

EARS Senior Thesis Guidelines and Procedures
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PLANNING A THESIS

So you think you might want to do a senior thesis or Honors thesis in Earth Sciences? The beginning of your junior year is not too early to begin thinking about one! Read on to find out how to go about deciding a topic, getting academic credit, getting funding, and completing the thesis.

Honors thesis or senior thesis? All Earth Sciences majors are encouraged to do a senior thesis. Doing one is one way of fulfilling the culminating experience requirement for a Dartmouth undergraduate degree (though there are also other ways, via EARS 87 or 88). Doing a thesis may, in addition, make you eligible to graduate with Honors or High Honors in Earth Sciences.

To fulfill the culminating experience requirement by doing a senior thesis, you must:

- Enroll in and complete EARS 89 (may be taken twice for course credit, but only once for credit towards the major requirements). During this time, you may design your chosen thesis topic and carry out the research.
- Complete and submit a written thesis, and present it to the department (see below).
- Attend weekly Earth Sciences research seminars during winter and spring terms of your senior year.

For your thesis to be an Honors thesis, in addition to the above you must:

- Have a grade point average of 3.0 (B) in the major and 3.0 (B) overall at the beginning of senior year (College requirement).
- Have a 3.3 (B+) average in the 8 courses constituting the major.

On the basis of overall academic performance, grade point average, and quality of the completed written thesis and thesis presentation, the department decides at the end of the spring term whether eligible students should receive Honors or High Honors.

Planning your thesis. Start thinking about potential topics during your junior year. Talk to faculty members with whom you might want to work and ask them about possible projects and timetables for doing them. Depending on whether the project involves field work or travel, you may have to commit as early as winter or spring of your junior year; other projects may be flexible enough that you can commit later. The earlier you start to think about a thesis, the more choice you have as to advisor and project and the greater your chance of receiving funding.

Thesis proposal. You are required to submit a senior thesis proposal to the department. A thesis proposal is essential, for two reasons. First and most important, it forces you to know the background of the scientific problem, to have a clear understanding of the question, and to think through the methodology, so that you know what you are doing

and why it's worthwhile. Second, virtually all sources of funding, including those at the College, require a proposal (versions of your proposal will likely be submitted to several places). Your advisor will help you prepare your proposal.

The proposal should be titled and should describe the aims, scope, strategy, key references, timing of specific tasks, and (if appropriate) budgetary considerations of your thesis research. This document should be *no more* than 10 pages (less is OK!) single-spaced, in Times 12 font. In addition, please include a separate page that includes the thesis title and signature(s) of your primary thesis advisor(s), indicating that your advisor has reviewed and approved the proposal. This signed page should be scanned and saved as a pdf file. Both proposal and cover page should be submitted electronically to the department chair (currently Brian Dade) and a hard copy delivered to Patty in the department office.

A proposal usually starts with an abstract (< 1 page, usually 1 paragraph) summarizing the project. The body of the proposal should state what the project is (what is the question or hypothesis?), explain why the research objectives are scientifically important, and describe procedures and logistics. If you include figures and tables, they should be numbered so that you can refer to them in the text and they should have explanatory captions. The proposal should be fully referenced. You must attach an itemized budget and justify each item. Copies of old thesis proposals, which you can use as examples, can be obtained from your advisor or the department office.

The requested funds should be used to directly support the research. You can request funds for equipment or supplies, for airfare, car rental, or other travel, and for accommodations if you have to be away from campus. The Department does not cover expenses for food. Other funding sources (e.g., Dean of Faculty research grants) have different policies regarding reasonable expenses. In the event that other funding sources have provided funds for a portion of the project, departmental funds should be requested for additional expenses only and a list of current funding included in the proposal.

The proposal should be written before beginning the research. Departmental thesis funding will not be provided until the proposal is submitted. The Earth Sciences department expects that most senior theses will require no more than \$1500. You are required to submit your proposal externally (to other offices in the College or outside the College); having complied with this, if you do not receive full external funding the Department will make up the difference between what you requested and what you received, up to a total of \$1500. For those rare cases in which a student may be ineligible for other College funding, upon request (with justification) the department will consider an exception to the requirement of external submission. Also, in rare cases the department has provided funding above the \$1500 limit, but in such cases it must be very clear that all possible external funding options have been attempted, no other funding is available, and the project cannot be scaled back without jeopardizing its scientific value.

There are several Dartmouth offices that provide senior thesis funding. These include:

- the Dean of Faculty office
(<http://www.dartmouth.edu/~ugar//undergrad//programs.html>)
- the Office of Residential Life (<http://www.dartmouth.edu/~orl/life-in-res/spec-pgms/senior.html>)
- the Outdoor Programs Office
(<http://www.dartmouth.edu/~doc/getmoney/mellongrant/>)
- the Dickey Center
(http://www.dartmouth.edu/~dickey/thesis_ind_study.html)
- the Rockefeller Center
(<http://rockefeller.dartmouth.edu/students/funding/index.html>)

There are also research grants for undergraduates available from the Northeastern Section of the Geological Society of America (<http://www.geosociety.org/grants/negrant.htm#research>).

Note that many of these offices have proposal submission deadlines *early in the term before* you wish to use the funds (in the case of the Geological Society, even earlier, in February of your junior year), so you may need to work on your proposal long before you plan to begin your actual research.

