PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Department of Industrial and Operations Engineering

Siqian M. Shen, associate professor of industrial and operations engineering, with tenure, Department of Industrial and Operations Engineering, and associate professor of civil and environmental engineering, without tenure, Department of Civil and Environmental Engineering, College of Engineering, is recommended for promotion to professor of industrial and operations engineering, with tenure, Department of Industrial and Operations Engineering, and professor of civil and environmental engineering, without tenure, Department of Civil and Environmental Engineering, College of Engineering.

Academic Degrees:
Ph.D.   2011   University of Florida, Industrial and Systems Engineering, Gainesville, FL
M.S.   2009   University of Florida, Industrial and Systems Engineering, Gainesville, FL
B.S.   2007   Tsinghua University, Industrial Engineering, Beijing, China

Professional Record:
2019 – present   Associate Professor (without tenure), Department of Civil and Environmental Engineering, University of Michigan
2017 – present   Associate Professor (with tenure), Department of Industrial and Operations Engineering, University of Michigan
2011 – 2017   Assistant Professor, Department of Industrial and Operations Engineering, University of Michigan

Summary of Evaluation:
Teaching: Professor Shen's contributions to teaching, course development, and student mentoring are excellent. Professor Shen has taught very successfully at all levels in the IOE Department. This includes the demanding and required undergraduate class IOE 310 (linear optimization). The bulk of Professor Shen's graduate teaching has been in IOE 510 (linear optimization) and IOE 612 (network optimization), with excellent Q1 scores. Recently, Professor Shen added IOE 512 (dynamic programming) to her repertoire and obtained Q1 scores of 4.5 and 4.6. Professor Shen has incorporated meaningful project work into her course offerings, helping students bridge the gap between theory and practice and echoing her research orientation. As a mentor, Professor Shen is very successful. She has graduated eight Ph.D. students as the chair or co-chair, and has another four in progress, with two expected to graduate this year. Her students have won an impressive range of awards and are placed in very good academic institutions and industry organizations.

Research: Professor Shen's research focuses on optimization under uncertainty (using and developing algorithmic techniques for stochastic integer programming, robust optimization, and network optimization) and its applications to a variety of areas, including health-care operations and critical infrastructures (especially transportation and energy). A common thread in much of Professor Shen's work is deft modeling in the presence of uncertainty, and in devising

computational schemes, taking advantage of problem structure, to develop scalable solution methods. She has made a substantial imprint on computational methods for practical problems in the area of optimization under uncertainty. Professor Shen has over 67 archival-journal and refereed-conference publications with the majority appearing in top journals in her field. This is prodigious output in the context of all subfields of operations research and industrial engineering. Professor Shen has a strong record of extramural support (from both federal and industry sponsors), with a total candidate share of over $2.6M.

Recent and Significant Publications:
Xian Yu, Siqian Shen, "Multistage Distributionally Robust Mixed-Integer Programming with Decision-Dependent Ambiguity Sets," *Mathematical Programming Series B*, volume 196, 1025-1064, 2022.
Beste Basciftci, Shabbir Ahmed, Siqian Shen "Distributionally robust facility location problem under decision-dependent stochastic demand," *European Journal of Operational Research*. 2021; 292(2): 548-561.
Yiling Zhang, Mengshi Lu, Siqian Shen "On the values of vehicle-to-grid electricity selling in electric vehicle sharing," *Manufacturing and Service Operations Management*. 2021; 23(2): 488-507.
Xian Yu, Siqian Shen "An integrated decomposition and Approximate Dynamic Programming approach for on-demand ride pooling," *IEEE Transactions on Intelligent Transportation Systems*. 2020; 21(9): 3811—3820.
Yiling Zhang, Ruiwei Jiang, Siqian Shen "Ambiguous chance-constrained binary programs under mean-covariance information," SIAM *Journal on Optimization*. 2018; 28(4): 2922-2944.

Service: Professor Shen has a strong service record. Her role as the chair of the IOE Graduate Recruitment and Admission (GRA) Committee is a highlight of her leadership within the department. Professor Shen is actively involved in service at the college and university levels. Highlights include serving on the Campus Support Committee (COVID-19), the steering committee of the Michigan Institute for Computational Discovery in Engineering (MICDE), and her faculty advisor role for Women in Science and Engineering (WISE). She also has an impressive external service and leadership record. She is on seven editorial boards, including serving as a guest editor for a special issue of a highly regarded journal. Professor Shen has served on many external committees, often in leadership positions, for professional societies.

External Reviewers:
Reviewer A: "I am confident that Dr. Shen would meet the bar for promotion at my institution based on her impressive portfolio across research, service, teaching, and DEI…. In sum, the decision to promote Dr. Shen to Professor should be an easy one. Dr. Shen is a productive, creative, and accomplished member of the operations research community in industrial engineering who boasts an international research reputation. Very few of her peers have similar accomplishments in both research and service."

Reviewer B: "I would include Siqian in the top group of researchers who are emerging as leaders in their fields. ... I strongly support the promotion of Dr. Siqian Shen to full professor with tenure at the University of Michigan…I am confident that her contributions meet the requirements for promotion to full professor at [my institution]."

Reviewer C: "…I find that Professor Shen has continued to develop in making important new contributions to the field of optimization and applications and believe that her record merits this promotion…."

Reviewer D: "Absolutely. Dr. Shen has 'it'—the intellect, drive, and savvy to produce high quality research, sustain her research program, and be recognized by the community as a leading academic in Operations Research and Optimization. She is a leader. If University of Michigan is not ready to promote Dr. Shen, I can name many other universities (including my own) that would be happy to have her as a Full Professor."

Reviewer E: "To conclude, when it comes to her research maturity, service and international visibility in the field, as well as the outreach (both, in academia and general public), Dr. Shen clearly stands out from her peers. Her prolific publication record demonstrates her high potential and a strong impact on the academic community."

<u>Summary of Recommendation:</u> Professor Shen's research is in the area of optimization under uncertainty with applications to industrial systems that arise in healthcare, transportation systems, and other societally important problems. She has demonstrated her ability to teach and mentor students at all stages and has an exemplary service record. It is with the support of the College of Engineering Executive Committee that I recommend Siqian M. Shen for promotion to professor of industrial and operations engineering, with tenure, Department of Industrial and Operations Engineering, and professor of civil and environmental engineering, without tenure, Department of Civil and Environmental Engineering, College of Engineering.

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

May 2023