

EXECUTIVE SUMMARY – PAUL SPENCE CURRICULUM VITAE

SUMMARY STATEMENT

I started as a Postdoctoral Researcher at the Climate Change Research Centre in 2009, and been selected for promotion three times (Research Associate, Lecturer, Senior Lecturer). I have a high and increasing research output in A* journals. I am Chief Investigator on two substantial research grants, including a 2014 ARC Discovering Early Career Researcher Award. As a Research Associate for the Australian Research Council Centre of Excellence for Climate System Science, I am the lead developer of Australia's finest global ocean climate models (see <https://www.youtube.com/watch?v=8VMSF28J9H4>), and was awarded the Directors Prize for Outstanding Contributions to the Centre in 2014.

SUPPORTING STATEMENTS

Research:

- 34 peer reviewed publications, 25 since year of last appointment (2012).
- All publications in A*/A ranked journals (28/34 with A* rankings), 956 citations, H-index of 13.
- Chief Investigator on ARC grants totally \$1.447M, including 2014 Discovering Early Career Researcher Award and 2016 Linkage Grant to create Australia's next generation ocean sea-ice models.
- Three citations, two as first author, in the Intergovernmental Panel on Climate Change 5th Assessment Report.
- Awarded the 2014 Director's Prize for Most Outstanding Contributions to the ARC Centre of Excellence for Climate System Science.
- Invited to numerous exclusive international scientific panel meetings including the World Climate Research Program Working Group on Ocean Model Development and Southern Ocean Panel Meetings.
- Lead designer of Australia's finest global high-resolution ocean-sea ice models that will provide the core of CSIRO's next generation ACCESS coupled climate model.

Learning and Teaching:

- Taught 16 undergraduate/graduate courses at three different institutions (11 courses at UNSW) with an average student evaluation score of 4.5/5. Winner of excellence in teaching award.
- Co-supervise three PhD students, panel member for two PhD projects, supervisor of 4 undergraduate student internship projects and one Postdoctoral researcher.

Engagement and Leadership:

- In past few years given invited lectures at SCRIPPS (USA), GFDL (NOAA, USA), Univ. Grenoble (France), Univ. of Hokkaido (Japan).
- Founder of the Consortium of Ocean Sea Ice Modelling in Australia (cosima.org.au)

CURRICULUM VITAE**Dr. Paul Spence**

Senior Lecturer
 Climate Change Research Centre
 University of New South Wales
 Sydney, NSW, Australia, 2052

Phone: +61 2 9385 9766
E-mail: paul.spence@unsw.edu.au
www.iampaulspence.com

Professional History

- 07/2016-Present** **Senior Lecturer**
 Centre of Excellence for Climate System Science,
 University of New South Wales, Sydney, Australia.
www.ccrc.unsw.edu.au
- 06/2015-Present** **Discovering Early Career Researchers Fellow**
 Australian Research Council,
 University of New South Wales, Sydney, Australia.
www.arc.gov.au/discovery-early-career-researcher-award
- 08/2011-Present** **Lecturer**
 Centre of Excellence for Climate System Science,
 University of New South Wales, Sydney, Australia.
www.ccrc.unsw.edu.au
- 08/2011-Present** **Research Fellow**
 Centre of Excellence for Climate System Science,
 University of New South Wales, Sydney, Australia.
www.climatescience.org.au
- 06/2009-08/2011** **Post Doctoral Research Fellow**
 Climate Change Research Centre, University of New South
 Wales, Sydney, Australia. <http://www.ccrc.unsw.edu.au>
- 09/2003-05/2009** **Graduate Student**
 School of Earth and Ocean Sciences, University of Victoria,
 Canada. <http://climate.uvic.ca/>
- 10/2000-04/2002** **Software Engineer – Marine Acoustics**
 Quester Tangent Corporation, Sidney, Canada.
<http://www.questertangent.com/seabed-classification/>

