

# Bioengineering Seminar

By Faculty Candidate:

**Stuart G. Campbell, Ph.D.**

*Department of Physiology and Center for Muscle Biology  
University of Kentucky*

## **Insights into Cardiac Disease from Integrative Multi-Scaled Approaches**

The long-term goal of my research is to create patient-specific therapies for heart disease. The guiding hypothesis is that traditional therapies can be made more effective through engineered modifications that account for each individual's genotype, anatomy, and environment. Toward this goal, I have developed methods for predicting the effects of single gene mutations on heart function using multi-scale computational models.

The effectiveness of these methods is demonstrated by correctly predicting alterations to cardiac wall motion observed in mice expressing a mutant muscle protein. More recently, I have focused on creating a system for high-throughput phenotyping of single cardiac cells. This system is enabling the construction of more detailed computational models as it can be used to map distributions of cellular function within hearts, while also providing new data for the construction and validation of cell-level models.

My next objective is to use this overall combination of multi-scaled computational and experimental approaches to study mouse strains harboring mutations that have been linked to cardiomyopathies in humans.

Friday February 21<sup>th</sup>, 2012

10:00 AM, Room 3507

Nguyen Engineering Building

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### **BIOGRAPHY**

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Dr. Stuart Campbell is a postdoctoral fellow in the Department of Physiology and Center for Muscle Biology at the University of Kentucky. He received his B.S. degree in Bioengineering from Washington State University (2004) and a Ph.D. in Bioengineering from the University of California, San Diego (2010).

Dr. Campbell's research is focused on developing multi-scale computational models of heart function, from molecules to the intact circulatory system. He is the recipient of pre- and postdoctoral fellowships from the American Heart Association and in 2009 received the Gordon Engineering Leadership Award from the Jacobs School of Engineering at UCSD.



For any questions please contact Claudia Borke at [cborke@gnu.edu](mailto:cborke@gnu.edu), (703) 993-4190