

## Title

### Mechanisms of Low Back Pain

## Simon Tang Bios

Dr. Simon Tang received his B.S. in Mechanical Engineering from the University of California, Berkeley; and completed his M.S. and Ph.D. in Biomedical Engineering from Rensselaer Polytechnic Institute. His postdoctoral training as a NRSA NIH F32 fellow was conducted in the Department of Orthopaedic Surgery at the University of California, San Francisco. He has received the John A. Haddad Young Investigator Award; the Harold M Frost Young Investigator Award; the Molecular Biology of Aging Fellowship from Ellison Medical Foundation. Currently as an Assistant Professor in the Departments of Orthopaedic Surgery, Biomedical Engineering, and Mechanical Engineering and Materials Science at Washington University in St. Louis, Dr. Tang and his research group is focused on understanding the biological regulation of skeletal matrix quality. The research group integrates engineering and biology approaches to investigate disease mechanisms and structure-function relationships of skeletal tissues with the long-term goal of developing translatable therapeutic and regenerative strategies for these diseases. These research efforts have been supported by industry sponsors, foundations, as well as federal agencies including the National Science Foundation and the National Institutes of Health.

## Abstract

Low back pain (LBP) is a public health issue that afflicts a significant proportion of the U.S. population. Degeneration of the intervertebral disc (IVD) is a leading contributor towards back pain, an epidemic that costs billions of dollars in the US. The IVD consists of a proteoglycan-rich nucleus pulposus surrounded by a collagenous annulus fibrosus that together provide support and transmit complex loads. The IVD degenerative cascade involves a multifactorial progression of biological, biochemical, and structural changes that lead to the collapse of the disc structure and to compromised mechanical function. In this seminar I will discuss our efforts to better understand the molecular and signaling mechanisms relating to the degeneration of the IVD. Furthermore, I will present our on-going efforts to define and improve diagnostic efforts of low back pain using quantitative imaging. These studies have the long-term goal of identifying novel therapeutic strategies to mitigate disc degeneration and associated LBP.