland, M.K. Gingras, G.W. Owttrim and K.O. Konhauser, “A novel approach to investigate the deposition of (bio)chemical sediments: The settling rate of cyanobacteria-ferrihydrite aggregates”, *Sed. Geology*, **91**, pp 390-398 (2021)
- A.D. Gervais<sup>†</sup>, Q. Ede<sup>‡</sup>, G.E. Swaters, T.S. van den Bremer and B.R. Sutherland, “Propagation and Overturning of Three-Dimensional Boussinesq Wavepackets with Rotation”, *Phys. Rev. Fluids*, **6**, 044801:1-20 (2021).
- M. Kapil<sup>†</sup>, B.R. Sutherland and S. Balasubramanian, “Spreading and Sedimentation from Bottom-Propagating Particle-Bearing Jets”, *J. Fluid Mech.*, **907**, A20 (2020).
- B.R. Sutherland, W. Reeves<sup>‡</sup> and T.S. van den Bremer, “Flows Induced by Coriolis-Influenced Vertically Propagating Two-Dimensional Internal Gravity Wavepackets”, *Phys. Rev. Fluids*, **5**, 064805 (2020).
- D. Deepwell<sup>†</sup>, R. Sapede, L. Buchart<sup>‡</sup>, G.E. Swaters and B.R. Sutherland, “Particle Transport and Resuspension by Shoaling Internal Solitary Waves”, *Phys. Rev. Fluids*, **5**, 054303 (2020).
- L.E. Baker<sup>†</sup> and B.R. Sutherland, “The Evolution of Superharmonics Excited by Internal Tides in Non-uniform Stratification”, *J. Fluid Mech.*, **891**, R1 (2020).
- B.R. Sutherland and R. Jefferson<sup>‡</sup>, “Triad Resonant Instability of Horizontally Periodic Internal Modes”, *Phys. Rev. Fluids*, **5**, 034801 (2020).

**Textbook Publication:**

*Internal Gravity Waves*, B.R. Sutherland, Cambridge University Press, pp 394 (2010).

**Patents:**

U.S. Provisional Patent Application (No. 60/170,928): “Method and apparatus for obtaining images and measurements of density fluctuations in two-dimensional stratified fluid flows”.

**Recent Invited Presentations:** (for complete list, see appendix 3)

*A star indicates keynote presentation*

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|------------|--|
| May 2019   | “Damping of Surface Waves by Floating Particles”, 6th DNVA-RSE Norway-Scotland Waves and Marine Hydrodynamics Symposium, Edinburgh, Scotland |
| Mar 2019   | “Nonlinear Transport by Gravity Waves Inside the Ocean”, Rencontre du Non-Linéaire, Paris, France  |
| Jun 2018 * | “Flows Induced by Quasi-Monochromatic Waves”, Keynote speaker, Canadian Applied and Industrial Mathematics Society, Toronto, Canada          |
| Mar 2018   | “Particles in Fluid Flows: How Microscopic Processes Impact Macroscopic Evolution”, Mathematics Seminar, Oxford, UK                          |

**Recent Service to Scientific Community:** (for complete list, see appendix 4)

Have served as an editor for 3 of the top four journals in Fluid Dynamics.

- 2021- Member, Executive Committee, Geophysical Fluid Dynamics Summer School Program, Woods Hole Oceanographic Institution
- 2016- Associate Editor, Physical Review Fluids
- 2015-2020 Editorial Committee Member, Annual Review of Fluid Mechanics

**Recent Meeting Organization Roles:** (for complete list, see appendix 5)

- 2021- Member, Executive Committee of Annual Woods Hole Oceanographic Institute Geophysical Fluid Dynamics Summer Program
- 2021-2022 Principle organizer, BIRS Workshop on Predicting Pathways for Microplastic Transport in the Ocean, Banff, AB, Canada
- 2021 Co-organizer, WHOI GFD Weekly Seminar Series (June 14-August 30), Woods Hole, MA, USA (online)
- 2020-2021 Co-organizer, KITP Workshop on Layering in Atmospheres, Oceans and Plasmas, Santa Barbara, CA, USA
- 2019 Principle Organizer, Workshop on Modelling Plastics in the Oceans, Boston, MA, USA
- 2019 Co-director, WHOI Geophysical Fluid Dynamics Summer Program, Woods Hole, MA, USA
- 2017-2018 Principle organizer, BIRS Workshop on Modelling Imbalance in the Atmosphere and Ocean, Banff, AB, Canada

**Other Recent Service Activities:**

- 2006–2007 Producer and Director, “Waves of the Tsunami”, a 30 minute DVD program that motivates the learning of high school mathematics through its application to predicting the speed of the December 2004 tsunami.
- 2012-2018 Director, Institute for Geophysical Research, U. Alberta
- 2016-2019 Member, NSERC Geosciences Evaluation Group (National)

**Recent Interviews and Media Relations:** (for complete list, see appendix 6)

- Feb 2021 “Where does plastic pollution go when it enters the ocean?”, The Conversation (UK-based online media outlet)
- Feb 2019 Broadcast interview: “How sea ice stops waves”, CBC Radio Active, CBC
- May 2016 Text interview: “Undersea waves may melt Arctic ice”, Inside Science (US-based online science news)

**Supervision of Highly Qualified Personnel:** (for complete list, see appendix 7)

- 7 Postdoctoral Fellows (6 publications, 1 submitted)
- 7 PhD students (20 publications)
- 16 MSc students (23 publications)
- 13 International graduate fellows and research interns (12 publications)
- 50 Undergraduate summer research students (25 publications)
- 9 Undergraduate projects (3 publications)

**References:** available upon request.

## Appendix 1: Grants, Fellowships and Awards

### Fellowships and Awards

2006-2007	McCalla Research Professorship Award (provides 1 year teaching relief)
2010-2011	Killam Annual Professor (\$3500, awarded to at most 6 professors at U. Alberta each year)
2012	Gledden Visiting Senior Fellowship, University of Western Australia
2012	Churchill College Overseas Fellowship, University of Cambridge
2016	Elected as a Fellow of the American Physical Society (granted to at most 0.5% of the membership each year)
2019	Invited Visiting Scientist, Université Aix/Marseille
2020	Invited Visiting Scientist, École Normale Supérieure de Lyon

### Grants (*Sutherland is PI on all grants below except where indicated*)

1995-1997	Natural Environment Research Council grant GR3/09399, University of Cambridge
1998-1999	PIMS Industrial Collaborative Fund, University of Alberta (\$15,000)
1999-2003	NSERC operating grant, University of Alberta (\$23,100/year)
1999	First PIMS Fluid Dynamics Summer School, University of Alberta (\$18,000)
1999-2000	Imperial Oil Charitable Foundation grant, University of Alberta (\$10,000)
1999	NSERC equipment grant, University of Alberta (\$66,127)
1999	Intellectual Infrastructure Partnership Program (IIPP) equipment grant, University of Alberta (\$115,000)
2000-2002	Annual PIMS Fluid Dynamics Summer School, University of Alberta (\$24,000/year)
2003-2006	CFCAS grant, University of Alberta (\$77,630/\$98,130/\$98,130)
2003-2008	NSERC Discovery grant, University of Alberta (\$24,800/year)
2004	NSERC Equipment grant, University of Alberta (\$12,327)
2005	NSERC Crystal grant, University of Alberta (\$25,000)
2006-2009	CFCAS grant, University of Alberta (\$88,760/\$88,760/\$88,760)
2007-2008	NSERC RTI Equipment Grant (\$19,010)
2007-2008	PIMS Collaborative Research Group Award (\$205,000, co-PI)
2008-2010	NSERC Discovery grant, University of Alberta (\$27,000/year)
2010-2013	NSERC Discovery Accelerator Supplement, University of Alberta (\$40,000/year)
2010-2015	NSERC Discovery grant, University of Alberta (\$53,000/year)
2010-2011	NSERC RTI - Category 1, University of Alberta (\$23,630/year, co-PI)
2011-2013	NSERC RTI Equipment Grant (\$81,206)
2013-2018	NSERC Climate Change and Atmospheric Research Program (\$4,999,930, Paul Myers PI and 22 others)
2015-2021	NSERC Discovery grant, University of Alberta (\$70,384/year)
2018-2020	Shastri Indo-Canadian Institute Collaborative Research Grant (\$9,000/year, co-PI)
2019	Worldwide Universities Network Research Development Fund: (GBP10,000 + GBP12,960 in matching institutional funds - Total:\$39,260)
2020-2022	ComputeCanada Resource Allocation, U. Alberta (Total equivalent:\$20,142/year)

