

PROMOTION RECOMMENDATION  
The University of Michigan  
College of Engineering  
Department of Civil and Environmental Engineering

Jeffrey T. Scruggs, associate professor of civil and environmental engineering, with tenure, Department of Civil and Environmental Engineering, and associate professor of electrical and computer engineering, without tenure, Department of Electrical and Computer Engineering, College of Engineering, is recommended for promotion to professor of civil and environmental engineering, with tenure, Department of Civil and Environmental Engineering, and professor of electrical and computer engineering, without tenure, Department of Electrical and Computer Engineering, College of Engineering.

Academic Degrees:

Ph.D.	2004	California Institute of Technology, Applied Mechanics, Pasadena, CA
M.S.	2000	California Institute of Technology, Applied Mechanics, Pasadena, CA
M.S.	1999	Virginia Polytechnic Institute and State University, Electrical and Computer Engineering, Blacksburg, VA
B.S.	1997	Virginia Polytechnic Institute and State University, Electrical Engineering, Blacksburg, VA

Professional Record:

2015 – present	Associate Professor (without tenure), Department of Electrical and Computer Engineering, University of Michigan
2014 – present	Associate Professor (with tenure), Department of Civil and Environmental Engineering, University of Michigan
2011– 2014	Assistant Professor, Department of Civil and Environmental Engineering, University of Michigan
2007 – 2011	Assistant Professor, Department of Civil and Environmental Engineering, Duke University, Durham, NC
2006	Visiting Scholar, Department of Mechanical and Aerospace Engineering, University of California San Diego, San Diego, CA
2004 – 2005	GW Housner Post-doctoral Fellow, Department of Mechanical and Civil Engineering, California Institute of Technology, Pasadena, CA

Summary of Evaluation:

Teaching: Professor Scruggs has demonstrated excellence in teaching. He has shown a commitment to training students to be independent thinkers through rigorous, high-quality courses. Both undergraduate and graduate students praise him for his teaching style and mentoring. He impacted the CEE curriculum by spearheading the development of the Intelligent Systems Graduate Program, which placed the CEE Department in a position to produce the next generation of leaders in the field. Professor Scruggs has graduated five Ph.D. students (as chair or co-chair) with another three in progress. He has served as a member of several other Ph.D. committees. As evidence of his success as a mentor, one former student is now an assistant professor while another received the prestigious Maria Goepfert Mayer Post-doctoral Fellowship at Argonne National Laboratory. In addition, he has mentored four post-doctoral students with two of them moving on to faculty positions at the University of Tsukuba in Japan and Michigan State University.

Research: Professor Scruggs has established himself as a leader in the emerging inter-related fields of energy harvesting, self-powered control, and wave energy technology. He is a national and international expert in the Intelligent Systems area of Civil and Environmental Engineering, working at the intersection of energy and control. His papers are characterized by intellectual depth, mathematical rigor and elegance. His current research areas in control of ocean wave energy conversion, control of self-powered cyber-physical systems, and control of vibratory systems with stroke control are very timely, and his new directions in self-powered robotics, hybrid energy storage, and control of transportation networks are well integrated into the strategic directions of the department, the college, and the university. He has carried out pioneering and break-through work on energy conversion from ocean waves and energy harvesting from mechanical vibrations. Professor Scruggs's accomplishments in research elevate the reputation of the Intelligent Systems program in CEE. Due in large part to Professor Scruggs, Michigan is a leader in the fields of energy harvesting, self-powered control, and wave energy technology. During his time in rank, Professor Scruggs has published 40 articles and secured \$2.47M in funding as the PI (with his share at \$1.14M) from sources such as the NSF and ONR. External reviewers praise Professor Scruggs for his work and are supportive of his promotion.

Recent and Significant Publications:

- C.H. Ligeikis and J.T. Scruggs, "On the Feasibility of Self-Powered Linear Feedback Control," *IEEE Transactions on Automatic Control*, Accepted, in press, 1-15, 2023.
- A. Kody and J.T. Scruggs, "MPC Trajectory Feasibility Constraints for Self-Powered Control Systems," *IEEE Transactions on Automatic Control*, 67(12), 6611-6626, 2022.
- Y. Lao and J.T. Scruggs, A. Karthikeyan, M. Previsic, "Discrete-Time Causal Control of a Wave Energy Converter with Finite Stroke in Stochastic Waves," *IEEE Transactions on Control Systems Technology*, 30(3), 1198-1214, 2022.
- J.T. Scruggs, S.M. Lattanzio, A.A. Taflanidis and I.L. Cassidy, "Optimal Causal Control of a Wave Energy Converter in a Random Sea," *Applied Ocean Research*, 42, 1-15, 2013.
- J.T. Scruggs, "An Optimal Stochastic Control Theory for Distributed Energy Harvesting Networks," *Journal of Sound and Vibration*, 320(4-5), 707-725 2009.

Service: Professor Scruggs has demonstrated his leadership through service to both the university and the professional community. He led the Civil Infrastructure and Systems Engineering division of CEE as chair, served as the chair of the CEE Curriculum Committee, and has been the chair of the master's program, which grew under his leadership. He served multiple terms on the College Committee on Discipline. Nationally, he is the chair of the Technical Committee on Power Generation for the IEEE Control System Society. Through his leadership, he expanded the scope of the committee by adding power conversion and power storage, initiated an award in Energy Systems for transformative impact on the field, and increased student participation through initiating an annual Best Student Paper Award. He has served as associate editor for top-tier journals.

External Reviewers:

Reviewer A: "His paper 'MPC Trajectory Feasibility Constraints...' is also pioneering and very impressive... I highly rank the originality, analytical finesse, and practical significance of this work. Thus Jeffrey Scruggs's standing in relation to others in his peer group who are working in this area is at the very top."

Reviewer B: "He is one of the strongest researchers in stochastic structural control theory – certainly among the top ten worldwide."

Reviewer C: “Dr. Scruggs has clearly demonstrated his research ability and established himself as a leading researcher in smart renewable energy systems, particularly ocean wave energy conversion systems. ... Building upon his expertise in optimal control theory, Dr. Scruggs has pioneered the concept of self-powered control...”

Reviewer D: “...Prof. Scruggs is the most talented researcher in the intelligent systems field today whose brilliant research and teaching define the theoretical foundations of this frontier field of civil engineering.”

Reviewer E: “The distinguishing feature of his work relative to others is his analytical depth. His methods are grounded in rigorous theory with elegant mathematical modeling.”

Reviewer F: “It is not often that I can pick up a fundamental insight from a casual conversation; with Dr. Scruggs it has happened multiple times. ...researchers like him are rare.”

Summary of Recommendation: Professor Scruggs is an outstanding researcher and educator. He established himself as a national and international leader in the area of self-powered control systems and optimal design of energy harvesting systems. He is a gifted teacher and mentor working tirelessly toward giving students the best education and experience at Michigan. He is an exemplary citizen, meaningfully contributing to the university and to the professional community. It is with the support of the College of Engineering Executive Committee that I recommend Jeffrey T. Scruggs for promotion to professor of civil and environmental engineering, with tenure, Department of Civil and Environmental Engineering, and professor of electrical and computer engineering, without tenure, Department of Electrical and Computer Engineering, College of Engineering.



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Steven L. Ceccio, Ph.D.  
Interim Dean of Engineering  
Vincent T. and Gloria M. Gorguze Professor  
of Engineering  
College of Engineering

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