01/2000–09/2000	Software Engineer – Particle Physics Stanford Linear Accelerator Centre, Stanford University, USA. http://www.slac.stanford.edu/
04/1999–08/1999	Researcher – Marine Acoustics Quester Tangent Corporation, Sidney, Canada. http://www.questertangent.com/seabed-classification/
09/1998–12/1999 09/1997 – 12/1998	Researcher – Geophysics Pacific Geoscience Centre, Environment Canada, Sidney, Canada. http://gsc.nrcan.gc.ca/org/sidney/index_e.php
05/1996 – 09/1996 09/1995 – 01/1996	Teacher – Outdoor Education Sheldon Centre for Outdoor Education, Toronto School Board, Canada. http://toes.tdsb.on.ca/residential/sheldon/index.asp
05/1994 – 09/1994	
05/1993 – 09/1993	Camp Counsellor – People with Disabilities Easter Seals Camp Shawnigan, Victoria, Canada. http://www.eastersealscamps.ca/camp-shawnigan
03/1992 – 08/1992	Teacher – Kindergarten Morant Bay Elementary School, Jamaica, WI.
09/1991 – 02/1992	Class Room Aid – Mathematics/Physics Souris Regional High School, PEI, Canada. http://www.edu.pe.ca/sourishigh/

Education

May 2009 2005 – 2009	Ph.D. – Climate Science School of Earth and Ocean Sciences, University of Victoria, Canada.
August 2005 2003 – 2005	M.Sc. – Climate Science School of Earth and Ocean Sciences, University of Victoria, Canada.
May 2000 1999 - 2000	Certified Java Software Engineer Sun Microsystems, Palo Alto California, USA.
May 1999 1994 – 1999	B. Sc. – Combined Major Physics and Physical Oceanography Department of Physics, University of Victoria, Canada.

Publications

1. Papers published in refereed journals

1. **Spence, P.**, R. Holmes, A. Hogg, S. Griffies, K. Stewart, M. England 2017: Localized rapid warming of West Antarctic subsurface waters by remote winds. *Nature Climate Change*, doi:10.1038/nclimate3335.
2. Stewart, K., et al., 2017: Vertical resolution of z-coordinate models, *Ocean Modelling*, 113, 50-65, 2017.
3. K. Walsh, P. Govekar, A. Babanin, M. Ghantous, **P. Spence**, E. Scoccimarro, 2017: The effect on simulated ocean climate of a parameterization of unbroken wave-induced mixing incorporated into the k-epsilon mixing scheme, *J. of Adv.. Earth Sys. Model*, doi:10.1002/2016MS000707, 2017.
4. N. Jourdain, P. Mathiot, N. Merino, G. Durand, J. Le Sommer, **P. Spence**, P. Dutrieux, G. Madec, 2017: Ocean circulation and sea ice thinning induced by melting ice shelves in the Amundsen Sea. *JGR-Oceans*, 122, 2550-2573, 2017. 8, 2017.
5. Hogg, A., **Spence, P.**, Saenko, O, 2016. The energetics of Southern Ocean upwelling. *JPO*, *accepted*.
6. Dutkiewicz, A., Muller, R., Hogg, A., **Spence, P.**, (2016): Vigorous deep-sea currents cause global anomaly in sediment accumulation in the Southern Ocean. *Geology* 44(8), 663-666.
7. Wiang, Q., et al., 2016: An assessment of the Arctic Ocean in a suite of inter-annual CORE-II simulations. Part 1: Sea ice and solid freshwater. *Ocean Modelling*, 99, 110-132.
8. Wiang, Q., et al., 2016: An assessment of the Arctic Ocean in a suite of inter-annual CORE-II simulations. Part 2: Liquid freshwater. *Ocean Modelling*, 99, 86-109.
9. Iliack, M., et al. 2016: An assessment of the Arctic Ocean in a suite of inter-annual CORE-II simulations. Part 3: Hydrography and fluxes, *Ocean Modelling*, 100, 141-161.
10. Ypma et al., 2016: The separation of the East Australian Current: a Lagrangian approach to potential vorticity and upstream control. *JGR-Oceans*, 121, 758-774.
11. Saenko, O., D. Yang, J. Gregory, **P. Spence**, 2015: Separating the influence of projected changes in air temperature and wind on patterns of sea level and ocean heat content. *JGR-Oceans*, 120(8), 5749-5765.
12. Stewart, K., **P. Spence**, S. Waterman, J. Le Sommer, J-M. Molines, J. Lilly, M. England,