## Appendix 2: Publications

<sup>‡</sup>undergraduate and <sup>†</sup>graduate students/RAs/PDFs supervised by Sutherland for the research in question

### Refereed Journal Articles

1. B.R.Sutherland and W.R. Peltier, “The Stability of Stratified Jets”, *Geophys. Astrophys. Fluid Dyn.*, **66**, pp 101–131 (1992).
2. B.R.Sutherland and A.E. Jacobs, “Self-Organisation and Scaling in a Lattice Predator-Prey Model”, *Complex Systems*, (Cover article) **8** (6), pp 385–405 (1994).
3. B.R.Sutherland, C.P. Caulfield, and W.R. Peltier, “Internal Wave Generation and Hydrodynamic Instability”, *J. Atmos. Sci.*, **51**, pp 3261–3280 (1994).
4. B.R.Sutherland and W.R. Peltier, “Turbulence Transition and Internal Wave Generation in Density Stratified Jets”, *Phys. Fluids*, **6** (3), pp 1267–1284 (1994).
5. B.R.Sutherland and W.R. Peltier, “Internal Gravity Wave Emission into the Middle Atmosphere from a Model Tropospheric Jet”, *J. Atmos. Sci.*, **52**, pp 3214–3235 (1995).
6. B.R. Sutherland, “On the Dynamic Excitation of Internal Gravity Waves in the Equatorial Oceans”, *J. Phys. Oceanogr.*, **26**, pp 2398–2419 (1996).
7. B.R. Sutherland, “Internal Gravity Wave Radiation into Weakly Stratified Fluid”, *Phys. Fluids*, **8**, pp 430–441 (1996).
8. B.R. Sutherland and P.F. Linden, “Internal Wave Excitation in the Lee of Flow over a Thin Barrier”, *J. Fluid Mech.*, **377**, pp 223–252 (1998).
9. B.R. Sutherland, “Propagation and Reflection of Internal Waves”, *Phys. Fluids.*, **11**, pp. 1081–90 (1999).
10. B.R.Sutherland, S.B. Dalziel, G.O. Hughes, and P.F. Linden, “Visualisation and Measurement of Internal Waves by ‘Synthetic Schlieren’. Part I: Vertically Oscillating Cylinder”, *J. Fluid Mech.*, **390**, pp 93–126 (1999).
11. B.R.Sutherland, “Internal Wave Reflection in Uniform Shear”, *Quart. J. Roy. Met. Soc.*, **126**, pp 3255–3287, (2000).
12. S.B. Dalziel, G.O. Hughes and B.R.Sutherland “Whole Field Density Measurements”, *Expt. Fluids*, **28**, pp 322–335 (2000).
13. B.R.Sutherland, G.O. Hughes, S.B. Dalziel, and P.F. Linden, “Internal Waves Revisited”, *Dyn. Atmos. Oceans*, **31**, pp 209–232 (2000).
14. B. R. Sutherland, “Finite-Amplitude Internal Wavepacket Dispersion and Breaking”, *J. Fluid Mech.*, **429**, pp 343–380, (2001).
15. M. K. Reszka<sup>†</sup>, G. E. Swaters and B. R. Sutherland, “Instability of Abyssal Currents in a Continuously Stratified Ocean with Bottom Topography”, *J. Phys. Oceanogr.*, **32**, pp 3528–3550 (2002).
16. K. Dohan<sup>†</sup> and B. R. Sutherland, “Turbulence Time Scales in Mixing Box Experiments”, *Expt. Fluids*, **33**, pp 709–719 (2002).
17. B. R. Sutherland, “Large-Amplitude Internal Wave Generation in the Lee of Step-Shaped Topography”, *Geophys. Res. Lett.*, **29**, art# 1769, (2002).
18. A. P. Mehta<sup>†</sup>, B. R. Sutherland and P. J. Kyba<sup>‡</sup>, “Interfacial Gravity Currents. Part II. Wave Excitation”, *Phys. Fluids*, **14**, pp 3558–3569, (2002).
19. B. R. Sutherland, “Interfacial Gravity Currents. Part I. Mixing and Entrainment”, *Phys. Fluids*, **14**, pp 2244–2254, (2002).

## Appendix 2: Publications (refereed journal articles, continued)

20. B. R. Sutherland and P. F. Linden, “Internal Wave Excitation by a Vertically Oscillating Elliptical Cylinder”, *Phys. Fluids*, **14**, pp 721–731, (2002).
21. M. R. Flynn<sup>‡</sup>, K. Onu<sup>‡</sup> and B. R. Sutherland, “Internal Waves Generated by a Vertically Oscillating Sphere”, *J. Fluid Mech.*, **494**, pp 65-93 (2003).
22. K. Onu<sup>‡</sup>, M. R. Flynn<sup>‡</sup> and B. R. Sutherland, “Schlieren Measurement of Axisymmetric Internal Wave Amplitudes”, *Expt. Fluids*, **35**, pp 24-31 (2003).
23. B. R. Sutherland, M. R. Flynn<sup>‡</sup> and K. Onu<sup>‡</sup>, “Schlieren Visualisation and Measurement of Axisymmetric Disturbances”, *Nonlin. Proc. Geophys.*, **10**, pp 303-309 (2003).
24. K. Dohan<sup>†</sup> and B. R. Sutherland, “Internal Waves Generated from a Turbulent Mixed Region”, *Phys. Fluids*, **15**, pp 489-499 (2003).
25. B. R. Sutherland, M. R. Flynn<sup>†</sup> and K. Dohan<sup>†</sup>, “Internal Wave Excitation from a Collapsed Mixed Region”, *Deep-Sea Res. II*, **51**, pp 2889-2904 (2004).
26. M. R. Flynn<sup>†</sup> and B. R. Sutherland, “Intrusive Gravity Currents and Internal Wave Generation in Stratified Fluid”, *J. Fluid Mech.*, **514**, pp 355-383 (2004).
27. B. R. Sutherland, P. Kyba<sup>‡</sup> and M. R. Flynn<sup>†</sup>, “Intrusive Gravity Currents in Two-layer Fluids”, *J. Fluid Mech.*, **514**, pp 327-353 (2004).
28. B. R. Sutherland and K. Yewchuk<sup>‡</sup>, “Internal Wave Tunnelling”, *J. Fluid Mech.*, **511**, pp 125-134 (2004).
29. B. R. Sutherland, J. Nault<sup>‡</sup>, K. Yewchuk<sup>‡</sup> and G. E. Swaters, “Rotating Dense Currents on a Slope. Part I: Stability”, *J. Fluid Mech.*, **508**, pp 241-264 (2004).
30. K. Dohan<sup>†</sup> and B. R. Sutherland, “Numerical and Laboratory Generation of Internal Waves from Turbulence”, *Dyn. Atmos. Ocean*, **40**, pp 43-56, (2005).
31. B. R. Sutherland, “Weakly Nonlinear Internal Wavepackets”, *J. Fluid Mech.*, **569**, pp 249-258 (2006).
32. B. R. Sutherland, “Internal Wave Instability: Wave-Wave Vs Wave-Induced Mean Flow Interactions”, *Phys. Fluids*, **18**, doi:10.1063/1.2219102, Art. No. 074107–1-8 (2006).
33. D. A. Aguilar<sup>†</sup> and B. R. Sutherland, “Internal Waves Generated by Rough Topography”, *Phys. Fluids*, **18**, doi:10.1063/1.2214538, Art. No. 066603–1-9 (2006).
34. M. J. Alexander, J. H. Richter and B. R. Sutherland, “Generation and Trapping of Gravity Waves from Convection with Comparison to Parameterization”, *J. Atmos. Sci.*, **36**, pp 2963-2977 (2006).
35. D. A. Aguilar<sup>†</sup>, B. R. Sutherland and D. J. Muraki, “Generation of Internal Waves over Sinusoidal Topography”, *Deep-Sea Res. II*, **53**, pp 96-115 (2006).
36. B. R. Sutherland, “Rayleigh Wave-Internal Wave Coupling and Internal Wave Generation Above a Model Jet Stream”, *J. Atmos. Sci.*, **63**, pp 1042–1055 (2006).
37. B. R. Sutherland, A. N. F. Chow<sup>‡</sup> and T. P. Pittman<sup>‡</sup>, “The Collapse of a Mixed Patch in Stratified Fluid”, *Phys. Fluids*, **19**, Art. No. 116602–1-6 (2007).
38. B. R. Sutherland and J. T. Nault<sup>‡</sup>, “Intrusive Gravity Currents Propagating along Thin and Thick Interfaces”, *J. Fluid Mech.*, **586**, pp 109-118 (2007).
39. G. L. Brown<sup>‡</sup> and B. R. Sutherland, “Internal Wave Tunnelling in Shear”, *Atmos. Ocean*, **45**, pp 47-56 (2007).

