

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

Selim Esedoglu, 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.	2000	New York University
M.S.	1998	New York University
Sc.B.	1996	Brown University

Professional Record:

2005 – present	Assistant Professor, Department of Mathematics, University of Michigan
2002 – 2005	CAM Assistant Professor of Mathematics, University of California, Los Angeles
2000 – 2002	Postdoctoral Associate, Institute for Mathematics and its Applications, University of Minnesota

Summary of Evaluation:

Teaching – Although Professor Esedoglu has taught relatively few courses during his short time at Michigan, he has contributed greatly to several areas of the Department’s educational mission, including teaching sophomore applied honors mathematics, a core service course in numerical analysis, and a graduate topics course of his own design. He supervised two students in the Research Experience for Undergraduates and currently has two doctoral students.

Research – Professor Esedoglu is an applied mathematician whose work focuses on image processing and computer vision. He is a key player in a growing community of researchers who are using methods drawn from partial differential equations, numerical analysis, and calculus of variations to design and analyze algorithms for processing images. Professor Esedoglu has a well funded research program with grants from the National Science Foundation, the Los Alamos National Laboratory, and the National Geospatial Intelligence Agency. He was awarded a Sloan Fellowship in 2007. Currently he has published eighteen papers in refereed journals with four manuscripts under review.

Recent and Significant Publications:

- “Analysis of a two-scale Cahn-Hilliard model for image inpainting,” with A. Bertozzi and A. Gillette, *Society for Industrial and Applied Mathematics (SIAM): Journal on Multiscale Modeling and Simulation*, 6(3), 2007, p. 913-936.
- “Threshold dynamics for the piecewise constant Mumford-Shah functional,” with Y.-H. Tsai, *Journal of Computational Physics*, 211(1), 2006, pp. 367-384.
- “Aspects of total variation regularized L^1 function approximation,” with T. F. Chan, *SIAM Journal on Applied Mathematics*, 65(5), 2005, pp. 1817-1837.
- “Decomposition of images by the anisotropic Rudin-Osher-Fatemi model,” with S. J. Osher, *Communications on Pure and Applied Mathematics*, 57 (2004), pp. 1609-1626.

Service – Professor Esedoglu has made well above average contributions to the service mission of the Department, including service on the Computer Committee, the Executive Committee, as well as co-director and director of the Research Experience for Undergraduates (REU) Program.

External Reviews:

Reviewer (A)

“Dr. Esedoglu is truly outstanding in his achievements. ... He is internationally noted and recognized. ... Would he get tenure at my institution? Of course he would.”

Reviewer (B)

“I consider Selim to be one of a very elite group of analysts...with an eye to modern problems and scientific applications whose importance will have long-lasting significance. His work has made many important contributions to the use of PDE-based models for image processing. While traditionally, much research in differential equations stems from extensions of models in classical physics, Selim’s work reflects many of the modern aspects of applied partial differential equations.”

Reviewer (C)

“He is driven, he has superb communication skills, and he has a knack for picking good problems. His raw analytical abilities, combined with his use of the computer as an investigation tool, makes him somewhat unique. At the same time he is cognizant of the importance of scientific computation in his work and has succeeded in developing powerful methods for image processing.”

Reviewer (D)

“...Esedoglu’s contributions lie at the fertile interface between image processing, PDE, and the calculus of variations. Through his work, mathematics is having dramatic impact on computer vision – and conversely. This is mathematics of the very highest caliber. Selim certainly deserves promotion and tenure at the University of Michigan.”

Reviewer (E)

“He is with no doubt one of the leading researchers [of his generation] on mathematical imaging in the US. Compared to other competing candidates of his [generation] he covers both deep analysis of the fundamental models and effective numerical schemes. His papers are carefully worked out and he has a very concentrated working style. ... He gives excellent lectures...”

Reviewer (F)

“With respect to every measure and standard that I can think of to justify tenure at a top department like yours, Selim excels and surpass[es] each amply. First and foremost, he has produced a body of research work that is impressive in both quality and quantity. ... It is rare that work at this early stage of a career has had such range and depth of impact. ...speaking as a former Chair and Dean, Selim has certainly met, indeed exceeded, the usual expectations for tenure in a top research department, including my own.”

Reviewer (G)

“He has produced leading work and I would range him as one of the leading persons [of his generation] in the mathematical community devoted to image processing.”

Reviewer (H)

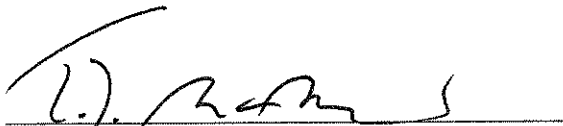
“I like his analysis in his thesis of the Perona-Malik equation, and its recent follow-up on ‘coarsening rate’ a great deal. I feel he is the first person to say something non-trivial about this mysterious equation. ... His analysis of it in terms of equations which start with dense singularities and gradually smooth them out is great.”

Reviewer (I)

“I have no doubt that Esedoglu will grow to be a leading figure in the field of applied nonlinear PDEs. His toolkit already includes studying a host of phenomena driven by geometric PDEs, from material science to image processing. He will do very well with collaborators and students.”

Summary of Recommendation:

Professor Esedoglu is regarded as a leading member of the growing group of researchers in his area. His record in teaching and service is substantial. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Assistant Professor Selim Esedoglu be promoted to the rank of associate 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

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