

POSTDOCTORAL POSITION IN PHOTOACOUSTIC IMAGING

Center for Biomedical OCT Research

December 2024

Department: Wellman Center for Photomedicine

Reports to: Principal Investigators

Primary Location: MGH at Assembly Row, 399 Revolution Drive, Somerville, Massachusetts MA 02145, US

The Bouma lab, part of CBORT, seeks a highly motivated and skilled Postdoctoral Associate to contribute to the development of advanced photoacoustic imaging systems. This project aims to develop clinically viable imaging systems for real-time functional photoacoustic imaging.

This is a full-time, 12-month appointment with the possibility of extension based on performance and project progress.

The Wellman Center for Photomedicine is the world's largest academic research facility dedicated to investigating the effects of light on human biology and to the development of light-mediated, diagnostic and therapeutic technologies. The Center for Biomedical OCT Research and Translation (CBORT) is a National Biomedical Technology Resource Center funded by the National Institute of Biomedical Imaging and Bioengineering (NIBIB) and focuses on developing novel diagnostic imaging, including but not limited to advancements in Optical Coherence Tomography (OCT) technology.

PRINCIPAL DUTIES AND RESPONSIBILITIES:

Working with the Principal Investigator, the Postdoctoral Associate will lead the technical and experimental aspects of the project, with specific responsibilities including:

Laser and Photoacoustic Systems Development:

- Design, build, and optimize lasers for photoacoustic imaging, including custom high-repetition-rate, fiber-based lasers.
- Optimize a photoacoustic microscope for laser design validation

Photoacoustic Imaging Experiments:

- Conduct ex vivo and in vivo imaging studies, including experiments with tissue-mimicking phantoms, resected human tissue specimens, and living animal models.
- Analyze and interpret imaging data to evaluate system performance against clinical metrics.

Collaboration, Documentation, and Scientific Dissemination:

- Collaborate with a multidisciplinary team of engineers, scientists, and clinicians.
- Contribute to publications, reports, and presentations to document technical progress and scientific findings.

SKILLS REQUIRED

- Expertise in laser design and development, including solid-state and fiber lasers, pulse modulation, wavelength multiplexing, polarization control, etc.
- Proficiency in optical system design and integration.

- Familiarity with photoacoustic imaging principles, ultrasound transducers, and system integration.
- Proficiency in Matlab and Python for signal processing and image reconstruction.
- Experience with experimental instrumentation and diagnostic tools (e.g. high-speed oscilloscopes, spectrum analyzers).
- Strong problem-solving and troubleshooting skills for complex optical and acoustic systems.
- Effective collaboration and communication in multidisciplinary teams, including clinicians.
- Ability to manage tasks, prioritize effectively, and adapt to project needs.
- Skilled in documentation, reporting, and scientific dissemination.
- Openness to learning and developing innovative solutions for biomedical challenges.

QUALIFICATIONS

- Ph.D. in Physics, Biomedical Engineering, Electrical Engineering or a related field.
- Demonstrated expertise in laser design and development, with an emphasis on custom fiber-based lasers.
- Strong background in optical and laser physics, including non-linear optics
- Experience in photoacoustic imaging, ultrasound, or a related biomedical imaging modality.
- Proficiency in experimental design, data analysis, and programming (e.g., MATLAB, Python).
- Excellent communication skills, including good written English, and the ability to work collaboratively in a team-oriented environment.

WORKING CONDITIONS

Normal laboratory conditions with typical exposures including chemicals, fumes, noise, sharp instruments and equipment. Exposure to laboratory animals and bodily fluids. Physical activity is incorporated within the position including extended periods of sitting, standing and walking. May lift, carry, push or pull boxes, supplies, carts or other materials.

FISCAL RESPONSIBILITIES

Prudent use of hospital resources. Cost-effective ordering of supplies.

EEO STATEMENT

Massachusetts General Hospital is an Affirmative Action Employer. By embracing diverse skills, perspectives and ideas, we choose to lead. All qualified applicants will receive consideration for employment without regard to race, color, religious creed, national origin, sex, age, gender identity, disability, sexual orientation, military service, genetic information, and/or other status protected under law. We will ensure that all individuals with a disability are provided a reasonable accommodation to participate in the job application or interview process, to perform essential job functions, and to receive other benefits and privileges of employment.

Interested candidate should submit their application by email to David Veysset (dveysset [AT] mgh.harvard.edu) with subject "PAI Postdoctoral Associate Application". Please attach your academic resume and provide contact information for at least three professional references.