

SELECTED TOPICS FOR MASTER’S SCHOLARSHIP OPPORTUNITIES: CALL FOR APPLICATIONS - FACULTY INITIATED IDEAS

No	Project brief	Non-communicable disease focus	Technology Focus	Key Staff at Mak-Uganda	Key Staff at CWRU-USA
1	Several publicly available datasets of individuals with Parkinson's disease are now available for secondary analyses. Our lab has several hypotheses that could inform independent analysis projects, exploring new approaches to objectively assessing motor symptoms. Trainees (up to two) with skills in signal processing and machine learning would interact directly with the PI to: 1) learn about Parkinson's disease and its motor symptoms, and 2) conduct exploratory analyses to train machine learning models to detect symptoms that are overlooked by current state of the art methods.	Chronic movement disorders	Data analytics and Artificial Intelligence		Prof Chris Pulliam
2	This is a new project that requires access to manufacturing facilities. In home mobility for children is difficult as bulky walkers and wheelchairs have difficulty navigating and don't enable much interaction with the environment. The project is aimed at developing a do-it-	chronic movement disorders	other		Prof James Sulzer

	yourself, in-home mobility tool for young children with hemiparetic cerebral palsy. The idea is based on an existing open source plan for children with use of both arms.				
3	The acceleration of our photoacoustic/ultrasound computed tomography reconstruction via C/Java and GPU. Current scripts in Matlab are time consuming and does not allow real-time imaging. The skill needed for this direction will be programming skills in C/Java, CUDA, and basic image processing.	Blood Disorders	Biomedical Imaging		Prof Rui Cao
4	Compressed sensing based photoacoustic microscopy. We will need to implement compressed sensing technique for our fast photoacoustic microscopy, which requires the good understanding of the mathematics behind it and implement it by code.	blood disorders	Biomedical Imaging		Prof Rui Cao
5	The aim of the project is to segment histology slides stained with Masson's Trichrome to further understand how the pathology of atrial fibrillation progresses. We will begin with manual segmentation and annotation of collagen content to discern differences in a	cardiovascular disease,	Biomedical Imaging		Dr. Michael Douglass Dr. Andrew M. Rollins

	control pig heart and a disease model pig heart. Remote access to scanned slides will be provided, but the student would be required to learn QuPath and R for data analysis and statistical comparisons. Manual segmentation will produce datasets to compare tissue thickness, endocardial thickness, collagen percentage, collagen morphology, and adipose presence				
6	We have developed a specialized imaging catheter to assist in ablation treatment of Atrial Fibrillation. The goal of this project is to use the imaging of the catheter to predict the force that is incident on tissue using an ex vivo rig. We have already built a rig with the capability of measuring catheter contact force. The student would be required to assist in the programmatic collection of imaging data at difference incident forces. This can be done remotely with assistance of either a graduate student or undergraduate collaborating in the lab. The student would then assist in analyzing the collected Optical Coherence Tomography images to understand how the imaging catheter can predict contact force.	cardiovascular disease,	Biomedical Imaging	Dr. Andrew M. Rollins	Dr. Michael Douglass Dr. Andrew M. Rollins

7	<p>Developing novel image analytic and machine/deep learning tools for multiple conditions using medical imaging data (MRI, CT, PET, digital pathology).,</p> <p>A note here is that the project can be in cancer, chronic, or cardiovascular diseases - we have ongoing efforts on all these spaces.</p>	other	Data Analytics and Artificial Intelligence		Satish Viswanath
8	<p>Students will work with collected single-channel data from bladder function (pressure) in rats and will train, validate, and optimize machine learning algorithms to predict bladder events. This algorithm will contribute to a project that aims at closing the loop to time stimulation of vagus nerve to promote neuroplasticity and restore bladder function after spinal cord injury.</p>	other	Data Analytics and Artificial Intelligence		Ana Hernandez Reynoso
9	<p>Collect (in-person) and analyze (remote) EEG signals from human participants to understand evoked sensory responses in neural signals and cortical networks during tactile stimulation. The student would interact with the PI and a PhD student. Key skills include signal processing,</p>	other	Data Analytics and Artificial Intelligence		Prof Luke Osborn

	programming, some physiology/neuro, basic familiarity with machine learning models/tools.				
10	The project(s) would consist of computational modeling of neurostimulation, and the tools needed would be Matlab, COMSOL (finite element software), NEURON (freeware from NIH). Proficiency in computer programming would greatly facilitate success in this project. An understanding of neuron and propagating action potential fundamentals would be very helpful too.	other	other		Prof Michael Moffitt
11	The student will work closely with my post-doc on a microbiological project investigating fungal cell-derived biomaterials as immune modulators. The role involves hands-on experience with fungal and human immune cell culture, advanced sequencing techniques, molecular biology, and immunology.	other	Biomaterials and Drug delivery		Prof Mei Zhang
13	Digital pathology	Other		Robert Ssekitoleko	Prof Jim Ulhir
14	Design of a contextually Ultrasound device	Other	Biomedical Imaging	Dr Robert Ssekitoleko	

15	Digital pathology	Other	Biomedical Imaging	Dr Hawa Nalwoga Dr Phiona Bukirwa	Prof Joe Willis
16	Fit-4-purpose prosthetic hand design	Chronic movement disorders		Dr Robert Ssekitoleko	
18	Integration of biomarkers, electrocardiographic signal analysis, and imaging techniques for prediction of progression of Rheumatic Heart Disease in Children	Cardiovascular (Rheumatic heart disease)	Data analytics and Artificial intelligence	Dr Agnes Namaganda	