- 2015: Anisotropy of Eddy Variability in the Global Ocean. *Ocean Modelling*, 95, 53-65.
13. S. Downes et al. 2015: An assessment of Southern Ocean water masses and sea ice during 1988–2007 in a suite of interannual COREII simulations, *Ocean Modelling*, 94, 67-94.
 14. Menviel, L., **P. Spence** N. Golledge, M. England, 2015: Southern Ocean Overturning Role in Modulating High Southern Latitude Climate and Atmospheric CO₂ on Millennial Timescales. *Nova Acta Leopoldina*, 121(408), 159-166.
 15. S. McGregor, **P. Spence**, F. Schwarzkopf, M. England, A. Santoso, W. Kessler, A. Timmermann, C. Boning, 2014: ENSO driven Inter-hemispheric Pacific mass transports. *JGR-Oceans*, 119(9), 6221-6237.
 16. L. Menviel, **P. Spence**, M. England, 2014: Contribution of Antarctic Bottom Water changes to Antarctic warm events and atmospheric CO₂ variations during MIS3. *Earth Planetary Science Letters*, 413, 37-50.
 17. **Spence, P.**, S. Griffies, M. England, A. Hogg, O. Saenko, N. Jourdain, 2014: Rapid subsurface warming and circulation changes of Antarctic coastal waters by poleward shifting winds. *GRL*, 41 (13), 4601-4610.
 18. Fogwill, C., C. Turney, K. Meissner, N. Golledge, **P. Spence**, J. Roberts, M. England, L. Carter, 2014: Testing the sensitivity of the East Antarctica Ice Sheet to Southern Ocean dynamics: past changes and future implications. *Journal of Quaternary Science*, 29, 91-98.
 19. England, M., S. McGregor, **P. Spence**, G. Meehl, A. Timmermann, W. Cai, A. Sen Gupta and M. McPhaden, 2014: Recently intensified Pacific Ocean wind-driven circulation and the ongoing warming hiatus. *Nature Climate Change*, 4(3), 222-227.
 20. **Spence, P.**, E. van Sebille, O. Saenko, M. England, 2014: Using Eulerian and Lagrangian approaches to investigate wind driven changes in the Southern Ocean abyssal circulation. *Journal of Physical Oceanography*, 44, 662-675.
 21. Morrison, A., O. Saenko, A. Hogg, **P. Spence**, 2013: The role of vertical eddy transport in Southern Ocean heat uptake. *Geophysical Research Letters*, 40, 5445-5450.
 22. Franckombe, L., **P. Spence**, A. Hogg, M. England, S. Griffies, 2013: Sea level changes forced by Southern Ocean winds. *Geophysical Research Letters*, 40, 5710-5715.
 23. van Sebille, E., **P. Spence**, M. Mazloff, M. England, S. Rintoul, O. Saenko, 2013: Abyssal connections of AABW in a Southern Ocean state estimate. *Geophysical Research Letters*, 40(10), 2177–2182.

24. McGregor, S., N. Ramesh, **P. Spence**, M. H. England, M. J. McPhaden and A. Santoso, Meridional movement of wind anomalies during ENSO events and their role in event termination, accepted *Geophysical Research Letters*, 40(4), 749-754.
25. **Spence, P.**, O. A. Saenko, J. Le Sommer, C. Dufour and M. H. England, 2012: Mechanisms maintaining Southern Ocean heat transport under projected wind forcing, *Journal of Physical Oceanography*, 42(11), 1923-1931.
26. **Spence, P.**, O.A. Saenko, W.P. Sijp, and M.H. England, 2012: North Atlantic Climate Response to Lake Agassiz Drainage at Coarse and Ocean Eddy-Permitting Resolutions. *J. Climate*, 26, 2651–2667.
27. W. Sijp, J. Gregory, R. Tailleux, **P. Spence**, 2012: The key role of the western boundary current in linking the AMOC to the north-south pressure gradient. *Journal of Physical Oceanography*, 42, 628–643.
28. O. Saenko, A. Sen Gupta, and **P. Spence**, 2012: On theoretical and numerical challenges in predicting bottom water transport in the Southern Ocean. *Journal of Climate*, 25, 1349-1356.
29. **Spence, P.**, O. Saenko, W. Sijp and M. England, 2012: The role of bottom pressure torque on the interior pathways of North Atlantic Deep Water. *J. of Physical Oceanography*, 42, 110-125.
30. Montenegro, A., **P. Spence**, K. Meissner, M. Eby, M. Melchin and S. Johnston, 2011: Climate-carbon cycle simulations of the Permian Triassic boundary: Implications for the extinction event. *Paleoceanography*, 26, PA3207.
31. **Spence, P.**, J. Fyfe, A. Montenegro and A. Weaver, 2010: On the Southern Ocean response to poleward intensifying winds: coarse versus eddy-permitting simulations. *Journal of Climate*, 23, 5332-5343.
32. **Spence, P.**, O. Saenko, M. Eby and A. Weaver, 2009: The Southern Ocean overturning: Parametrized versus permitted eddies. *J. of Physical Oceanography*, 39, 1634-1651.
33. **Spence, J. P.**, M. Eby and A.J. Weaver, 2008: The sensitivity of of the Atlantic meridional overturning circulation to freshwater forcing at eddy-permitting resolutions. *Journal of Climate*, 21, 2697-2710.
34. **Spence, J. P.** and A.J. Weaver, 2006: The impact of tropical Atlantic freshwater fluxes on the North Atlantic meridional overturning circulation. *Journal of Climate*, 19, 4592-4604.

