

BRIAN K. ARBIC

Research Associate, Institute for Geophysics, Jackson School of Geosciences, The University of
Texas at Austin
Curriculum Vitae

Scientific interests

Global models of barotropic tides, baroclinic tides, and paleotides
Geostrophic turbulence and mesoscale eddies
Energy budget of eddies, tides, and the general circulation
Variability of subsurface ocean temperatures and salinities
Tidal effects on ice streams and ice shelves
Coupling between motions in the ocean and solid earth

Education

- 2000 MIT-WHOI Joint Program, (1994 - 2000)
Massachusetts Institute of Technology, Cambridge, MA
Woods Hole Oceanographic Institution, Woods Hole, MA
Ph.D. in Physical Oceanography
- 1988 University of Michigan, Ann Arbor, MI, (1984 - 1988)
B.S. in Physics (with distinction; high honors) and in Mathematics

Research employment

- 2005–present Research Associate, Institute for Geophysics, The University of Texas at Austin
- 2003–2005 Research Staff Member, AOS Program, Princeton University
Member, ocean biogeochemistry group, headed by Prof. J.L. Sarmiento
Topic: development of isopycnal ocean model for climate/biogeochemistry studies
Collaborated chiefly with Dr. A. Gnanadesikan and Dr. R.W. Hallberg.
- 2001–2003 Visiting Scientist, AOS Program, Princeton University/GFDL
Supervisor: Dr. S.T. Garner Topic: global ocean tides and tidal dissipation
- 1994–2000 Graduate student research assistant, MIT-WHOI Joint Program
Thesis advisor: Prof. G.R. Flierl Topic: ocean eddies/geostrophic turbulence
Also collaborated with Dr. W.B. Owens Topic: sub-thermocline climate change
- 1993–1994 Research assistant, Geology Department, University of Michigan, Ann Arbor
Supervisor: Prof. K. Satake Topic: tsunamis
- 1985–1988 Research assistant, Physics Department, University of Michigan, Ann Arbor
Supervisor: Dr. M. Skalsey Topic: lepton interactions

Teaching/Mentoring

- 2007 With colleague Rob Scott, worked with high school student Ayon Sen on summer project organizing current meter data in the ocean and using it to estimate dissipation of geostrophic flows in the oceanic bottom boundary layer. A paper on the results, with Sen as first author, has been published. A companion paper, with Sen as co-author, is in preparation. Sen entered the results in the Siemens-Westinghouse Science and Technology Competition, placing 4th in the national finals (individual category) out of 1,641 initial entries. Sen also entered the results in the Intel Science Talent Search, and was named one of 40 national finalists, from 1,602 initial entries. Sen was one of only three students in the country to be named as a national finalist in both competitions, and his was the only earth science project represented in the national finals of either competition (during this year).
- 2006 With colleagues Rob Scott and Christina Holland, worked with high school student Ayon Sen on summer project quantifying anisotropy in the ocean. Sen presented posters on the results at Fall 2006 AGU meeting. A paper on the results, with Sen as co-author, has been published.
- 1990–1992 United States Peace Corps, West Africa
Taught secondary school math and physics as a Peace Corps volunteer.
Served first in Liberia (evacuated due to civil war), then in Ghana.

Publications

1. Several manuscripts in preparation.
2. Arbic, B.K., J.X. Mitrovica, D.R. MacAyeal, and G.A. Milne (2008), On the factors behind large Labrador Sea tides during the last glacial cycle and the potential implications for Heinrich events, *Paleoceanography*, **23**, PA3211, doi:10.1029/2007PA001573.
3. Scott, R.B., B.K. Arbic, C.L. Holland, A. Sen, and B. Qiu (2008), Zonal versus meridional velocity variance in satellite observations and realistic and idealized ocean circulation models, *Ocean Modelling*, **23**, doi:10.1016/j.ocemod.2008.04.009, 102-112.
4. Sen, A., R.B. Scott, and B.K. Arbic (2008), Global energy dissipation rate of deep-ocean low-frequency flows by quadratic bottom boundary layer drag: Computations from current-meter data, *Geophysical Research Letters*, **35**, L09606, doi:10.1029/2008GL033407.
5. Arbic, B.K., and R.B. Scott (2008), On quadratic bottom drag, geostrophic turbulence, and oceanic mesoscale eddies, *Journal of Physical Oceanography*, **38**, 84-103.
6. Arbic, B.K., P. St-Laurent, G. Sutherland, and C. Garrett (2007), On the resonance and influence of the tides in Ungava Bay and Hudson Strait, *Geophysical Research Letters*, **34**, L17606, doi:10.1029/2007GL030845.
7. Arbic, B.K., G.R. Flierl, and R.B. Scott (2007), Cascade inequalities for forced-dissipated geostrophic turbulence, *Journal of Physical Oceanography*, **37**, 1470-1487.
8. Scott, R.B., and B.K. Arbic (2007), Spectral energy fluxes in geostrophic turbulence: Implications for ocean energetics, *Journal of Physical Oceanography*, **37**, 673-688.

