

PROMOTION RECOMMENDATION
The University of Michigan
College of Literature, Science, and the Arts

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

Academic Degrees:

Ph.D.	2000	Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program
B.S.	1988	University of Michigan

Professional Record:

2017 – 2018	Visiting Professor, Institut des Geosciences de L'Environnement (IGE), Universite Grenoble Alpes, and Centre National de la Recherche Scientifique (CNRS), Grenoble, France
2015 – present	Associate Professor, Department of Earth and Environmental Sciences, and Associate Professor, Department of Climate and Space Sciences and Engineering, Applied and Interdisciplinary Mathematics Program, and Applied Physics Program
2010 – 2015	Assistant Professor, Department of Earth and Environmental Sciences, University of Michigan
2008 – 2010	Assistant Professor, Department of Oceanography, Florida State University
2005 – 2008	Research Associate (tenure-track research scientist position), 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's teaching accomplishments are strong, particularly for his high-enrollment introductory oceanography course, which he has taught each year since 2015. He offers an advanced upper-level course in physical oceanography that consistently receives high student evaluations and attracts undergraduate and graduate students from a wide variety of disciplines. Professor Arbic has also led a major team effort to develop and teach a course for elementary school educators, who will hopefully go on to engage and excite children about the wonders of science during elementary school. He has effectively contributed to the professional development of graduate students and has mentored students in research outside of traditional courses. Since 2015, he has supervised eight undergraduate research assistants, advised four

undergraduate students, mentored three post-doctoral scholars, and graduated three Ph.D. and one M.S. student.

Research – Professor Arbic is a physical oceanographer who computationally models how oceanic motions across a wide array of spatial and temporal scales influence global oceanic circulation. His research has important practical applications and societal relevance in areas of marine fisheries research, coastal engineering, and studies of global climate change. Several external reviewers state that Professor Arbic is an international leader in modeling ocean tides and eddies in global ocean circulation models.

Recent and Significant Publications:

- “The role of rough topography in mediating impacts of bottom drag in eddying ocean circulation models,” with D. S. Trossman, et al., *Journal of Physical Oceanography*, 47, 2017, pp. 1941-1959, doi: 10.1175/JPO-D-16-0229.1 [3.086, 2, 2].
- “Frequency content of sea surface height variability from internal gravity waves to mesoscale eddies,” with A. C. Savage, et al., *Journal of Geophysical Research Oceans*, 122, 2017, pp. 2519-2538, doi: 10.1002/2016JC012331 [2.711, 9, 14].
- “Impact of internal wave drag on the semidiurnal energy balance in a global ocean circulation model,” with M. C. Buijsman, et al., *Journal of Physical Oceanography*, 46, 2016, pp. 1399-1419, doi: 10.1175/JPO-D-15-0074.1 [3.086, 23, 27].
- “Indirect evidence for substantial damping of low-mode internal tides in the open ocean,” J. K. Ansong, et al., *Journal of Geophysical Research Oceans*, 120, 2015, pp. 6057-6071, doi: 10.1002/2015JC010998 [2.711, 14, 19].

Service – Professor Arbic has filled several different service roles in the department, including recruitment of faculty, diversity initiatives, and service on the Executive Committee. At the university level, he has played an active role in a range of committees. His professional service includes activities within several federal agencies. Some of his service — in particular, his involvement in an oceanography training capacity in western Africa—carries a significant societal impact.

External Reviews:

Reviewer (A)

“Brian’s work has had considerable impact...because [of] his nearly unique niche, and partly because he has chosen important problems and provided strong results. ...he is prominent internationally. This shows through his publications in top-quality journals, and through the sorts of people who he attracts as co-authors. I know that he is well-respected among the people I regard as the best in the field.”

Reviewer (B)

“He is the world leader in modeling internal waves and tides in global scale models. In this role, he has been a key player in national and international teams focused on understanding and parameterizing these processes and for remote sensing projects that aim to measure and/or filter out these signals. This has placed him on numerous ONR, NASA and European research teams, scientific working groups and review panels.”

Reviewer (C)

“Brian has impressed me as one of the most outstanding physical oceanographers (within top 10%) in the past decade. He has brilliantly demonstrated the mechanisms of energy cascade in oceanic quasigeostrophic turbulence with the use of a hierarchy of numerical models with keen comparison to observations. This is a fundamental problem in understanding the role of the mesoscale eddies in shaping the large-scale ocean circulation. I believe Brian’s work has moved the field forward in a very significant manner.”

Reviewer (D)

“My overall view is that Dr[.] Arbic is playing a leading role in a very important and fruitful research area, namely the exploitation of increasingly high-resolution numerical models to understand very important aspects of the physics of the atmosphere and the ocean.”

Reviewer (E)

“Brian’s research productivity in terms of grants, papers and impact easily, in my opinion, justifies the promotion. His mentoring of students and postdocs similarly justifies the promotion.”

Reviewer (F)

“In particular, his work was instrumental in allowing probably the leading ocean modeling system, HYCOM, to incorporate these internal tide effects, and tide effects in general into the system. Brian is the world expert on these important improvements to the modeling.”

Summary of Recommendation:

Professor Arbic has established a productive and impactful research program, has made substantial contributions to the undergraduate and graduate programs in the department, and is a valued colleague within the university and his professional community. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Associate Professor Brian K. Arbic be promoted to the rank of professor of Earth and environmental sciences, with tenure, College of Literature, Science, and the Arts, and professor of climate and space sciences and engineering, without tenure, College of Engineering.



Elizabeth R. Cole, Interim Dean
Professor of Women’s Studies, Psychology
and Afroamerican and African Studies
College of Literature, Science, and the Arts



Alec D. Gallimore, Ph.D.
Robert J. Vlasic Dean of Engineering
College of Engineering

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