Postdoctoral Position in Ultrasound Image Simulation for Surgical Training

The Department of Systems and Computer Engineering at Carleton University is accepting applications for a postdoctoral fellowship in ultrasound image simulation for surgical training. The anticipated start date will be September 2023 or as soon as possible, with a duration of one year. The postdoctoral fellow will develop an ultrasound-based cyber-physical simulator for percutaneous nephrolithotomy in collaboration with a company and hospitals.

Department Background Information

The Department of Systems and Computer Engineering at Carleton University (located in Ottawa, Canada) is a recognized world-class institution in computer systems engineering, electrical engineering, software engineering, communications engineering, and biomedical engineering. The department offers a broad range of undergraduate and graduate programs in these disciplines. More information here: https://carleton.ca/sce/

Research Project Overview

Percutaneous nephrolithotomy (PCNL) is a procedure to remove large kidney stones via a small incision in the patient's back. Despite over 40 years of development, PCNL remains a complex procedure to master and is associated with a high risk of complications. Fluoroscopy is the preferred imaging modality in PCNL, however, ultrasound has been emerging as an easier-to-learn alternative. In collaboration with Marion Surgical, the Ottawa Hospital, and the Kingston Health Sciences Centre, the postdoctoral fellow will be involved in a project aimed at developing the first virtual reality simulator for ultrasound-guided PCNL. The simulator will enable urologists to immerse in a virtual operating room to practice PCNL in a controlled environment. The postdoctoral fellow and will develop methods to create volumetric ultrasound images from 2D images, display real-time 2D images, and simulate the presence of surgical tools in the images. The researcher will have access to a state-of-the art surgical simulator and will work in close collaboration with a company, urologists, and radiologists in a truly multidisciplinary research environment.

Salary

The postdoctoral fellow will be offered a salary of $50,000 per annum, with the additional ability to opt into an extended health and dental benefit plan. The postdoc will be considered unionized and will be a member of PSAC Local 77000. Information on this bargaining unit can be found here: https://psac77000.ca/.

Position Duties and Responsibilities

The incumbent of this position will, under the direction of Prof. Carlos Rossa, be responsible for leading research activities including but not limited to the following core responsibilities:

- Develop algorithms to create volumetric ultrasound images from 2D images;
- Develop algorithms to simulate 2D images in real-time
- Develop methods to simulate the presence of a surgical tool in the images;
- Work with an industry partner to implement the algorithms in a commercial VR surgical simulator;
- Prepare manuscripts for publication;
- Assist with graduate student supervision;

- Collaborate with an interdisciplinary team of scientists and industry partners.

Job Requirements
The ideal candidate will have one or more of the following qualifications:
- PhD in Computer Science, Engineering, or relevant areas;
- Expertise in medical imaging, or ultrasound imaging;
- Strong publication record in medical image processing, or ultrasound imaging;
- Strong communication, teamwork, and leadership skills;
- Strong writing skills;
- Expertise with unreal engine and real-time simulation is an asset but not required.

Accommodations and Accessibility
Should you require a copy of this posting in an alternate format, please contact us as soon as possible and we would be happy to get one to you in a timely manner. We believe in the importance of supporting on the-job success for the incumbent and are pleased to discuss and/or provide specific tools, resources or other requirements for day-to-day work requirements, as needed.

About Carleton University
Carleton University is a dynamic and innovative research and teaching institution with a national and international reputation as a leader in collaborative teaching and learning, research and governance. To learn more about our university and the City of Ottawa, please visit www.carleton.ca/provost.

Carleton University is committed to fostering diversity within its community as a source of excellence, cultural enrichment, and social strength. We welcome those who would contribute to the further diversification of our university including, but not limited to: women; visible minorities; First Nations, Inuit and Métis peoples; persons with disabilities; and persons of any sexual orientation, gender identity and/or expression. Carleton understands that career paths vary. Legitimate career interruptions will in no way prejudice the assessment process and their impact will be taken into careful consideration.

We thank all applicants for their interest, however, only those selected for an interview will be contacted. If contacted for an interview, please inform us should accommodation be required, and arrangements will be made in a timely manner. All qualified candidates are encouraged to apply.

How to Apply
Candidates that would like to apply for this fellowship opportunity are invited to submit the following documents to Prof. Carlos Rossa at rossa@sce.carleton.ca.
- A cover letter;
- A recent CV;
- Copies of relevant publications; and
- The name and contact information of 3 references, including the PhD supervisor.

More information here: https://www.biomechatronics.ca/. Applications will be accepted until the position is filled and the vacancy may close without notice.