

Research Engineer (BCI / Neurotechnology)

Brown University School of Engineering

The BrainGate lab in the School of Engineering at Brown University is seeking an enthusiastic and skilled software engineer to join our internationally recognized research team to further advance the BrainGate neural interface system and to support the overall neurotechnology research endeavor in the laboratory of Leigh Hochberg, M.D., Ph.D. Our lab and consortium focus on developing brain-computer interfaces that will restore communication and upper limb function for people with severe speech and motor impairments, including people with spinal cord injury, stroke, or ALS. Throughout our clinical research, we also conduct fundamental human neuroscience research in movement control, cognition, and attention.

Working closely with members of our highly multidisciplinary lab and consortium, the Research Engineer will be responsible for the design, development, integration and maintenance of a suite of innovative complex software spanning a variety of hardware systems at the core of the BrainGate brain-computer interface platform. They will have responsibility for system and software verification and release for use in the BrainGate pilot clinical trial. The incumbent will provide guidance to, train, and collaborate with students, peers, and senior researchers and clinicians to enable data collection and testing of novel research hypotheses. They will serve as an expert technical resource for using the BrainGate system and processing data with responsibility for data integrity and usability.

The Research Engineer will be self-driven, a committed team player, nimble with emerging technologies, highly disciplined in software engineering best practices (such as GitHub version control and code review, agile development, verification through simulation, coding standards and documentation) and skilled at selecting and applying a variety of languages and packages as appropriate for optimal performance. They will guide integration of new hardware devices and software apps into the real-time system as needed (eye tracking, robotic device interfaces).

Based in our BrainGate research lab at Brown University, this is a two-year fixed-term full-time staff position with full benefits, with the possibility of extension contingent upon available funding.

Education and Experience:

- Bachelor of Science in Computer/Electrical Engineering, Computer Science or related field required (MS preferred)
- 3+ years software/engineering development experience across multiple domains

Job Competencies

Essential competencies:

- ◆ Fluency in Python and C (or C++)
- ◆ Expertise in Matlab and matrix operations
- ◆ Experience with Simulink

- ◆ Proficiency with source control (GitHub) and/or industry-standard software development environments and collaborative development tools
- ◆ Experience with network programming / communication constructs (UDP, WebSockets, TCP, ZMQ)
- ◆ Ability to work effectively in both Windows and Linux/Ubuntu
- ◆ Working knowledge of digital signals and filters
- ◆ Experience interfacing software with devices (such as peripherals or robotics)
- ◆ Familiarity with emerging software technologies and methodologies
- ◆ Demonstrable ability to develop accurate, sustainable, well-documented software
- ◆ Excellent judgment in making independent engineering decisions in the context of project objectives
- ◆ Strong leadership, communication and organizational skills
- ◆ Motivated self-starter able to work individually and as a critical member of a high-performance cross-functional team

Preferred competencies:

- ◆ Experience with Verilog/VHDL
- ◆ Core concepts of web protocols, web servers, modern web app infrastructure, RESTful API
- ◆ Experience with databases (e.g., SQL, MongoDB, queries, table design, JSON/blobs)
- ◆ Experience programming for iOS and Android
- ◆ Working knowledge of HMM, classification, and dimensionality reduction (e.g., LDA, PCA, FA)
- ◆ Knowledge of machine learning, recursive neural networks,
- ◆ Experience with TensorFlow, AWS, hyperparameter optimization
- ◆ Interest in user interface design and implementation, UI/UX
- ◆ Experience with embedded system development, FPGA, and ARM programming
- ◆ Experience with neuroscience and electrical brain signals
- ◆ Prior work experience in academic research or the medical device industry

Inquiries should be directed to John Simeral, PhD - John_Simeral@brown.edu