If you are planning to pursue senior thesis research the summer after junior year that will require financial support, but you are not yet ready to submit a full proposal, the department can accommodate this. We require a one-page statement outlining the key aims and approach of your anticipated summer work and a brief justification of the amount requested for the summer, as well as one-page budget indicating the line items of requested funds. This summer-research pre-proposal document should be submitted to the administrator (Patty Alves) by email by 1 May. Any funds awarded for summer support of senior thesis research will be drawn from the total you are eligible to receive from the department in support of your thesis work. You are strongly encouraged to also seek support from outside of the department for this summer term research.

Thesis proposal deadlines. Regardless of whether or not you are applying for funding, the department needs to receive a written proposal approved by your advisor(s) before the end of the Fall term of your Senior year. If you require summer funding for field work, requests should be submitted to the department by May 1 of your junior year.

COMPLETING YOUR THESIS

Successful completion of EARS 89 requires submission of a written thesis and oral presentation of the thesis. The format of the written thesis should be similar to that of graduate theses; consult your advisor(s), the graduate thesis guidelines, and previous theses for further information. Your thesis should properly introduce the research topic, provide justification for the research, explain the experiments or procedures that were performed, present the data in a concise form, and interpret the data. The work should be fully referenced. You may also include appendices containing a complete dataset, additional data that was collected but not analyzed, computer codes, or other supplementary information.

You must also present your work orally in the spring of your senior year. The Earth Sciences Department requires two presentations, a poster presentation at the Karen Wetterhahn Science Symposium (<http://www.dartmouth.edu/~wisp/wetterhahn>) which generally takes place on the 3rd or 4th Thursday in May, and a scientific conference-style talk at the Earth Sciences Department's Senior Thesis Night, usually the Tuesday following Memorial Day.

Thesis Drafts. You will submit 3 successive drafts of your thesis:

1. A *first public draft* of your thesis is due to your advisor by May 1. Please also submit a version of this to the department office, for interested parties to skim through. This should not be a first draft, but rather a more-or-less complete version of your thesis, though perhaps lacking formatting, acknowledgements, or the like. In other words, it should be *much* closer to the final version than to a first draft. Your advisor will return this draft to you by May 7 with comments.
2. A second draft is due May 15. This will be read by two readers: your advisor and a 2nd faculty reader chosen by mutual agreement between you and your advisor. It should be returned to you by May 20.
3. The final draft is due to your advisor and to the general faculty, via the department office, on the Friday before Memorial Day. This is essentially the final version, barring any changes you may decide to make based on discussion at the Wetterhahn Symposium or Senior Thesis night.

Final bound copies are due June 1.

The format of the written thesis should be similar to that of graduate theses; consult your advisor(s), the graduate thesis guidelines, and previous theses for more details. Your thesis should include an abstract. The body of the thesis should properly introduce the research topic, provide justification for the research, explain the experiments or procedures that were performed, present the data in a concise form, and interpret the data. Your acknowledgment section should mention all funding sources and individuals who have helped you complete your work. You should include a complete and correctly

formatted list of references cited in the body of the thesis. You may also include appendices containing a complete dataset, additional data, computer codes, or other supplementary information. All figures and tables should have captions and be numbered in the order they are referenced in the text.

Oral presentations. Although the details may vary from year to year, the instructions below describe the general format of Senior Thesis night.

A few days before, the faculty and staff will arrange the order of presentations.

You should have your PowerPoint presentations already loaded on to the computer in the classroom used for presentations, and you should have checked that all the graphics display correctly.

Your advisor will briefly introduce you before you present.

The style of presentations is similar to those for oral presentations at national scientific meetings. Each presentation should last 12 minutes, followed by 2 minutes for questions and 1 minute for changing over to the next speaker. There will be a laptop running a timer whose screen color changes according to the time schedule below, so that you can easily gauge the time remaining.

Green: 0- 10 min

Yellow: 10 -12 min

Red: 12 min (starts blinking at 14 minutes).

Although we will not cut you off if you go over time, keep in mind that your audience will become increasingly uncomfortable and incapable of listening the longer you go. So please, practice your talk so that it fits within the time limits!

Do not forget to acknowledge funding sources in your talk!

And please stay for food and congratulations after the talks!

Thesis final versions. Final bound copies are due by June 1. You must print AND BIND at least three copies of your thesis (two for Kresge Library, one of which will go to Rauner special collections, and one for each of your advisors). You can either turn these in to the department administrator, or deliver them personally to the libraries.

Cloth binding with card stock covers is fine. The cover does not have to be white. Color copying is allowed, because many theses require it (e.g. those with photos). Please consider double sided to save paper and library shelf space.

The department will pay for the bound copies of your thesis for Kresge and your advisor(s), but you will have to pay for any additional copies. If you have external

funding (e.g. Dean of Faculty funds), those can be used to cover printing and binding copies.

Please use the College Printing and Mailing Center (<http://www.dartmouth.edu/~dpms/>), Use the following the chart string

20.469.645114.396057.0000.xxxx

to charge the three departmental copies. PLEASE SAVE THE RECEIPT AND GIVE IT TO THE DEPARTMENT ADMINISTRATOR.

Printing and Mailing will deliver (you can use Patty Alves's office, Fairchild 228, as the delivery spot if you want). You can send them your thesis file as a PDF via email. *Give the copy center at least a week to print and bind.*