Summary
The student will engage in a laboratory-based project in the field of computational neuroscience in one of the research labs of the EPFL working in this field.

Content
A typical project will involve a theoretical or computationally-oriented project in the field of neuroscience. The projects are available on the lab websites or discussed directly with a potential head of lab.

Learning Prerequisites

Required courses
- Bachelor in Life Science, Physics, Engineering, or Computer Science.
- Good knowledge of Mathematics and Computational Principles
- One core master course in the field of computational neuroscience finished before the start of the project (e.g., Unsupervised and Reinforcement Learning, Statistical Neuroscience, Biological Modeling of Neural Networks, In silico neuroscience, Computational Motor Control)

Learning Outcomes
By the end of the course, the student must be able to:
- Manage an individual research project
- Develop expertise in a specific area of computational neuroscience
- Implement appropriate mathematical or computational methods to address a specific neuroscience problem
- Conduct simulations appropriate to study the problem
- Assess / Evaluate data obtained computational experiments
- Interpret data obtained computational experiments
- Optimize simulation protocols and data presentation
- Derive mathematical predictions from theoretical models

Transversal skills
• Use a work methodology appropriate to the task.
• Assess progress against the plan, and adapt the plan as appropriate.
• Plan and carry out activities in a way which makes optimal use of available time and other resources.
• Continue to work through difficulties or initial failure to find optimal solutions.
• Keep appropriate documentation for group meetings.
• Demonstrate the capacity for critical thinking.
• Demonstrate a capacity for creativity.
• Write a scientific or technical report.

Expected student activities

Students will focus on hands-on computational and mathematical approaches depending on the project. Students will read and discuss assigned papers from the original scientific literature. As part of the evaluation process, students are required to submit a written report and give an oral presentation that summarizes and interprets their results.

Assessment methods

Continuous control
Written report
Oral presentation

Supervision

Others Typically, the student will be matched with a secondary mentor (this will usually be a senior PhD student or a Postdoctoral Fellow) who will take responsibility for the day-to-day supervision and training of the student.

Resources

Bibliography
Appropriate reading materials will be assigned by the student's mentor depending on the nature of the research project. The assigned reading material will usually comprise original research papers, review articles, and secondary sources (e.g., books).

Websites

• http://sv.epfl.ch/brain-mind