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STEVEN ROBERT JAYNE

EDUCATION

Sc.D., 1999, Massachusetts Institute of Technology and Woods Hole Oceanographic Institution – Joint Program in Oceanography; Oceanography

S.B., 1994, Massachusetts Institute of Technology; Earth, Atmospheric and Planetary Sciences with minors in Mathematics and Music

POSITIONS HELD

Woods Hole Oceanographic Institution – Physical Oceanography Department
Senior Scientist: May 2013 – present
Associate Scientist with Tenure: April 2009 – May 2013
Associate Scientist: September 2005 – April 2009
Assistant Scientist: September 2001 – August 2005

National Center for Atmospheric Research – Climate and Global Dynamics Division
Affiliate Scientist: March 2002 – present

King Abdullah University of Science and Technology – Red Sea Research Center
Visiting Professor: January 2010

University of Colorado at Boulder – Physics Department and CIRES
National Center for Atmospheric Research – Climate and Global Dynamics Division
Postdoctoral Research Associate: March 1999 – August 2001

Massachusetts Institute of Technology – Earth, Atmospheric and Planetary Sciences Department
Research Assistant: June 1994 – March 1999

Woods Hole Oceanographic Institution – Physical Oceanography Department
Summer Student Fellow: June 1993 – August 1993

Bermuda Biological Station for Research
Work/Study Intern: January 1993 – May 1993

Massachusetts Institute of Technology – Earth, Atmospheric and Planetary Sciences Department
Undergraduate Research Opportunities Program: September 1990 – May 1994

RESEARCH INTERESTS

Understanding and modeling the ocean's dynamics and its role in the Earth's climate. Collecting and synthesizing the diverse set of global ocean observations to map and understand the ocean's general circulation. Studying the special role of western boundary currents in the general circulation and eddy-mean flow interactions within them. Investigating air-sea interaction in tropical cyclones. Improving physical parameterizations in ocean circulation models.

AWARDS

Office of Naval Research, Young Investigator Award, 2003
Zeldovich Medal, Committee on Space Research and the Russian Academy of Sciences, 2002
National Defense Science and Engineering Graduate Fellowship, 1994
National Science Foundation, Graduate Research Fellowship, 1994
Dean A. Horn Award for Bachelor's thesis, MIT Sea Grant, 1994
Goulandris Foundation Award, MIT Sea Grant, 1992

PROFESSIONAL PUBLICATIONS AND PRESENTATIONS

Author or co-author of 46 refereed publications and 11 other publications. Author or co-author of 56 conference abstracts; presenter at 49 national and international conferences and workshops.

REFEREED PUBLICATIONS

Trossman, D. S., B. K. Arbic, S. T. Garner, J. A. Goff, S. R. Jayne, E. J. Metzger, J. G. Richman, R. B. Scott, and A. J. Wallcraft, 2014: Evaluation of topographic internal wave drag's impact on an eddying global ocean model. *Journal of Geophysical Research*, submitted.

Rypina, I. I., S. R. Jayne, S. Yoshida, A. M. Macdonald, and K. O. Buesseler, 2014: Drifter-based estimate of the 5-year dispersal of Fukushima-derived radionuclides. *Journal of Geophysical Research*, submitted.

Delman, A. S., J. L. McClean, J. Sprintall, L. D. Talley, E. Yulaeva, and S. R. Jayne, 2014: Effects of eddy vorticity forcing on the mean state of the Kuoshio Extension. *Journal of Physical Oceanography*, submitted.

Rainville, L., S. R. Jayne, and M. F. Cronin, 2014: Variations of the North Pacific Subtropical Mode Water from direct observations. *Journal of Climate*, **27**, 2842–2860.

Sun, O. M., S. R. Jayne, K. L. Polzin, B. A. Rather, and L. C. St. Laurent, 2013: Parameterizing turbulent mixing in the transition layer. *Journal of Physical Oceanography*, **43**, 2475–2489.