## Appendix 2: Publications (refereed journal articles, continued)

40. J. Nault<sup>†</sup> and B. R. Sutherland, “Internal Wave Transmission in Non-uniform Flows”, *Phys. Fluids*, **19**, doi:10.1063/1.2424791, Art. No. 016601–1-8 (2007).
41. J. T. Nault<sup>†</sup>, and B. R. Sutherland, “Beyond Ray Tracing for Internal Waves. Part I: Small-Amplitude Anelastic Waves”, *Phys. Fluids*, **20**, Art. No. 106601–1-10 (2008).
42. G. L. Brown<sup>†</sup>, A. B. G. Bush and B. R. Sutherland, “Beyond Ray Tracing for Internal Waves. Part II: Finite-Amplitude Effects”, *Phys. Fluids*, **20**, Art. No. 106602–1-13 (2008).
43. J. R. Munroe<sup>†</sup> and B. R. Sutherland, “Generation of Internal Waves by Sheared Turbulence”, *Env. Fluid Mech.*, doi:10.1007/s10652-008-9094-3, 8 pages (2008).
44. S. Décamp<sup>†</sup>, C. Kozack<sup>‡</sup> and B. R. Sutherland, “Three-Dimensional Schlieren Measurements Using Inverse Tomography”, *Expt. Fluids*, **44** doi:10.1007/s00348-007-0431-y, pp 747-758 (2008).
45. J. K. Ansong<sup>†</sup>, P. J. Kyba<sup>‡</sup> and B. R. Sutherland, “Fountains Impinging upon a Density Interface”, *J. Fluid Mech.* **595**, pp 115-139 (2008).
46. J. R. Munroe<sup>†</sup>, C. Voegeli<sup>‡</sup>, B. R. Sutherland, V. Birman and E. H. Meiburg, “Intrusive Gravity Currents from Finite-Length Locks in a Uniformly Stratified Fluid”, *J. Fluid Mech.* **635**, p 245-273 (2009).
47. H. A. Clark<sup>†</sup> and B. R. Sutherland, “Schlieren Measurements of Internal Waves in Non-Boussinesq Fluids”, *Expt. Fluids*, **47** doi:10.1007/s00348-009-0648-z, p 183-190 (2009).
48. A. M. Holdsworth<sup>†</sup>, S. Décamp<sup>†</sup>, and B. R. Sutherland, “The Axisymmetric Collapse of a Mixed Patch and Internal Wave Generation in Stratified Fluid”, *Phys. Fluids*, **22**, Art. No. 106602–1-8 (2010).
49. K. Gregory<sup>†</sup> and B. R. Sutherland, “Transmission and Reflection of Internal Wave Beams” *Phys. Fluids*, **22**, Art. No. 106601–1-12 (2010).
50. J. M. McMillan<sup>†</sup> and B. R. Sutherland, “The Lifecycle of Axisymmetric Internal Solitary Waves”, *Nonlin. Proc. Geophys.*, **17**, doi:10.5194/npg-17-443-2010, pp 443-453 (2010).
51. J. Scinocca and B. R. Sutherland, “Self-Acceleration in the Parameterization of Orographic Wave Drag”, *J. Atmos. Sci.* **67**, doi:10.1175/2010JAS3358.1, p 2537-2546 (2010).
52. J. K. Ansong<sup>†</sup> and B. R. Sutherland, “Internal Gravity Waves Generated by Convective Plumes”, *J. Fluid Mech.* **648**, p 405-434 (2010).
53. H. A. Clark<sup>†</sup> and B. R. Sutherland, “Generation, Propagation and Breaking of an Internal Wave Beam”, *Phys. Fluids*, **22**, Art. No. 076601–1-16 (2010).
54. J.K. Ansong<sup>†</sup>, A. Anderson-Frey<sup>‡</sup>, and B. R. Sutherland, “Turbulent Fountains in One- and Two-layer Crossflows” *J. Fluid Mech.*, doi:10.1017/jfm.2011.413, **689**, 254–278 (2011).
55. H.V. Dosser<sup>‡</sup> and B. R. Sutherland, “Anelastic Internal Wavepacket Evolution and Stability” *J. Atmos. Sci.*, **68**, doi:10.1175/JAS-D-11-097.1, pp 2844-2859 (2011).
56. G. E. Swaters, H. V. Dosser<sup>‡</sup> and B. R. Sutherland, “Conservation laws, Hamiltonian structure, modulation instability properties and solitary wave solutions for a higher-order model describing nonlinear internal waves”, *Stud. Appl. Math.*, doi:10.1111/j.1467-9590.2011.00533.x, pp 1-24 (2011).
57. T. Touvet<sup>‡</sup>, N. J. Balmforth R.V. Craster, and B. R. Sutherland, “Fingering Instability in Buoyancy-Driven Fluid-Filled Cracks” *J. Fluid Mech.*, **672**, pp 60-77 (2011).
58. H. V. Dosser<sup>†</sup> and B. R. Sutherland, “Weakly Nonlinear Non-Boussinesq Internal Gravity Wavepackets”, *Physica D*, **240**, doi:10.1016/j.physd.2010.09.008, pp 346-356 (2011).
59. B.R. Sutherland, B. Lee<sup>‡</sup> and J.K. Ansong<sup>†</sup>, “Light Attenuation Experiments on Double Diffusive Plumes and Fountains”, *Phys. Fluids*, **24**, Art. No. 066605–1-20 (2012).

## Appendix 2: Publications (refereed journal articles, continued)

60. A. M. Holdsworth<sup>†</sup>, K. J. Barrett<sup>‡</sup> and B. R. Sutherland, “Axisymmetric Intrusions in Two-Layer and Uniformly Stratified Environments with and without Rotation”, *Phys. Fluids*, **24**, 036603–1-16 (2012).
61. B.R. Sutherland, “The Internal Wave Instability Pathway to Turbulence”, *J. Fluid Mech.*, doi:10.1017/jfm.2013.149, **724**, 1–4 (2013).
62. B.R. Sutherland, K.J. Barrett<sup>‡</sup> and G.N. Ivey, “Shoaling Internal Solitary Waves”, *J. Geophys. Res. - Oceans*, doi:10.1002/jgrc.20291, **118**, pp 1-14 (2013).
63. B.R. Sutherland, D. Polet<sup>‡</sup> and M. Campbell<sup>‡</sup>, “Gravity Currents Shoaling over a Slope”, *Phys. Fluids*, **25**, 086604 (2013).
64. A.M. Holdsworth<sup>†</sup> and B.R. Sutherland, “Influence of Lock Aspect Ratio upon the Evolution of an Axisymmetric Intrusion”, *J. Fluid Mech.*, doi:10.1017/jfm.2013.517, **735**, R3-1–11 (2013).
65. L. Eberly<sup>†</sup> and B.R. Sutherland, “Anelastic Internal Wave Reflection and Transmission in Uniform Retrograde Shear, ”, *Phys. Fluids*, doi:10.1063/1.4864104, **26**, 026601-1–20 (2014)
66. A. Kim<sup>†</sup>, G.E. Swaters and B.R. Sutherland, “Cross-Equatorial Flow of Grounded Abyssal Ocean Currents”, *Geophys. Astrophys. Fluid Dyn.*, **108**, 363-386 (2014)
67. B.R. Sutherland and S. B. Dalziel, “Bedload Transport by a Vertical Jet Impinging upon Sediments”, *Phys. Fluids*, doi:10.1063/1.4867707, **26**, 035103 (2014)
68. T.S. Richards<sup>†</sup>, Q. Aubourg<sup>†</sup> and B.R. Sutherland, “Radial intrusions from turbulent plumes in uniform stratification”, *Phys. Fluids*, doi:10.1063/1.4869119, **26**, 036602 (2014)
69. L.J. Marleau<sup>†</sup>, M.R. Flynn and B.R. Sutherland, “Gravity Currents Propagating Up a Slope”, *Phys. Fluids*, doi:10.1063/1.4872222, **26**, 046605 (2014)
70. K. Snow<sup>†</sup> and B.R. Sutherland, “Particle-Laden Flow Down a Slope in Uniform Stratification”, *J. Fluid Mech.*, doi:10.1017/jfm.2014.413, **755**, 251-273 (2014)
71. J.R. Munroe<sup>†</sup> and B.R. Sutherland, “Internal Wave Energy Radiated from a Turbulent Mixed Layer”, *Phys. Fluids*, doi:10.1063/1.4895645, **26**, 096604:1-16 (2014)
72. J.-B. Tary, M. van der Baan, D. Eaton and B.R. Sutherland, “Characteristics of fluid-induced resonances observed during microseismic monitoring”, *J. Geophys. Res. - Solid Earth*, **119**, 8207-8222 (2014)
73. T.S. van den Bremer<sup>†</sup> and B.R. Sutherland, “The Mean Flow and Long Waves Induced by Two-dimensional Internal Gravity Wavepackets”, *Phys. Fluids*, doi:10.1063/1.4899262, **26**, 106601:1-23 (2014)
74. B.R. Sutherland, K.J. Barrett<sup>‡</sup> and M.K. Gingras, “Clay Settling in Fresh and Salt Water”, *Env. Fluid Mech.*, doi:10.1007/s10652-014-9365-0, **15**, 147-160 (2015).
75. C.S. Jones<sup>†</sup>, C. Cenedese, E.P. Chassignet, P.F. Linden and B.R. Sutherland, “Gravity Currents Propagating Up a Valley”, *J. Fluid Mech.*, doi:10.1017/jfm.2014.627, **762**, 417-434 (2015)
76. L.J. Marleau<sup>†</sup>, M.R. Flynn and B.R. Sutherland, “Gravity Currents Propagating Up a Slope in a Two-Layer Fluid”, *Phys. Fluids*, doi:10.1063/1.4914471, **27**, 036601:1-17 (2015)
77. A.M. Holdsworth<sup>†</sup> and B.R. Sutherland, “The Axisymmetric Collapse of a Mixed Patch and Internal Wave Generation in Uniformly Stratified Rotating Fluid”, *Phys. Fluids*, doi:10.1063/1.4919850, **27**, 056602:1-21 (2015)
78. B.R. Sutherland, S. Keating<sup>‡</sup> and I. Shrivastava<sup>‡</sup>, “Transmission and Reflection of Internal Solitary Waves Incident upon a Triangular Barrier”, *J. Fluid Mech.*, doi:10.1017/jfm.2015.306, **775**, 304-327 (2015)



