Master's Internship – How Does the Brain Decide to Stop?

Bernardo Sabatini Lab, Harvard Medical School (Boston, USA)

We are looking for a motivated Master's student to join a neuroscience project on how the brain decides when to stop an ongoing action. We are particularly interested in situations where there is no external signal telling the animal to stop, and the animal must decide on their own. For example, when an expected reward fails to occur, the brain must detect this absence and decide to stop. We study this problem using a simple mouse behavior in which animals repeatedly perform an action (licking for water), but sometimes the water reward is omitted. Because sensory input and movement are nearly identical across licks, stopping must arise from an internal computation, which is the focus of our work.

Using state-of-the-art techniques, including in vivo Neuropixels recordings and closed-loop optogenetic perturbations, we are investigating how this internal computation, specifically expectation mismatch signals, is transformed into a stopping decision within neural circuits. Parts of these questions are currently being prepared for publication, and the student will have the opportunity to contribute.

Key questions

- How does the brain detect the absence of an expected reward?
- How is sensory error transformed into a decision to stop?
- Which cell types and circuits implement these computations?
- Are there different types of stopping, and do they rely on the same mechanisms?
- Why do some animals take longer to stop, and can we predict this trait from neural activity?
- Can studying mouse stopping help us understand stop-related neuropsychiatric disorders in humans, such as obsessive-compulsive disorder?

What you'll do

You will work closely with Dr. Shijia Liu, a postdoctoral fellow, to help address these questions. Your day-to-day work will include mouse behavioral experiments, running optogenetic manipulations, and assisting with histology. Depending on your interests, you may also learn brain surgery, Neuropixels recordings, and computational analysis.

Who we're looking for

Students from biology, neuroscience, psychology, computer science, engineering, or related fields are welcome. Prior experience is helpful but not required. We value curiosity, attention to detail, and a willingness to engage with open-ended problems.

Logistics

Duration: 8–12 months (longer preferred)
Start: Flexible in 2026–2027 (please allow ~3 months for visa processing)
Funding: Typically self-funded (we can advise on options)

To apply, please email **shijia_liu@hms.harvard.edu** with your CV and a short note about your background and timeline.