

Steven R. Jayne

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- Research Interests*
- Developing statistical estimation techniques for use with the Global Ocean Observing System for mapping ocean velocity and heat content using profiling floats (Argo program), satellite gravity (GRACE), and satellite altimetry (Jason), and the development and application of new remote sensing techniques (*e.g.* GPS reflections and LIDAR)
 - Understanding the dynamics of western boundary current jets, and their associated recirculation gyres and eddy fluxes, through the use of *in-situ* observations, high-resolution ocean general circulation models, and quasi-geostrophic process-model studies
 - Demonstrating the connections between the ocean's tides, the conversion of the tide's energy into internal waves over rough topography, the vertical mixing that results from the breaking internal waves, and the impact of that mixing on Earth's climate

Education

Massachusetts Institute of Technology *Cambridge, MA*
Woods Hole Oceanographic Institution *Woods Hole, MA*
Sc.D. in Oceanography from the MIT/WHOI Joint Program in Oceanography and Applied Ocean Sciences, Department of Physical Oceanography, March 1999. Thesis title: *Dynamics of Global Ocean Heat Transport Variability*, supervised by Prof. Jochem Marotzke (MIT)

Massachusetts Institute of Technology *Cambridge, MA*
S.B. in Earth, Atmospheric, and Planetary Sciences with minors in Mathematics and in Music, June 1994. Thesis title: *Dynamics of a Beta Plane Jet*, supervised by Prof. Paola Malanotte-Rizzoli (MIT) and Dr. Nelson Hogg (WHOI)

Professional Experience

WHOI, Physical Oceanography Department *Woods Hole, MA*
Assistant Scientist: September 2001 – present

NCAR, Climate and Global Dynamics Division *Boulder, CO*
Affiliate Scientist: March 2002 – present

University of Colorado, Department of Physics & CIRES *Boulder, CO*
NCAR, Climate and Global Dynamics Division *Boulder, CO*
Postdoctoral Research Associate: March 1999 – August 2001

MIT, Earth, Atmospheric, and Planetary Sciences Department *Cambridge, MA*
WHOI, Physical Oceanography Department *Woods Hole, MA*
Research Assistant: June 1994 – March 1999

WHOI, Physical Oceanography Department *Woods Hole, MA*
Summer Student Fellow: June 1993 – August 1993

Bermuda Biological Station for Research, Inc. *Ferry Reach, Bermuda*
Work/Study Intern: January 1993 – May 1993

MIT, Earth, Atmospheric, and Planetary Sciences Department *Cambridge, MA*
Undergraduate Research Opportunities Program: September 1990 – May 1991, June 1991 – December 1991, January 1992 – May 1992, June 1992 – August 1992 (at WHOI), September 1992 – December 1992, September 1993 – May 1994

