THE UNIVERSITY OF ARIZONA
COLLEGE OF ENGINEERING
Biomedical Engineering

DEPARTMENT OF BIOMEDICAL ENGINEERING SEMINAR SERIES

PRESENTS

Elizabeth Hutchinson, PhD

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University of Arizona

"Development of pre-clinical MRI markers for brain injury and beyond"

BIO: Dr. Elizabeth Hutchinson is an assistant professor in the department of Biomedical Engineering at the University of Arizona and leads the multi-scale brain imaging lab, which uses pre-clinical imaging – especially MRI – to better understand brain disorders and develop translationally relevant imaging markers. Dr. Hutchinson has an educational background in the physical sciences and neuroscience and her research interests include neuroimaging and pre-clinical models of brain disorders. She has contributed primarily in the areas of diffusion MRI methods and traumatic brain injury (TBI) models and in her work has identified several novel markers of brain pathology that follow brain trauma. Within these broad research areas, her research interests include: radiologic-pathologic correspondence studies to associate imaging markers with their biological underpinnings, the development of processing and analysis tools for multi-brain studies, the identification of imaging markers in human-similar models of injury and fixed specimen studies to establish the translational relevance of novel imaging markers. Her current research activities continue to explore and apply advanced neuroimaging approaches through the use of translationally relevant models and pre-clinical neuroimaging across a range of spatial scales and modalities.

ABSTRACT: The non-invasive detection of subtle brain changes in neurologic disorders and after brain injury is a major goal of imaging science. In particular, quantitative MRI approaches combined with pre-clinical models is a promising approach toward this goal because changes at the cellular level can be probed by methods that are sensitive to physical and chemical changes in the tissue environment. In this presentation, I will describe the primary avenues of research undertaken by my lab in an effort to develop and understand translationally relevant imaging markers – especially by diffusion MRI methods – of brain changes after experimental traumatic brain injury (TBI). This includes radiologic-pathologic studies to determine the correspondence of diffusion MRI alterations after injury with their cellular underpinnings, the application of advanced diffusion MRI "microscopy" methodology in multi-brain studies of fixed specimens, the use of human-similar ferret models of TBI to recapitulate key imaging outcomes established for TBI in humans and translational studies to directly compare imaging observations made in fixed tissue specimens from pre-clinical studies with those found in post-mortem human tissue. A commonality across all levels of investigation is the impact that advanced MRI methods can have for advancing the tools and understanding of TBI research and for bridging pre-clinical and clinical findings. Furthermore, the imaging methodology that is developed in the course of this work has been readily extended for studying a wide range of other brain disorders including developmental disorders, stroke research and the effects of gestational viral infection. Already, the use of these pre-clinical MRI approaches has advanced the tools and knowledge of TBI research and I hope to convey how consequential this methodology may be for the future of translational neurologic disorders research.

Please join us on

Monday, September 9th, 2019

12:00-12:50 pm, Keating Bldg., Room 103

Refreshments will be available at 11:50 am

Host: Drs. DK Kang and Minkyu Kim

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