## Appendix 2: Publications (refereed journal articles, continued)

79. B.R. Sutherland, “Excitation of Superharmonics by Internal Modes in Non-uniformly Stratified Fluid”, *J. Fluid Mech.*, doi:10.1017/jfm.2016.108, **793**, 335-352 (2016)
80. B.R. Sutherland, “Internal Wave Transmission through a Thermohaline Staircase”, *Phys. Rev. Fluids*, doi:10.1103/PhysRevFluids.1.013701, **1**, 013701:1-13 (2016)
81. B.R. Sutherland and Y.S. Hong<sup>‡</sup>, “Sedimentation from Particle-Bearing Plumes in a Stratified Ambient”, *Phys. Rev. Fluids*, doi:10.1103/PhysRevFluids.1.074302, **1**, 074302:1-17 (2016)
82. B.R. Sutherland and C.P. Caulfield, “Optimal Perturbation Growth in Axisymmetric Intrusions”, *J. Fluid Mech.*, doi:10.1017/jfm.2015.798, **811**, R4:1-13 (2017)
83. Y. Ma<sup>†</sup>, M.R. Flynn and B.R. Sutherland, “Convection from a line-source into a two-layer stratified ambient fluid”, *J. Fluid Mech.*, doi:10.1017/jfm.2017.143, **818**, 46-67 (2017)
84. T. Playter<sup>†</sup>, K. Konhauser, G. Owttrim, C. Hodgson, T. Warchola, A. M. Mloszewska, B.R. Sutherland, A. Bekker, J.-P. Zonneveld, S. G. Pemberton, M. Gingras, “Microbe-clay interactions as a mechanism for the preservation of organic matter and trace metal biosignatures in black shales”, *Chem. Geol.*, doi:10.1016/j.chemgeo.2017.04.007, **459**, 75-90 (2017).
85. M. Reichert<sup>†</sup>, B. Blunt<sup>†</sup>, T. Gabruch<sup>†</sup>, T. Zerulla<sup>†</sup>, A. Ralph<sup>†</sup>, M. Gamal El-Din, B.R. Sutherland, K. Tierney, “Sensory and behavioral responses of a model fish to oil sands process-affected water with and without treatment”, *Environ. Sci. Technol.*, doi:10.1021/acs.est.7b01650, **51**, 7128-7137 (2017).
86. T. S. van den Bremer and B. R. Sutherland, “The wave-induced flow of internal gravity wavepackets with arbitrary aspect ratio”, *J. Fluid Mech.*, doi:10.1017/jfm.2017.745, **834**, 385-408 (2018).
87. T. Playter<sup>†</sup>, K. Konhauser, G. Owttrim, D.S. Whitford, T. Warchola, C. Hodgson, A. M. Mloszewska, B.R. Sutherland, A. Bekker, J.-P. Zonneveld, S. G. Pemberton, M. Gingras, “Determination of the Settling Rate of Clay/Cyanobacterial Floccules”, *J. Vis. Expt.*, doi:10.3791/57176, **136**, e57176 (2018).
88. B.R. Sutherland, K. Cote<sup>‡</sup>, Y. S. Hong<sup>‡</sup>, L. Steverango<sup>‡</sup> and C. Surma<sup>‡</sup>, “Non-self-similar Viscous Gravity Currents”, *Phys. Rev. Fluids*, doi:10.1103/PhysRevFluids.3.034101, **3**, 034101:1-19 (2018).
89. B.R. Sutherland, M.K. Gingras, C. Knudson<sup>‡</sup>, L. Steverango<sup>‡</sup> and C. Surma<sup>‡</sup>, “Particle-Bearing Currents in Uniform Density and Two-Layer Fluids”, *Phys. Rev. Fluids*, doi:10.1103/PhysRevFluids.3.023801, **3**, 023801:1-15 (2018).
90. A.D. Gervais<sup>†</sup>, G.E. Swaters, T.S. van den Bremer and B.R. Sutherland, “Evolution and Stability of Two-Dimensional Anelastic Internal Gravity Wavepackets”, *J. Atmos. Sci.*, doi:10.1175/JAS-D-17-0388.1, **75**, 3703-3724 (2018).
91. A. Meroni<sup>†</sup>, C. McConnochie, C. Cenedese, B.R. Sutherland and K. Snow, “Nonlinear Influence of the Earth’s Rotation on Iceberg Melting”, *J. Fluid Mech.*, doi:10.1017/jfm.2018.798, **858**, 832-851 (2019).
92. B.R. Sutherland, U. Achatz, C. P. Caulfield and J. M. Klymak, “Recent Progress in Modelling Imbalance in the Atmosphere and Ocean”, *Phys. Rev. Fluids*, doi:10.1103/PhysRevFluids.4.010501, **4**, 010501:1-22 (2019).
93. T.S. van den Bremer, H. Yassin<sup>‡</sup> and B.R. Sutherland, “Lagrangian Transport by Vertically Confined Internal Gravity Wavepackets”, *J. Fluid Mech.*, doi:10.1017/jfm.2019.30, **864**, 348-380 (2019).
94. B.R. Sutherland and N. J. Balmforth, “Damping of Surface Waves by Floating Particles”, *Phys. Rev. Fluids*, doi:10.1103/PhysRevFluids.4.014804, **4**, 014804:1-14 (2019).
95. R. Ouillon, E. Meiburg and B.R. Sutherland, “Turbidity Currents Propagating Down a Slope into a Stratified Saline Ambient Fluid”, *Env. Fluid Mech.*, doi:10.1007/s10652-019-09675-z, **19**, 1143-1166 (2019).