2. Papers in progress

1. Courtois et al., 2017: Mixed layer depth calculation in deep convection regions in ocean numerical models. Ocean Modelling, revised.
2. Maher et al., 2017: Role of Pacific trade winds in driving ocean temperatures during the recent hiatus and projections for a wind trend reversal. Climate Dynamics, revised.
3. Downes et al., 2017: Regional impacts of the westerly winds on Southern Ocean mode and intermediate water subduction. JPO, revised.
4. Downes et al., 2017: Antarctic bottom water changes in CORE forced numerical simulations. JPO, revised.
5. Donat-Magnin et al., 2017: Ice-shelf melt response to changing winds and glacier dynamics in the Amundsen Sea Sector, Antarctica. JGR-Oceans, revised.

3. Contributions to industrial research and development

1. Young, D., **Spence, P., 2002**: Commercial Beta Release of QTC Multiview and Sideview Seabed Classification System. Quester Tangent Corporation, Sidney, BC.
2. **Spence, P., Young, D., 2001**: System Functional Design Manual of QTC Multiview and Sideview Seabed Classification System. Quester Tangent Corporation, Sidney, BC.

4. Theses

1. **P. Spence, 2009**: Coarse versus ocean eddy-permitting global climate simulations: Experiments with the UVic ESCM. Ph.D. Thesis. University of Victoria, Canada.
2. **P. Spence, 2005**: The impact of tropical Atlantic fresh water fluxes on the North Atlantic Meridional Overturning Circulation. M.Sc. Thesis. University of Victoria, Canada.

Presentations at Conferences and Institutions

1. Selected Oral Presentations at Refereed Scientific Meetings as First Author

1. International Conference of Southern Hemisphere Meteorology and Oceanography (Oral), Cape Town, South Africa, Aug., 2017. Remote warming of West Antarctica by East Antarctic winds. P. Spence, S. Griffies, A. Hogg, M. England.

