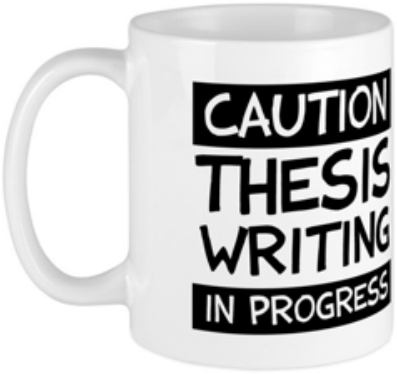
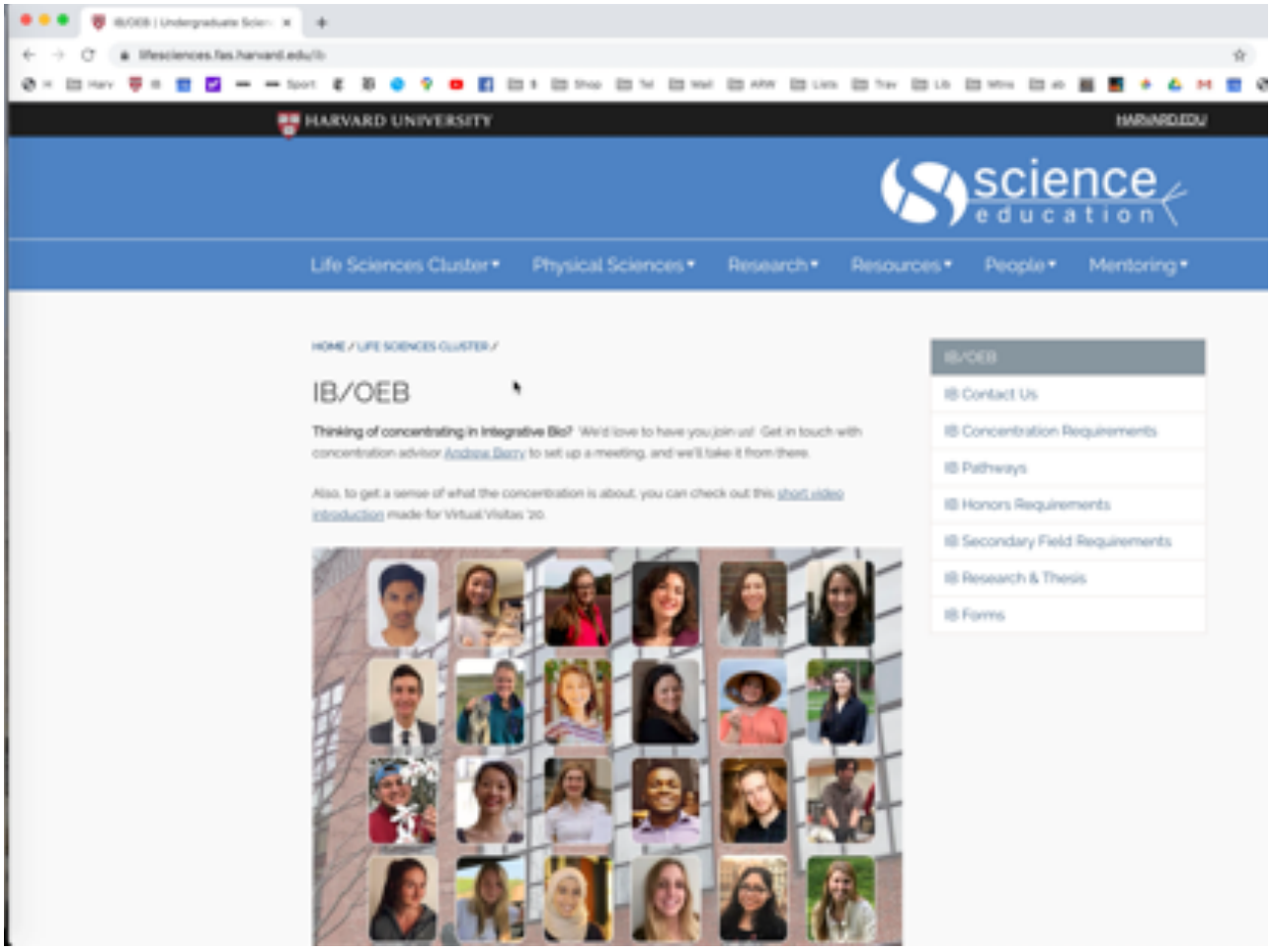


