

# Peter Lillehoj

College of Engineering  
Department of Mechanical Engineering

Dr. Peter Lillehoj is an Assistant Professor in the Department of Mechanical Engineering. His research interests include BioMEMS, microfluidic biosensors, wearable biosensors & point-of-care diagnostics; microsystems for sample preparation & bioprocessing; and innovative approaches to manufacture of disposable biosensors for global healthcare diagnostics. Peter Lillehoj received his M.S. degree and Ph.D. degree in Mechanical Engineering from the University of California, Los Angeles in 2007 and 2011, respectively. Before that, he received his B.S. degree from the John Hopkins University in 2006.

## **Global Research Interests**

Lillehoj's research is aimed at exploring creative solutions to current and emerging grant challenges in the 21<sup>st</sup> century including human healthcare, food/water safety, biosecurity and sustainable energy. His global research interests include the development of innovative biomedical and micro-/nanotechnologies for various applications including point-of-care diagnosis and prognosis; rapid, in situ biosensing and analysis; and low cost sample preparation and bioprocessing. His current research involves developing point-of-care diagnostics for improved malaria diagnosis with partners in both Malawi and India.

## **Description of Research Proposal:**

The objective of this research proposal is to develop a mobile phone biosensor for rapid detection of dengue fever. This device will integrate a miniature electrochemical detection scheme onto a conventional smartphone that can perform rapid, quantitative measurements of protein biomarkers in human serum and blood samples. Disposable microfluidic cartridges will be employed for sample loading, processing and electrochemical measurements.

A second objective of this proposal is to initiate collaborations with research groups in India to validate the functionality of this assay and obtain feedback on improving the operation of the platform. Preliminary experiments will be performed using clinical samples of dengue infected individuals and healthy individuals for control measurements. Comparative measurements will be performed using the mobile phone device and a gold standard assay (ELISA). These studies will be used to determine if modifications are needed to improve the sensitivity of the assay.

## **Region/Country of research:**

Malawi, India and China.