9. Smith, W.H.F., R. Scharroo, V.V. Titov, D. Arcas, and B.K. Arbic (2005), Satellite altimeters measure tsunamis: Early model estimates confirmed, *Oceanography*, **18**, 11-13.
10. Arbic, B.K. (2005), Atmospheric forcing of the oceanic semidiurnal tide, *Geophysical Research Letters*, **32**, L02610, doi:10.1029/2004GL021668.
11. Arbic, B.K., D.R. MacAyeal, J.X. Mitrovica, and G.A. Milne (2004), Ocean tides and Heinrich events, *Nature*, **432**, 460.
12. Arbic, B.K., S.T. Garner, R.W. Hallberg, and H.L. Simmons (2004), The accuracy of surface elevations in forward global barotropic and baroclinic tide models, *Deep-Sea Research II*, **51**, 3069-3101.
13. Simmons, H.L., R.W. Hallberg, and B.K. Arbic (2004), Internal wave generation in a global baroclinic tide model, *Deep-Sea Research II*, **51**, 3043-3068.
14. Arbic, B.K., and G.R. Flierl (2004), Baroclinically unstable geostrophic turbulence in the limits of strong and weak bottom Ekman friction: Application to mid-ocean eddies, *Journal of Physical Oceanography*, **34**, 2257-2273.
15. Arbic, B.K., and G.R. Flierl (2004), Effects of mean flow direction on energy, isotropy, and coherence of baroclinically unstable beta-plane geostrophic turbulence, *Journal of Physical Oceanography*, **34**, 77-93.
16. Arbic, B.K., and G.R. Flierl (2003), Coherent vortices and kinetic energy ribbons in asymptotic, quasi two-dimensional f-plane turbulence, *Physics of Fluids*, **15**, 2177-2189.
17. Arbic, B.K., and W.B. Owens (2001), Climatic warming of Atlantic intermediate waters, *Journal of Climate*, **14**, 4091-4108.
18. Dickson, B., J. Hurrell, N. Bindoff, A. Wong, B. Arbic, W.B. Owens, S. Imakawi, and I. Yashayaev (2001), *The world during WOCE*, in *Ocean Circulation and Climate*, edited by G. Siedler, J. Church, and J. Gould, Academic Press, London, pp. 557-583.
19. Arbic, B.K., S. Hatamian, M. Skalsey, J. Van House, and W. Zheng (1988), Angular correlation test of CPT in polarized positronium, *Physical Review A*, **37**, 3189-3194.

Review Experience

Reviewer of proposals for
National Science Foundation,
Netherlands Organization for Scientific Research (NWO)

Reviewer of journal articles for
Deep-Sea Research I,
Deep-Sea Research II,
Geophysical Research Letters,
Journal of Geophysical Research-Oceans,
Journal of Physical Oceanography,
Nature Geoscience,
Ocean Dynamics,
Ocean Modelling

Outreach

- 2006 Authored article on “Tides” for World Book Encyclopedia.
 2006 Delivered presentation on tides to Texas Education Service Center coordinators (mentors of teachers).
 2006 Delivered presentation on tides to students at Lake Travis Middle School.
 Ongoing Have delivered numerous presentations on experience as math and science teacher in Peace Corps.

Media Writeups

- 2008 U.S. News and World Report article on the Intel STS, featuring a description of an honorary lecture given by Ayon on behalf of all the finalists.
 Intel Science Talent Search press release on Ayon Sen and on the announcement of the national finalists.
 2007 *Nature Geoscience* highlight of 2007 *Geophysical Research Letters* article on tides in Ungava Bay and Hudson Strait.
 Bipartisan U.S. Senate resolution congratulating Ayon Sen and other national finalists in Siemens high school science competition.
News 8 Austin article and TV story on Ayon Sen’s placement in national finals of Siemens high school science competition.
Austin American-Statesman article on Ayon Sen’s placement in national finals of Siemens high school science competition.
 Siemens Foundation press release on Ayon Sen’s victory in regional finals of Siemens high school science competition.
 2004 Writeups of 2004 *Nature* article on Labrador Sea paleotides by eurekaalert and others.

