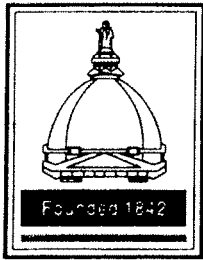


# AEROSPACE & MECHANICAL ENGINEERING



## 2010 COLLOQUIUM 2011 SEMINARS ARE OPEN TO THE PUBLIC

INFORMAL COFFEE PERIOD BEFORE THE SEMINAR IN ROOM 365 FITZPATRICK HALL  
UNIVERSITY OF NOTRE DAME, NOTRE DAME, INDIANA 46556

**SPEAKER:** **Dr. Jason P. Long**  
University of Michigan  
Department of Orthopaedic Surgery  
Ann Arbor, Michigan

**TOPIC:** **AN EXPERIMENTAL MODEL TO DEVELOP AND  
EVALUATE NOVEL IMPLANT TOPOLOGIES FOR BONE  
FIXATION UNDER MULTI-DIRECTIONAL LOADING**

**DATE:** Tuesday, August 31, 2010

**TIME:** 3:30 p.m.

**PLACE:** 136 DeBartolo Hall

### *ABSTRACT*

While contemporary prosthetic devices provide some restoration of function to individuals who have lost a limb, there are ongoing efforts to develop bio-integrated prostheses that would enhance functionality by providing motor control and sensory feedback of a robotic device. A critical step in the development of a bio-integrated prosthesis will be establishing long-term, secure fixation to the bone in the remnant limb. This would allow the transfer of multi-axial and multi-directional loads generated during normal daily activity, and establish a secure interface for the acquisition and transmission of neural or muscular data. As part of a large program to study technologies for bio-integrated prosthetic limb development, I will discuss ongoing investigations for establishing long-term, robust fixation in bone under complex loading environments. Specifically, I will focus on efforts to use a topologic optimization strategy to design implant interface conditions that would promote secure fixation under multi-directional loading in a unique in vivo model.