THE UNIVERSITY OF ARIZONA
COLLEGE OF ENGINEERING
Biomedical Engineering

DEPARTMENT OF BIOMEDICAL ENGINEERING SEMINAR SERIES

PRESENTS

Amirhossein Azami

MS Student
Biomedical Engineering
PI: Dr. Philipp Gutruf
Gutruf Lab

"Optimization and design strategies for wireless implantable electronics using deep learning based marker less pose estimation"

ABSTRACT: Wireless battery-free implantable electronics provide the opportunity to create intimate bio interfaces that enable advanced exploratory and therapeutic tools. These devices omit the need for wired connections and therefore enable continuous biodata streams in freely moving subjects without risk of infection or the behavioral impact of conventional externalized approaches.

Leveraging the battery free design architecture, ultrathin, soft and stretchable devices can be created that are intimately conformed to the target sensing organ resulting in minimal foreign body response and high sensor fidelity because of minimized motion artifacts.

With this new design freedom devices can take highly optimized layouts that are in symbiosis with subject. Currently these devices are designed using simple estimations of the use scenario because there is a lack of design tools available for this new device class.

In this talk we introduce a data driven approach to wireless and battery free implantable device design using deep-learning based markerless pose estimation to create highly optimized electromagnetic and mechanical designs and its role in the creation of the first wireless battery-free fully implantable multimodal recording and neuromodulation tools for freely flying birds. We will also discuss the use of the markerless pose estimation as a tool to evaluate impact of neural interfaces on test subjects and how this data can be used to create advanced interfaces to the musculoskeletal and cardiovascular system to enable next generation exploratory, diagnostic and therapeutic tools.

AND

Persons with a disability may request a reasonable accommodation by contacting the Disability Resource Center at 621-3268 (V/TTY).

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Devin Murphy

MS Student
Biomedical Engineering
PI: Dr. Ted Trouard
Trouard Lab

"Treatment of Parkinson's Disease with Enhanced Delivery of Antibody Therapy Selectively Targeting Toxic Protein Variants"

ABSTRACT: This project is using Parkinson's Disease mice to investigate the therapeutic benefits of a new antibody-based reagent that can selectively target toxic forms of alpha-synuclein, a protein aggregate believed to be instrumental in the progression of Parkinson's Disease. Using a combination of microbubble contrast agent and an ultrasound transducer, the microbubbles can be energized inside the microvasculature of the brain, causing oscillation of the microbubbles and subsequent temporary opening of the blood brain barrier. The opening of the blood brain barrier will allow the antibody reagent to enter the brain. Mice will be in 4 separate experimental cohorts, and will receive treatment and behavior testing every two weeks until the conclusion of the study.

Please join us on

Monday, November 30th, 2020

12:00-12:50 pm, https://arizona.zoom.us/j/94765815841

Hosts: Dr. DK Kang and Dr. Russ Witte
dkkang@arizona.edu and rwitte@arizona.edu

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