Community Service

Member of recent review panels (within last three years) for National Science Foundation and for NASA.

Co-convener (with Doug Luther) of session “Observing and Modeling Oceanic Internal Tides and their Impact”, 2006 AGU Ocean Sciences Meeting, Honolulu, Hawaii.

Member, advisory committee, Zanzibar Channel Project, project run by Theiss Research Inc. Project sent an American oceanography graduate student to work with members of the Zanzibar Institute for Marine Sciences on coastal modeling problems.

Jackson School Service

Participated extensively in development of Jackson School strategic plan, particularly in areas of climate graduate curriculum development, expansion of climate research, and outreach to developing nations.

Member, search committee, Jackson School search for multiple permanent hires in Climate Systems Science, 2007-2008. Committee made seven offers for permanent positions, five of which were accepted.

Grants/Awards

- 2007 Office of Naval Research Grant
 “Effects of small-scale bathymetric roughness on the global internal wave field”
 Co-PI with John Goff (U-Texas) on three-year project for 244,017 dollars beginning
 March 23, 2007. Other collaborators: Walter Smith, Karen Marks.
- 2006 National Science Foundation Grant
 “Collaborative Research: Understanding tidal resonances in the present-day and
 ice-age oceans”
 Co-PI with Samar Khatiwala (Lamont-Doherty Earth Observatory, Columbia) on
 three year project for 410,907 dollars (UT part 210,475 dollars) beginning October
 1, 2006. Other collaborators: Chris Garrett, Pierre St-Laurent, Graig Sutherland,
 Doug MacAyeal, Glenn Milne, Jerry Mitrovica.
- 2006 Naval Research Laboratory Contract
 “Embedding a forward model of barotropic and baroclinic tides into a high-
 resolution general circulation model”
 Sole PI on five year project for 553,115 dollars beginning September 1, 2006
 Collaborators: Harley Hurlburt, Joseph Metzger, and Alan Wallcraft of NRL,
 Eric Chassignet of Florida State University
- 1994 NSF Graduate Research Fellowship and AMS Graduate Fellowship
 Awarded, but declined in favor of:
- 1994–1997 ONR-NDSEG Graduate Fellowship
 MIT-WHOI Joint Program, Cambridge and Woods Hole, MA
- 1988 William Williams Undergraduate Physics Thesis Award
- Cruises** WHOI-directed research cruises in North Atlantic.
- Dec 1997 PRIMER experiment, R/V Endeavor (4 days).
 Jul 1997 WOCE, re-occupied 52 West hydrographic section, R/V Knorr (25 days).
 Dec 1996 GLOBEC experiment, R/V Endeavor (4 days).
- Memberships** American Meteorological Society
 American Geophysical Union
- Citizenship** United States of America
- Other**
- 1984–1989 Worked various odd jobs to finance undergraduate education and self.
 1989 Volunteered for Safewalk, a night-time walking service at the University of Michigan.
 Ongoing Avid hiker.
 Ongoing Travel experience in Europe, Asia, South America, Africa and North America.

