

Postdoc Position on 3D Printed Brain-Machine Interfaces, Carnegie Mellon University, Pittsburgh PA

Job Description

A postdoctoral research position to work on an NIH sponsored project is open in Panat laboratory at Carnegie Mellon University (CMU). The project involves the use of Aerosol Jet 3D printing to create the next generation brain-machine interfaces (BMIs) for large scale recording and stimulation of neurons. The fellow will carry out research in the area of metal nanoparticle and polymer printing to develop neural probes that can isolate and record action potentials from individual neurons and induce optogenetic stimulation of neural activity. The printing process will be followed by fab processes to functionalize the BMIs. The postdoc will interface with Yttri lab at CMU ([link](#)) to test the BMIs in a mouse brain. Mechanical, electrical, and optical properties of the probes will be measured and optimized to achieve high fidelity signal recording/stimulation of neurons. Finite element modeling will also be used to guide the probe development and the manufacturing process. A background in microfabrication, nanoparticle 3D printing, biomedical device engineering and/or knowledge of structure-property relations of materials is necessary. Experience with ASICs, electrical interfaces, recording electrical potentials, especially in neural tissue is a significant plus. Knowledge of microfluidics is a plus. Familiarity with characterization tools such as SEM, FIB, and TEM is highly desirable. Further, a knowledge of the chemistry of ink preparation is also a plus. Most importantly, the candidate should have strong enthusiasm to explore new engineering problems and their scientific solutions. The salary will be commensurate with research experience and technical background. Note that the Panat lab works in the area of nanoparticle 3D printing and its applications for energy storage, sensing, and implantable neural devices.

Link to Dr. Panat's CMU webpage: <https://www.meche.engineering.cmu.edu/faculty/panat.html>

Link to Panat lab website: <https://advancedmanufacturing.us/>

Core responsibilities will include:

- The candidate will be responsible for conducting research on nanoparticle and polymer 3D printing of neural probes that simultaneously record from and stimulate neurons in a mouse brain
- Carry out fabrication, modeling, and testing of the devices
- Explore the relationship between manufacturing, device microstructure, and the device mechanical, electrical, and optical properties, and its performance in biological environments
- Supervising and evaluating technical work of others in the group such as graduate students
- Prepare verbal presentations and manuscripts

Qualifications

- Doctorate in Mechanical Engineering, Manufacturing Engineering, Biomedical Engineering, or Materials Science and Engineering.
- Experience and familiarity with printed electronics/3D printing
- A background in microfabrication (e.g. methods such as PVD, RIE) is highly desirable. Familiarity with characterization tools such as SEM, FIB, and TEM is also desirable. A knowledge of microfluidics is a major plus. Familiarity with the chemistry of ink preparation is a plus.
- Experience with ASICs, electrical interfaces, recording electrical potentials, especially in neural tissue is a significant plus.
- A strong aptitude and demonstrated accomplishment in micro or nanoscale manufacturing research and/or biomedical device research. An understanding of structure-property relations for metallic materials.
- The candidate must have a strong publication record in relevant journals and excellent verbal and written English communication skills along with an ability to work effectively with others.
- The candidate must also have the ability to work well in a self-paced, independent manner, while working well in cooperation with team members and partners. Must be committed to meeting research project deadlines.

More Information

Please visit "Why Carnegie Mellon" to learn more about becoming part of an institution inspiring innovations that change the world www.cmu.edu/jobs/why-cmu. Employee benefits is available at: www.cmu.edu/jobs/benefits-at-a-glance.

Carnegie Mellon University considers applicants for employment without regard to, and does not discriminate on the basis of, gender, race, protected veteran status, disability, or any other legally protected status

How to Apply: Please send your CV directly to Dr. Panat at panatlab19@gmail.com