Curriculum Vitae
Sonya Allayne Legg

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Education

1989-1992	**Imperial College, University of London**, UK Dynamical meteorology and oceanography, PhD. Thesis title: Open-ocean deep convection: the spreading phase. Thesis supervisor: John Marshall.
1986-1989	**Oxford University, Keble College**, UK Physics, BA Honours, First Class.

Positions Held

Sept 2004 - present	**Princeton University**, Princeton. *Research Oceanographer* in Program in Atmospheric and Oceanic Sciences.
May 2001 - Sept 2006	**Woods Hole Oceanographic Institution**, Woods Hole. *Associate Scientist* Awarded tenure Jan 2005.
June 2003 - Sept 2003	**NOAA-GFDL and Princeton University**, Princeton *Visiting Fellow*
Sept 1997 - May 2001	**Woods Hole Oceanographic Institution**, Woods Hole. *Assistant Scientist*
Feb 1997 - Sept 1997	**University of California Los Angeles**, Los Angeles, USA. *Assistant Researcher* in Inst. for Geophysics and Planetary Phys.
Feb 1995 - Feb 1997	**Universities Corporation for Atmospheric Research**, Boulder, USA *NOAA Climate and Global Change program postdoctoral fellow.* (host institution: University of California Los Angeles)
Feb 1993 - Jan 1995	**University of Colorado**, Boulder, USA. *Postdoctoral Research Associate* in Joint Institute for Laboratory Astrophysics.
Feb 1993 - Jan 1995	**National Center for Atmospheric Research**, Boulder, USA. *Visiting postdoctoral scientist*
Sep 1991 - Oct 1992	**Massachusetts Institute of Technology**, Cambridge, USA. *Research Fellow*
Oct 1990 - Jun 1991	**Imperial College**, London, UK. *Student laboratory teaching assistant*

Jul - Sep 1989	**Ecole Polytechnique Federal de Lausanne**, Lausanne, Switzerland. *Student assistant*
1986 - 1987	**Royal Aerospace Establishment**, Farnborough, UK. *Student Scientist*

Fellowships and Awards

2003	**NOAA-GFDL/Princeton University** Visiting Fellowship
1995-1997	**National Oceanic and Atmospheric Administration**, USA, post-doctoral fellowship in Climate and Global Change
1989-1992	**Natural Environment Research Council**, UK, studentship.
1986-1989	**Ministry of Defense**, UK, student sponsorship.
1986-1989	**Keble College**, Oxford University, UK, Open Scholarship.

Teaching and Outreach

Graduate education

- MIT/WHOI joint program in oceanography, 2000-2004: member of "Joint Committee for Physical Oceanography", taught course in Geophysical Turbulence, thesis committee member for 2 students.
- Princeton University Atmospheric and Oceanic Sciences program, 2004-present: lecturer, teaching class 572 "Atmospheric and Oceanic Wave Dynamics" and coordinating class GEO 503 "Responsible Conduct of Research"; 2006-present: member of Graduate Work Committee; 2009-present: Director of Graduate Studies; thesis committee member for 2 students; Graduate student advisees: He Wang (2009-present); graduate summer interns supervised: University of Girona PhD student (2005), MPOWIR summer intern (2011).
- Lecturer at: International school on "Topographic internal waves in the atmosphere and the ocean", Cargese, France, 2010; Alpine summer school on "Buoyancy driven flows", Aosta, Italy, 2010.
- External examiner for PhD theses from University of Western Australia (2012), University of Grenoble, France (2010), University of Waterloo, Canada (2007).

Undergraduate education

- Princeton University, 2007-2009: co-taught class GEO 425 "Introduction to physical oceanography".
- Imperial College, 1990-1991: Laboratory demonstrations for physics undergraduates.
- Tutorial on Climate Modeling at MIRTHE NSF engineering research center summer workshop, Princeton, 2011.

- Undergraduate Summer Student interns supervised: 2 Woods Hole undergraduate summer student fellows (1998,2002); Hollings scholar (2009).

K-12 education

- February 2012: presentation to middle-school science class on oceans and climate.
- March 2009: Participant in Young Women's Conference, at Princeton Plasma Physics Laboratory.

Women in Science Mentoring activities

- September 2011: Invited panelist at Princeton University Graduate Women in Science and Engineering mentoring program inaugural event.
- April 2010: Participant in "Women Scientists' Networking Lunch" at Columbia University Lamont-Doherty Earth Observatory.
- Mentorgroup leader for MPOWIR (Mentoring Physical Oceanography Women to Increase Retention), 2008-present.