Conferences

- 2008 Chris Garrett 65th birthday celebration, Victoria, British Columbia
- 2008 Ocean Tide Model Workshop, Hamburg, Germany
- 2008 A Workshop on Mesoscale and Submesoscale Oceanic Processes: Explorations with Wide-Swath Interferometry Radar Altimetry, sponsored by NASA, Scripps Institution of Oceanography, San Diego, CA
- 2008 32nd Society for Industrial and Applied Mathematics Southeastern Atlantic Section Conference, Orlando, Florida
- 2008 AGU Ocean Sciences meeting, Orlando, Florida
- 2008 NCAR workshop on Turbulent Theory and Modeling, Boulder, Colorado
- 2007 IUGG general assembly, Perugia, Italy
- 2007 AMS 16th Conference on Atmospheric and Oceanic Fluid Dynamics, Santa Fe, New Mexico
- 2007 HYCOM numerical model users meeting, Stennis Space Center, Mississippi
- 2006 AGU Fall meeting, San Francisco, California
- 2006 HYCOM numerical model users meeting, Tallahassee, Florida
- 2006 AGU Ocean Sciences meeting, Honolulu, Hawaii
- 2005 AMS 15th Conference on Atmospheric and Oceanic Fluid Dynamics, Cambridge, Massachusetts
- 2004 AGU Fall meeting, San Francisco, California
- 2004 IAPSO/SCOR conference on Ocean Mixing, Victoria, British Columbia
- 2004 SMP JGOFS meeting, Woods Hole, Massachusetts
- 2004 Layered Ocean Model meeting, Miami, Florida
- 2004 AGU Ocean Sciences meeting, Portland, Oregon
- 2003 AMS 14th Conference on Atmospheric and Oceanic Fluid Dynamics, San Antonio, Texas
- 2003 EGS/EUG/AGU meeting, Nice, France
- 2003 Layered Ocean Model meeting, Miami, Florida
- 2002 AGU Ocean Sciences meeting, Honolulu, Hawaii
- 2001 Waves III meeting, Edmonton, Alberta
- 2001 AMS 13th Conference on Atmospheric and Oceanic Fluid Dynamics, Breckenridge, Colorado
- 2000 AGU Ocean Sciences meeting, San Antonio, Texas
- 1999 AMS 12th Conference on Atmospheric and Oceanic Fluid Dynamics, New York, New York
- 1998 AGU Ocean Sciences meeting, San Diego, California

Seminars

USA:

- NOAA/Geophysical Fluid Dynamics Laboratory (GFDL) (eight seminars)
- Oceanography and Climate Sack Lunch Seminar, MIT (five seminars)
- Ocean and Climate Physics Seminar, Lamont-Doherty Earth Observatory, Columbia University (four seminars)
- Physical Oceanography Seminar, WHOI (three seminars)
- Physical Oceanography Seminar, University of Rhode Island (three seminars)
- Earth Sciences Departmental Seminar, University of Chicago (two seminars)
- GFD Summer School Seminar, Walsh Cottage, WHOI (two seminars)
- Physical Oceanography Seminar, Oregon State University (two seminars)
- Oceanography Department, Florida State University (two seminars)
- Institute of Marine and Coastal Sciences Seminar, Rutgers University (two seminars)
- Informal Oceanography Seminar, MIT (two seminars)
- Center for Atmosphere-Ocean Science, Courant Institute, NYU (two seminars)
- Institute for Geophysics, The University of Texas at Austin (two seminars)
- Center for Environmental and Applied Fluid Mechanics Seminar, Johns Hopkins University (two seminars)
- Seminar, Meteorology Department, Florida State University
- Colloquium, IGERT Program, Columbia University
- Physical Oceanography Seminar, Scripps Institution of Oceanography, University of California, San Diego
- Theoretical Seminar, Scripps Institution of Oceanography, University of California, San Diego
- Institute for Computational and Engineering Sciences seminar, The University of Texas at Austin
- Nonlinear Dynamics Seminar, Physics Department, The University of Texas at Austin
- Tech Talk, Department of Geological Sciences, The University of Texas at Austin
- Seminar, Bureau of Economic Geology, The University of Texas at Austin
- Marine Science Institute, The University of Texas at Austin
- Oceanography Seminar, Texas A and M University
- Physical Oceanography Seminar, University of Hawaii at Manoa
- Seminar, Naval Research Laboratory, Stennis Space Center
- Seminar, NOAA NESDIS
- Paleoceanography Group Seminar, Princeton University
- Geophysics Brown Bag Seminar, Princeton University
- Paleoceanography Group Seminar, WHOI
- Laboratory for Hydrospheric Processes Seminar, NASA Goddard Space Flight Center
- Space Geodesy Seminar, NASA Goddard Space Flight Center
- Atmospheric Sciences Seminar, UCLA
- Theory Seminar, Princeton Plasma Physics Laboratory, Princeton University
- Applied Physics Laboratory Seminar, University of Washington
- Marine Sciences Research Center Seminar, SUNY at Stony Brook
- Ocean Sciences Seminar, University of California at Santa Cruz

CANADA:

- TAO Seminar, University of Victoria (two seminars)
- Seminar, Institute for Ocean Sciences

FRANCE:

- IFREMER, Brest (two seminars)
- LMD (Laboratoire de Meteorologie Dynamique), Ecole Normale Supérieure
- LSCE (Laboratoire des Sciences du Climat et de l'Environnement)
- L'OCEAN (formerly LODYC)

UK:

- National Oceanography Centre, Southampton (two seminars)
- British Antarctic Survey
- Proudman Oceanographic Laboratory