Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
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TRINITY CENTRE FOR BIOENGINEERING SEMINAR SERIES 2019

Understanding joint maturation through mechanobiology

Speaker: **Megan Killian**
Assistant Professor, Department of Biomedical Engineering,
University of Delaware
When: **4pm on Friday 7th of June 2019**
Where: **Tercentenary Lecture Theatre, Trinity Biomedical Sciences Institute**

Life-long musculoskeletal health depends on the growth, adaptation, and mechanical loading of connective tissues, like tendon and muscle. Our work explores the developmental and mechanical factors that guide tendon and bone growth; we are especially interested in the maturation of the tendon-bone attachment (i.e., enthesis). The enthesis is a structurally-graded tissue at the interface of tendon and bone, is exposed to high strains during loading, and often experience a high rate of rupture. Yet the risk of rupture remains unknown. Our research studies how developmental defects in enthesis structure can predispose this tissue to failure. The structural adaptation of the enthesis to mechanical loading is dependent on the behavior of its resident cells. We have recently shown that the resident cells of the enthesis respond to fibroblast growth factor (FGF) signaling, and FGF9 from skeletal muscle limits the rate of enthesis growth during embryonic development. We have demonstrated that FGF receptor signaling regulates the adaptation response of the enthesis during postnatal growth, leading to bone and joint deformities later in life. In addition, we have recently developed in vivo models of joint instability, induced by disrupted muscle/tendon loading, that can be used to study mechanisms of growth and adaptation of connective tissues during postnatal growth.

Megan Killian is an Assistant Professor at the University of Delaware in the Department of Biomedical Engineering, where she leads a research group of graduate and undergraduate students. Prior to joining the University of Delaware, Megan was a postdoctoral fellow at Washington University in Saint Louis in Orthopaedic Surgery and received her PhD in Biomedical Engineering at Michigan Technological University. Megan's research focuses on development and structure/function relationships of musculoskeletal tissues and joints, specifically of tendon-bone attachments in the shoulder and hip. Her research has garnered recognition from the Orthopaedic Research Society and is funded by the National Institutes of Health. Along with her research pursuits, Megan is also an active citizen scientist and participates in her community through engagement and outreach.