Trossman, D. S., B. K. Arbic, S. T. Garner, J. A. Goff, S. R. Jayne, E. J. Metzger, and A. J. Wallcraft, 2013: Impact of parameterized lee wave drag on the energy budget of an eddying global ocean model. *Ocean Modelling*, **72**, 119–142.

Douglass, E. M., Y.-O. Kwon, and S. R. Jayne, 2013: A comparison of subtropical mode waters in a climatologically-forced model. *Deep-Sea Research II*, **91**, 139–151.

Jochum, M., B. P. Briegleb, G. Danabasoglu, W. G. Large, N. J. Norton, S. R. Jayne, M. H. Alford, and F. O. Bryan, 2013: The impact of oceanic near-inertial waves on climate. *Journal of Climate*, **26**, 2833–2844.

Mrvaljevic, R. K., P. G. Black, L. R. Centurioni, Y.-T. Chang, E. A. D'Asaro, S. R. Jayne, C. M. Lee, R.-C. Lien, I-I Lin, J. Morzel, P. P. Niiler, L. Rainville, and T. B. Sanford, 2013: Observations of the cold wake of Typhoon Fanapi (2010). *Geophysical Research Letters*,

40, 316–321.

Cronin, M. F., N. A. Bond, J. T. Farrar, H. Ichikawa, S. R. Jayne, Y. Kawai, M. Konda, B. Qiu, L. Rainville, and H. Tomita, 2013: Formation and erosion of the seasonal thermocline in the Kuroshio Extension Recirculation Gyre. *Deep-Sea Research II*, **85**, 62–74.

Rypina, I. I., S. R. Jayne, S. Yoshida, A. M. Macdonald, E. M. Douglass, and K. O. Buesseler, 2013: Short-term dispersal of Fukushima-derived radionuclides off Japan: Modeling efforts and model-data intercomparison. *Biogeosciences*, **10**, 4973–4990.

Charette, M. A., C. F. Breier, P. B. Henderson, S. M. Pike, I. I. Rypina, S. R. Jayne, and K. O. Buesseler, 2013: Radium-based estimates of cesium isotope transport and total direct ocean discharges from the Fukushima Nuclear Power Plant accident. *Biogeosciences*, **10**, 2159–2167.

Douglass, E. M., S. R. Jayne, F. O. Bryan, S. Peacock, and M. E. Maltrud, 2012: Kuroshio pathways in a climatologically-forced model. *Journal of Oceanography*, **68**, 625–639.

Bates, S. C., B. Fox-Kemper, S. R. Jayne, W. G. Large, S. Stevenson, and S. G. Yeager, 2012: Mean biases, variability, and trends in air-sea fluxes and SST in the CCSM4. *Journal of Climate*, **25**, 7781–7801.

Buesseler, K. O., S. R. Jayne, N. S. Fisher, I. I. Rypina, H. Baumann, Z. Baumann, C. F. Breier, E. M. Douglass, J. George, A. M. Macdonald, H. Miyamoto, J. Nishikawa, S. M. Pike, and S. Yoshida, 2012: Fukushima-derived radionuclides in the ocean and biota off Japan. *Proceedings of the National Academy of Sciences*, **109**, 5984–5988.

Waterman, S. N., and S. R. Jayne, 2012: Eddy-driven recirculations from a localized transient forcing. *Journal of Physical Oceanography*, **42**, 430–447.

Danabasoglu, G., S. Bates, B. P. Briegleb, S. R. Jayne, M. Jochum, W. G. Large, S. Peacock, and S. G. Yeager, 2012: The CCSM4 ocean component. *Journal of Climate*, **25**, 1361–1389.

Douglass, E. M., S. R. Jayne, S. Peacock, F. O. Bryan, and M. E. Maltrud, 2012: Subtropical mode water variability in a climatologically-forced model in the Northwestern Pacific Ocean, *Journal of Physical Oceanography*, **42**, 126–140.