2. Ocean Sciences (Oral), New Orleans, USA, March, 2016. Remote warming of West Antarctica by East Antarctic winds. P. Spence, S. Griffies, A. Hogg, M. England.
3. International Conference of Southern Hemisphere Meteorology and Oceanography (Oral), Santiago, Chile, Oct., 2015. Subsurface warming and circulation changes around coastal Antarctica. P. Spence, S. Griffies, A. Hogg, M. England, O. Saenko.
4. Australian Meteorological and Oceanographic Society (Oral), Hobart, Australia, February 2014. 'Using Eulerian and Lagrangian Approaches to Investigate the Southern Ocean Abyssal Circulation'. P. Spence, E. van Sebille, O. Saenko, and M. England.
5. Ocean Sciences Meeting, Honolulu, USA, February 2014. 'Using Eulerian and Lagrangian Approaches to Investigate the Southern Ocean Abyssal Circulation'. P. Spence, E. van Sebille, O. Saenko, and M. England.
6. CLIVAR Working Group on Ocean Model Development Workshop (Oral), May, 2014, Kiel, Germany. "High-resolution Ocean Model Developments within the Australian Centre of Excellence for Climate System Science" Spence, P., S. Griffies, M. England, A. Hogg.
7. European Geophysical Union Annual Meeting (Oral), May, 2014, Vienna, Austria. "Warming of subsurface Antarctic coastal waters by poleward intensifying winds.." Spence, P., S. Griffies, M. England, A. Hogg, N. Jourdain.
8. European Geophysical Union Annual Meeting, May, 2014, Vienna, Austria. "Using Eulerian and Lagrangian Approaches to Investigate Wind--Driven Changes in the Southern Ocean Abyssal Circulation." Spence, P., O. Saenko, M. England, E. van Sebille.
9. Australian Meteorological and Oceanographic Society (Oral), February, 2014, Hobart, AUS. "Using Eulerian and Lagrangian Approaches to Investigate Wind--Driven Changes in the Southern Ocean Abyssal Circulation." Spence, P., O. Saenko, M. England, E. van Sebille.
10. PAGES Young Scientists Meeting, Feb., 2013, Goa, India. "High Resolution Simulations of EOCENE climate". P. Spence, C. Bull, W. Sijp, and M. England.
11. PAGES Past Global Changes Conference, Feb., 2013, Goa, India. "High Resolution Simulations of EOCENE climate". P. Spence, C. Bull, W. Sijp, and M. England.
12. Australian Research Council Centre of Excellence for Climate System Science Annual Meeting, Sept., 2012 Hobart, Australia. "A review of Australia's global ocean eddy-permitting climate model: ACCESS-OEP". P. Spence, M. Ward, A. Hogg

and M. England.

13. International Conference on Southern Hemisphere Meteorology and Oceanography, April, 2012, Noumea, New Caledonia. "Mechanisms maintaining Southern Ocean heat transport under projected wind forcing." Spence, P., O. A. Saenko, J. Le Sommer, C. Dufour and M. H. England
14. *Workshop on modeling of polar ocean circulation and processes* (Oral), Nov, 2011, Tokyo University, Tokyo, Japan. "Towards an Australian High Resolution Ocean Climate Model." Spence, P.
15. *International Union of Geodesy and Geophysics* (Oral), July, 2011, Melbourne, Australia. "The role of bottom pressure torques on the interior pathways of NADW." Spence, P., O. Saenko, W. Sijp and M. England.
16. *European Geophysical Union* (Oral), April, 2011, Vienna, Austria. "The Southern Ocean response to poleward intensifying winds in a global eddy permitting climate model." Spence, P., J Fyfe, A. Montenegro and A.Weaver.
17. *European Geophysical Union* (Poster), April, 2011, Vienna, Austria. "The role of bottom pressure torques on the interior pathways of NADW." Spence, P., O. Saenko, W. Sijp and M. England.
18. *Australian Meteorological and Oceanographic Society* (Oral), February, 2011, Wellington, NZLD. "The role of bottom pressure torques on the interior pathways of NADW." Spence, P., O. Saenko, W. Sijp and M. England.
19. *Australian Meteorological and Oceanographic Society* (Oral), February, 2010, Canberra, AUS. "The Southern Ocean response to poleward intensifying winds." Spence, P., J Fyfe, A. Montenegro and A.Weaver.
20. *American Geophysical Union Fall Meeting*, December (Poster), 2008, San Francisco, USA. "The Southern Ocean overturning: Parametrized versus permitted eddies". Spence, P., O. Saenko, and A.Weaver.
21. *Physical Oceanography Dissertation Symposium* (Oral), National Science Foundation, October, 2008, Honolulu, USA. "Coarse versus eddy-permitting global climate simulations". Spence, P., J Fyfe, A. Montenegro and A.Weaver.
22. *Canadian Meteorological and Oceanographic Society* (Oral), May, 2008, Kelowna, Canada. "Model resolution sensitivity of a subpolar Atlantic warming response triggered by freshwater discharge along the Labrador coast". Spence, P., J Fyfe, and A.Weaver.
23. *American Geophysical Union Fall Meeting* (Oral), December, 2007, San Francisco, USA. "The Southern Ocean temperature response to poleward intensifying

winds". Spence, P., J. Fyfe, A. Montenegro and A.Weaver.