## Appendix 2: Publications (refereed journal articles, continued)

96. G.S. Voelker<sup>†</sup>, P.G. Myers, M. Walter and B.R. Sutherland, “Generation of Oceanic Internal Gravity Waves by a Cyclonic Surface Stress Disturbance”, *Dyn. Atmos. Oceans*, **86**, 116-133 (2019).
97. Y. Ma<sup>†</sup>, M.R. Flynn and B.R. Sutherland, “Plumes in a rotating two-layer stratified fluid”, *Env. Fluid Mech.*, **20**, 103-122 (2020).
98. B.R. Sutherland, M.G. Rosevear<sup>†</sup> and C. Cenedese, “Laboratory Experiments Modelling the Transport and Deposition of Sediments by Glacial Plumes Rising Under an Ice Shelf”, *Phys. Rev. Fluids*, **5**, 013802:1-20 (2020).
99. B.R. Sutherland and R. Jefferson<sup>‡</sup>, “Triad Resonant Instability of Horizontally Periodic Internal Modes”, *Phys. Rev. Fluids*, **5**, 034801:1-20 (2020).
100. L.E. Baker<sup>†</sup> and B.R. Sutherland, “The Evolution of Superharmonics Excited by Internal Tides in Non-uniform Stratification”, *J. Fluid Mech.*, **891**, R1:1-13 (2020).
101. D. Deepwell<sup>†</sup>, R. Sapede, L. Buchart<sup>‡</sup>, G.E. Swaters and B.R. Sutherland, “Particle Transport and Resuspension by Shoaling Internal Solitary Waves”, *Phys. Rev. Fluids*, **5**, 054303:1-21 (2020).
102. B.R. Sutherland, W. Reeves<sup>‡</sup> and T.S. van den Bremer, “Flows Induced by Coriolis-Influenced Vertically Propagating Two-Dimensional Internal Gravity Wavepackets”, *Phys. Rev. Fluids*, **5**, 064805:1-20 (2020).
103. M. Kapil<sup>†</sup>, B.R. Sutherland and S. Balasubramanian, “Spreading and Sedimentation from Bottom-Propagating Particle-Bearing Jets”, *J. Fluid Mech.*, **907**, A20:1-19 (2020).
104. Y. Li<sup>†</sup>, B.R. Sutherland, M.K. Gingras, G.W. Owttrim and K.O. Konhauser, “A novel approach to investigate the deposition of (bio)chemical sediments: The settling rate of cyanobacteria-ferrihydrite aggregates”, *J. Sed. Res.*, **91**, pp 390-398 (2021)
105. A.D. Gervais<sup>†</sup>, Q. Ede<sup>‡</sup>, G.E. Swaters, T.S. van den Bremer and B.R. Sutherland, “Propagation and Overturning of Three-Dimensional Boussinesq Wavepackets with Rotation”, *Phys. Rev. Fluids*, **6**, 044801:1-20 (2021).
106. D. Deepwell<sup>†</sup>, R. Ouillon, E. Meiburg and B.R. Sutherland, “Settling of a particle pair through a sharp, miscible density interface”, *Phys. Rev. Fluids*, **6**, 044304:1-23 (2021).
107. B.R. Sutherland, B. Mueller<sup>‡</sup>, B. Sjerve<sup>‡</sup>, and D. Deepwell<sup>†</sup>, “Particle settling from constant-flux surface gravity currents and a near-stationary particle-bearing layer”, *Phys. Rev. Fluids*, **6**, 063802 (2021)
108. B.R. Sutherland, Y. Ma<sup>†</sup>, M.R. Flynn, D. Frank, P.F. Linden, D. Lemasquierier, M. Le Bars, C. Pacary, T. Jamin, T. Dauxois and S. Joubaud, “Plumes in rotating fluid and their transformation into tornados”, *J. Fluid Mech.*, **in press**

### **Manuscripts Under Consideration**

109. C. Toupoint, S. Joubaud and B. R. Sutherland, “Fall and break-up of viscous miscible drops in a Hele-Shaw cell”, *Phys. Rev. Fluids*, **submitted**

## Appendix 2: Publications (continued)

### **Refereed Book Chapters and Conference Proceedings**

110. B.R. Sutherland, S. B. Dalziel, G. O. Hughes and P. F. Linden, “Laboratory Observation of Internal Waves”, 13th Australasian Fluid Mechanics Conference, Melbourne, Australia, Dec 13–18, pp 855–858 (1998).
111. B.R. Sutherland and P.F. Linden, “An Experimental/Numerical Study of Internal Wave Transmission Across an Evanescent Level”, in Mixing and Dispersion in Stably Stratified Flows, Ed. P. A. Davies, pp 251–262 (1999).
112. B. R. Sutherland, “Reflection and Stability of Large Amplitude Internal Waves in Uniform Shear”, in Recent Trends in Mathematical Sciences, Eds. Misra and Sinha, pp 201–208 (2001).
113. B. R. Sutherland, “Internal Wave Propagation”, in Modern Applied Mathematics, Ed. J.C. Misra, Narosa Press, New Delhi, pp 372–422 (2005).
114. B. R. Sutherland, “Stratified Shear Flow: Instability and Wave Radiation”, in Instability of Flows, Advances in Fluid Mechanics Series, Ed. M. Rahman, WIT Press, pp 79–104 (2005).
115. B. R. Sutherland and D. A. Aguilar<sup>‡</sup>, “Stratified Flow over Topography: Wave Generation and Boundary Layer Separation”, in Advances in Fluid Mechanics 2006, WIT Press, pp 317–326 (2006).
116. B. R. Sutherland and G. L. Brown<sup>†</sup>, “The Evolution of Large-Amplitude Internal Gravity Wavepackets”, Proceedings 18eme Congrès Français de Mécanique, 6 pages, (2007).
117. B. R. Sutherland, “Internal Gravity Waves”, in Environmental Fluid Dynamics Handbook, Volume One: Overview and Fundamentals, pp 377–388, Ed. H.J.S. Fernando, CRC Press, Boca Raton, FL, USA (2012).
118. B.R. Sutherland, T. Dauxois and T. Peacock, “Internal Waves in Laboratory Experiments”, in Modelling of Atmospheric and Oceanic Flows: Insights from Laboratory Experiments and Numerical Simulations, Eds. T. von Larcher and P. Williams, American Geophysical Union, 193–212 (2015).
119. B.R. Sutherland, “Internal Waves in the Atmosphere and Ocean: Instability Mechanisms”, in Fluid Mechanics of Planets and Stars, Eds. M. le Bars and D. Lecoanet, CISM International Centre for Mechanical Sciences, **595**, pp 71–98 (2019).

### **Textbook Publication:**

120. *Internal Gravity Waves*, B.R. Sutherland, Cambridge University Press, pp 394 (2010).

### **Patents:**

121. U.S. Provisional Patent Application (No. 60/170,928): “Method and apparatus for obtaining images and measurements of density fluctuations in two-dimensional stratified fluid flows”.

### Appendix 3: Invited Presentations

*A star indicates a plenary or keynote presentation. "Invited" means expenses for the visit were partially or fully paid, online presentations excepted.*

#### Conference and Workshop Presentations

Jul 1999	"Shear Excitation of Internal Waves, and Their Stability", <i>Special Session on Gravity Wave Sources and Parameterization</i> , International Union of Geophysics and Geodesy General Assembly, Birmingham, UK
Dec 2000	"Reflection and Stability of Large Amplitude Internal Waves in Uniform Shear", International Conference on Recent Advances in Mathematical Sciences, Kharagpur, India
Jul 2004	"Internal Wave Propagation", Geophysical Fluid Dynamics Summer School, Woods Hole Oceanographic Institute, Woods Hole, MA, USA
Mar 2005	"Wave Excitation by Gravity Currents", Workshop on Gravity Currents, University of Santa Barbara, Goleta, CA, USA
★ Apr 2005	"Internal Waves and Turbulence", RASP Hydrodynamics Workshop, University of California San Diego, San Diego, CA, USA
Aug 2006	"Internal Wave Momentum Transport Diagnostics", Workshop on Spontaneous Imbalance, Seattle, WA, USA
May 2007	"Gravity Currents in Stratified Fluids", Canadian Applied and Industrial Mathematics Society, Banff, AB, Canada
Aug 2007	"Internal Wave Propagation: Nonlinearity and Tunnelling", Summer School on Tropical Multiscale Convective Mixing, Victoria, BC, Canada
★ Sep 2007	"The Generation of Internal Waves from Turbulence and Shear", 11th Workshop on Physical Processes in Natural Waters, Warnemunde, Germany
Dec 2007	"Intrusions in Stratified Fluids", 5th International Symposium on Environmental Hydraulics, Tempe, AZ, USA
Aug 2008	"Weakly nonlinear Internal Waves", Geophysical Fluid Dynamics Summer School, Woods Hole Oceanographic Institute, Woods Hole, MA, USA
★ Sep 2009	"The Generation of Internal Waves from Turbulence", 4th Warnemunde Turbulence Days, Isle of Vilm, Germany
Apr 2010	"The Lifecycle of Axisymmetric Internal Solitary Waves", BIRS Workshop on Internal Gravity Waves, Banff, Canada
Aug 2010	"Axisymmetric Intrusions", Geophysical Fluid Dynamics Summer School, Woods Hole Oceanographic Institute, Woods Hole, MA, USA
Feb 2011	"Drag Parameterization for Large-Amplitude Atmospheric Waves", Workshop on Internal Gravity Waves, Les Houches, France
Mar 2011	"Parameterization of Finite-Amplitude Internal Waves in Climate Models", Chapman Conference on Atmospheric Gravity Waves and their Effects on General Circulation and Climate, Honolulu, HI, USA
Feb 2013	"The Evolution and Stability of Internal Waves", Winter School on Waves and Instabilities in Geophysical and Astrophysical Flows, Les Houches, France
Jul 2013	"Shoaling and Tunnelling Internal Solitary Waves", Geophysical Fluid Dynamics Summer School, Woods Hole Oceanographic Institute, Woods Hole, MA, USA
Sep 2013	"Particle Transport by Turbidity Currents, Solitary Waves and Jets", GE-OFLOWS Workshop, Kavli Institute, UC Santa Barbara, Goleta, CA, USA
Apr 2014	"Turbidity Currents in Stratified Fluids", GKB Fluids Laboratory 50th Anniversary, U. Cambridge, UK
★ Jun 2014	"Non-local Momentum Transport by a Localized Internal Gravity Wavepacket", Nonlinear Effects in Internal Waves, Cornell U., Ithaca, NY, USA