Gent, P. R., G. Danabasoglu, L. J. Donner, M. M. Holland, E. C. Hunke, S. R. Jayne, D. M. Lawrence, R. B. Neale, P. J. Rasch, M. Vertenstein, P. H. Worley, Z.-L. Yang, and M. Zhang, 2011: The Community Climate System Model version 4. *Journal of Climate*, **24**, 4973–4991.

Waterman, S. N., N. G. Hogg, and S. R. Jayne, 2011: Eddy-mean interaction in the Kuroshio Extension region. *Journal of Physical Oceanography*, **41**, 1182–1208.

Waterman, S. N., and S. R. Jayne, 2011: Eddy-mean flow interactions in the along-stream development of a western boundary current jet: An idealized model study. *Journal of Physical Oceanography*, **41**, 682–707.

D'Asaro, E., P. Black, L. Centurioni, P. Harr, S. R. Jayne, I.-I. Lin, C. Lee, J. Morzel, R. Mrvaljevic, P. P. Niiler, L. Rainville, T. Sanford, and T. Y. Tang, 2011: Typhoons and the ocean in the western North Pacific: Part 1. *Oceanography*, **24**, 24–31.

Canuto, V. M., A. M. Howard, C. J. Muller, A. Leboissetier, Y. Cheng, and S. R. Jayne, 2010: Ocean turbulence, III: New GISS vertical mixing scheme. *Ocean Modelling*, **34**, 70–91.

Jayne, S. R., N. G. Hogg, S. N. Waterman, L. Rainville, K. A. Donohue, D. R. Watts, J.-H. Park, J. L. McClean, M. E. Maltrud, B. Qiu, S. Chen, and P. Hacker, 2009: The Kuroshio Extension and its recirculation gyres. *Deep-Sea Research I*, **56**, 2088–2099.

Jayne, S. R., 2009: The impact of abyssal mixing parameterizations in an ocean general circulation model. *Journal of Physical Oceanography*, **39**, 1756–1775.

McClean, J. L., S. R. Jayne, M. E. Maltrud, and D. P. Ivanova, 2008: The fidelity of ocean models with explicit eddies. In "Ocean Modeling in a Eddying Regime", M. W. Hecht and H. Hasumi, Eds., AGU Geophysical Monograph Series, **177**, 149–163.

Park, J.-H., D. R. Watts, K. A. Donohue, and S. R. Jayne, 2008: A comparison of in situ bottom pressure array measurements with GRACE estimates in the Kuroshio Extension. *Geophysical Research Letters*, **35**, L17601.

Qiu, B., S. Chen, P. Hacker, N. G. Hogg, S. R. Jayne, and H. Sasaki, 2008: The Kuroshio Extension northern recirculation gyre: Profiling float measurements and forcing mechanism. *Journal of Physical Oceanography*, **38**, 1764–1779.

Montengro, Á., M. Eby, A. J. Weaver, and S. R. Jayne, 2007: Response of a climate model to tidal mixing parameterization under present day and Last Glacial Maximum conditions. *Ocean Modelling*, **19**, 125–137.

Rainville, L., S. R. Jayne, J. L. McClean, and M. E. Maltrud, 2007: Formation of subtropical mode water in a high-resolution ocean simulation of the Kuroshio Extension region. *Ocean Modelling*, **17**, 338–356.

Jayne, S. R., 2006: The circulation of the North Atlantic Ocean from altimetry and the Gravity Recovery and Climate Experiment geoid. *Journal of Geophysical Research*, **111**, C03005.

Qiu, B., P. Hacker, S. Chen, K. A. Donohue, D. R. Watts, H. Mitsudera, N. G. Hogg, and S. R. Jayne, 2006: Observations of the subtropical mode water evolution from the Kuroshio Extension System Study. *Journal of Physical Oceanography*, **36**, 457–473.