24. *Canadian Meteorological and Oceanographic Society* (Oral), May, 2007, St. Johns, Canada. "The influence of mesoscale eddies and boundary currents on surface freshwater forcings used to drive meridional overturning variations". Spence, P., and A.Weaver.
25. *RAPID Climate Change Conference* (Oral), October, 2006, Birmingham, England. "Sensitivity of 8.2 kYr event simulations to increasing horizontal resolution". Spence, P., and A.Weaver.
26. *Ocean Sciences Meeting* (Oral), February, 2006, Honolulu, USA. "The impact of tropical Atlantic freshwater fluxes on the AMOC." Spence, P., and A.Weaver.
27. *Canadian Meteorological and Oceanographic Society* (Oral), May, 2005, Montreal, Canada. "The impact of tropical Atlantic freshwater fluxes on the AMOC." Spence, P., and A. Weaver.

2. Invited Lectures at Research Institutes

1. Mechanisms of subsurface warming of coastal Antarctic waters." March, 2017, University of Hawaii, HI, USA.
2. Mechanisms of subsurface warming of coastal Antarctic waters." Feb, 2017, University of Victoria, BC, Canada.
3. "The Science of Surf", Australia National University, Canberra, Aus., Oct., 2016.
4. "Mechanisms of subsurface warming of coastal Antarctic waters." July 2016, SCRIPPS Institute of Oceanography, Ca., USA.
5. "Mechanisms of subsurface warming of coastal Antarctic waters." Jan. 2016, Univ. Hokkaido, Hokkaido, Japan.
6. "Mechanisms of subsurface warming of coastal Antarctic waters." July, 2015, GFDL, Princeton, NJ, USA.
7. "Vorticity Dynamics." April 2014, ANU, Canberra, Australia.
8. "Investigating the Southern Ocean abyss with Eulerian and Lagrangian approaches."April, 2014, GEOMAR, Kiel, Germany.
9. "Investigating the Southern Ocean abyss with Eulerian and Lagrangian approaches."April, 2014, LEGI, Univesite de Grenoble, Grenoble, France.

10. "Southern Ocean abyssal response to a positive Southern Annular Mode." Sept., 2013, GFDL, Princeton, NJ, USA.
11. "Fundamentals of Geophysical Fluid Dynamics." Feb., 2013, CoE Summer School, UNSW, Sydney, Australia.
12. "Towards an Australian High Resolution Ocean Climate Model." Nov., 2011, ANU, Canberra, Australia.
13. "Towards an Australian High Resolution Ocean Climate Model." Oct., 2011, CCRC, Sydney, Australia.
14. "Coarse versus ocean eddy permitting global climate simulations." May, 2011, LEGI-MEOM, Grenoble, France.
15. "Coarse versus ocean eddy permitting global climate simulations of the Southern Ocean." February, 2010, *Climate Change Research Centre*, University of New South Wales, Australia.
16. "The Southern Ocean response to poleward intensifying winds." October, 2009, *CSIRO Marine and Atmospheric Research Centre*, Hobart, Tasmania, Australia.
17. "Climate sensitivity to 8.2 kyr event freshwater forcing at eddy-permitting resolutions." February, 2006, *Climate Change Research Centre*, University of New South Wales, Australia.

3. Invited Visitations at Research Institutes

1. Laboratoire des Ecoulements Géophysiques et Industriels, Université de Grenoble, France, February, 2016. Host: **Dr. Bernard Bernier**.
2. Institute of Low Temperature Science, University of Hokkaido, Hokkaido, Japan, Jan, 2016. Host: **Dr. Keichi Ohshima**
3. Geophysical Fluid Dynamics Laboratory, Princeton, NJ, July, 2015. Host: **Dr. Stephen Griffies**. Objective: Develop an Australian High Resolution Ocean Climate Model.
4. Canadian Centre for Climate Modelling and Analysis, Victoria, Canada, July, 2015. Host: **Dr. Oleg Saenko**. Objective: Antarctic coastal warming research.
5. Laboratoire des Ecoulements Géophysiques et Industriels, Université de Grenoble, France, January, 2013. Host: **Dr. Bernard Bernier**. Objective: Reynolds Eddy Statistics.
6. Geophysical Fluid Dynamics Laboratory, Princeton, NJ, Sept, 2013. Host: **Dr.**