- Awards and Fellowships*
- Office of Naval Research (ONR) Young Investigator Award, 2003
 - Zeldovich Medal for excellence and achievements by a young scientist, Committee on Space Research (COSPAR, Scientific Commission A) 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 excellence in research for Bachelor's thesis, MIT Sea Grant, 1994
 - Goulandris Foundation Award for excellence in marine research, MIT Sea Grant, 1992
- Professional Activities*
- Member of the Gravity Recovery and Climate Experiment (GRACE) Science Working Team
 - Member of the Community Climate System Model (CCSM) Ocean Model Working Group
 - Science Working Team member for the proposed Altimetric Bathymetry from Surface Slopes (ABYSS) mission to map the global ocean bottom topography
 - Member of the GPS Oceanography Working Group (NASA)
 - Member of the American Geophysical Union (AGU)
 - Member of the Committee on Space Research (COSPAR)
 - Reviewer of manuscripts for *Journal of Physical Oceanography*, *Journal of Geophysical Research*, *Journal of Climate*, *Geophysical Research Letters*, *Progress in Oceanography*, *Deep-Sea Research*, and *Journal of Geodesy*, *Nature*, and proposals for the National Science Foundation (NSF), the National Aeronautics and Space Administration (NASA), and the Office of Naval Research (ONR) Postdoctoral Fellowship Program
 - Proposal review panel for NASA Earth Science Enterprise, April 2003
 - Panel member for the National Defense Science and Engineering Graduate Fellowship, administered by the American Society for Engineering Education, 2000–present
 - Organizing committee and host, NASA Workshop on Oceanography with GPS, May 2002
- Cruise and Field Work*
- R/V Oceanus, Irminger Sea hydrography and mooring ops cruise, 14 days at sea, 2003
 - R/V Knorr, Indian Ocean WOCE (I2) hydrography cruise, 56 days at sea, 1996
 - R/V Cape Hatteras, 8 JGOFS/BATS hydrographic cruises, totaling 42 days at sea, 1993
 - R/V Delaware II, clam dredging on 3 NOAA/NMFS survey cruises for 36 days at sea, 1992
 - Greenland Ice Sheet Project II, ice core sampling for 4 weeks at summit camp, 1991
- Advising*
- Stephanie Waterman, MIT/WHOI Joint Program, WHOI advisor
 - Colin Goldblatt, WHOI Summer Student Fellow, University of East Anglia
 - J. Scott Stewart, Ph.D. Thesis Committee, University of Colorado

*Journal
Publications*

- Simmons, H. L., S. R. Jayne, L. C. St. Laurent, and A. J. Weaver, 2003: Internal Tide Driven Mixing in a Model of the Oceanic General Circulation. In press in *Ocean Modelling*. DOI: 10.1016/S1463-5003(03)00011-8.
- Jayne, S. R., J. M. Wahr, and F. O. Bryan, 2003: Observing Ocean Heat Content Using Satellite Gravity and Altimetry. *Journal of Geophysical Research*. Vol. 108, DOI: 10.1029/2002JC001619.
- 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*. Vol. 107, DOI: 10.1029/2001JC001274.
- 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*, Vol. 29, DOI: 10.1029/2002GL015633.
- Jayne, S. R., and J. Marotzke, 2002: The Oceanic Eddy Heat Transport. *Journal of Physical Oceanography*, Vol. 32, pp. 3328–3345.
- Munk, W., M. Dzieciuch, and S. R. Jayne, 2002: Millennial Climate Variability: Is There a Tidal Connection? *Journal of Climate* Vol. 15, pp. 370–385.
- Jayne, S. R., and L. C. St. Laurent, 2001: Parameterizing Dissipation over Rough Topography. *Geophysical Research Letters*, Vol. 28, pp. 811–814.
- Jayne, S. R., and J. Marotzke, 2001: The Dynamics of Wind-Induced Ocean Heat Transport Variability. *Reviews of Geophysics*, Vol. 39, pp. 385–411.
- Jayne, S. R., and N. G. Hogg, 1999: On Recirculation Forced by an Unstable Jet. *Journal of Physical Oceanography*, Vol. 29, pp. 2711–2718.
- Jayne, S. R., and J. Marotzke, 1999: A Destabilizing Thermohaline Circulation — Atmosphere — Sea Ice Feedback. *Journal of Climate*, Vol. 12, pp. 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*, Vol. 27, pp. 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*, Vol. 26, pp. 492–504.

*Other
Publications*

- Jayne, S. R., S. T. Gille, and L. C. St. Laurent, 2002: The Effects of Bathymetry on Climate and Sea Level. To appear in *Bathymetry from Space: Oceanography, Geophysics, and Climatology*, edited by W. H. F. Smith, D. T. Sandwell, S. T. Gille, and J. Orcutt.
- 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*, edited by D. B. Chelton.
- Jayne, S. R., and J. Marotzke, 2000: The Dynamics of Ocean Heat Transport Variability. *WOCE International Newsletter #38*, pp. 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.

