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

No	Project brief	Non-communicable	Technology	Key Staff at	Key Staff at
		disease focus	Focus	Mak-Uganda	CWRU-USA
				-	
1	Several publicly available datasets of individuals	Chronic movement	Data analytics		Prof Chris
	with Parkinson's disease are now available for	disorders	and Artificial		Pulliam
	secondary analyses. Our lab has several hypotheses		Intelligence		
	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.				
2	This is a new project that requires access to	chronic movement	other		Prof James
	manufacturing facilities. In home mobility for	disorders			Sulzer
	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-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	Blood Disorders	Biomodical	Prof Rui Cao
5	computed tomography reconstruction via C / Java	blood Disorders	Imaging	1101 Kul Cao
	and CPU Current scripts in Matlah are time		Intaging	
	concurring and door not allow real time imaging			
	The skill needed for this direction will be			
	The skill heeded for this direction will be			
	programming skins in C/ Java, CODA, and basic			
	image processing.			
4	Compressed sensing based photoacoustic	blood disorders	Biomedical	Prof Rui Cao
	microscopy. We will need to implement		Imaging	
	compressed sensing technique for our fast			
	photoacoustic microscopy, which requires the good			
	understanding of the mathematics behind it and			
	implement it by code.			
5	The aim of the project is to segment histology slides	cardiovascular disease,	Biomedical	Dr. Michael
	stained with Masson's Trichrome to further	,	Imaging	Douglass
	understand how the pathology of atrial fibrillation		0 0	0
	progresses. We will begin with manual			
	segmentation and annotation of collagen content to			Dr. Androw M
	discern differences in a control pig heart and a			DI. Andrew M.
	disease model pig heart. Remote access to scanned			Komits
	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	Developing novel image analytic and machine/deep learning tools for multiple conditions using medical imaging data (MRI, CT, PET, digital pathology)., A note here is that the project can be in cancer, chronic, or cardiovascular diseases - we have ongoing efforts on all these spaces.	other	Data Analytics and Artificial Intelligence		Satish Viswanath

8	Students will work with collected single-channel	other	Data Analytics	Ana Hernandez
	data from bladder function (pressure) in rats and		and Artificial	Reynoso
	will train, validate, and optimize machine learning		Intelligence	-
	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.			
9	Collect (in-person) and analyze (remote) EEG	other	Data Analytics	Prof Luke
	signals from human participants to understand		and Artificial	Osborn
	evoked sensory responses in neural signals and		Intelligence	
	cortical networks during tactile stimulation. The			
	student would interact with the PI and a PhD			
	student. Key skills include signal processing,			
	programming, some physiology/neuro, basic			
	familiarity with machine learning models/tools.			
10	The project(s) would consist of computational	other	other	Prof Michael
	modeling of neurostimulation, and the tools			Moffitt
	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.			
11		.1		
11	I he student will work closely with my post-doc on	other	Biomaterials and	Prot Mei Zhang
	a microbiological project investigating fungal cell-		Drug delivery	
	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.				
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	