

PROMOTION RECOMMENDATION
The University of Michigan-Dearborn
College of Arts, Sciences, and Letters

Joan C. Remski, associate professor of mathematics, with tenure, Department of Mathematics and Statistics, College of Arts, Sciences, and Letters, is recommended for promotion to professor of mathematics, with tenure, Department of Mathematics and Statistics, College of Arts, Sciences, and Letters.

Academic Degrees:

Ph.D.	1997	Mathematics, Michigan State University, Lansing, MI
B.S.	1990	Mathematics, University of Michigan-Dearborn, MI

Professional Record:

2003 – present	Associate Professor, Department of Mathematics and Statistics, University of Michigan-Dearborn
1997 – 2003	Assistant Professor, Department of Mathematics and Statistics, University of Michigan-Dearborn

Summary of Evaluation:

Teaching: Professor Remski's teaching is ranked as excellent. Professor Remski has developed new undergraduate and graduate courses, and has adapted some of these to hybrid formats. She developed a new required course for mathematics majors, Computing Environments for Math Majors, which gives math students better programming skills early in their studies. In the classroom, she has taught a variety of courses from introductory-level Calculus sequence to the pure masters-level courses; she has supervised seven projects for the ACM (Applied and Computational Mathematics) Master's Program since her last promotion; she has worked with three undergraduates — one of these resulting in a publication for the student in an IEEE Journal; she has been selected as a site participant for a project that promotes open-source software in the undergraduate curriculum. The breadth of the courses taught by Professor Remski demonstrates her versatility at both the undergraduate and graduate levels; the masters-level projects indicate that students seek her out as a knowledgeable mentor. Outside the classroom, she annually coaches a team representing our campus in the national Mathematics Modeling Competition; she was a co-organizer of the Michigan Undergraduate Mathematics Conference on our campus in 2008. The reflections on comments made by students on in-class teaching evaluations almost uniformly praise her expertise and clarity, while noting her expectations of them are high.

Research: Professor Remski's research is ranked as significantly capable. Professor Remski's research covers two distinctive areas: Singular Value Decomposition and Adaptive Moving Mesh Methods. She has contributed a dozen presentations at local, regional and national meetings since her last promotion, and she was an organizer for two Great Lakes Section SIAM Conferences hosted on the UM-Dearborn campus, one in spring 2010 and most recently spring 2016. She has produced both solo and joint papers. Enriching the department, she has collaborated with several of her departmental colleagues as well as scholars at other institutions.

Recent and Significant Publications:

J. Remski, "Mesh Spacing Estimates and Efficiency Considerations for Moving Mesh Systems,"

Numerical Mathematics: Theory, Methods and Applications. vol. 9, issue 03, 2016. pp. 432-450.

- J. Remski, J. Zhang, and Q. Du, "On Balanced Moving Mesh Methods," *Journal of Computational and Applied Mathematics*, vol 265, Current Trends and Progresses in Scientific Computation — Dedicated to Professor Ben-yu Guo on his 70th Birthday, August, 2014. pp. 255-263.
- D. James, M. Lachance, and J. Remski. "Singular Vectors Subtle Secrets," *College Mathematics Journal*, vol. 42, no. 2, 2011. pp. 86-95.
- J. Clifford, D. James, M. Lachance, and J. Remski, "A Constructive Approach to the Singular Value Decomposition and Symmetric Schur Factorization," *The American Mathematical Monthly*, vol. 112, no. 4, 2005, pp. 353-363.
- J. Remski. "The Transport Equation: An Application of Directional Derivatives," *Journal of Online Mathematics and Applications*, 2005.