*Conference
Abstracts*

- Jayne, S. R., “GRACE — Utility & Validation: Mapping the Time-Mean Circulation of the North Atlantic Ocean”, IUGG Meeting, Sapporo, Japan, July 2003 (**invited**)
- Jayne, S. R., “Ocean Bottom Pressure from GRACE — Utility & Validation”, AGU 2002 Fall Meeting, San Francisco, CA, December 2002 (poster)
- Jayne, S. R., “Connections Between Ocean Bottom Topography and the Earth’s Climate”, Global Bathymetry for Oceanography, Geophysics, and Climatology Workshop, San Diego, CA, October 2002 (**invited**)
- Jayne, S. R., “Parameterizing Diapycnal Mixing over Rough Topography in Ocean General Circulation Models”, Z-coordinate Ocean Modeling Meeting, MIT, Cambridge, MA, August 2002 (**invited**)
- Jayne, S. R., L. C. St. Laurent, and H. L. Simmons, “Parameterizing Diapycnal Mixing over Rough Topography in the Community Climate System Model”, CCSM Meeting, Breckenridge, CO, June 2002 (**invited**)
- Jayne, S. R., L. C. St. Laurent, and H. L. Simmons, “Parameterizing Tidal Dissipation and Diapycnal Mixing over Rough Topography”, Ocean Sciences Meeting, Honolulu, HI, February 2002
- Jayne, S. R., W. H. F. Smith, and the ABYSS Science Working Team, “Ocean Floor Topography from Space: The ABYSS Mission”, Ocean Sciences Meeting, Honolulu, HI, February 2002
- Jayne, S. R., and V. Zlotnicki, “Validating the GRACE Satellites for Ocean Bottom Pressure”, Ocean Sciences Meeting, Honolulu, HI, February 2002 (poster)
- Jayne, S. R., J. M. Wahr, and F. O. Bryan, “Satellite Gravimetry: A New Tool for Physical Oceanography”, IAPSO/IABO Meeting, Mar del Plata, Argentina, October 2001 (**invited**)
- Jayne, S. R., L. C. St. Laurent, and H. L. Simmons, “Parameterizing Tidal Dissipation and Diapycnal Mixing over Rough Topography”, IAPSO/IABO Meeting, Mar del Plata, Argentina, October 2001
- Jayne, S. R., and F. O. Bryan, “Implementing Partial Bottom Cells in the Ocean Component of the Community Climate System Model”, CCSM Meeting, Breckenridge, CO, June 2001 (**invited**)
- Jayne, S. R., J. M. Wahr, and F. O. Bryan, “Determining Steric Sea Surface Height Variability by Combining Data from the Upcoming Jason and GRACE missions”, COSPAR Scientific Assembly, Warsaw, Poland, July 2000 (**invited**)
- Jayne, S. R., J. M. Wahr, and F. O. Bryan, “Determining Steric Sea Surface Height Variability by Combining Data from the Upcoming Jason and GRACE missions”, IAG Gravity, Geoid and Geodynamics Meeting, Banff, Canada, July 2000 (**invited**)
- Jayne, S. R., and L. C. St. Laurent, “A Parameterization for Dissipation over Rough Topography with Applications to the Tides”, Ocean Sciences Meeting, San Antonio, TX, January 2000
- Jayne, S. R., and J. Marotzke, “High-Frequency Ocean Heat Transport Variability”, Ocean Sciences Meeting, San Diego, CA, January 1998
- Jayne, S. R., and J. Marotzke, “High-Frequency Ocean Heat Transport Variability”, École d’Été de Physique Théorique, NATO Advanced Study Institute, Les Houches, France, 1997
- Jayne, S. R., and R. Tokmakian, “Forcing and Sampling of Ocean General Circulation Models: Impact of High-Frequency Motions”, AGU 1996 Fall Meeting, San Francisco, CA, December 1996