20 Oct 2020

Job Title: Post-doctoral scholar openings at Johns Hopkins Department of Neurosurgery

- NeuroAcoustics Laboratory, in conjunction with the HEPIUS (Holistic Electrical, Ultrasonic and Physiological Interventions Unburdening those with Spinal Cord Injury) center

General Description

The Johns Hopkins University's Department of Neurosurgery (DNS) is seeking a highly motivated, independent, **hands-on** and **creative engineering PhD**, with outstanding work ethics to conduct pioneering ultrasound research at the department's HEPIUS (Holistic Electrical, Ultrasonic and Physiological Interventions Unburdening those with Spinal Cord Injury) center's, in conjunction with the NeuroAcoustics Laboratory, especially as related to the recently received DARPA award: https://www.hopkinsmedicine.org/news/newsroom/news-releases/1348m-awarded-to-johns-hopkins-scientists-to-develop-implantable-ultrasound-devices-for-patients-with-spinal-cord-injury

This position involves **full-time scholarship,** as well as **mentorship** of other trainees, and **operations** of state-of-the-art ultrasound equipment / acoustic measurements setups, including:

- Canon's clinical Ultrasound System (Aplio I800), equipped with Microflow Imaging (MFI), contrast harmonic imaging, shear wave elastography and high frequency probes (upto 33 MHz);
- Phillips clinical Ultrasound System (EPIQ 7), equipped with Super Microvascular Imaging (SMI);
- Verasonics Vantage system with 1024 channels, and ability to store, study and modify ultrasound raw RF data, requiring knowledge of MATLAB scripts;
- BrainBox's Ultrasound Neuromodulation system (NeuroFUS), equipped with NeuroNavigation and various probes with frequencies ranging from 0.5-2.5 MHz.
- Portable handheld ultrasound scanners, such as Clarius, Butterfly iQ and Interson;
- Acoustic simulation packages, such as PiezoCAD, PZFlex and Wave3000;
- Fundamental Acoustic Measurement setups, such as a 5-gallon (10" x 10' x 10") water tank equipped with 3-axis motorized positioner, and water conditioning unit;
- Mock ICU room, with realistic mannequins and phantoms, mimicking the acoustic characteristics of tissue models, e.g. General-Purpose Ultrasound phantom, Lumbar puncture mannequin, Doppler Ultrasound training model, etc.;
- Fabrication shop, housing state-of-the-art manufacturing equipment, such as: metal 3D printers, MakerBot 3D printers, 3D scanners, laser cutters, vinyl cutters, CADing station, electronics station and microscope station.

The post-doctoral scholar's studies will play a pioneering role in **innovative** ultrasound devices that are built for FDA approval and use in human patients within 5 years timeline.

In addition to the hands-on engineering and scholarship responsibilities, this position will also be responsible for training and mentoring other trainees of the center to design, build, and test ultrasound technologies, particularly related to implantable sensors for spinal cord injury patients. This individual will also be the primary point of contact with other **collaborating ultrasound companies** (e.g. Sonic Concepts Inc, FUS Instruments, etc), as well as **collaborating academic labs** (e.g. Johns Hopkins Applied Physics Laboratory, Columbia University, etc) as well as **collaborating clinicians**, to develop and test devices in pre-clinical (animal) and clinical settings.

The HEPIUS and NeuroAcoustics centers are multipurpose facilities used for various innovation brainstorming meetings, innovative experiments, fundamental acoustic measurements, fabrication workshops, and events, and primarily for the Johns Hopkins Neurosurgery's DARPA award. The position will report to the center's Principle Investigators: Drs. Manbachi and Theodore.

Responsibilities

1. Research and Scholarship

a) Coming up with new ideas, generating data and seeing them through peer-reviewed journal publications, or conference proceedings;
b) Brainstorming with collaborating industries, academics and clinicians to start new initiatives; and generating preliminary data to pave the path for future funding for such ideas;
c) Assisting with preparation and submission of funding applications for the center;
d) Taking initiative to prepare and submit fellowship applications for themselves to promote their own career;

2. Educational and Instructional Development

e) Serve as scientific mentor and role model for lab trainees to support them in publications;
f) Providing technical assistance to lab trainees including the development of technical workshops;
g) Responsible for training and accountability of everyone else in terms of lab safety;
h) Working closely with faculty, to integrate new equipment, procedures, or methods;

3. Facilities Management

i) Setup, routine operations, and maintenance of the ultrasound lab facilities, managing both the use of space and equipment. Facilities include the main studio, as well as the ultrasound systems and fabrication equipment listed above;
j) Developing procedures and checklists for efficient and safe use of all equipment;
k) Continuously identifying and implementing creative ideas that employs these resources;
l) Developing new software scripts to operate the equipment and expedite organizational operations;

m) Work with the PIs and the financial manager of the center to assist in identification of the technical and budgetary needs required to pioneer the field through future scientific experiments;
n) Overseeing smooth functionality and repairs associated with the center's equipment;
o) Responsible for organizing demo days for key stakeholders of the center.
p) Develops and maintains Standard Operating Procedure for all scientific equipment;

Required Qualifications

Education/Training

- Ph.D. in an engineering or related technical field, with >2 years of experience in ultrasound field.
- Demonstrated successful teaching related courses or workshops.
- Those with machine shop, rapid prototyping, wet lab and engineering design experience are especially encouraged to apply.
- Those with software development capabilities on MATLAB especially encouraged to apply.
- Those with prior experience in preparing grant applications are especially encouraged to apply.

Other

- Creative thinking, independent judgment and critical analysis necessary for implementation of new equipment and procedures
- Demonstrated strong management and organizational skills
- Demonstrated strong mentorship and training skills
- Demonstrated initiative to meet competing deadlines and manage multiple activities
- Excellent interpersonal and oral/written communication skills
- Ability to develop and maintain cooperative, effective working relationships with students, faculty and staff
- Ability to develop instructional display materials, and to assist in the production of AV aids for teaching laboratories
- Knowledge of the University organizational structure and administrative policies and procedures such as accounting, contracts and grants, personnel and purchasing
- Knowledge of processes, regulations and policies for the Animal Care and Use Committee (ACUC) and the Human Subjects Research Protocols.
- Knowledge of the safety and Environmental, Health and Safety (EHS) procedures, processes, regulations and policies.
- Note that ACUS, EHS, and other JHU training requirements could be fulfilled by taking and successfully completing online JHU training modules during the probationary employment period.

Please send Inquiries and CVs to:

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