SENIOR THESIS IN NEUROSCIENCE

The Senior Thesis in Neuroscience is an opportunity for seniors to develop and complete a research project of their design under the mentorship of a neuroscience faculty member. The program is intended to engage our most ambitious students, and demands dedication and the ability to work independently. Successful completion of a Senior Thesis with a grade of A- each semester is one criterion for nomination to Phi Beta Kappa.

Completion of the Senior Thesis may lead to graduation with Honors in Neuroscience, for which students must:
- complete a year-long faculty-mentored research project
- complete a written dissertation
- defend the thesis in front of a faculty committee
- earn a B+ or higher in both NE 401 and NE 402

ELIGIBILITY
Senior Thesis applicants:
- must have an overall GPA of 3.2
- must conduct their project during their last two semesters as an undergraduate
- may not receive a stipend from UROP for their Senior Thesis project
- may apply for a UROP grant to cover research supplies
- may work with any faculty member conducting neuroscience research anywhere in the BU community (CRC or BUMC)
or in the greater Boston area, i.e. researchers at Mass General Hospital, Beth Israel Deaconess Medical Center, Harvard Medical School, Brigham and Women’s Hospital (by approval from the Neuroscience Program)

APPLICATION GUIDELINES
The Senior Thesis Application is designed to assess a student’s project and relationship with their thesis advisor. Applications must be submitted online by Thursday, September 15th. The application will be available at bu.edu/neuro/undergraduate/forms in mid-August. Application components include:

Thesis Project Proposal – Concise description of the project’s rationale, significance, and method of investigation/analysis. Please refer to Page 2 for detailed instructions for the thesis proposal. Students should discuss their project and proposal with their thesis advisor before submitting it via the online application.

Thesis Advisor Assessment – Online form to be completed by your thesis advisor. The official thesis advisor must be the Principal Investigator of the lab, not a graduate student or postdoctoral fellow.

Copy of Unofficial BU Transcript – A PDF or screen capture of the transcript preview will suffice.

THESIS PAPER
The dissertation should be 35-50 pages, including references and figures, should be framed like a peer-reviewed manuscript, and include:
- Abstract
- Introduction (a review of the literature)
- Methods (a clear description of your experiment and data analysis)
- Results in clearly-labeled tables and figures with legends
- Discussion
- References

You and your thesis advisor may agree upon other criteria that will also factor into your grade. Examples of previous thesis papers are available in room 109C. A digital copy of your paper is due to your committee one week before your defense to give them time to prepare.

Final, hard copy thesis papers are due to Liz Tingley (2 Cummington Mall room 109C) by 5pm on the day after your defense.

DEFENSE
The culminating event of the Senior Thesis project is the defense. You are required to assemble an examination committee of three faculty members, one of whom is your thesis advisor. At least two of your committee members must be BU faculty members. Postdocs or professionals in the field from other institutions may serve as the third committee member. Graduate students are ineligible to serve on the thesis committee, but may be present during the defense.

You must prepare a 30-40 minute presentation, which will be followed by questions from your committee. Following the defense, your committee will decide whether or not to recommend you for Honors in Neuroscience, noting their decision on the Senior Thesis Grading Sheet. The Senior Thesis Grading Sheet must be completed and submitted no later than 5pm on the day after your defense. Plan to select and contact your committee members and schedule your defense date by late January.

If you have any questions about the senior thesis or need assistance reserving a space for your defense, please email etingley@bu.edu. Defenses must be complete by the last day of classes in the spring semester. For 2016-2017, this is May 3rd.

GRADING
If your Senior Thesis application is accepted, you will automatically be enrolled in NE 401 in the fall, and NE 402 in the spring. Your thesis advisor is responsible for assigning a grade for NE 401/402 at the end of each semester via web-grading. If your lab is off-campus and you are enrolled under Dr. Hattori, your mentor must email the grade to shattori@bu.edu by the first day of the spring finals period. As noted above, you and your thesis advisor are responsible for determining grading criteria; possible factors include attendance, presentations in lab meetings, etc.

INFORMATION SESSION
An information session will be held in early September to discuss the timeline and expectations of the Senior Thesis project, and we strongly encourage you to attend before submitting your application. Dr. Hattori will hold progress meetings in early November and early February. Refer to page 3 for a complete timeline.
SENIOR THESIS PROPOSAL GUIDELINES

The purpose of the thesis proposal is to concisely articulate the project’s rationale, significance, and method of investigation/analysis. Students should consult with their advisor to establish specific expectations for the thesis proposal. Once you have discussed your project with your thesis advisor and your thesis proposal is complete, you will submit it via the online Senior Thesis Application.

THESIS PROPOSAL REQUIREMENTS

Format:

- Arial size 11-pt font
- Single-spaced
- 2-4 pages

Organization:

The organization of a scientific proposal is similar to writing a scientific manuscript for a completed research project, as many of you have done for NE102 and NE203 labs. The difference is that the experiments have not been completed yet and therefore requires one to clarify what will be done, how it will be done, and what the expected outcomes are in order to assess the merit and feasibility of the proposed project.

a. Project Title

b. Project Description. Explain the background information necessary to understand the proposed project, rationale, and its significance in relation to long-term research objectives. This section should include a critical evaluation of existing literature and should identify forward progress that the project is intended to provide.
   - Introduce your research subject
   - State what is currently known by referring to scientific literature
   - State the gap in knowledge and the critical need for addressing this knowledge gap
   - Convey that your research will address this knowledge gap by stating the project objectives, hypothesis, and rationale

c. Specific Aims. Provide a clear, concise point-by-point summary of the aims of the proposed research that will test your hypothesis.

d. Significance. Describe the potential outcomes and significance of the proposed research – provide a broad impact statement about how your proposed research will benefit the field.

e. Experimental Design and Methods. Discuss in detail the experimental design and procedures that will be used to accomplish the specific aims of the project. Describe the protocols and methodologies to be used and include methods of data analysis. Consider potential technical difficulties and/or limitations and alternative approaches that could be used to achieve the aims.

Please include a tentative sequence or timetable for the proposed project. Please keep in mind that the final thesis paper and oral defense must be completed before the last day of classes of Spring semester.

f. References. List all references cited in the text, including all authors and the full title of the publication using the format required for the Journal of Neuroscience.

Example:

Make every attempt to be clear, precise, and succinct with the use of relatively few, well-chosen words to describe a focused, coherent set of objectives. This proposal format is modeled after the Specific Aims page for NIH Grant Applications. For tips and examples on how to write an NIH Specific Aims, please refer to Anatomy of a Scientific Aims Page.
Senior thesis information session

September 15th, 2016: Senior thesis applications due

Progress meeting with Dr. Hattori

Form senior thesis committee
Schedule senior thesis defense

Progress meeting with Dr. Hattori

Provide digital copy of written thesis to committee minimum 1 week in advance
Submit and defend thesis

May 3rd, 2017: Senior thesis paper final hard copy due
Defense must be complete