

Postdoctoral Scholar: Machine learning foundation models for image-guided cancer surgery

The Montillo Lab (www.montillolab.org), a part of the Biodata Engineering Program of the [Biomedical Engineering](#) and [Bioinformatics](#) departments at the University of Texas Southwestern in Dallas, TX is looking for a full-time postdoc to develop novel machine learning methods and foundation models to improve outcomes and democratize access to expert image-guided (endoscopic) cancer surgery.

Our group's primary focus is on developing the theory and application of deep learning (DL). A central goal in this position is to improve outcomes in endoscopy-guided cancer surgery, working closely with our surgeons in the [Otolaryngology - Head & Neck surgery](#) department. The complexity of soft-tissue endoscopy video has meant that the analysis of this rich source of information using traditional machine learning is inadequate to guide surgery and improve outcomes. We are well positioned to change the status quo by developing performant DL-based models and segmentation methods. We aim to do this by (1) exploiting a successful pan-cancer contrast agent (dye) developed at UTSW as grounding information and (2) integrating expert surgeon knowledge, foundation models, and our large endoscopy database. We are also interested in furthering *the theory of DL* by improving how DL models learn. Existing models do not handle model and data uncertainty, and they don't characterize covariates in statistically meaningful ways. Using our experience in developing new DL frameworks for repeat measure (non-*iid*) data, we aim to develop approaches integrating ideas from causal inference and Bayesian neural networks.

With cutting-edge computational infrastructure, access to leading cancer surgery experts, and an unparalleled trove of medical images, multi-omic data, our machine learning lab in the BME and Bioinformatics departments of a leading academic medical center is poised for success in these research endeavors. What we need now are brilliant postdocs who are eager to innovate, think beyond traditional models, and explore bold new directions in biomedical research.

The ideal candidates will have:

- A PhD in computer science, biomedical or electrical engineering, statistics, physics, or any related field providing a firm computational/analytical background.
- Publications demonstrating algorithmic innovation.
- Strong programming ability and experience with machine learning.

Previous experience in endoscopy analysis, foundation models and PEFT, BNN, or causal discovery is advantageous, but not mandatory. Outstanding candidates with a strong oncology or radiology background may also be considered if they have exhibited a commitment to mastering machine learning.

Through close collaborations with surgeons, neurologists, psychiatrists, and neuroscientists, our lab offers truly interdisciplinary training: you will work on problems at the cutting edge of machine learning and medicine. We are a dynamic and forward-thinking lab situated at the forefront of two rapidly growing departments committed to an entrepreneurial approach to research, with a flexible work culture and competitive compensation. Additionally, our university provides world-class computational resources (portal.biohpc.swmed.edu) and research-dedicated high field imaging (utsouthwestern.edu/departments/airc) so that your efforts are focused solely on scientific innovation.

The position is available immediately and we will accept applications until the position is filled; early application is strongly recommended. Apply by email to [Dr. Montillo](mailto:Dr.Montillo@utsouthwestern.edu) (albert.montillo@utsouthwestern.edu) and include:

1. Your CV
2. A statement of research accomplishments and interests
3. Contact information for 3 references