



How To Write and Defend Your Thesis

Overview

As a graduate student, part of the requirements for receiving your degree will be writing a thesis on your research topic and defending the thesis to your supervisory committee. The thesis is a written document focused on your chosen research theme and is composed of more-or-less independent chapters that relate to that theme. The thesis chapters will describe the scientific projects and tactics you chose to address your research theme and topic. The goal of your thesis is to definitively document that you are now an expert of your chosen research topic, that you can think critically and follow the scientific method, and that your conclusions are based on sound science that you have conducted. The goal of the defense is to convey that expertise to your supervisory committee. Typically, writing the thesis comes after completing projects and analyzing results, and the goal of writing the thesis is often to publish the chapters in scientific journals (but this is not strictly a requirement for graduation). Truly though, writing the thesis can start on Day One in graduate school and this mentality can speed up finishing your graduate program. This guideline provides some steps and advice towards making many of your writings throughout graduate school work for (not against) writing your thesis, preparing the thesis to submit to your graduate school, and defending the thesis to your committee.

Writing a thesis

Writing a thesis need not be overly difficult, but it is likely going to be very time-consuming and can start very early on in the graduate school process. A first step is to identify how you would like to organize your thesis. Structuring your thesis will depend on how you decided to pursue your research projects. Thesis structure should be a discussion between you and your primary supervisor. Typically, the first chapter of any thesis is a general Introduction to the research theme, and the last chapter of the thesis is often called a Synthesis chapter which will be used to thematically link your results and discussion into the broader literature and problems associated with your research topic. Key questions to address for the ‘middle’ chapters which relate directly to your research projects prior to writing the thesis are: (1) how many and what are your thesis chapters?; and (2) do you write each chapter based on independent projects (i.e., each chapter is structured like a separate journal article with Introduction, Methods, Results, Discussion), or do you write one chapter for Methods, one for Results, and one for Discussion that would describe all of your projects? Use theses written by former graduate students in your lab or department to guide the formatting requirements and type of structure that you decide upon for your own thesis. A common recommendation is that you write each ‘middle’ chapter as though you would submit them as separate articles for publication in a journal relevant to your discipline. However, deciding on thesis structure should be part of an early committee meeting, so that all committee members agree on what will become the final product.

Writing early and often in your graduate school career can help speed up your thesis writing. Specifically, you can use writings required from your graduate supervisor, coursework, and scholarship applications as though you were writing the thesis from Day One. For example, many graduate supervisors want their students to provide an initial literature review and thesis proposal related to the proposed research topic within the first 6–12 months of joining their lab. Use this thesis proposal/review to write what could end up being the bulk of the first general Introduction chapter of your thesis. Rely upon fellow students, friends, and colleagues to critique your writing and shape this first piece of writing in your graduate career into a well-composed scientific document. Incorporating well-written arguments and paragraphs from your thesis proposal/review or scholarship applications could speed up your thesis writing substantially! The thesis proposal and literature review can also identify your favorite research articles that relate to your topic, which can be used to shape your thesis results and conclusions specifically to answer, support, refute, or discuss recent topics related to your research. The literature cited or reference list is not something many students think about when they write their thesis. However, keeping references organized and staying on task to write and cite will substantially save you time. Additionally, formatting is something that students often leave to the very end of thesis writing and can be quite time consuming. Make sure to consult your department's formatting requirements prior to writing your thesis, and you won't have to reformat everything when you have finished the challenging part of putting your thesis on paper.

How will you overcome the inevitable writer's block to finish your thesis?! Our recommendation here is four-fold: (1) write the Introduction chapters (and sub-chapters) based on the key themes you touched on in your thesis proposal, literature review, and relevant scholarship applications so that early on you can answer the question '*Why does my research matter in the context of my chosen field?*'; (2) write the Methods section when you are actually doing your thesis projects and statistical analyses (and look at the key books and papers published regarding the analyses you ended up using!); (3) write Results and Discussion paragraphs as though you were directly answering several of the problems and questions that are posed by the authors of your top-5 favorite (and recent) scientific papers related to your thesis topic; (4) send the latest version of your thesis chapter (or even sub-sections of those chapters) to your colleagues, friends, or supervisory committee for critiques, edits, and suggestions. Make sure to spend some time away from actively working on your thesis as this will allow your mind to refresh itself with ideas, clarify your thoughts, and re-evaluate what you have already written. Do something like go for a walk, change environments (coffee shops, library, or parks) or brainstorm with someone to help overcome writer's block. As the bulk of your time working on your thesis will be spent editing your writing, time away can be a good thing!

Defending your thesis

How should you approach the thesis defense? Specifically, your approach may vary and will depend upon the people that comprise your supervisory committee. Do they want to examine your claims in depth, or have a conversation about your research topic? Ask your committee. Many times the thesis defense is fun and a mere formality with your soon-to-be colleagues. Other times, the thesis defense is quite formal. Either way, remember that you are now expected to be the leading expert of your chosen thesis topic, and the defense is your chance to make this claim to your committee. Though the members of your supervisory committee may broadly

know more about the fields of ecology, fisheries, conservation, or environmental science, none of them know more about your project than you! Present your information clearly and defend your expertise rigorously.

How should you prepare for the defense? Attend the defenses of other students so you get comfortable with the structure of the meeting. You will also get ideas on what to include in your presentation and how best to present the information, and ideas on what kinds of questions will be asked, and how they are answered. Expect to answer questions involving: why you thought this was an interesting question; why your experimental, field, analytical, and statistical methods were appropriate to tackle this question; why your results are valid; and why your conclusions are sufficient and at an appropriate level of depth/expertise. Come up with a series of questions you think your committee members may ask; often they have already given clues about topics they may ask about or lines of questioning they may use based on prior meetings. Research your evaluators and their expertise. Often, people ask questions in their worldview and will ask questions about your work from their respective angle of research. This could help you come up with potential questions to prepare for your defense. Be sure to work on answers to all of these potential questions before your defense, and say your answers out loud during your preparations so that you are ready and can answer these questions clearly. In the month before your defense, ask your supervisory committee what topics you should study or what you can do to prepare for your defense. They often give very specific suggestions such as reading a particular paper or lecture that they wrote on a particular topic. Also, practice your presentation with your fellow students and get their advice on how to improve it. If you have colleagues working in a similar field as you are, have a “mock” defense with them in a friendly environment, and have them create and ask you potential questions. Thorough preparations for the defense will help enormously.

During the actual defense, try to relax and enjoy the last step in your thesis but carry enough stress so that your mind is sharp. You will field a potentially wide variety of questions that relate directly or indirectly to your thesis topic. If you do not know the answer to one of these critiques/questions, you may feel free to admit that you do not know the answer. But also be confident to speculate on an answer to the best of your abilities or offer ways on how you will address this knowledge gap. You may not know, but you might have a good idea! Defending your strengths and acknowledging your weaknesses can go a long way to show that you have become an expert scientist that has a considerable knowledge base, can draw on that knowledge to speculate about topics you may not know well, and can learn and find answers when necessary. Also remember that you are the expert on your thesis, and try to have fun with your defense. It is as much a time to celebrate becoming a scientist as it is a ‘dreaded defense’.

Cheers and good luck!

By:

Kyle Wilson, PhD Student, University of Calgary

Recipient of the 2013 Outstanding M.Sc. Thesis of the Year, School of Forest Resources and Conservation, The University of Florida

Karen Dunmall, PhD Candidate, University of Manitoba

Vivian Nguyen, PhD Candidate, Carleton University