

AEROSPACE & MECHANICAL ENGINEERING



**2012 COLLOQUIUM 2013
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UNIVERSITY OF NOTRE DAME, NOTRE DAME, INDIANA 46556

SPEAKER: Dr. Joel Boerckel
Lerner Research Institute
Cleveland Clinic
Cleveland, Ohio

**TOPIC: BIOMATERIAL, BIOMECHANICAL AND BIOLOGICAL
REGULATION OF TISSUE REGENERATION**

DATE: Thursday, March 7, 2013

TIME: 3:30 p.m.

PLACE: Lower Level Auditorium, Geddes Hall

RECEPTION: 3:00 – 3:30 p.m. – Coffee House, Geddes Hall

ABSTRACT

Tissue engineering is a promising strategy for regeneration of damaged or diseased tissues and organs. Our aim is to develop tissue-engineering solutions that stimulate endogenous repair mechanisms to regenerate challenging bone defects, which pose a severe clinical burden. We first hypothesized that in bone, which has primary mechanical function and adapts dynamically to mechanical forces, the mechanical environment regulates the endogenous regenerative response. To test this hypothesis, we characterized a biomaterial growth factor delivery system for large bone defect regeneration, which we then used as a platform to evaluate the effects of in vivo mechanical loading on bone formation, adaptation, and angiogenesis.

These studies underscored the importance of neovascular growth in tissue repair, so to better understand the endogenous mechanisms which regulate angiogenesis in response to injury, we identified and characterized a novel, non-canonical pathway by which the phosphatase, MKP-1, positively mediates recovery from critical limb ischemia.

Together, these studies highlight three points of intervention for harnessing endogenous repair mechanisms in tissue engineering: biomaterials, biomechanics, and biology.

NOTE: *If you are interested in meeting individually with Dr. Boerckel, please contact Linda at 631-5431*