

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

Divakar Viswanath, associate professor of mathematics, with tenure, College of Literature, Science, and the Arts, is recommended for promotion to professor of mathematics, with tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D. 1998 Cornell University  
B. Tech. 1992 Indian Institute of Technology

Professional Record:

2007 – present Associate Professor, Department of Mathematics, University of Michigan  
2008 Visiting Professor, Department of Mathematics, Indian Institute of Science  
2001 – 2007 Assistant Professor, Department of Mathematics, University of Michigan  
1999 – 2001 L.E. Dickson Instructor, Department of Mathematics, University of Chicago  
1998 – 1999 Post-doctoral Fellow, Mathematical Sciences Research Institute

Summary of Evaluation:

Teaching – Professor Viswanath’s classroom teaching since his promotion to tenure has been entirely in applied mathematics courses, ranging in level from first-year undergraduate to advanced graduate. Student evaluations are high across the board. He designed and taught a special course that focused on parallel computer architecture and software which attracted students from science and engineering departments as well as from mathematics. Professor Viswanath is writing a book based largely on this course on how to take advantage of recent hardware advances to accelerate numerical computation. He has supervised one doctoral thesis and is currently supervising two more. He has also supervised the research projects of six undergraduate students.

Research – Professor Viswanath performs research in applied mathematics and scientific computation. His work displays great technical strength, creativity, and sophistication in developing numerical algorithms. Techniques that he developed for computation of dynamical processes have been adopted by other leading researchers. They have revealed phenomena that were missed by earlier computational techniques, and have forced a rethinking of the physical basis for the onset of turbulence in fluid flow. His work spans a wide range of topics and is published in prestigious journals. Professor Viswanath’s research has been recognized by numerous honors, including a Sloan fellowship, second prize in the Leslie Fox Prize competition, and an invitation to address the Abel Symposium. He has been supported by National Science Foundation funding since 2004.

Recent and Significant Publications:

“Complex singularities and the Lorenz attractor,” with S. Şahutoğlu, *SIAM Review*, 52, 2010, pp. 294–314.

“The critical layer in pipe flow at high Reynolds number,” *Philosophical Transactions of the Royal Society A*, 367, 2009, pp. 561–576.

“Exact and asymptotic conditions on the traveling wave solutions of the Navier-Stokes equations,” with Y. C. Li, *Physics of Fluids*, 21, 2009, article 101703.

“Stable manifolds and the transition to turbulence in pipe flow,” with D. Cvitanović, *Journal of Fluid Mechanics*, 627, 2009, pp. 215–233

Service – Professor Viswanath has served on important committees and as the principal investigator for a computing grant in his department. He has also served on grant review panels for the National Science Foundation, as associate editor of a book series, as a referee for many journals, and as seminar co-organizer.

#### External Reviews:

##### Reviewer (A)

“Viswanath’s 2003 paper on the periodic orbits of the Lorenz equations set a new standard for numerical computation of such orbits. ... The spectrum of periodic orbits in the attracting set of a turbulent fluid is devilishly complicated...but it is now within the realm of possibility, thanks to Viswanath’s work. ... All of the papers were of very high quality, and were written with evident attention to pedagogy and clarity.”

##### Reviewer (B)

“A common theme in many of Divakar’s publications is the application of clever numerical methods to obtain results of unexpected accuracy and reliability, and thereby gain previously inaccessible insights. ... This is numerical analysis at its best...and he has contributed several outstanding results. ... Over the years, he has again and again impressed me with his deep understanding and intuition about the internal workings of numerical methods and his ability to improve them to regions I would have considered inaccessible.”

##### Reviewer (C)

“Looking at the rest of his CV I see that he has made numerous numerical contributions in several areas... ..he has a good list of publications in excellent journals.”

##### Reviewer (D)

“He is a remarkable mathematician [of his generation] at the height of his powers: creative, intelligent and with guts to consider (and occasionally conquer) difficult problems of fundamental importance. I have no hesitation in recommending him for promotion.”

##### Reviewer (E)

“He is a leading mathematician of dynamical systems theory... The...matrix-free method developed by Prof. Viswanath has had a strong impact on turbulence research, and how many scientists...are using his method. This should be...clear evidence of [the] significance of his work. ...thus I would like to strongly recommend him for promotion to full professor.”

##### Reviewer (F)

“Divakar strikes me as a deep and creative thinker who has the courage and confidence to follow his own tastes. ...this is how breakthroughs are made...”

Reviewer (G)

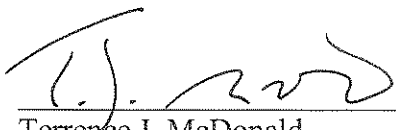
“Professor Viswanath is a unique applied mathematician. He frequently works on his own. His work is of a very high quality; his results are always interesting and his ideas always original.”

Reviewer (H)

“He has excellent taste and has shed new light on a number of long-standing difficult problems... In everything he does, he shows a flair for using rigorous mathematics to create delicate, new, high-precision numerical algorithms. ... He’s also a very clear communicator. His papers are a pleasure to read.”

Summary of Recommendation:

Professor Viswanath has established himself as a leading researcher in scientific computation, fluid dynamics, and other areas of applied mathematics. He makes an essential contribution to teaching and mentoring, and he has done important service work. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Associate Professor Divakar Viswanath be promoted to the rank of professor of mathematics, with tenure, in the College of Literature, Science, and the Arts.



---

Terrence J. McDonald  
Arthur F. Thurnau Professor,  
Professor of History and Dean  
College of Literature, Science, and the Arts

May 2012