CARNEGIE MELLON UNIVERSITY
BME 2025 SPRING SEMINAR SERIES

BIOMEDICAL ENGINEERING
Carnegie Mellon University

Evolution of a BME Design Program through Clinical Exposure

PRESENTED BY

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SCHEDULE

Doherty Hall (DH) 2315

Tuesday, March 25, 2025
(11:00-12:00 PM)

Biomedical engineering (BME) capstone design courses provide students with a culminating experiential learning opportunity to apply the skills and knowledge they have acquired in their undergraduate courses and apply them to an unstructured, real world clinical problem. To develop innovative, effective, and safe solutions, BME students must understand the clinical setting and learn to collaborate with healthcare professionals. I will present the 20-year evolution of the undergraduate BME design curriculum at the University of Michigan, inspired by and initially adapted from mechanical engineering. Incorporating BME-specific skills and knowledge into the design curriculum, I developed two novel clinical experiential learning activities - 1.) the Medical Device Sandbox (MDS), a simulated clinical environment where groups of BMEs and medical learners co-investigate medical device use and together propose redesigns to improve patient safety, and 2.) the Clinical Peer Mentors (CPM) program, a clinical immersion program where BME students conduct observations, needs identification and assessment within the clinical setting and generate capstone design projects. The MDS provides intentional, guided, collaborative, realistic simulated use scenarios where BME students and medical learners gain a better understanding of patient safety issues and user errors associated with medical devices and the contributions each profession brings to medical device design. Facilitating meaningful interactions with healthcare professionals, the CPM program allows BME students to witness first-hand clinical procedures, medical device utilization, and workflow, then develop clinical reference materials and design project proposals accessible to all students. The MDS and CPM program reinforce critical thinking and problem-solving skills required of all engineers, but also teach students front-end design, human factors, clinical awareness, interprofessional communication, and leadership, uniquely preparing them for careers in healthcare, medical product development, and related fields.