- Stephen Griffies.** Objective: Develop an Australian High Resolution Ocean Climate Model.
7. Canadian Centre for Climate Modelling and Analysis, Victoria, Canada, Sept. 2013. Host: **Dr. Oleg Saenko.** Objective: Antarctic coastal warming research.
 8. Laboratoire des Ecoulements Géophysiques et Industriels, Université de Grenoble, France, January, 2013. Host: **Dr. Bernard Bernier.** Objective: DRAKKAR Consortium Annual Meeting.
 9. National Centre for Atmospheric Research, Boulder Colorado, July, 2012. Host: **Dr. Stephen Griffies.** Objective: Develop an Australian High Resolution Ocean Climate Model.
 10. Australian National University, Canberra, Australia, 2011-2012 (Numerous visits). Host: **Dr. Andy Hogg.** Objective: Develop an Australian High Resolution Ocean Climate Model.
 11. Laboratoire des Ecoulements Géophysiques et Industriels, Université de Grenoble, France, January, 2012. Host: **Dr. Bernard Bernier.** Objective: DRAKKAR Consortium Annual Meeting.
 12. Geophysical Fluid Dynamics Laboratory, Princeton, USA, August, 2011. Host: **Dr. Steven Griffies.** Objective: Develop an Australian High Resolution Ocean Climate Model.
 13. Laboratoire des Ecoulements Géophysiques et Industriels, Université de Grenoble, France, May, 2011. Host: **Dr. Bernard Bernier.** Objective: Develop an Australian High Resolution Ocean Climate Model.
 14. Canadian Centre for Climate Modelling and Analysis, Victoria, Canada, July, 2011. Host: **Dr. Oleg Saenko.** Objective: North Atlantic Deep Water research.
 15. School of Earth and Ocean Science, University of Victoria, Canada, July, 2010. Host: **Dr. Andrew Weaver.** Objective: Southern Ocean research.

Research Grants and Honours

Agency	Title	Date	Amount (\$)
⁸ ARC	LEIF Infrastructure Grant	2014	410,000
⁸ ARC	DECRA Fellowship	2014	360,000

⁷ CoE	Directors Prize	2014	750
⁸ ARC	FASIC Grant	2012	6,000
⁷ CoE	Early Career Researcher Award	2012	22,000
¹ NSERC	Postgraduate Degree Scholarship	2006-2009	54,000
² UVic	Postgraduate Degree Scholarship	2006-2009	12,000
³ NSF	Physical Oceanography Dissertation Symposium.	2008	3,000
² UVic	Andy Farquharson Award for Excellence in Teaching	2008	150
⁴ AGU	Outstanding Student Paper Award	2007	0
⁵ NERC	Travel Grant Rapid Conference	2006	3,000
¹ NSERC	Student Research Employment	1999	5,000
⁶ CWY	International Development Grant	1992	10,000
¹ NSERC	= National Science and Engineering Research Council, Canada.		
² UVic	= University of Victoria, Canada.		
³ NSF	= National Science Foundation, USA.		
⁴ AGU	= American Geophysical Union, USA.		
⁵ NERC	= National Environment and Research Council, UK.		
⁶ CWY	= Canada World Youth, Government of Canada.		
⁷ CoE	= Australian Centre of Excellence for Climate System Science		
⁸ ARC	= Australian Research Council		

Teaching Experience

1. Courses taught at Bamfield Marine Science Station, Canada

Year	Course	No. Students
2014	MTI2014 – Marine Terrestrial Interactions <ul style="list-style-type: none"> • Co-taught with 1 other lecturer 	25
2012	MTI2012 – Marine Terrestrial Interactions	17

- Co-taught with 1 other lecturer

Student Evaluations: My average student rating across all categories and years is 4.6/5.