Integrative Bio's Thesis Process

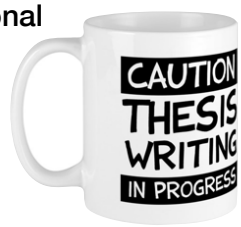
Information for Juniors
4 May 2020

berry@oeb.harvard.edu



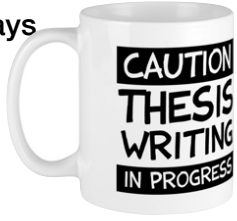
PI

- We encourage you to follow your interests in finding a research group to join. Med Sch, The Broad Inst., Sch of Public Health… All fine.
- If you're working with a PI outside of the OEB Department, we require that you have an OEB faculty member as a "Thesis Sponsor."
- The idea is to find an OEB faculty member with interests closest to your non-OEB PI's; talk to me about this.
- Your OEB sponsor does three things: 1. Ensures that your PI is providing guidance in keeping with OEB's expectations; 2. Formally awards grades for OEB 99r (only OEB faculty can award OEB grades; 3. Provides a (hopefully useful) additional perspective on your research



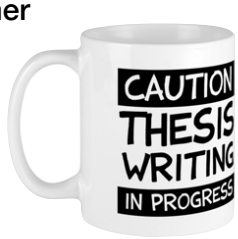
Time Line: Jnr-Snr Summer

- Junior Summer. 95% of thesis writers generate their thesis data over their Junior-Senior Summer
- You're effectively a Grad Student over the summer, working 10 hours a day for 10 weeks, say. You can be super productive
- Contrast this with in-term research. Even if you're doing an OEB 99r (ie you've created space on your schedule to do research), you're still doing three other courses + all the other things you during term time. The amount of time you can put into thesis work in term is limited — meaning that Jr-Sr summer is critical
- Your first priority, then, is to get funding for the summer. Think HCRP, PRISE, HUCE, MCZ-GUR. Deadlines Feb/Mar of your Jnr spring
- It's not a hard guarantee but Harvard is generous with research funds, and rising Snr thesis writers almost always receive financial support for the summer
- IB does not require a 'thesis proposal' like some other concentrations. We figure that your HCRP (or whatever) proposal serves this purpose



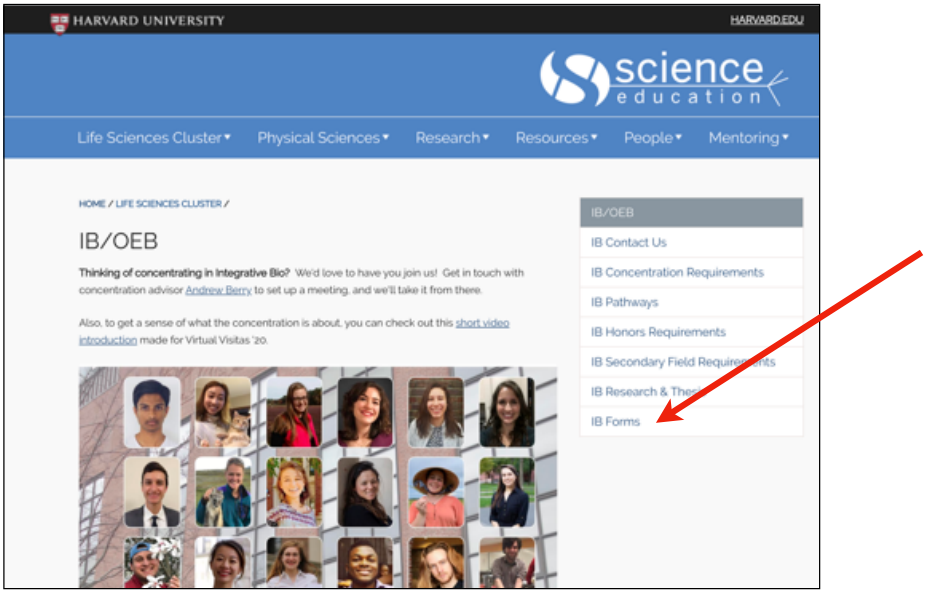
Time Line: Snr Fall

- Most thesis-writers do two OEB 99r's, one per semester as a Snr
- OEB 99r is not required for thesis writers. Non-thesis writers who are doing research may also do 99r
- Some thesis writers prefer to apply for in-semester HCRP funds (HCRP has a deadline at the end of March for summer funding, and two deadlines close to the beginning of each semester for in-term funding). Harvard does not permit students to be paid and to gain academic credit for the same work, so it's a case of *either* 99r *or* in-term HCRP
- In general, I discourage students from doing 99r's before their Senior year. In principle, you can do as many as you like (the 'r' means that it is a course that you can repeat with credit), but two is typically enough on a transcript. Doing more 99r's creates a significant opportunity cost in terms of taking other courses
- During the semester, we hold a couple of thesis writers' workshop meetings as check-ins, and to facilitate the exchange of hacks/tips (eg good bibliographic software; useful R routines)



Time Line: Snr Fall

- OEB 99r requires paperwork that has to be submitted to me by the course registration deadline
- Abstract; signature of your PI; signature of your OEB Sponsor (if relevant)



Updated 8/6/2019

OEB 99r
OEB SUPERVISED RESEARCH
REGISTRATION FORM
2019-2020

Please read this document carefully!

