

# COMBINED JUNIOR THESIS PROPOSAL & NEURO 91 REPORT

**\*\* NOTE: FOLLOW THESE INSTRUCTIONS IF YOU ARE ENROLLED IN NEURO 91 & ARE CONSIDERING WRITING A THESIS \*\***

This report serves as the junior thesis proposal & the Neuro 91 final written assignment for students in their sixth semester (typically junior spring). Please email your thesis proposal/final report (described below) to James Poolner ([jp@mcb.harvard.edu](mailto:jp@mcb.harvard.edu)) by **5 PM on Tuesday, May 5<sup>th</sup>, 2020**. You must also submit a copy of your report to your lab director.

The Head Tutor and the Concentration Advisor will review your proposal, and you will be notified over the summer with feedback. This report should be submitted if you are considering writing a thesis, but does **not** obligate you to do so.

If you have any questions, contact Dr. Laura Magnotti or Dr. Ryan Draft, Neuroscience Concentration Advisors ([magnotti@fas.harvard.edu](mailto:magnotti@fas.harvard.edu), [draft@fas.harvard.edu](mailto:draft@fas.harvard.edu)).

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Because in-person research was curtailed this semester due to the coronavirus, this report has been reconfigured to focus on the development of your literature review and de-emphasize your data collection and actual results.

Thesis Proposal/Final Report Instructions:

- Length: **10-12 pages (double spaced)**. Include the following:
- Title: **Please include "Junior Thesis Proposal / Neuro 91 Final Report" in your title.**
- Introduction: *approximately 8-10 pages, double spaced.*

The Introduction should present an overall framework for your research by reviewing the literature, discussing what is currently known about the particular subject (as well as perhaps how this knowledge may have evolved historically), identifying relevant questions or debates that exist in the field, and detailing the specific question/s that you investigate in the thesis. The Introduction often reads like a mini review article on your topic. It should be very obvious to the reader what specific scientific questions you aim to address with your work. If you introduce the background well, the reader should also understand why your specific experiments are an important and obvious next step for your particular field or laboratory.

You should end your introduction by clearly stating (or perhaps restating) your objectives and rationale for the thesis. This provides a starting point for the thesis and tells the reader what to expect in the forthcoming sections. For example, your Introduction may end with something like the following: "This thesis investigates the role of calcium waves in the development of the embryonic mammalian cortex. Specifically, we will 1) use calcium imaging techniques to characterize the morphology and frequency of calcium waves that occur spontaneously in embryonic cortical slice preparations; 2) demonstrate that we can invoke calcium waves with extracellular stimulation; 3) demonstrate pharmacologically that calcium waves are dependent upon ATP receptors; and 4) use a cell proliferation assay in embryonic brain slices to demonstrate that calcium waves are crucial to embryonic neurogenesis." Try your best to list these items in a logical order that walks the reader through your 'story'.

Throughout the introduction you should supply sufficient information to allow the reader to understand the forthcoming results without her/him needing to read previous publications. Assume that your audience has the background of a general neuroscientist but not necessarily one that knows your field

well. (This means that you don't have to describe what an "axon" is, but you should explain things like "presenilin", "connexins", "synapsin", "iPS cells", or "glioma".) When in doubt, explain briefly. Include schematic figures or diagrams in your Introduction that illustrate the details you are introducing, e.g., important brain regions you are discussing or a complex biochemical pathway. If it is something crucial for the reader to understand, a figure is always a good idea. It improves your overall presentation and also helps the reader to focus on the important points they must understand for the remainder of the thesis. Many authors feel that one figure should be included for every main point in a scientific paper.

Throughout the Introduction, you should include in-text citations of all relevant published work. References serve multiple purposes. Beyond their most important role in giving credit to previous work, references also serve as resources for the reader to learn where s/he might find further reading on a particular subject. Be sure to include relevant reviews or even textbook chapters that you found helpful as you learned about your topic.

- **Experimental Approach:** In approximately 1-2 pages (double spaced), describe both the experiments you completed this semester as well as those you plan to complete in the coming year. Include the specific methods you have used/will use. Provide enough detail so that the reader will have a clear idea about what you plan to do in the lab. We will use this section to make sure that your project will be appropriate for a thesis in Neuroscience. Do not just describe the overall research plan of your host laboratory, but try to be specific about the work you plan to do. Your research director and your mentor should help you to define your specific role in the project. Also, make sure that your mentors read a draft of your proposal for suggestions and revisions.
- **References:** (*not included in the page count*). Provide key references regarding the background and experimental design of your project. Provide complete reference information (authors, year, title, journal, volume, pages numbers, etc.).
- **Joint Concentrators:** If you are a joint concentrator, your thesis proposal must demonstrate how you will integrate both of your concentrations into an interdisciplinary thesis. This means you must show how approaches from both fields will be applied to your work and how both provide essential contributions to further your central thesis question. Your proposal will be reviewed by the Neuroscience Standing Committee (and also your joint concentration) to determine if it meets the standards for a coherent and integrated project. This checkpoint is a requirement to continue to pursue a joint concentration.

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PLEASE SUBMIT YOUR PROPOSAL BY:  
**5 PM on May 5<sup>th</sup>**

Email your report to your lab director and James Poolner ([jp@mcb.harvard.edu](mailto:jp@mcb.harvard.edu))