### Appendix 3: Invited Presentations (conferences and workshops, continued)

- Aug 2014 “Turbidity Currents in Stratified Fluids”, Mathematical Modelling of Particles in Fluid Flow, BIRS, Banff, AB, Canada
- Oct 2015 “Sub- and Superharmonic Instability of Internal Modes”, 4th Norway-Scotland Waves Symposium, Edinburgh, Scotland
- Nov 2015 “Internal Wave Transmission through a Staircase Density Profile”, BIRS Workshop on the Mathematics of Layers and Interfaces, Oaxaca, Mexico
- Mar 2016 “Spreading and Splitting Plumes”, MUST Workshop, U. Cambridge, Cambridge, UK
- Apr 2016 “Flows Induced by 1D and 2D Internal Wavepackets”, Workshop on Energy Transfers in the Atmosphere and Ocean, U. Hamburg, Hamburg, Germany
- Jul 2016 “Flows Induced by 1D, 2D and 3D Internal Wavepackets”, Geophysical Fluid Dynamics Summer School, Woods Hole Oceanographic Institute, Woods Hole, MA, USA
- ★ Aug 2016 “Flows Induced by 1D, 2D and 3D Internal Gravity Wavepackets”, 8th International Symposium on Stratified Flows, San Diego, CA, USA
- Jan 2017 “Flows Induced by Internal Wavepackets Manifest as Vertical Modes”, 5th Norway-Scotland Waves Symposium, Oslo, Norway
- ★ Mar 2017 “Willful Fluids and the Pertinence of Laboratory Experiments”, Paul Linden Symposium, Cambridge U. Cambridge, UK
- Jul 2017 “Lagrangian Transport and Superharmonic Instability of Internal Modes”, Geophysical Fluid Dynamics Summer School, Woods Hole Oceanographic Institute, Woods Hole, MA, USA
- Feb 2018 “Flows Induced by Internal Waves and their Influence upon Breaking Heights”, BIRS Workshop on Modelling Imbalance in the Atmosphere and Ocean, Banff, AB, Canada
- ★ Apr 2018 “Internal Gravity Waves”, Lectures at International Centre for Mechanical Sciences (CISM) Advanced School on “Fluids Mechanics of Planets and Stars”, Udine, Italy
- ★ Jun 2018 “Flows Induced by Quasi-Monochromatic Waves”, Canadian Applied and Industrial Mathematics Society, Toronto, Canada
- Jul 2018 “Spreading, Splitting and Penetrating Plumes in Two-Layer Fluids”, Geophysical Fluid Dynamics Seminar, Woods Hole Oceanographic Institution, Woods Hole, MA, USA
- Mar 2019 “Nonlinear Transport by Gravity Waves Inside the Ocean”, Rencontre du Non-Linéaire, Paris, France
- May 2019 “Damping of Surface Waves by Floating Particles”, 6th DNVA-RSE Norway-Scotland Waves and Marine Hydrodynamics Symposium, Edinburgh, Scotland
- Nov 2019 “Collective Particle Settling from Fresh to Salt Water”, Workshop on Modelling Plastics in the Oceans, Boston, MA, USA

#### **Seminars and Colloquia**

- Feb 1995 “Shear Excitation of Internal Gravity Waves by a Model Tropospheric Jet”, *Forecasting Research Dynamics Seminar Series*, Meteorological Office, Bracknell, UK
- May 1995 “Internal Gravity Wave Transmission into Weakly Stratified fluid”, *Applied Mathematics and Numerical Analysis Group Seminar Series*, School of Mathematics, Bristol, UK
- Oct 1996 “Non-hydrostatic Internal Gravity Wave Propagation”, *Atmospheric Sciences Research Colloquium*, Atmospheric Environment Service, Toronto, Canada
- Mar 1998 “Internal Waves, Lee Waves, and Wavelets”, *Atmospheric Sciences Seminar*, Department of Physics, University of Toronto, Toronto, Canada

### Appendix 3: Invited Presentations (seminars and colloquia, continued)

Mar 1998	“Internal Waves, Lee Waves, and Wavelets”, <i>Water Resources Seminar</i> , Department of Civil and Environmental Engineering, University of Alberta, Edmonton, Canada
Oct 2003	“Gravity Wave Tunnelling”, Department of Mathematics Colloquium, Simon Fraser University, Vancouver, Canada
Oct 2003	“Gravity Wave Tunnelling”, <i>Mathematics and Computer Science Colloquium</i> , Department of Mathematics, University of Northern British Columbia, Prince George, Canada
Mar 2004	“Gravity Wave Tunnelling”, Department of Mathematics Colloquium, University of British Columbia, Vancouver, Canada
Mar 2004	“Intrusions in Two-Layer Fluids”, Department of Earth and Ocean Sciences & Department of Civil Engineering Colloquium, University of British Columbia, Vancouver, Canada
Jun 2004	“Intrusions in Two-Layer Fluids”, Bedford Institute of Oceanography Colloquium, Dartmouth, NS, Canada
Sep 2004	“Internal Wave Tunnelling”, Earth and Space Sciences Seminar, York University, Toronto, ON, Canada
Sep 2004	“Intrusions, Waves and Solitary Waves”, Mathematics Seminar, McMaster University, Hamilton, ON, Canada
Sep 2004	“Intrusions, Waves and Solitary Waves”, Applied Mathematics Seminar, U. Waterloo, Waterloo, ON, Canada
Sep 2004	“Intrusive Gravity Currents”, Atmospheric Sciences Seminar, U. Toronto, Toronto, ON, Canada
Oct 2004	“Internal Wave Tunnelling”, Colorado Research Associates, Boulder, CO, USA
Oct 2004	“Internal Wave Tunnelling”, Atmospheric Sciences Seminar, University of Washington, Seattle, WA, USA
Oct 2004	“Intrusions, Waves and Solitary Waves”, North-West Research Associates, Bellevue, WA, USA
Dec 2004	“Intrusions, Waves and Solitary Waves”, Applied Mathematics Seminar, University of Colorado, Boulder, CO, USA
Jan 2005	“Internal Wave Propagation”, Mechanical and Aerospace Engineering Seminar, University of California San Diego, San Diego, CA, USA
Jan 2005	“Internal Wave Breaking Mechanisms: Parametric Subharmonic Instability vs Self-Acceleration”, PORD Theory Seminar, Scripps Institution of Oceanography, La Jolla, CA, USA
Feb 2005	“Intrusions, Waves and Solitary Waves”, Earth System Sciences Seminar, University of California at Irvine, Irvine, CA, USA
Feb 2005	“Internal Wave Tunnelling”, Mechanical and Environmental Engineering Seminar, University of Santa Barbara, Goleta, CA, USA
Mar 2005	“Internal Waves Generated by a Collapsing Mixed Region”, PORD Colloquium, Scripps Institution of Oceanography, University of California San Diego, San Diego, CA, USA
Mar 2005	“Wave Generation by Intrusive Gravity Currents”, Aerospace and Mechanical Engineering Seminar, University of Southern California, Los Angeles, CA, USA
Dec 2006	“Internal Gravity Wave Propagation”, Mathematics Seminar, Istanbul, Turkey
Jan 2007	“Gravity Wave Propagation: Tunnelling and Stability”, Applied Mathematics Seminar, U. Waterloo, ON, Canada
Mar 2007	“Stratified Flow over Topography: Wave Generation and Boundary Layer Separation”, Oceanography Seminar, Florida State University, USA

