

# Postdoctoral Research Fellowships (Machine Vision/Image Analysis)

## Employer Description

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Until recently, visualizing the architectural and cellular morphology of human tissue has required histopathological examination. Samples would be excised from the patient, processed, sectioned, stained and viewed under a microscope. In addition to being invasive, time consuming and costly, the static nature of conventional pathology prohibits the study of biological dynamics and function. The Tearney Laboratory at Massachusetts General Hospital has led the way in transforming the current diagnostic paradigm through the invention and translation of new noninvasive, high-resolution optical imaging modalities that enable disease diagnosis from living patients without excising tissues from the body.

Led by [Guillermo \(Gary\) Tearney, MD, PhD](#), the lab's 80+ person multidisciplinary team invents, validates and translates novel devices that use light to conduct microscopy in living patients. Light is uniquely well suited for noninvasively interrogating the microscopic structure, molecular composition and biomechanical properties of biological tissues. The goal of the laboratory's research is to improve understanding and diagnosis of disease by imaging the human body at the highest possible level of detail in vivo.

## Job Description

A Postdoctoral research fellowship in the area of Machine Vision/Image Analysis is available in the Tearney Lab ([www.tearneylab.org](http://www.tearneylab.org)) at the Massachusetts General Hospital (MGH) in the Wellman Center for Photomedicine. This appointment will be made at the rank of postdoctoral fellow at Harvard Medical School. MGH's role as a leading teaching affiliate of Harvard Medical School and close ties to Harvard University and MIT provide an outstanding environment for developing and translating new medical imaging technologies with applications in basic and clinical research.

The fellowship will focus on advancing state-of-the-art in medical image analysis to solve challenging problems in processing, evaluating and interpreting clinical data. Working closely with the technology development teams and clinical collaborators, the candidate will be responsible for inventing, developing, and validating machine learning and computer vision algorithms. He/she will develop a set of semi-automated and automated image processing and analysis applications, including segmentation, classification, registration, feature extraction and pattern detection. The specific aim of the fellowship can be tailored to meet individual goals, which will provide an opportunity to build clinical, research, and publication experience.

Representative recent publications from our group include:

- Leung, H.M., et al. Imaging intracellular motion with dynamic micro-optical coherence tomography. *Biomed Opt Express* **11**, 2768-2778 (2020).
- Yin, B., et al. 3D cellular-resolution imaging in arteries using few-mode interferometry. *Nature: Light Sci Appl* **8**, 104 (2019).
- Leung, H.M., et al. Intranasal micro-optical coherence tomography imaging for cystic fibrosis studies. *Sci Transl Med* **11**(2019).
- Gora, M.J., et al. Tethered capsule endomicroscopy for microscopic imaging of the esophagus, stomach, and duodenum without sedation in humans (with video). *Gastrointest Endosc* **88**, 830-840 e833 (2018).
- Gerbaud, E., et al. Plaque burden can be assessed using intravascular optical coherence tomography and a dedicated automated processing algorithm: a comparison study with intravascular ultrasound. *Eur Heart J Cardiovasc Imaging* **21**, 640-652 (2020).

## Job Requirements

A PhD (or equivalent) in Computer Science or Engineering, Biomedical Engineering, Electrical Engineering, Physics or a related field is required. Demonstrated excellence in one or more of the following areas is required: machine vision, machine learning, artificial intelligence, digital signal and image processing. Candidate must have excellent programming skills in an object-oriented language such as Java, Python, C/C++ or C#. Experience on deep learning frameworks such as PyTorch, Keras or TensorFlow is highly desired. Additional skills and experience with Intel Integrated Performance Primitives (IPP), MATLAB, ImageJ, embedded operating systems, Arduino, and GPU programming are helpful. Experience with developing and using optical imaging instrumentation such as OCT and microscopy imaging systems will be a big plus.

## Contact Information

Interested candidates are encouraged to send a CV accompanied by a cover letter describing any previous research training, specific areas of interest, and contact information for three letters of reference. **Address correspondence to Dr. Gary Tearney, note the position you are applying for in the subject line, and send by email to [tearneylabsearch@partners.org](mailto:tearneylabsearch@partners.org).**

*MGH is an equal opportunity employer.*