2. Courses taught at University of New South Wales, Australia

Year	Course	No.
2017	MSCI2001 – Marine Sciences • Co-taught with 4 other lecturers	25
2016	MSCI2001 – Marine Sciences • Co-taught with 4 other lecturers	45
2015	MSCI2001 – Marine Sciences • Co-taught with 4 other lecturers	45
2014	MSCI2001 – Marine Sciences • Co-taught with 4 other lecturers	45
2013	CLIM3001 – Climate Science • Co-taught with 5 other lecturers	5
2013	MSCI2001 – Marine Sciences • Co-taught with 2 other lecturers	45
2012	CLIM3001 – Climate Science • Co-taught with 5 other lecturers	5
2012	MSCI2001 – Marine Sciences • Co-taught with 2 other lecturers	45
2011	MSCI2001 – Marine Sciences • Co-taught with 2 other lecturers	45
2010	MSCI2001 – Marine Sciences • Co-taught with 2 other lecturers	45
2010	MSCI0501 – The Marine Environment • Co-taught with 3 other lecturers	>150
2009	MATH3261 – Fluid Dynamics • Co-taught with 1 other lecturer	23
2009	MSCI0501 – The Marine Environment • Co-taught with 3 other lecturers	>150

3. Courses taught at University of Victoria, Canada

Year	Course	No.

2007	EOS340 – Dynamic Meteorology • Full lecture duties	35
2006	EOS340 – Dynamic Meteorology • Full lecture duties	35
2003-2007	EOS101 – Intro. Earth Science Lab • Lab instructor for 6 terms	25

Student Evaluations: My average student rating across all categories and years is 4.4/5.

3. Student Supervision

Year	Student	Project & Student Outcomes
2015	Earl Duran	PhD student joint-supervisor. Project on the Southern Ocean.
2015	ValeriaPrando	PhD student joint-supervisor. Project on the Southern Ocean.
2015	David Webb	PhD joint-supervisor. Project on the Southern Ocean.
2014	Carlo Jamandre	PhD student committee member. Land surface modelling
2014	Tomas Beuzen	12 week summer student project on the Southern Ocean Outcomes: paper in progress.
2013	David Crock	6 week summer student project on the Southern Ocean Outcomes: student started Masters Program.
2012	Christopher Bull	6 week summer student project on Eocene climate. Outcomes: work presented at PAGES, GOA, and started PhD at UNSW.
2011	Nandini Ramesh	3 month summer student project on the tropical Pacific. Outcomes: 1 published paper, and student started PhD at Columbia University.

5. Other teaching experience

Year	Institution
1994-1997	Sheldon Centre for Outdoor Education, Canada. Instructor of Toronto school board programs for three, 4-month

contracts. Taught basic farming, and nature skills in a rural residential setting.

1992 Morant Bay Elementary, Jamaica
Five-month kindergarten teacher position as part of Canada World Youth program.

1991 Souris Regional High School, Canada
Teaching aid (math and physics) for five-months as part of Canada World Youth program.

Service and Professional Activities

1. Membership and service on professional bodies and societies

- American Geophysical Union (since 2005)
- Canadian Geophysical Union (since 2004)
- Canadian Meteorological and Oceanographic Society (since 2004)
- Australian Meteorological and Oceanographic Society (since 2009)
- European Geophysical Union (since 2011)

2. Reviewer for journals

- Journal of Climate
- Climate Dynamics
- Nature
- Geophysical Research Letters
- Nature Geoscience
- Nature Climate Change
- Journal of Physical Oceanography
- Ocean Modelling
- Journal of Geoscientific Research

3. Voluntary Service

- Volunteer for the organizing committee of the 2018 Australian Meteorological and Oceanographic conference.
- Volunteer for the 2016 UNSW Talented Students Program.
- Volunteer for the 2016 secondary school research mentorship program at the CCRC.

- Chief organiser of the four day 2015 ARC Centre of Excellence for Climate System Science Oceans Node Annual Meeting.
- Member of CSIRO's Scientists in Schools Program from 2013-2015, which links scientists with local community public schools. I was partnered at Mascot and Ascham Public Schools.
- Session organizer for 2013 Australian Meteorological and Oceanographic Society Annual Meeting.
- Volunteer for the 2013 UNSW Parent and Students Information Night.
- Volunteer for Mentoring Students Program at the 2014 Ocean Sciences conference.
- Invited Public Talks – "*The Science of Climate Change*" Volunteered over 30 lectures to the general public on behalf of the University of Victoria Speakers Bureau, 2003-2008.