Guidelines for 6 month Master's thesis project

Biocommunication and Entomology, ETHZ

Evaluation

At the end of the project you will be evaluated upon a written thesis and an oral presentation and questioning (subject to the requirements of your course, please note Biology students must register for their presentation; contact your course advisor for details), as well as for your performance throughout the project. For the thesis/presentation, you will be graded based on clear understanding and explanation of your work and how it fits in to the broader context of your subject area.

You will be asked to write a research proposal at the start of your project, but this will not count towards your grade.

Outcomes and Expectations

You will learn or improve:

- The ability to use specific methods and skills to give the desired results
- Critical thinking – experimental design, literature analysis, discussion
- Presentation –practice and receive feedback on oral and written presentation skills

You need to demonstrate:

- Independence – self-motivation, time management and being willing to put in the effort. It is *your* thesis, and your chance to show how well you can do.
- Problem solving – Thinking about/researching/carrying out the next step yourself first when you get stuck.

Basic timeline

Before: Agree dates and project, and sign contract
Month 1: Understand the study system, literature review, write research proposal, meet with Consuelo/Mark
Month 2: Presentation of experimental plan at lab meeting, finalise experimental design, start experiments
Month 3: Experiments
Month 4: Experiments, start data analysis, approve thesis outline with supervisor
Month 5: Data analysis, and draft of the thesis
Month 6: Thesis correction, submission, and final defence presentation

Proposal

In the first month of your project you should present a 4-5 page proposal detailing the plan for the project. Pay attention to feedback from your supervisor on your writing as well as the experimental design, as it will be relevant for your thesis. After this you are expected to do a short presentation at group lab meeting (~10min) to present your plan. The proposal should consist of roughly:

1 page	Summary and clear project aims/objectives
1 page	Introduction, with references to literature
2 pages	Description of methods, including detailed plans for experiments and relevant statistical tests
1 page	Timeline of project month by month including when each experiment is planned, time for writing thesis etc.

Thesis

A thesis is on average 20-30 pages including bibliography and any supplementary information (e.g., volatiles tables, metabolomics data). It should consist of Summary, Introduction, Methods, Results and Discussion. You should discuss an outline of your thesis with your supervisor before you start writing it. Your supervisor will read through a draft of your thesis and give detailed feedback before the final version – ensure that you leave plenty of time for this and corrections before your deadline.

Tips:

1. Try and keep everything written in the style of a research manuscript – you want it to be concise and scientific, and keep to a clear structure. Look at related literature for examples of style. Read the articles on 'The Science of Scientific Writing' and the 'Short Guide to Scientific Writing' – ask your supervisor for copies.
2. Clearly define your thesis question and objectives, and then make sure that everything in your thesis is related to your question/problem – including the introduction and discussion.
3. Have subsections in your introduction – break it down into smaller categories.
4. Write up the methods as you go along in your experiments – these are then ready for your thesis. Your data collection and analyses must be clearly understandable and reproducible.
5. Make sure you include all key literature, and recent references (from the last 2 years) – these prove your work is relevant.
6. At Masters level you are also expected to be able to synergise information from different sources in your writing – for example, for each point/topic/result in the discussion section of your thesis quote relevant results from multiple sources, describe how your own results fit into this context, analyse the weaknesses in your research and then draw an overall conclusion.

Oral Defence

Your presentation should be 20 minutes and be supported with slides. You will then be asked questions by the general audience, and after they leave you will be questioned by your supervisors.

Tips:

1. This is basically a condensed version of your thesis in which you emphasize the most important information and results.
2. Ensure you have a clear structure and refer back to your research question
3. Don't use too many acronyms
4. Have lots of photos/diagrams/tables! The best way for you to explain your work, especially your methods, is to show a picture/schematic of it – it's much more immediately understandable.
5. Practice beforehand with people you can ask for feedback from.
6. Be prepared for general, broad questions as well as challenges over your methods/results. Most common question: Why are your results important/meaningful?

Miscellaneous

- Be aware that, when working with insect and plant systems, long hours and/or weekend work is frequently necessary. Be prepared to commit the amount of time needed.
- You will be given a lab note book, in which you should write detailed information on all of your plans, methods, results and analysis. This way the data can be referred back to in the future.
- While projects are carefully planned so that students should be able to safely get results, science is unpredictable. If your results do not prove your hypothesis or you have methodological trouble and do not achieve all that you planned, it is no problem for your thesis as long as you were conducting valid experiments and keeping careful records of them that you can write up.
- Most student projects contribute a small part towards a larger project, and students will be in the acknowledgements section of any resulting publications.
- Ensure that you are okay handing the related organisms (ie. not allergic, phobic).
- Lab participation – In addition to attending the lab meetings every week you are expected to attend and present in the biweekly journal club. There are also regular seminars which you are encouraged to attend.

Guidelines for 3 month semester project

Evaluation

For a semester project the grading is either pass or fail. At the end of the project you will be evaluated on a written report. This should be written in the style of a research manuscript and be approximately 5-10 pages (see **thesis** section above for tips). You will also be asked to do a presentation at lab meeting near the end of your project to explain your work and show your results, but this will not count towards your grade.

Basic timeline

Before: Agree dates and project
Month 1: Understanding the study system, short literature review, finalise experimental design and start experiments
Month 2: Experiments
Month 3: Finish experiments, statistical analysis and write report

Miscellaneous (see section above)