UCONN
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BIOMEDICAL ENGINEERING

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DEPARTMENT OF BIOMEDICAL ENGINEERING

2025 Fall Seminar Series

Dr. Karen Troy

Department Head
John Woodman Higgins Professor
Biomedical Engineering
Worcester Polytechnic Institute

THURSDAY October 2, 2025
11am-12pm
AUST 445

ABSTRACT:

Sole Searching: bone health, foot biomechanics, and metatarsal bone stress injury

Runners and military professionals sustain a high rate of bone stress injuries, with many occurring in the metatarsal bones of the feet. These overuse injuries result from a combination of biological, biomechanical, and training factors. Weekly training volume is a strong predictor of these injuries, but many people run high volumes injury-free while others become injured with relatively low mileage. The question is: how can a person prevent these injuries without overly limiting their training volume? Our laboratory studies how bones are loaded during physical activity, and how these loads stimulate adaptation and injury. Our most recent research has focused on better understanding metatarsal structure and foot biomechanics, with a long-term goal of identifying biomechanical interventions that can reduce risk of injury by altering bone loading and reducing damage accumulation.

BIOGRAPHY:

Dr. Karen Troy is Department Head and John Woodman Higgins Professor of Biomedical Engineering at Worcester Polytechnic Institute (WPI) in Worcester, MA. She directs the Musculoskeletal Biomechanics Research Laboratory, which aims to understand how physical forces (such as those generated by the body during exercise and sports) interact with and change bone structure. Dr. Troy is an expert in orthopaedic and whole-body biomechanics, quantitative image analysis including computed tomography (QCT), and patient-specific finite element (FE) modeling (which we call "digital twins" these days). She collaborates with physicians and other clinicians, with the goal of preventing fractures and other types of bone injury in various populations such as growing children, athletes, older adults, and individuals with spinal cord injury. Dr. Troy teaches engineering at the graduate and undergraduate levels and particularly enjoys working individually with students in her lab and on projects. Throughout her career she has prioritized student-centered mentorship and has advocated for inclusion, diversity, support, and mentorship for scientists at all career levels. Her research accomplishments and inclusive mentorship have been recognized by multiple national awards, most recently with Fellow status within the American Institute for Medicine, Biology and Engineering (AIMBE), the American Society of Biomechanics (ASB), and the Orthopaedic Research Society (ORS).

Suggested Article: *Biomechanics of a Drop Landing: Osteogenic Stimulus Measures May Vary*

Can't attend in person?
Join on-line:

For questions, please contact
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