Postdoctoral advisees: James Girton (2002-2004), Ulrike Riemenschneider (2004-2007), Lucas Merckelbach (2005-2008) (co-advised with David Smeed, NOC, UK), Maxim Nikurashin (2009-2011), Mehmet Ilicak (2009-present), Maarten Buijsman (2010-present), Angelique Melet (2011-present).

Membership of Professional Societies

American Geophysical Union
European Geophysical Union

Panels and Committees

- NSF review panels
- Universities' Corporation for Atmospheric Research member representative for WHOI 2002-2004
- Coordinating PI for NSF/NOAA funded "Gravity Current Entrainment Climate Process Team", 2003-2008.
- Co-convener of scientific sessions at AGU Ocean Sciences and EGS General Assembly
- Facilitator for session on "Key Physical Processes" at CLIVAR workshop on Ocean Component of Climate Models, June 2004.
- Associate member of IAPSO/SCOR working group 121 on Ocean Mixing, 2004-2007

- Member of US CLIVAR Process Studies and Model Improvement Panel, 2005-2009; co-chair of panel, 2007-2009.
- Member of Review Panel for NOAA Hollings Undergraduate Scholarship Program, 2007
- Mentor and steering committee member for MPOWIR (Mentoring Physical Oceanography Women to Increase Retention), 2008-present
- Member of editorial board for Ocean Modelling, 2009-present
- Member of External Advisory Board for Modeling Complex Systems IGERT program at Johns Hopkins University, 2010

Refereed Publications

Legg S. and J. Marshall, 1993. A heton model of the spreading phase of open-ocean deep convection, *J. Phys. Oceanogr.*, **23**, 1040-1056.

Julien K., S. Legg, J. McWilliams, and J. Werne, 1996. Penetrative convection in rapidly rotating flows: Preliminary results from numerical simulation, *Dyn. Atmos. Oceans*, **24** 237-249.

Julien K., S. Legg, J. McWilliams and J. Werne, 1996. Hard-Turbulence in rotating Rayleigh-Benard convection, *Phys. Rev. E* **53** R5557.

Julien, K., S. Legg, J. McWilliams, and J. Werne, 1996. Rapidly rotating turbulent Rayleigh-Benard convection, *J. Fluid Mech.* **322**, 243-273.

Legg S., H. Jones, and M. Visbeck, 1996. A heton perspective of baroclinic eddy transfer in localized ocean convection, *J. Phys. Oceanogr.* **26**, 2251-2266.

Legg S. and J. Marshall, 1998. The influence of the ambient circulation on the spreading of convected fluid, *J. Mar. Res.* **56**, 107-139.

Legg, S., J. Gao, and J. McWilliams, 1998. Localization of ocean deep convection by a mesoscale eddy, *J. Phys. Oceanogr.* **28** 944-970.

The LabSea Group, 1998. The Labrador Sea Deep Convection experiment, *Bull. American Met. Soc.* **79**, 2033-2058.

Julien K., S. Legg, J. McWilliams and J. Werne, 1999. Plume structure in rotating convection. Part I: balances and ensemble statistics, *J. Fluid Mech.* **391**, 151-187.

Fischer K.W., S. Legg, W. H. Munk, R.M. Shuchman, R.W. Garwood, and J.P.Palshook, 1999. Modeled radar surface signature of deep ocean convection *IEEE Transactions of*

geoscience and remote sensing **37**, 2050-2067.

Legg S., and J.C. McWilliams, 2000. Temperature and salinity variability in heterogeneous ocean convection *J. Phys. Oceanogr.*, **30**, 1188-1206.

Legg S. and J. C. McWilliams, 2001. Convective modifications of a geostrophic eddy field *J. Phys. Oceanogr.*, **31**, 874-891

Legg S., K. Julien, J. McWilliams, and J. Werne, 2001. Vertical transport by convective plumes: modification by rotation, *Phys. and Chem. of the Earth*, **26**, 259-262.

Legg S. and J. McWilliams, 2002. Sampling characteristics from isobaric floats in a convective eddy field, *J. Phys. Oceanogr.*, **32**, 527-544.

Legg S. and A. J. Adcroft, 2003. Internal wave breaking on concave and convex continental slopes, *J. Phys Oceanogr.* **33**, 2224-2246.

