

Approved by the
Regents
May 21, 2015

PROMOTION RECOMMENDATION
THE UNIVERSITY OF MICHIGAN
COLLEGE OF LITERATURE, SCIENCE, AND THE ARTS

Brian K. Arbic, assistant professor of Earth and environmental sciences, College of Literature, Science, and the Arts, and assistant professor of atmospheric, oceanic and space sciences, College of Engineering, is recommended for promotion to associate professor of Earth and environmental sciences, with tenure, College of Literature, Science, and the Arts, and associate professor of atmospheric, oceanic and space sciences, without tenure, College of Engineering.

Academic Degrees:

Ph.D.	2000	Massachusetts Institute of Technology
B.S.	1988	University of Michigan

Professional Record:

2010 – present	Assistant Professor, Department of Earth and Environmental Sciences and Department of Atmospheric, Oceanic and Space Sciences, University of Michigan
2010 – present	Affiliation, Applied Physics Program, Applied and Interdisciplinary Mathematics Program, and Center for the Study of Complex Systems, University of Michigan
2008 – 2010	Assistant Professor, Department of Oceanography, Florida State University
2005 – 2008	Research Associate, Institute for Geophysics, Jackson School of Geosciences, The University of Texas at Austin
2003 – 2005	Research Staff Member, Atmospheric and Oceanic Sciences Program, Princeton University
2001– 2003	Visiting Scientist, Atmospheric and Oceanic Sciences Program, Princeton University

Summary of Evaluation:

Teaching – Professor Arbic is a dedicated and accomplished instructor whose teaching extends beyond the classroom. He has taught large enrollment (>150 student) introductory and upper level undergraduate courses in oceanography, and he developed a science course for aspiring elementary school teachers. Professor Arbic is committed to pedagogical methods that optimize active learning and real world experiences. For example, he offers an optional field trip in his upper level oceanography class that gives students the opportunity to operate oceanographic instruments on a NOAA research vessel. He has included seven undergraduate students in his research, three of whom have successfully advanced to graduate school. He currently supervises five Ph.D. students, and he has served on eight thesis committees and thirteen preliminary exam committees across several departments.

Research – Professor Arbic is a physical oceanographer with expertise in ocean modeling. He is widely regarded as a leader in tidal research, and the leader in the effect of bottom friction and drag on ocean flow. He is well known for his pioneering efforts to simulate ocean tides and circulation simultaneously, and is active in analyzing and determining the limitations of satellite

altimetry estimates. Professor Arbic has a productive and very well-funded research program. He has published 41 papers and has been awarded over \$2.7 million in research funding.

Recent and Significant Publications:

- “Nonlinear cascades of surface oceanic geostrophic kinetic energy in the frequency domain,” with R. B. Scott, et al., *Journal of Physical Oceanography*, 42, 2012, doi:10.1175/JPO-D-11-0151.1,1577-1600.
- “Global modeling of internal tides within an eddying ocean general circulation model,” with J. G. Richman, et al., *Oceanography*, 25, 2012, doi:10.5670/oceanog.2012.38.
- “A coupled oscillator model of shelf and ocean tides,” with C. Garrett, *Continental Shelf Research*, 30, 2010, pp. 564-574, doi:10.1016/j.csr.2009.07.008.
- “Concurrent simulation of the eddying general circulation and tides in a global ocean model,” with A. J. Wallcraft and E. J. Metzger, *Ocean Modelling*, 32, 2010, pp. 175-187, doi:10.1016/j.ocemod.2010.01.007.

Service – Professor Arbic has contributed significant service through his participation on departmental committees, including the Turner Student Awards Committee, the Turner Post-doctoral Fellowship Committee, the Computer Committee, and two faculty search committees, one of which he chaired. He also assisted in organizing and judging the Michigan Geophysical Union, a graduate-student led research symposium co-convened by the Departments of Earth and Environmental Sciences and Atmospheric, Oceanic and Space Sciences in the College of Engineering. He served on two university committees—the ARCAT Committee on University Supercomputing and the STEM Africa Committee. Beyond the university, his service includes co-convening sessions at national science meetings, hosting the 2013 Layered Ocean Model meeting in Ann Arbor, and efforts to establish oceanography summer schools in Ghana.

External Reviewers:

Reviewer (A)

“I see him as already having had some major achievements, developed a strong reputation in the community, and set up some very useful collaborations. He has demonstrated creativity, sustained productivity and considerable scientific skill. As a scientist being considered for an associate professorship, I would rate him very highly indeed: one of the best I have known of.”

Reviewer (B)

“Brian has impressed me as one of the most outstanding ocean modelers (within top 10 %) in the past decade. He has brilliantly demonstrated the mechanisms of energy cascade in oceanic quasi-geostrophic turbulence with the use of a hierarchy of numerical models with keen comparison to observations. ... I believe Brian’s work has moved the field forward in a very significant manner.”

Reviewer (C)

“Brian is a clearly a leader in the modern...study of global tides, both surface and internal. ...[the] list of people willing to collaborate with him as co-authors shows that he is in the leading group of...researchers on topics of interest to him. ... I strongly recommend his promotion and tenure at the University of Michigan.”

Reviewer (D)

"...Brian is a star research scientist and amazing educator. ... I consider Brian to be among the top research scientists of his generation. He is creative, incredibly productive, and amazingly capable as a writer, communicator, educator, and mentor. Anyone discussing science with Brian soon realizes that his head and heart are fully engaged in the work. His sincere and unpretentious engagement in science helps to bring out the most from his collaborators, whether they are top senior scientists or bright high school students."

Reviewer (E)

"I would characterize his work as being extremely solid and thorough – his papers are always worth reading, a much under-rated virtue in the modern metric-dominated academic world! ...Arbic tends to write solid papers that are likely to have a longer term impact... ..he has also attracted a steady stream of funding, including ongoing grants..."

Reviewer (F)

"One of your questions concerned how Brian's papers would rank for significance, which I interpret as making an impact on his field. I would cite his papers in the area of merging tidal and mesoscale variability in numerical models as having a huge impact. This is cutting edge work... These efforts by Brian and his collaborators are leading the way to the next generation of ocean models. ... Brian's success with external funding is exceptional by any standard that I'm aware of."

Reviewer (G)

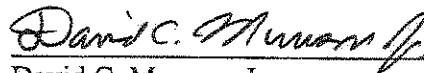
"I find it difficult to establish a group of contemporaries one might compare Brian to – anyone I can think of has far narrower interests and/or less rigorous training in the fundamentals... One might think of... a scientist who has similar research interests, but Brian's work has had significantly more impact. Moreover, I believe that Brian's contributions will ultimately eclipse those of more senior scientists..."

Summary of Recommendation:

Professor Arbic is a talented instructor and dedicated mentor. He is also an innovative teacher and valued departmental citizen. The Executive Committees of the College of Literature, Science, and the Arts and the College of Engineering recommend that Assistant Professor Brian K. Arbic be promoted to the rank of associate professor of Earth and environmental sciences, with tenure, College of Literature, Science, and the Arts, and associate professor of atmospheric, oceanic and space sciences, without tenure, College of Engineering.



Andrew D. Martin
Dean, and Professor of Political Science,
College of Literature, Science, and the Arts



David C. Munson, Jr.
Robert J. Vlasic Dean of Engineering,
College of Engineering

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