Sandwell, D. T., W. H. F. Smith, S. Gille, E. Kappel, S. Jayne, K. Soofi, B. Coakley, and L. Géli, 2006: Bathymetry from Space: Rationale and requirements for a new, high-resolution altimetric mission. *Comptes Rendus Geoscience*, **338**, 1049–1062.

Jayne, S. R., L. C. St. Laurent, and S. T. Gille, 2004: Connections between ocean bottom topography and the Earth's climate. *Oceanography*, **17**, 61–70.

Simmons, H. L., S. R. Jayne, L. C. St. Laurent, and A. J. Weaver, 2004: Tidally driven mixing in a numerical model of the ocean general circulation. *Ocean Modelling*, **6**, 245–263.

Jayne, S. R., J. M. Wahr, and F. O. Bryan, 2003: Observing ocean heat content using satellite gravity and altimetry. *Journal of Geophysical Research*, **108**, 3031.

Jayne, S. R., and J. Marotzke, 2002: The oceanic eddy heat transport. *Journal of Physical Oceanography*, **32**, 3328–3345.

Munk, W., M. Dzieciuch, and S. R. Jayne, 2002: Millennial climate variability: Is there a tidal connection? *Journal of Climate*, **15**, 370–385.

St. Laurent, L. C., H. L. Simmons, and S. R. Jayne, 2002: Estimates of tidally driven enhanced mixing in the deep ocean. *Geophysical Research Letters*, **29**, 2106.

Wahr, J. M., S. R. Jayne, and F. O. Bryan, 2002: A method of inferring changes in deep ocean currents from satellite measurements of time variable gravity. *Journal of Geophysical Research*, **107**, 3218.

Jayne, S. R., and J. Marotzke, 2001: The dynamics of wind-induced ocean heat transport variability. *Reviews of Geophysics*, **39**, 385–411.

Jayne, S. R., and L. C. St. Laurent, 2001: Parameterizing dissipation over rough topography. *Geophysical Research Letters*, **28**, 811–814.

Jayne, S. R., and N. G. Hogg, 1999: On recirculation forced by an unstable jet. *Journal of Physical Oceanography*, **29**, 2711–2718.

Jayne, S. R., and J. Marotzke, 1999: A destabilizing thermohaline circulation — atmosphere — sea ice feedback. *Journal of Climate*, **12**, 642–651.

Jayne, S. R., and R. Tokmakian, 1997: Forcing and sampling of ocean general circulation models: Impact of high-frequency motions. *Journal of Physical Oceanography*, **27**, 1173–1179.

Jayne, S. R., N. G. Hogg, and P. Malanotte-Rizzoli, 1996: Recirculation gyres forced by a beta plane jet. *Journal of Physical Oceanography*, **26**, 492–504.

OTHER PUBLICATIONS

Arbic, B. K., *et al*., 2014: Inserting tides and topographic wave drag into high-resolution eddying simulations. *CLIVAR Exchanges*, **19**(2), 30–33.

Lee, C. M., *et al*., 2012: Marginal Ice Zone (MIZ) program: Science and experiment plan. Applied Physics Laboratory, University of Washington Technical Report APL-UW 1201.

Smith, R., *et al*., 2010: The Parallel Ocean Program (POP) reference manual ocean component of the Community Climate System Model (CCSM). Los Alamos National Laboratory Technical Report LAUR-10-01853.

Dushaw, B., *et al*., 2010: A global ocean acoustic observing network. In *Proceedings of the OceanObs'09: Sustained Ocean Observations and Information for Society (Vol. 2),* Hall, J., D. E. Harrison, and D. Stammer, Eds., ESA Publication WPP-306.

Shum, C. K., *et al*., 2010: Geodetic observations of ocean surface topography, ocean currents, ocean mass, and ocean volume changes. In *Proceedings of the OceanObs'09: Sustained Ocean Observations and Information for Society (Vol. 2),* Hall, J., D. E. Harrison, and D. Stammer, Eds., ESA Publication WPP-306.

