



JOHNS HOPKINS
M E D I C I N E

THE RUSSELL H. MORGAN DEPARTMENT OF
RADIOLOGY AND RADIOLOGICAL SCIENCE

POSTDOCTORAL FELLOW POSITIONS

The Division of Medical Imaging Physics (DMIP) is seeking applicants for several Postdoctoral Research Fellow positions that are immediately available in the follow areas.

1. Ultrasound Imaging for Image-Guided Therapy
2. X-ray CT Imaging
3. Molecular and Multi-Modality Imaging
4. High-Speed Computing for Medical Image Reconstruction

For more information about DMIP and the positions, please refer to the website <http://dmip.rad.jhmi.edu/>

Successful applicants will join a division currently consisting of more than 25 researchers actively involved in medical imaging physics and engineering research. Computational and instrumentation laboratory facilities are available. Projects are funded by government, foundation, and industrial funding.

Applicants should have degrees in electrical engineering, physics, computer science or a closely related field. Relevant experience and skills in physics, mathematics, modeling, instrumentation, computer programming and/or the specific imaging modality, are essential. Good communication and writing skills and a willingness to work in a multidisciplinary collaborative environment are required.

Applications should include a cover letter, 3 references, and a recent curriculum vitae. For information about the application process, contact LaVahn Otey (lotey1@jhmi.edu). Johns Hopkins University is an equal opportunity employer.

POSTDOCTORAL FELLOW POSITIONS

1. Ultrasound Imaging for Image-Guided Therapy

The primary initial focus of the project will be in the development and implementation of novel ultrasound imaging techniques for image-guided therapy. The candidate will have excellent collaborative opportunities with a diverse group of multidisciplinary researchers from medical robotics, medical imaging, image processing, computational mechanics, image modeling, and analysis; as well as with a diverse pool of clinical collaborators. Primary research interactions will take place within the division of medical imaging physics and secondary interactions within Engineering Research Center for Computer Integrated Surgical Systems and Technology (www.cisst.org) and the new Laboratory for Computational Sensing and Robotics (lcsr.jhu.edu), together with collaborating clinical departments at the Johns Hopkins Medical School.

Successful candidate would have the following qualifications:

- PhD degree in Engineering, Computer Science or a closely related field.
- Research experience in the integration of image-guided interventional systems.
- Research experience in ultrasound imaging.

For more information about the position, please contact Emad Boctor, Ph.D. (E-mail: eboctor@jhmi.edu)

2. X-ray CT Imaging

The research group aims to develop novel x-ray CT imaging methods for each of the three major revolutions occurring in the field: Time-resolved four-dimensional cardiac CT imaging, energy-resolved CT imaging with photon counting x-ray detector (PCXD), and C-arm CT imaging for interventional radiology. The cardiac project is to develop methods to estimate and compensate for the motion of the heart during the image reconstruction process. The PCXD project is to develop methods using the novel PCXD to reduce the image noise and/or to identify the tissue type of the object. The C-arm CT project is to develop methods to quantify the perfusion of the liver for interventional tumor oncology. The projects will take place at our research lab, the Johns Hopkins Hospitals, and an instrumentation laboratory. Our collaborators in academia and industry have various expertise such as mathematicians, engineers, physicists, and physicians.

Successful candidate would have the following qualifications:

- PhD degree in Electrical Engineering, Physics, Computer Science or a closely related field.
- Experience and skills in computer programming, mathematics, instrumentation, and/or medical physics.

For more information about the position, please contact Ken Taguchi, Ph.D. (E-mail: ktaguchi@jhmi.edu).

3. Molecular and Multi-Modality Imaging

The DMIP has a long history of molecular imaging research, including single photon emission computed tomography (SPECT) and positron emission tomography (PET). Active research projects include development of simulation tools including computational models of human anatomy and physiology and Monte Carlo simulation methods, development of 3D and 4D analytical and iterative image reconstruction methods with models of the image formation process, optimization of image acquisition and reconstruction methods, and task-based image evaluation using human and numerical observers using applied to both simulated and clinical data. There are research projects in multi-modality imaging techniques and instrumentation including PET/CT, SPECT/CT, SPECT/MR and SPECT/US. Other active research projects include development of instrumentation, system optimization, data acquisition techniques, image reconstruction methods, image evaluation and small animal imaging studies using microCT, and small animal PET and SPECT imaging systems.

Successful candidate would have the following qualifications:

- PhD degree in Physics, Engineering, or a closely related field.
- Experience and skills in mathematics, physics, engineering, instrumentation and computer programming

For more information about the position, please contact, Benjamin M. W. Tsui, Ph.D. (E-mail: btsui1@jhmi.edu).

4. High-speed computing for medical Image reconstruction

This project involves the development of libraries for fast tomographic reconstruction using hardware accelerators including multi-core CPUs, GPUs or FPGAs. Our Division maintains a computer cluster with ~160 processor cores for medical imaging physics research. However, this provides insufficient processing power for some research projections including x-ray CT reconstruction that model the physics of image generation and incorporate object motion. Development of tomographic reconstruction libraries that use one or more of the above mentioned hardware platforms will enable the development of innovative, computationally intensive reconstruction algorithms that would be otherwise impractical.

The ideal candidate would have the following qualifications:

- Ph.D., M.Sc., or B.Sc. degree in Engineering or a closely related field.
- Experience and skills in computer programming and mathematics
Prior experience in GPU/FPGA programming and familiarity with a hardware programming environment and language is a definite plus.

For more information about the position, please contact Benjamin M. W. Tsui, Ph.D. (E-mail: btsui1@jhmi.edu).