

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

Siqian M. Shen, assistant professor of industrial and operations engineering, Department of Industrial and Operations Engineering, College of Engineering, is recommended for promotion to associate professor of industrial and operations engineering, with tenure, Department of Industrial and Operations 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:

2016-present	Associate Director, Michigan Institute for Computational Discovery & Engineering, University of Michigan
2011-present	Assistant Professor, Department of Industrial and Operations Engineering, University of Michigan

Summary of Evaluation:

Teaching: Professor Shen has taught four courses during the last six years: IOE 310 (Introduction to Optimization Methods), IOE 510 (Linear Programming I), IOE 612 (Network Flows) and a new course, IOE 691 (Stochastic and Robust Optimization). Her average Q1/Q2/Q4 scores are 4.3/4.3/4.4, respectively, with strong scores in her large undergraduate course, IOE 310. The enrollment in this course ranged from 101 to 111 and she had scores of 4.3/4.1/4.1. Two of her Ph.D. students have completed their studies and are now researchers at Amazon and Google. She has another five Ph.D. students under supervision. The letters from undergraduate and graduate students attest to the care she devotes to teaching and research supervision.

Research: Professor Shen's research is in the broad area of optimization with a focus on decomposition methods for stochastic and robust optimization. One of her fundamental contributions has been the development of deterministic formulations of optimization models with distributionally robust constraints. She has applied this approach to a variety of problems in healthcare, energy and car-sharing problems. Her papers have been published in leading journals in her field including *Mathematical Programming*, *INFORMS* (Institute for Operations Research and the Management Sciences) *Journal on Computing*, and *IEEE Transactions on Power Systems*. With 18 published or accepted refereed papers, she has another 14 submitted or under review at leading journals including *Operations Research* and *Management Science*. She has 175 citations and an h-Index of 6 (Google Scholar). She has four NSF grants and an MCubed grant, and has three NSF grants under review as well as a proposal to the Department of Energy.

Her own work has been recognized with several Best Paper finalist placements and she advised the winner of the INFORMS Undergraduate Operations Research Award.

Recent and Significant Publications:

Yongjia Song and Siqian Shen, “Risk averse shortest path interdiction,” *INFORMS Journal on Computing*, 28(3), 527-539, 2016.

Yiling Zhang, Siqian Shen and Johanna Mathieu, “Distributionally robust chance-constrained optimal power flow with uncertain renewables and uncertain reserves provided by loads,” *IEEE Transactions on Power Systems*, 2016, Accepted.

Yan Deng and Siqian Shen, “Decomposition algorithms for optimizing multi-server appointment scheduling with chance constraints,” *Mathematical Programming*, 157(1), 245-276, 2016.

Siqian Shen, Murat Kurt and Jue Wang, “Chance-constrained programming models and approximation algorithms for general stochastic bottleneck spanning tree problems,” *INFORMS Journal on Computing*, 27(2): 301–316, 2015.

Siqian Shen and Jue Wang, “Stochastic modeling and approaches for managing energy footprints in Cloud Computing service,” *Service Science*, 6(1): 15–33, 2014.

Service: Professor Shen’s service has been exemplary. She has served on the department’s Graduate Admissions and Financial Aid committee as well as the elected Department Committee. She is a member of the Department Chair Search Committee. At the university level, she is a member of the Steering Committee for the Michigan Institute for Computational Discovery and Engineering. She has served as an advisor to the Women in Science and Engineering Program. Nationally, she is the vice chair of the Global Optimization Special Interest Group of the INFORMS Optimization Society and has served as an officer of the Women in Operations Research and Management Science group. She is an associate editor of *Optimization Letters*.

External Reviewers:

Reviewer A: “...she has done very significant work on optimization based approaches for appointment scheduling under uncertainty.”

Reviewer B: “This record of accomplishments to data [sic] represents a strong career start for Professor Shen...”

Reviewer C: “...Siqian has amassed an impressive research publication record... The choices of outlets for her work are of the highest quality...”

Reviewer D: “...Prof. Shen is well-known as a researcher who tackles the tough problems associated with introducing uncertainty into difficult discrete optimization problems.”

Reviewer E: “...Professor Shen’s work has introduced novel and useful models for a variety of important and emerging application areas. ...Professor Shen’s research output is exceptionally high for someone at her career stage.”

Reviewer F: “Dr. Shen has made important contributions in optimization under uncertainty, including models with risk-averse and adversarial constructs. ...Dr. Shen’s funding record is exceptional...Dr. Shen has an outstanding record.”

Reviewer G: “Indeed, Dr. Shen has made great contribution to energy and sustainability-related optimization problems... There is no doubt that Siqian is a very productive and also creative researcher.”

Reviewer H: “Her work is a nice mix of modeling, theory, computation and insights. ...All of her papers, though, provide insights of interest to engineers and managers that go beyond the technical aspects of her papers.”

Summary of Recommendation: Professor Shen has an impressive record of research, teaching, and university and national service as outlined above. It is with the support of the College of Engineering Executive Committee that I recommend Siqian M. Shen for promotion to associate professor of industrial and operations engineering, with tenure, Department of Industrial and Operations Engineering, College of Engineering.



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

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