

PROMOTION RECOMMENDATION  
The University of Michigan  
College of Engineering  
Department of Mechanical Engineering

Shanna Daly, assistant professor of mechanical engineering, Department of Mechanical Engineering, College of Engineering, is recommended for promotion to associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering.

Academic Degrees:

Ph.D.	2008	Purdue University, Engineering Education and Chemistry, West Lafayette, IN
M.S.	2006	Purdue University, Chemistry, West Lafayette, IN
B.E.	2003	University of Dayton, Chemical Engineering, Dayton, OH

Professional Record:

2016 – present	Assistant Professor, Department of Mechanical Engineering, University of Michigan
2010 - 2015	Assistant Research Scientist, Undergraduate Education, University of Michigan
2008 – 2010	Post-doctoral Research Fellow, Mechanical Engineering, University of Michigan

Summary of Evaluation:

Teaching: Professor Daly is passionate about engaging her students. She consistently ranks among the top instructors in the Department of Mechanical Engineering with respect to course evaluation scores, student feedback, and course demand. She is committed to teaching and is a pioneer of Engineering Design Research and Engineering Education Research (EER). She has focused her fervor for this research into developing a new undergraduate/graduate-level course focused on creative thinking and design ethnography (ME 499/599, Front-End Design), which receives high praise from students, and attracts a greater percentage of women than in the college. Students express the focus of the course fills a gap in their engineering and design education. She is also the co-developer of ME 602, Theoretical and Conceptual Frameworks in Engineering Education Research, a course that examines prominent theoretical frameworks used across the diversity of engineering research areas. Professor Daly has graduated three Ph.D. students, four M.S. students, and mentored four post-doctoral scholars. She is currently advising or co-advising six Ph.D. students. She is actively engaged in undergraduate research, having mentored nearly 40 undergraduate students since 2010. Her students consistently praise her enthusiastic and engaging methods of teaching, and her investment into their learning and growth.

Research: Professor Daly's research focuses on engineering education and engineering design, with a particular emphasis on divergent thinking in engineering, for which she has developed an international reputation. Early in her career, Professor Daly developed *Design Heuristics*, a tool to promote the generation of novel concepts in design, now used by more than 500 educators and

practitioners in over 300 universities, high schools, and industries spanning 21 countries. She has a formidable research record having published over 40 full articles in renowned journals, including the *Journal of Engineering Research*, *Design Science*, the *Journal of Mechanical Design*, and the *Global Journal of Engineering Education*. Professor Daly has secured significant funding over many grants from the National Science Foundation, totaling over \$5.5M with \$1.85M as her share. Professor Daly's research is clearly impactful as evidenced by the numerous national awards she has received, among them 11 best paper awards including the American Education Research Association Best Paper (Education in the Professions) and the *IEEE Transactions on Education* Theodore E. Batchman Best Paper Award.

Professor Daly's work has advanced knowledge on engineering strategies for success in front-end design and successfully translated these strategies to design tools that both students and practitioners have used to support their design processes. Her work has brought attention to and identified approaches for engineers to successfully engage in essential engineering skills, including creativity, idea generation, and the integration of people and context into decision making. These skills are often under-taught within core engineering curricula, but their inclusion is central to educating the next generation of engineers; Professor Daly's work pushes engineers to be more comprehensive and innovative in their approaches to problem solving.

#### Recent and Significant Publications:

- J. Murray, J. Studer, S. Daly, S. McKilligan, C. Seifert, "Design by taking perspectives: How engineers explore problems," *Journal of Engineering Education*, 108(2), 248-275, 2019.
- J. Studer, S. Daly, S. McKilligan, C. Seifert, "Evidence of problem exploration in creative designs," *Artificial Intelligence for Engineering Design, Analysis and Manufacturing (AI EDAM)*, 32(4): 415-430, 2018.
- M. Deininger, S. Daly, K. Sienko, J. Lee, "Novice designers' use of prototypes in engineering design," *Design Studies*, 51: 25-65, 2017.
- S. Daly, E. Mosyjowski, C. Seifert, "Teaching creativity in engineering courses," *Journal of Engineering Education*, 103(3): 417-449, 2014.
- S. Daly, S. Yilmaz, J. Christian, C. Seifert, R. Gonzalez, "Design heuristics in engineering concept generation," *Journal of Engineering Education*, 101(4): 601-629, 2012.

Service: Professor Daly has served on the Department of Mechanical Engineering's Graduate Admissions Committee and the Seminar Committee. Her service to the college is extensive, as she is currently serving on the Engineering Education Research (EER) Core Faculty Group, and has served on the Transdisciplinary Engineering Education Committee, the EER Faculty Search Committee, and the EER Ph.D. Program Development Committee. Her dedication to DEI is wide-spread and pervasive. She co-founded the Center for Socially Engaged Design, which provides education on skills required to account for social, cultural, and environmental contexts in design. She has had a leadership role in establishing the PEER Collaborative Network within ASEE, which aims to support the success of diverse faculty in engineering education research, and the community building that happens as a result of this organization's work, by promoting success for a number of women and URM faculty. Within her scientific community, Professor Daly recently joined the editorial board of the *International Journal of Mechanical Engineering Education*, and is the co-director of the Design in Engineering Education Division of the

American Society of Engineering Education. Professor Daly has served on several NSF panels, and is a reviewer for several top rated journals, including *Design Studies*, the *International Journal of Design Creativity and Innovation*, the *International Journal of Engineering Education*, the *Journal of Engineering Education*, the *Journal of Mechanical Design*, and the *Journal of Science and Technology Education*.

External Reviewers:

Reviewer A: “Dr. Shanna Daly’s scholarship is uniformly of top quality, highly cited and already having high impact. The quality of her scholarship, teaching and service has been recognized through the long list of awards she has won. She is internationally known for her work in developing and evaluating diversity thinking strategies and tools for idea generation.”

Reviewer B: “I consider Dr. Daly as one of the most accomplished researchers [of her cohort] in the field of engineering education research and one of the pioneers who study interdisciplinary design education.”

Reviewer C: “...Professor Daly offers those of us who teach design an important collection of insights about educating engineering students as well as tools and guidance for improving our students’ learning experiences.”

Reviewer D: “I believe that with her deep involvement in design education (both through her own teaching, and in the larger national/international community) that she is well positioned to lead that transition of research into educational .... Dr. Daly should be recognized as a leading national design methods scholar. She is poised to continue to add to, if not reframe, that field.”

Reviewer E: “There are many other researchers in the field who use qualitative methods to gather design data, but Dr. Daly is unfailingly thorough in her research design and execution, akin to a well trained social scientist....Her papers all speak of careful attention to the detail of an experiment, and precise conclusions, resulting in high caliber research.”

Summary of Recommendation: Professor Daly is a very prominent and ambitious teacher and mentor, who is making significant impact with her research. It is with the support of the College of Engineering Executive Committee that I recommend Shanna Daly for promotion to associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering.



---

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

May 2020