Donohue, K. A., *et al.*, 2008: An integrated system study of the Kuroshio Extension, *EOS Transactions AGU,* **89**, 161–162.

Allison, M. A., *et al*., 2006: *Hurricanes and the U. S. Gulf Coast: Science and Sustainable Rebuilding*, American Geophysical Union Report, see also *EOS Transactions AGU*, **87**, 245.

Scott, E. C., *et al*., 2004: The Morphology of Steve. *Annals of Improbable Research*, **10**, 24–29.

Sandwell, D. T., W. H. F. Smith, S. Gille, S. R. Jayne, K. Soofi, and B. Coakley, 2001: Bathymetry from space: White paper in support of a high-resolution, ocean altimeter mission. In "Report of the High-Resolution Ocean Topography Science Working Group Meeting", D. B. Chelton, Ed.

Jayne, S. R., and J. Marotzke, 2000: The dynamics of ocean heat transport variability. *WOCE International Newsletter #38*, 7–9.

Jayne, S. R., 1999: *Dynamics of Global Ocean Heat Transport Variability.* Sc.D. Thesis, MIT/WHOI Joint Program in Oceanography and Applied Ocean Sciences.

EDUCATIONAL ACTIVITIES

Teaching

12.753 – Marine Geodynamics Seminar program – "Gravity", 2012
12.808 – Introduction to Descriptive Physical Oceanography, 2011
Marine Science 204 – Introduction to Physical Oceanography,
King Abdullah University of Science and Technology, Winter Enrichment Period, 2010
MIT/WHOI Joint Committee for Physical Oceanography, 2006–2009
WHOI Education Council, 2006–2009
MIT/WHOI Physical Oceanography General Exam Committee, 2005, 2012
Geophysical Fluid Dynamics Summer School, 2004

Advising

Bryan Kaiser, MIT/WHOI Joint Program – Advisor, 2014–present
Isabela Le Bras, MIT/WHOI Joint Program – Thesis committee member, 2014–present
Oliver Sun, WHOI Postdoctoral Investigator – Postdoctoral advisor, 2011–present
Iam-Fei Pun, WHOI Postdoctoral Investigator – Postdoctoral advisor, 2012–2013
Alexander Miltenberger, MIT/WHOI Joint Program – Master's thesis advisor, 2011–2012
Sachiko Yoshida, WHOI Postdoctoral Investigator – Postdoctoral advisor, 2011–2012
Alec Bogandoff, MIT/WHOI Joint Program – Summer advisor, 2011
Joseph Lozier, Duke University – Summer Student Fellow advisor, 2011
Ke-Hsien Fu, National Sun Yat-Sen University – Guest student advisor, 2011
Keith Gehres, KAUST – Guest student advisor, 2010
Pedro De La Torre, KAUST – Guest student advisor, 2010
Cimarron Wortham, MIT/WHOI Joint Program – Thesis committee member, 2008–2012
Elizabeth Douglass, WHOI Postdoctoral Scholar – Postdoctoral advisor, 2008–2011
Cristian Proistosescu, Princeton University – Summer Student Fellow advisor, 2008
Julian Schanze, MIT/WHOI Joint Program – Summer advisor, 2007
Sian Grigg, Macquarie University, Australia – External thesis examiner, 2006
Holly Dail, MIT/WHOI Joint Program – WHOI advisor, 2006–2008
Luc Rainville, WHOI Postdoctoral Scholar – Postdoctoral advisor, 2004–2007
Stephanie Waterman, MIT/WHOI Joint Program – Ph.D. thesis advisor, 2003–2009

Colin Goldblatt, University of East Anglia – Summer Student Fellow advisor, 2002
J. Scott Stewart, University of Colorado – Ph.D. thesis committee, 2000

PROFESSIONAL ACTIVITIES

Society Memberships: American Geophysical Union (1994), Committee on Space Research (2000).

