

Wednesday, March 19, 2025 | 135 Shillman Hall | 12:00 PM

Distinguished Seminar Speaker

*Investigating the “Black Box” of Active Learning Approaches
in Engineering Education*

Professor Kristen Wendell, Ph.D.

*Associate Professor of Mechanical Engineering and Education
and Co-Director of the Institute for Research on Learning and Instruction
Tufts University*



Abstract: In our research on undergraduate engineering education, we seek to build theory about the details of active learning experiences in engineering courses. Engineering educators aspire to support students from all backgrounds and identities in developing deep conceptual understanding and sophisticated engineering skills. To meet this goal, more work is needed to inform theory about individual variation and moment-to-moment processes within active learning approaches. For example, what do students’ talk and actions look like when they are successfully learning from collaborative engineering problem solving? What specific kinds of interaction between instructors and learners foster students’ knowledge construction? I will present findings from three studies in which engineering faculty and education researchers collaborated to investigate these

questions. We explore a “personalized problem” approach to team homework assignments in thermal fluids, a framework for “messy” open-ended modeling problems in mechanics, and a “responsive teaching” approach to training undergraduate learning assistants. Across the three contexts, we conducted discourse analysis of audio recorded student interaction, a qualitative technique common in the learning sciences. Our findings begin to characterize the task features and instructor moves that cue productive learning dynamics among undergraduate engineering students.

Biography: [Dr. Kristen Wendell](#) is Associate Professor of Mechanical Engineering and Education and Co-Director of the Institute for Research on Learning and Instruction ([IRLI](#)) at Tufts University. Her research group is based at the Center for Engineering Education and Outreach ([CEEEO](#)). An NSF PECASE award recipient, she serves as PI and co-PI on NSF-funded projects that investigate curriculum and instructional supports for deeper and more inclusive knowledge construction by engineering learners. She is a Deputy Editor for the *Journal of Engineering Education*. She teaches courses in design, mechanics, electronics, and engineering education. Wendell holds a PhD in science education from Tufts and BS and MS degrees in mechanical and aerospace engineering from Princeton and MIT.