

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

Shravan K. Veerapaneni, assistant professor of mathematics, College of Literature, Science, and the Arts, is recommended for promotion to associate professor of mathematics, with tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D.	2008	University of Pennsylvania
B.Tech.	2003	Indian Institute of Technology

Professional Record:

2011 – present	Assistant Professor, Department of Mathematics, University of Michigan
2008 – 2011	Research Scientist, Courant Institute of Mathematical Sciences, New York University

Summary of Evaluation:

Teaching – Professor Veerapaneni is an effective and dedicated teacher. At the undergraduate level, he has demonstrated his commitment to teaching by taking on difficult service courses required for students from other departments. In upper-division courses he has developed a fresh approach to the curriculum that brings students closer to the frontier of real-world applications. Outside the classroom, Professor Veerapaneni has been heavily involved in the Department of Mathematics' Research Experiences for Undergraduates program (REU). At the graduate level, he has successfully supervised one Ph.D. and one M.S. student, and is currently supervising two more Ph.D. students.

Research – Professor Veerapaneni has emerged as a rising star in the field of scientific computation, leading a new wave of innovation with his development of fast, highly accurate numerical methods for solving partial differential equations. He has earned a reputation for careful attention to detail and a willingness to attack hard computational problems in biophysics and engineering. Professor Veerapaneni has been awarded government-sponsored support for his research, including a recent five-year National Science Foundation (NSF) CAREER award. All indications point toward his continued growth as an outstanding scholar with an international reputation.

Recent and Significant Publications:

- “Gating of a mechanosensitive channel due to cellular flows,” with O.-S. Pak, et al., *Proceedings of the National Academy of Sciences*, 112(32), 2015.
- “Boundary integral method for the flow of vesicles with viscosity contrast in three dimensions,” with A. Rahimian, et al., *Journal of Computational Physics*, 298, 2015, pp. 766-786.
- “Long-wave dynamics of an inextensible planar membrane in an electric field,” with Y.-N. Young and M. Miksis, *Journal of Fluid Mechanics*, 751, 2014, pp. 406–431.
- “A fast algorithm for spherical grid rotations and its application to singular quadrature,” with Z. Gimbutas, *SIAM Journal on Scientific Computing*, 35, 2013, 6th issue.

Service – Professor Veerapaneni has done a substantial amount of service work in the Department of Mathematics and to the wider community. Internally, he served for five years on the Admissions and Fellowships Committee for the Graduate Program in Applied and Industrial Mathematics, and for four years on the Undergraduate Research Committee. The latter includes organizing a summer seminar series for undergraduate students to present their results. He has also served on several external grant-evaluation panels (including three at the NSF), and organized or co-organized several mini-symposia. In addition, Professor Veerapaneni has served on eight Ph.D. thesis committees in other departments, including three outside the university.

External Reviewers:

Reviewer (A)

“...[Veerapaneni] has developed into an independent researcher while maintaining a high standard of quality. His current level of activity is high, and he has students participating in his research program. He is broadly knowledgeable in scientific computing, including continuum modeling, analytic techniques of applied mathematics, numerical issues associated with stability and efficiency, and sophisticated numerical techniques. ... He is doing leading work in an area that promises to have impact on scientific advances. I think he would be a valuable addition to any mathematics department with a commitment to scientific computation, and I enthusiastically recommend his promotion.”

Reviewer (B)

“At the University of Michigan Shraavan has been extremely productive, extending the work on vesicles to cover more complex phenomena... His most recent work on a numerical method for Stokesian mobility problems and magnetorheology is a tour de force of numerical analysis that resolves significant problems with existing methods.”

Reviewer (C)

“When I think of researchers contributing to high-fidelity numerical methods for boundary integral methods, especially for Stokes flow suspensions in complex geometries, Prof. Veerapaneni comes immediately to mind, which is a testament to both his visibility and the value of his contributions.”

Reviewer (D)

“...Shraavan is a superb computational scientist who has established himself as a national leader in numerical analysis, with a particular expertise in fluid-structure interactions, heat flow, viscous flow, and (more generally) potential theory. He is very productive, has excellent taste, is enthusiastic and personable, and builds important interactions between mathematics, engineering, and biophysics.”

Reviewer (E)

“The simultaneous breadth and depth of his work and his focus on important problems is truly outstanding. Shraavan’s ability to form partnerships with both leading senior experts and talented scientists [in their cohort] in a variety of fields seems to be extremely strong. This kind of researcher has a bright future in a world where important research problems get increasingly complicated and where interdisciplinary collaboration is increasingly essential.”

Reviewer (F)

“Dr. Veerapaneni has in less than 10 years published 20 very solid papers. He consistently publishes in top journals... I am familiar with several of these papers, and consider them to be of very high quality. I must stress that the work that Dr. Veerapaneni does is very challenging. That the types of techniques that he employs should in principle be very powerful for the problems that he addresses has been known for decades. The promise has always been there... However, actually realizing this promise has proven much harder than originally anticipated. In order for a simulation to be successful, the researcher who designs it must be an expert on a broad range of subjects... ..it is only in the last decade or so that we have started to see simulations that to very high accuracy resolve problems involving realistic physical interactions in highly complex geometry. The work of Dr. Veerapaneni is at the forefront of this field, and is very well regarded in the community.”

Reviewer (G)

“Prof. Veerapaneni is an active faculty member contributing to all aspects of academic life. I expect these contributions to continue in the future. He has an international reputation that continues to grow. He is one of the leading...computational scientists [in his cohort] today. ... I very strongly and without hesitation support his tenure and promotion.”

Reviewer (H)

“Shravan is an extremely talented scholar with deep interdisciplinary knowledge spanning the fields of physics, mechanics, biology, and applied mathematics. ... In addition to mastering highly advanced mathematical and computational problems, Shravan is also keen on testing the implications of his studies to real problems. To this end, he has recently contributed to a longstanding biological problem ‘Gating of mechanosensitive channel due to cellular flow’ (2015) which appeared in the high standard American journal *PNAS*. This is already very praiseworthy for a biophysicist, but is exceptional for an applied mathematician.”

Summary of Recommendation:

Professor Veerapaneni has become a leading figure in scientific computation. At the same time, he is a dedicated and effective teacher as well as an actively involved citizen. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Assistant Professor Shravan K. Veerapaneni be promoted to the rank of associate professor of mathematics, with tenure, College of Literature, Science, and the Arts.



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

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