Associate Editor: Journal of Geophysical Research – Oceans, 2010–2012.

Reviewer: Journal Reviewer: Journal of Physical Oceanography, Journal of Geophysical Research, Journal of Climate, Geophysical Research Letters, Progress in Oceanography, Deep-Sea Research, Journal of Geodesy, Nature, Journal of Atmospheric Research, Journal of Atmospheric and Oceanic Technologies, Dynamics of Atmospheres and Oceans, Ocean Dynamics, Ocean Modelling, Ocean Science, Oceanography, Journal of Oceanography, Geoscientific Model Development; Proposal Reviewer: National Science Foundation, National Aeronautics and Space Administration, Department of Energy, Office of Naval Research Postdoctoral Fellowship Program; Proposal panelist: NASA Earth Science proposal review panels.

WHOI Committees: Information Technology Review Panel, 2014; Center for Marine and Environmental Radioactivity advisory committee, 2013–present; Scientific Advisory Committee on Computing, 2013–present; Scientific Staff Executive Committee, 2012–present; Ad Hoc Computer Information Systems review committee, 2007–2008; Physical Oceanography Department recruitment committee, 2005–2014; University Corporation for Atmospheric Research (UCAR) member representative for WHOI, 2004–present; Arnold Arons Award committee, 2004; Stommel Visiting Scholar organizer, 2003; Information Technology Advisory Committee, 2002–2005.

Community Activities: Co-Chair: International Association of Geodesy (IAG) Study-Group SG4.1: GNSS Remote Sensing & Applications, Chair of Sub-Study-Group SSG4.1.2: Ocean Remote Sensing, 2007–2011; Community Climate System Model (CCSM) Ocean Working Group, 2004–2009; Ocean Sciences Meeting Special Session, 2008; Member: Community Earth System Model (CESM) Scientific Steering Committee, 2012–present; Ocean Surface Topography Science Team, 2008–present; Gravity Recovery and Climate Experiment (GRACE) Science Working Team, 2002–2012; National Defense Science and Engineering Graduate Fellowship, Oceanography panel, 2000–2008; AGU Conference of Experts on "Hurricanes and the U.S. Gulf Coast: Science and Sustainable Rebuilding", 2006; Altimetric BathymetrY from Surface Slopes (ABYSS) Science Working Team, 2001–2004; GPS Oceanography Working Group (NASA), organizing host for Workshop on Oceanography with GPS, 2002.

FIELD EXPERIENCE

2014 U.S. Air Force 53rd Weather Reconnaissance Squadron, float and AXBT deployments, 3 flights
2013 U.S. Air Force 53rd Weather Reconnaissance Squadron, AXBT deployments, 6 flights
2011 R/V *Ka'imikai-O-Kanaloa*, Fukushima radionuclide cruise, 15 days at sea, Co-Chief Scientist
2010 R/V *Revelle*, Impact of Typhoons on the Pacific coldwake cruise, 25 days at sea, Chief Scientist

2006 R/V *Melville*, Kuroshio Extension mooring operations cruise, 12 days at sea, Chief Scientist
2005 R/V *Revelle*, Kuroshio Extension mooring operations cruise, 19 days at sea, Co-Chief Scientist
2004 R/V *Thompson*, Kuroshio Extension mooring operations cruise, 14 days at sea
2003 R/V *Oceanus*, Irminger Sea hydrography and mooring operations cruise, 14 days at sea
1996 R/V *Knorr*, WOCE Indian Ocean (I-2) hydrography cruise, 56 days at sea
1993 R/V *Cape Hatteras*, JGOFS/BATS hydrography cruises, 42 days at sea
1992 R/V *Delaware II*, clam dredging on NOAA/NMFS survey cruises, 36 days at sea
1991 Greenland Ice Sheet Project II, ice core sampling at glacier summit drilling camp, 48 days