Legg S., 2004. Internal tides generated on a corrugated continental slope. Part I: Cross-slope barotropic forcing, *J. Phys Oceanogr.* **34**, 156-173.

Legg S., 2004. Internal tides generated on a corrugated continental slope. Part II: Along-slope barotropic forcing, *J. Phys Oceanogr.* **34**, 1824-1838.

Legg S., 2004. A simple criterion to determine whether convection is localized or distributed, *J. Phys Oceanogr.* **34**, 2843-2846.

Legg S., R.W. Hallberg and J.B. Girton, 2006. Comparison of entrainment in overflows simulated by z-coordinate, isopycnal and nonhydrostatic models, *Ocean Modelling*, **11**, 69-97.

Legg S. and K.M.H. Huijts, 2006. Preliminary simulations of internal waves and mixing generated by finite amplitude tidal flow over isolated topography, *Deep Sea Research, part II*, **53**, 140-156.

Riemenschneider U. and S. Legg, 2007. Regional Simulations of the Faroe Bank Channel Overflow in a Level Model, *Ocean Modelling*, **17**, 93-122.

Green J.A.M., J.H. Simpson, S. Legg and M.R. Palmer, 2008. Internal waves, baroclinic energy fluxes and mixing at the European shelf edge, *Continental Shelf Research*, **28**, 937-950.

Jackson L., R.W. Hallberg and Legg S., 2008. A parameterization of shear-driven turbulence for ocean climate models, *J. Phys. Oceanogr.*, **38**, 1033-1053.

Legg S., L. Jackson and R.W. Hallberg, 2008. Eddy-resolving modeling of overflows,

in *"Ocean Modeling in an Eddying regime*, eds M.W. Hecht and H. Hasumi, AGU Geophysical Monographs, p63-82.

Legg S. and J. Klymak, 2008. Internal Hydraulic Jumps and Overturning Generated by Tidal Flow over a Tall Steep Ridge, *J. Phys. Oceanogr.*, **38**, 1949-1964.

Legg S., B. Briegleb, Y. Chang, E.P. Chassignet, G. Danabasoglu, T. Ezer, A.L. Gordon, S. Griffies, R. Hallberg, L. Jackson, W. Large, T.M. Ozgokmen, H. Peters, J. Price, U. Riemenschneider, W. Wu, X. Xu and J. Yang, 2009: Improving oceanic overflow representation in climate models: the gravity current entrainment climate process team. *Bull. Am. Met. Soc.*, **90**, 657-670.

Griffies, S., A. Adcroft, H. Banks, C.W. Boning, E.P. Chassignet, G. Danabasoglu, S. Danilov, E. Deleersnijder, H. Drange, M. England, B. Fox-Kemper, R. Gerdes, A. Gnanadesikan, R.W. Hallberg, E. Hanert, M.J. Harrison, S. Legg, C.M. Little, G. Madec, S.J. Marsland, M. Nikurashin, A. Pirani, H.L. Simmons, J. Schroter, B.L. Samuels, A-M. Treguier, J.R. Toggweiler, H. Tsujino, G.K. Vallis, L. White, 2009: Problems and prospects in large scale ocean circulation models. In *OceanObs'09*, 21-25 September, Venice, Italy, ESA Special Publication, 1-23.

Klymak, J.M., S. Legg and R. Pinkel, 2010: High-mode stationary waves in stratified flow over large obstacles, *J. Fluid Mech.*, **644**, 321-336.

Klymak, J.M., and S. Legg, 2010: A simple mixing scheme for models that resolve breaking internal waves. *Ocean Modelling*, doi:10.1016/j.ocemod.2010.02.005

Klymak, J.M., S. Legg and R. Pinkel, 2010: A simple parameterization of turbulent tidal mixing near supercritical topography. *J. Phys. Oceanogr.*, **40**, 2059-2074, doi: 10.1175/2010JPO4396.1.

Nikurashin, M., and S. Legg, 2011: A mechanism for local dissipation of internal tides generated at rough topography. *J. Phys. Oceanogr.*, **41**, 378-395.

Ilicak, M., S. Legg, A. Adcroft and R. Hallberg, 2011: Dynamics of a dense gravity current flowing over a corrugation. *Ocean Modelling*, **38**, 71-84.

Buijsman, M.C., S. Legg and J. Klymak, 2012: Double ridge internal tide interference and its effect on dissipation in Luzon Strait. *J. Phys. Oceanogr.*, submitted.

