

9.17 Spring term

Specific Guide to Authors:

You will have a chance to revise and re-submit your draft: We will use the higher of the two scores for your final grade.

If you don't wish to submit a revision for a specific component, please let Eric know – the score for the original version will then be used as the final score for that component.

Length of complete final paper: Approximately **10 pages, double-spaced, with 1" (NOT MORE) margins all around. Please use a 12 point Times New Roman font.**

The paper is to be a report of your studies on the topographic organization and receptive field properties of the whisker-associated barrels in SI cortex of rats.

In the **Abstract** and **Introduction**, state the hypothesis you will test or the questions you will address. At the most general level, you expect to observe somatotopy (this has been described before), and you're interested in the response properties (i.e. multi-whisker receptive fields, direction selectivity). If you have a hypothesis that leads to a specific prediction as to what you expect to see, include it here.

TITLE PAGE: **Does not count toward your page limit.** Should include title, author, affiliation, key words, running title. Use format provided in class.

ABSTRACT (limit: **250 words**) A paragraph about the reason why these experiments are interesting, and your hypothesis, a very brief description of methods, a summary of your Results, a brief Discussion, and the final line should provide a “big picture” perspective, with possible implications of your work.

INTRODUCTION (**~ 1.5 pages**). It should contain

- Background material that provides context (use your reading of published papers), and states in general why the project is worth undertaking – why should the reader be interested in reading your paper? As background, for instance, you could have a couple of lines on the pathway from the trigeminal periphery to the cortex (include where in the pathway vibrissal patterns are visible), how rats use their whiskers, what type of stimuli are effective, etc.
- What is not well understood, contradictory in previous literature, or remains to be clarified? Why are questions about the cells' response properties (multi-whisker input, directionality, etc.) important and of interest to neuroscientists?
- A brief mention of your hypothesis and just one sentence summarizing your findings.

Remember that the Introduction should include **Context, Focus and Justification** (as discussed in class); **NO RESULTS, or METHODS** in this section.

METHODS: (~3 pages)

- Use subheadings.
- Describe the methods used to test your hypothesis. Include enough detail so another neuroscientist could replicate your study.
- Include the animals used, anesthesia, surgery (briefly), where recordings were made, how the whiskers were stimulated.
- What measures did you make and how? Add a brief description of the recording equipment used (electrode, nature and location of the reference, amplifier – including settings, etc.).
- How did you analyze the data? Quantification or categorization, and any statistics.

Please do not cut and paste from the Lab Instructions and notes. Instead, use your own words to re-phrase and summarize procedures. Look at the papers from recitation, or that you've read as background for this paper, for guidance about the kind of detail to include. Assume that the reader will know basics of surgery, electrophysiological recording, etc. and mainly needs the details specific to this experiment – craniotomy location, electrode positioning, filter settings, etc.

RESULTS: (~ 3 pages)

- Use subheadings
- This section should have a logical organization.
- Each subsection should start with an orienting sentence. E.g.
 - To show, we did ...;
 - Direction selectivity was assessed by
 - At each recording location, we compared with
- “What you did” should be brief – enough to orient the reader so that the data and figures make sense, but don't reproduce the entire Methods section. E.g. if you classified responses on a 5 point scale, you should restate that before giving averages, tables, etc.
- Figures, numbers, tables, graphs should be used to support your statements.

FIGURES (belong in the Results section) (3 - 4 figures, each with its own legend)

- Figures are a very important part of your paper and you should give Figure-preparation the time it deserves!
- Figures should be “*stand-alone*” – i.e., **the figure and the legends should have enough detail to be self-explanatory**: the reader should NOT have to read the narrative to understand the figures. Similarly with Tables and captions. Include in the legend a very brief summary of the findings that are illustrated in each Figure/Table.
- Place figures plus legends at the end of your paper, after the Reference list.
- Arrange figures to fit coherently with your text – if necessary look at some published papers in J Neuroscience for how this is done.
- Use your figures to support claims about your findings. You don't need to include ALL the data you collected. Suggestion: consolidate; include 3-4 key figures in your paper.

- Write clear legends with each figure, indicating specifically what you are documenting.
- NOTE: Every figure included must have a figure #. All figures must be referred to in the text, in sequential order.

TABLES: For a modest amount of data, we may list every observation. With more data, look to combine into categories. In some experiments, these may be very natural from the experimental design – dose levels of a drug, treatment vs. control, etc. In others, they may emerge from the data themselves (e.g. sites with single-whisker receptive fields vs. sites with multi-whisker receptive fields).

Location (depth)	preferred direction	response magnitude -- preferred	response magnitude -- opposite	ratio
location1 (depth)				
location2 (depth)				
location3 (depth)				

- NOTE: Every Table included must have a Table # and a Title, placed appropriately. All Tables must be referred to in the text, in sequential order.

DISCUSSION: (~ 2 pages) This is where you discuss what your observations (shown in Results section) mean – i.e., this is where you will interpret your findings. Do NOT use this section to merely restate your results.

Refer to at least **6 relevant papers, including at least 4 primary research papers (not reviews)** from the literature, and *discuss your findings within the context of these papers*. You can refer to Figures/Tables from your Results, but DO NOT introduce new findings in this section.

REFERENCES:

In this section, list the papers you have cited.

Use the citation style for J of Neuroscience – consistently throughout the paper. If you are not familiar with the journal’s citation style, look it up on the J Neuroscience website.

MIT OpenCourseWare
<http://ocw.mit.edu>

9.17 Systems Neuroscience Lab
Spring 2013

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.