### Appendix 3: Invited Presentations (seminars and colloquia, continued)

Apr 2007	“Pollutant Dispersion in Stratified Flows”, Mechanical Engineering Seminar, Arizona State University, USA
Aug 2009	“Intrusive Gravity Currents”, Atmosphere-Ocean Seminar, U. Victoria.
Apr 2011	“The Lifecycle of Anelastic Internal Wavepackets”, CEAFM Seminar, Johns Hopkins University, Baltimore, MD, USA
Nov 2011	“The Growth and Rise of Anelastic Internal Wavepackets”, Ecole Polytechnique, ENS de Lyon, U. Marseille and U. Toulouse, France
Mar 2012	“(What’s the Story) Internal Solitary Waves?”, U. Western Australia, Perth, Australia.
★ Mar 2012	“Atmospheric and Oceanic Waves”, IMA Masterclass, U. Western Australia, Perth, Australia.
Apr 2012	“Modulational Stability and Breaking of Anelastic Internal Wavepackets”, Fluid Dynamics Seminar, DAMTP, U. Cambridge, UK
May 2012	“(What’s the Story) Internal Solitary Waves?”, Joint Applied Mathematics Colloquium, U. Dundee/St. Andrews, Dundee, UK; BP Institute, U. Cambridge, UK
Sep 2013	“The Stokes Drift of Internal Waves”, Center for Nonlinear Dynamics Seminar, UT Austin, Austin, TX, USA
Jan 2016	“From River Mouth to Ocean Deep: Where do Sediments Sediment?” Oceanography Seminar, U. British Columbia, BC
Jan 2016	“Plumes and Fountains in the Stratified Atmosphere”, Atmospheric Sciences Seminar, U. Washington, Seattle, WA, USA
Jan 2016	“Long Waves and Flows Induced by Non-Breaking Internal Waves”, Noble Seminar, Dept. Physics, U. Toronto, Toronto, ON
Feb 2016	“Sedimentation and Resuspension from River Plumes”, Fluid Dynamics Seminar, Okinawa Institute of Science & Technology, Japan
Jan 2017	“Flows Induced by Internal Waves”, School of Engineering Seminar, U. Edinburgh, Edinburgh, Scotland
Mar 2017	“From River Mouth to Ocean Deep: Where do Sediments Sediment?”, Yale Geosciences Colloquium, Yale U. New Haven, CT, USA
Mar 2018	“Particles in Fluid Flows: How Microscopic Processes Impact Macroscopic Evolution”, Mathematics Seminar, Oxford, UK; BP Institute Seminar, Cambridge, UK
May 2018	“Plumes in Stratified Fluids”, Fluid Dynamics Seminar, Okinawa Institute of Science and Technology, Okinawa, Japan
Aug 2018	“Spreading, Splitting and Penetrating Plumes in Two-Layer Fluids”, Fluid Dynamics Seminar, University of British Columbia, Vancouver, Canada
Mar 2019	“Particles in Fluid Flows: How Microscopic Processes Impact Macroscopic Evolution”, Fluid Dynamics Seminar, U. Twente, Netherlands; Seminar, IRPHE, Marseille, France
Mar 2019	“Particles in Fluid Flows: Small Things Making a Big Difference”, Seminar, ENS de Lyon, Lyon, France
Apr 2019	“Particles in Fluid Flows: Small Things Making a Big Difference”, Seminar, U. Waterloo, Waterloo, ON, Canada
Jan 2020	“From Moon to Mixing: Pathways for Energy Transport via Vertically Confined Internal Gravity Waves”, TAO Seminar, University of Victoria, Victoria, BC, Canada
Jan 2020	“Particles in Fluid Flows: Small Things Making a Big Difference”, Institute of Ocean Sciences, Victoria, BC, Canada

### Appendix 3: Invited Presentations (seminars and colloquia, continued)

May 2020	“Transport by Oceanic Internal Modes and their Instability Mechanisms”, Atmospheric Physics Seminar, University of Frankfurt (online)
Feb 2021	“The Importance of Non-uniform Stratification for the Breakdown of Oceanic Internal Gravity Waves”, Fluid Dynamics Seminar, University of Leeds (online)
Feb 2021	“The Importance of Non-uniform Stratification for the Breakdown of Oceanic Internal Gravity Waves”, Applied Mathematics Seminar, University of California, Santa Cruz (online)
May 2021	“Rotating Plumes and their Formation into Tornados”, BP Institute Seminar, Cambridge, UK (online)
Jun 2021	“Rotating Plumes and their Possible Transformation into Tornados”, Engineering Seminar, Imperial College London, UK (online)



## Appendix 4: Service to Scientific Community

### **Editorial Roles**

1996	Co-editor, The Glossary of Meteorology of the American Meteorological Society
2007	Co-Editor, Proceedings of the International Symposium on Environmental Hydraulics
2008	Special Guest Editor, Atmosphere-Ocean
2014–2016	Associate Editor, Physics of Fluids
2015–2020	Editorial Committee Member, Annual Review of Fluid Mechanics
2016-	Associate Editor, Physical Review Fluids

### **Scientific Committees**

2005–2010	Member, Atmospheric and Oceanic Fluid Dynamics Committee, American Meteorological Society
2017-	Faculty, Geophysical Fluid Dynamics Summer School Program, Woods Hole Oceanographic Institution
2019-	Councillor At Large, Canadian Meteorological and Oceanographic Society
2021-	Member, Nominating Committee, American Physical Society - Division of Fluid Dynamics
2021-	Member, Executive Committee, Geophysical Fluid Dynamics Summer School Program, Woods Hole Oceanographic Institution

## Appendix 5: Meeting Organization Roles

### **Sole or Principle Organizer**

1999–2002	Organizer and Director, Annual PIMS Fluid Dynamics Summer School (international), Edmonton, AB
2006–2007	Organizer, Paul Linden Commemorative Symposium, San Diego, CA, USA
2007	Organizer, Workshop on Plumes and Gravity Currents in Stratified Environments (international), Edmonton, AB, Canada
2011-2012	Organizer, PIMS Fluid Dynamics Summer School (international), Edmonton, AB, Canada
2012-2014	Principle Organizer, BIRS Workshop on Particles in Fluid Flow, Banff, AB, Canada
2017-2018	Principle organizer, BIRS Workshop on Modelling Imbalance in the Atmosphere and Ocean, Banff, AB, Canada
2019	Principle Organizer, Workshop on Modelling Plastics in the Oceans, Boston, MA, USA
2021-2022	Principle organizer, BIRS Workshop on Predicting Pathways for Microplastic Transport in the Ocean, Banff, AB, Canada

### **Co-Organizer**

1998	Workshop on Gravity Currents in the Environment, Vancouver, BC
2000–2001	Conference: Wave Phenomena III (international), Edmonton, AB
2008-2010	BIRS Workshop on Internal Waves, Banff, AB, Canada
2008-2010	Conference: Wave Phenomena IV (international), Edmonton, AB, Canada
2008	Workshop on Internal Gravity Waves, Seattle, WA, USA
2014-2015	BIRS Workshop on the Mathematics of Layers and Interfaces, Oaxaca, Mexico
2019	Co-Director, WHOI Geophysical Fluid Dynamics Summer Program, Woods Hole, MA, USA
2020-2021	KITP Workshop on Layering in Atmospheres, Oceans and Plasmas, Santa Barbara, CA, USA (online)
2021	WHOI GFD Weekly Seminar Series (June 14-August 30), Woods Hole, MA, USA (online)