Klymak, J., M. Buijsman, S. Legg and R. Pinkel, 2012: Parameterizing baroclinic internal tide scattering and breaking on supercritical topography: the one- and two-ridge cases. *J. Phys. Oceanogr.*, submitted.

Melet, A., R. Hallberg, S. Legg and K. Polzin, 2012: Sensitivity of the Pacific Ocean state to the vertical distribution of internal-tide driven mixing. *J. Phys. Oceanogr.*, sub-

mitted.

Klymak, J.M., S. Legg, M.H. Alford, M. Buijsman, R. Pinkel, and J.D. Nash, 2012: The direct breaking of internal waves at steep topography. *Oceanography*, submitted.

Unrefereed publications

Legg, S., 1993: Open ocean deep convection: the spreading phase. *PhD thesis*, University of London, 185pp.

Bretherton, C., F. Ferrari and S. Legg, 2004: Climate Process teams: a new approach to improving climate models. *U.S. CLIVAR Variations*, **2**, 1-6.

International CLIVAR project office, 2004: Report of the CLIVAR workshop on assessment of a new generation of ocean climate models. CLIVAR publication series no. 83.

Legg, S., and the members of the gravity current entrainment climate process team, 2006: Gravity Current Entrainment Climate Process Team. *U.S. CLIVAR Variations*, **4**, 5-7.

U.S.CLIVAR Office, 2008: Review of U.S. CLIVAR pilot Climate Process Teams and recommendations for future Climate Process Teams Report 2008-3, U.S. CLIVAR Office, Washington, DC 20006, 6pp.

S. Griffies, A. Adcroft, H. Aiki, V. Balaji, M. Bentson, F. Bryan, G. Danabasoglu, S. Denvil, H. Drange, M. England, J. Gregory, R.W. Hallberg, S. Legg, T. Martin, T. McDougall, A. Pirani, G. Schmidt, D. Stevens, K. E. Taylor, H. Tsujino, 2009: Sampling physical ocean fields in WCRP CMIP5 simulations. CLIVAR working group on ocean model development (WGOMD) committee on CMIP5 ocean model output, WCRP informal report no. 3/2009.

Cronin, M.F., S. Legg and P. Zuidema, 2009: Best practices for Process Studies, *Bull. Am. Met. Soc.*, **90**, 917-918.

Legg S., A. Adcroft, W. Anderson, V. Balaji, J. Dunne, S. Griffies, R. Hallberg, M. Harrison, I. Held, A. Rosati, R. Toggweiler, G. Vallis, and L. White, 2009: Oceanography in 2025: a modeling perspective. In *Oceanography in 2025, proceedings of a workshop*, a report of the National Research Council.

Coles, V., L. Gerber, S. Legg and S. Lozier, 2011: Commentary: Mentoring groups - a non-exit strategy for women in physical oceanography. *Oceanography*, **24**, 17-20, doi: 10.5670/oceanog.2011.43

Legg S., 2012: Overflows and Convectively-driven flows. In "Buoyancy Driven Flows",

Chassignet E.P., C. Cenedese, and J Verron, (Eds) Cambridge University Press, 203-239.

Recent Invited Talks

Swedish Society for Marine Sciences, "Visions of the Sea" 2011, Stockholm; Keynote lecture at 7th International Symposium on Stratified Flows, Rome, 2011; International school on "Topographic internal waves in the atmosphere and the ocean", Cargese France, 2010; Alpine summer school on "Buoyancy driven flows", Aosta Italy, 2010; Banff International Research Station workshop on "Coordinated mathematical modeling of internal waves", 2010; MOCA-09, IAPSO symposium on Overflows and Abyssal currents, Montreal, 2009; Courant Institute CAOS workshop on "Vortices and Waves in Geophysical Flows", New York, 2006; European Geophysical Union, session on "Steep Topography", Vienna, 2006; Warwick University symposium on "Geophysical and Environmental Turbulence", 2006; NOAA Climate and Global Change 100th postdoctoral fellow celebration, Silver Spring, 2005; CLIVAR workshop on "North Atlantic Thermohaline Circulation Variability", Kiel, 2004; IAPSO/SCOR symposium on "Ocean Mixing", Victoria, 2004; CLIVAR workshop on "The Ocean component of climate models", 2004; Aha Hulikoa Hawaiian Winter Workshop on "Boundary mixing and its parameterization", 2003; AGU fall meeting, special session to mark 10 years of the UCAR postdoctoral program, 2000.