

## Coupled Multiscale Computational & Experimental Approaches to Understand & Emulate the Body's Own Smart Materials & Systems

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**Date:** Tuesday, 24<sup>th</sup> November 2015  
**Time:** 10:30 am - 12:00 pm (start with drinks/snacks at 10:30)  
**Venue:** 320A/B, Chemical Sciences Building (F10)



### Abstract

Smart properties abound in the human body, from the stimulus responsive 'skin on our bones' (periosteum) to counterintuitive flow-directing musculoskeletal tissues that exhibit surprisingly higher pumping capacity than the human heart. Yet an understanding and the harnessing of these smart properties, to develop new technologies and/or materials, is not a trivial endeavour. This talk presents the power of coupled multiscale computational and experimental modeling to understand and emulate the body's own smart materials and systems. The deeper understanding of nature's paradigms enabled through this approach has led to protected intellectual property and disruptive technologies, which will be described by example in this talk. These examples will also be discussed in context of the U.S. Food and Drug Administration's as well as the National Science Foundation and National Institutes of Health's recent recognition of the power of multiscale modeling for benchmarking of new technologies and devices, which itself presents an opportunity for UNSW and Australia's TGA.

### Biography

**Professor Melissa Knothe Tate's MechBio Team** carries out interdisciplinary work at the intersection of mechanics and physiology, from cells to organismal systems (the human body). Professor Knothe Tate has published more than 220 peer-reviewed publications, book chapters and proceedings, has patented several disruptive technologies, and has given more than one hundred fifty plenary, keynote and invited talks. She was elected as a Fellow to the American Institute for Medical and Biological Engineering (AIMBE), the American Society of Mechanical Engineers (ASME) and the Biomedical Engineering Society (BMES). Professor Knothe Tate has earned a number of prestigious international awards. Her R&D programme has garnered more than USD15 million in international funding. Professor Knothe Tate's trainees have gone on to leading posts in industry, academia, medicine and government.