### **Advisory Committees**

2005–2007	Member, Scientific Advisory Committee, 6th International Symposium on Stratified Flows, Perth, Australia
2010–2011	Member, Scientific Advisory Committee, 7th International Symposium on Stratified Flows, Rome, Italy
2013-2014	Member, Scientific Advisory Committee, Workshop on Nonlinear Effects in Internal Waves, Cornell, NY, USA
2016	Member, Scientific Advisory Committee, International Congress of Theoretical and Applied Mathematics (ICTAM), Montreal, QC, Canada
2017-2018	Member, Scientific Advisory Committee, Summer School/Workshop on Waves, Instabilities and Turbulence in Geophysical and Astrophysical Flows, Cargèse, France

## Appendix 6: Interviews and Media Relations

### **Reporting on research**

May 2016	Text interview: “Undersea waves may melt Arctic ice”, Inside Science, US-based online science news
May 2016	Text interview: “Water staircases in the sea”, The Hindu, India daily newspaper
Feb 2019	Broadcast interviews: “How sea ice stops waves”, CBC Radio Active, CBC; 660 News, Rogers
Feb 2019	Text interview: “A vodka on the rocks could help you understand the effect of climate change.”, CTV Web News, Canadian online reporting
Feb 2021	Text interview: “Where does plastic pollution go when it enters the ocean”, The Conversation (online academic reporting based in the UK)

### **Other Reporting**

Oct 2009	Broadcast interview, Global Television, Calgary; Text interview, Calgary Sun: regarding January 10, 2008, flight AC190 accident and the possibility it may have been caused by atmospheric internal waves and not wake-turbulence, as proposed by the Transportation Safety Board
Dec 2018	Broadcast interview: “Why is there dust in a rain drop?”, Quirks and Quarks, CBC
Oct 2020	Broadcast interview: “Does breathing carbon dioxide contribute to global warming?”, Quirks and Quarks, CBC

## Appendix 7: Supervision of High Qualified Personnel

### **Supervision of Graduate Students and Postdoctoral Fellows:**

(7 PDF, 8 PhD, 17 MSc; *A star indicates co-supervision*)

Years	Name	Degree completion	present position
2021-	Kehan Li	MSc	
2021-	Mohnish Kapil (★)	PhD	
2020-2021	Clément Toupoint (★)	PDF, ENS Lyon	Res. Assoc., École Polytechnique
2018-	Alain Gervais	PhD	
2018-2021	David Deepwell	PDF	Computer Research Analyst, U Calgary
2018	Yongxing Ma (★)	PDF	Res. Assoc., Dept. Fisheries and Oceans
2014-2018	Yongxing Ma (★)	PhD Sep 2018	Res. Assoc., Dept. Fisheries and Oceans
2016-2018	Alain Gervais	MSc Dec 2018	PhD U. Alberta
2012-2014	Larissa Marleau (★)	MSc Nov 2014	Pilot, Royal Canadian Air Force
2012-2014	Lauren Eberly	MSc Apr 2014	Engineer, Uniflow
2012-2014	Tamar Richards	MSc Apr 2014	PhD, Trent U.
2013	Amber Holdsworth	PDF	Research Scientist, Inst. Ocean Sciences
2011-2013	Alexander Kim (★)	MSc Jul 2013	Consultant, UrthCast
2008-2012	Amber Holdsworth	PhD Dec 2012	Research Scientist, Inst. Ocean Sciences
2010-2011	Joseph Ansong	PDF	Assoc. Prof., U. Ghana
2008-2010	Justine McMillan	MSc Dec 2010	Research Scientist, Can. Hydrogr. Service
2008-2010	Colin More (★)	MSc Dec 2010	
2007–2009	Hayley Dosser	MSc Dec 2009	Res. Assoc., U British Columbia
2007–2009	Heather Clark	MSc Nov 2009	Researcher, National Research Council
2007–2009	Kate Gregory	MSc Nov 2009	Operational Analyst, Alberta Energy
2006-2008	Sabine Decamp	PDF	Ocean Scientist, Hay & Company Cons.
2005–2009	James Munroe	PhD Sep 2009	Assoc. Prof., Memorial U. Newfoundland
2004–2009	Joseph Ansong	PhD Sep 2009	Assoc. Prof., U. Ghana
2004–2008	Geoff Brown (★)	MSc Jan 2008	PhD student, U. Calgary
2004	Jasmine Hosne	PDF	Assistant Professor, U. Bangladesh
2006–2007	Tingting Shu (★)	PhD May 2007	Consultant, BMT Cordah Ltd, UK
2005–2007	Joshua Nault	MSc May 2007	Finance Analyst, Stanley Morgan
2003–2005	Dawn Aguilar	MSc Aug 2005	Lecturer, Queen's U., Kingston
2002–2004	Mehdi Saghafi (★)	MSc Apr 2004	Lecturer, Grant McEwan College
2001–2003	Morris Flynn	MSc Jul 2003	Professor, U. Alberta
1999–2004	Kathleen Dohan	PhD May 2004	Research Assoc., Earth & Space Res.
1998–1999	Adarsh Mehta	MSc Aug 1999	Director, Acciona Wind Energy Can. Chair, CanWEA Board

### Appendix 3: Supervision (continued)

#### **Supervision of International Graduate Fellows and Research Interns:**

(13 graduate students supervised in research during visiting internships or during the Woods Hole Oceanographic Institute Geophysical Fluid Dynamics Summer Program; *A star indicates co-supervision*)

Year	Name	Home institution
2020	Corentin Pacary (★)	École Normale Supérieure de Lyon
2019	Lois Baker	Imperial College London, WHOI GFD Fellow
2019	Mohnish Kapil (★)	IIT Bombay, Visiting Research Fellow
2017	Agostino Meroni (★)	U. Milan, WHOI GFD Fellow
2017	Madelaine Rosevear (★)	ANU, Canberra, WHOI GFD Fellow
2016	Raphaël Sapède	ENSTA ParisTech Université, Visiting Research Fellow
2015	Georg Voelker	U. Bremen, Visiting Research Fellow
2013	Ton van den Bremer	U. Oxford, WHOI GFD Fellow
2013	Catherine Jones (★)	UC San Diego, WHOI GFD Fellow
2013	Kate Snow	ANU, Canberra, WHOI GFD Fellow
2013	Quentin Aubourg	U. Grenoble, Visiting Research Fellow
2011	Jelle van der Horst	U. Utrecht, Visiting Research Fellow
2009	Theo Touvet	U. Grenoble, Visiting Research Fellow

#### **Undergraduate Research Supervision:**

(50 undergraduate students supervised in summer research, 9 supervised in project courses. Additional funding support given in parentheses; “USRA” stands for the federally funded Undergraduate Student Research Assistantship.)

2021	Aaron Phu (USRA), Maninder Dhaliwal, Samir Marsa
2020	Brendan Sjerne
2019	Brianna Mueller (SUPRE)
2018-2019	Liam Buchard (project course)
2018	Apolline Bard, Kota Endo (USRA), Maria Lozano, Armaan Pandey
2017	Quinlan Ede
2016	Steven Winter, Kyle Leigh (project course)
2016	Wyatt Reeves (USRA), Houssam Yassin (USRA)
2016	Riley Jefferson, Luke Steverango, Chris Surma
2015-2016	Calla Knudson (project course)
2015	Abe Kulmiye (project course)
2015	Youn Hong (USRA), Kristen Cote, Rajorshi Paul (UARE)
2014	Youn Hong (ESROP), Sahith Kadula (UARE), D. Perrez, E. Kravchinsky, I. Bestman
2014	Tylan Murphy (project course)
2013	Scott Keating, Ishita Shrivistava (UARE)
2012-2013	Margaret Campbell (project course)
2011	Michelle Hauer (USRA), Delyle Polet (USRA), Kai Barrett
2010	Alex Anderson-Frey (USRA), Kai Barrett, Branwen Price (WISEST)
2008	Brace Lee (USRA, project course)
2007	Heather Clark (USRA), Hayley Dosser (USRA), Camille Callifoux (WISEST), Cara Kozack
2006	Amenda Chow (USRA), Tyler Pittman, Amy Palmer
2005	Cara Kozack (USRA), Chris Voegeli (USRA), Amy Palmer, Belal Sweileh
2004	Andrea Cochrane (USRA), Josh Nault (2004), Lauren Blackburn
2003	Josh Nault (USRA), Kerianne Yewchuk (USRA), Patrick Kyba, Natalia Gomez (project course)
2002	Josh Nault (USRA), Kerianne Yewchuk (USRA), Patrick Kyba
2001	Morris Flynn (USRA), Kristjan Onu (USRA), Patrick Kyba, Ron Mark
2000	Lawrence Mudryk (project course)
1999	Daniel Van Vliet, Jay Sheldon