Service: Professor Remski's service is ranked as excellent. Professor Remski was a member of the Senate, was the vice chair of the Senate Council, was a member and chair of the Senate Promotion & Tenure Committee, and is a current member of the Faculty Senate Grievance Panel. Among the significant service contributions, Professor Remski has served as the director of the ACM Master Program twice. In addition, Professor Remski has been active in campus strategic planning by virtue of serving on the Vision 2020: Improvement 17 Committee, in preparation for the campus' reaccreditation effort by serving on the General Education Committee, and in graduate education by serving three years on the Graduate Board. Her outstanding service contributions were recognized publicly as she was awarded the University of Michigan-Dearborn's Distinguished Service Award in 2014. Presently, she represents Mathematics and Statistics on CASL's Executive Committee, and is currently serving as the secretary of the Great Lakes Section of the Society for Industrial and Applied Mathematics (GLS-SIAM).

External Reviewers:

Reviewer A: "The CMJ paper .. on the subtle secrets of singular vectors is outstanding. It is beautifully explicated and provides the reader with an excellent overview of some key properties of the SVD, including how that decomposition allows us to write a given matrix A as a sum of rank-one matrices, and indeed as a sum that is best possible in a certain sense. ... The Monthly paper ... is very good and a nice contribution to the literature surrounding mathematicians' understanding of the SVD. While there are other strong expositions of the development and importance of the SVD, Remski and her colleagues offer a new perspective that takes advantage of the continuity of a linear transformation, and offers clever insight into orthogonality among the left singular vectors. Their elegant constructive proof is new and adds depth to our understanding of how and why a linear transformation always maps the unit sphere in the domain space to an ellipsoid in the image space. ... The final two papers ... demonstrate to me that Remski has an active program of original research that is both collaborative and independent and is producing new results that professional peers deem worthy of sharing with the broader community."

Reviewer B: "I think that her publication ... published in *Journal of Computational and Applied Mathematics* with her former Ph.D. advisor, Dr. Qiang Du, is impressive [sic] ... From her CV, Dr. Remski has directed or mentored several graduate students and undergraduate students. Her services to the university, to the profession, and to the community are excellent."

Reviewer C: "In summary, ... are useful for students to better understand SVD and its applications while will help them learn the transport equation specifically and PDEs in general.

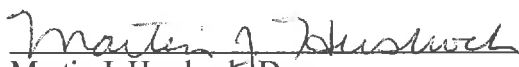
Her recent work is a significant contribution to the area of moving mesh methods which may shed light on developing more efficient implementations of moving mesh methods and help practitioners use them in applications. ... I would also like to mention that Dr. Remski has advised 7 master students and 3 undergraduate students (for research projects) since 2004. This is impressive especially it is on the top of her heavy teaching load and heavy university and department services. Dr. Remski also gives presentations regularly.”


Reviewer D: “Dr. Remski is focusing on important and timely topics in applied math. While the quantity and impact of her work are modest, the quality is good. Her work on moving mesh methods is a promising development and I hope in the future she will extend her studies to higher space dimensions. ... I know that Dr. Remski is active in organizing meetings of the SIAM Great Lakes Chapter, an excellent contribution to sustaining the applied math community in our region. I also saw on her CV that she’s involved in an NSF project for undergraduate curriculum development.”

Reviewer E: “Although Dr. Remski has only published eight papers, the quality of these papers is high. They cover several important areas of applied mathematics, including mathematical superconductivity, transport equations, and adaptive moving mesh methods. Moving mesh methods have been proven very useful for solving PDEs with large solution variations, but the theoretical analysis has been far behind the algorithm development. Dr. Remski’s two recent papers ... provided some interesting ideas, which seem of strong potential for further investigation. I have asked my research group to study the balancing moving mesh methods papers in our recent seminars.”

Summary of Recommendation:

Professor Remski has been rated excellent in the areas of teaching and service; and significantly capable in the area of research. She is an excellent representative of the teacher-scholar model, making contributions inside and outside the classroom that enhance opportunities for her students and her colleagues. We are very pleased to recommend, with strong support of the College of Arts, Sciences, and Letters Executive Committee, Joan C. Remski for promotion to professor of mathematics, with tenure, Department of Mathematics and Statistics, College of Arts, Sciences, and Letters.


Martin J. Hershook, Dean
College of Arts, Sciences, and Letters


Daniel Little, Chancellor
University of Michigan-Dearborn

May 2017