OEB 99r is taken to receive credit for supervised research, whether this research leads to a thesis or not. The 'r' suffix indicates that the course can be repeated. Students who plan on submitting a thesis at the end of the semester must also fill out a Senior Thesis Abstract Form (available on the website or in the Undergraduate Office) at the beginning of the semester.

Instructions: Please complete and return this form with the appropriate signatures to the Life Sciences Undergraduate Office by the day study cards are due. **(Fall Semester: Monday, September 9, 2019; Spring Semester: Friday, January 31, 2020)**

Research is usually directed by a faculty member in OEB. For students conducting research with directors outside OEB, your OEB concentration advisor (or appropriate OEB substitute) needs to approve and sign this registration form as a co-sponsor. The Research Director will assign the final grade (unless work is conducted in a lab outside of the Harvard community in which case the co-sponsor assigns the grade).

Ordinarily a student is expected to work approximately 15 hours a week on the research project. It is very important for you to clarify this up-front with your research director and co-sponsor. *This registration form requires a signature and statement from your director that your proposed research is feasible to complete in the allotted time. We also require both you and your director to sign a statement of agreement on the number of hours per week you will be working.*

A written report should be submitted to your research director **BY 12:00 NOON** on the LAST DAY OF CLASSES: **Tuesday, December 3, 2019** (Fall Semester) or **Wednesday, April 29, 2020** (Spring Semester). The format of the report is at the discretion of your research director and co-sponsor (if applicable). **Submit your report via email as a .pdf document, sent directly to your Research Director, and *cc'ed to James Poolner (jp@mcb.harvard.edu)*. NOTE:** If you've submitted a thesis instead of a report during that semester, the thesis fulfils the requirement for the written report.

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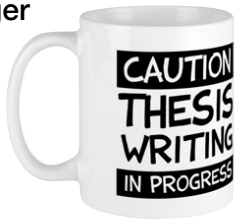
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- The report at the end of the Fall semester is generally taken as an opportunity to jumpstart the thesis writing process (eg a first draft of the Results section)
- There is no strict requirement for the format or length of the report; it's entirely up to you and your PI to come to an agreement on what is required
- Unlike other concentrations, IB does not impose deadlines other than 99r and the actual thesis deadline (the day before Spring Break). This is partly because IB theses come from a range of research traditions (eg tropical field biology vs. Med Sch immunology) so it's not possible to create a one-size-fits-all schedule. This means that you have to create your own set of deadlines in consultation with your mentor(s)

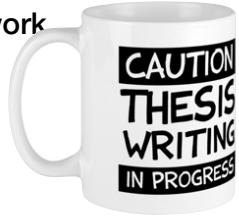
Time Line: Snr January

- This is a great time — three weeks of focused effort — to dedicate to the thesis effort
- You're effectively back in the summer scenario: being an undistracted graduate student
- As a thesis writer, you qualify for housing on campus over this period (but you have to opt in, through your house office)
- My rule of thumb is that data collection should be complete by the beginning of the Spring Semester. This semester should be dedicated to writing up.
- Remember: everything in science takes three times longer than you thought it would



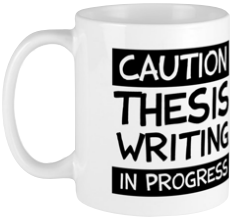
Time Line: Snr Spring

- Another 99r, but this time your thesis fulfills the write up/report requirement
- Another paperwork requirement. You need to submit a thesis abstract form (you can use the same abstract as on your 99r form). This is to give us a complete list of who's writing a thesis. Some thesis writers won't be doing 99r (eg they are HCRP funded); and some people doing 99r won't be planning on doing a thesis
- The thesis abstract is important because we use it in soliciting thesis readers (ie evaluators). We send them your abstract and ask whether they would be happy reviewing the thesis. Your abstract is therefore their first encounter with your work



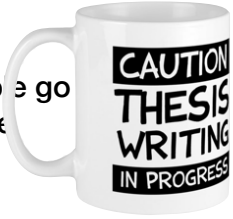
Time Line: Snr Spring

- Your thesis will be evaluated by four people: your PI (we are particularly interested in their comments about your independence) + three readers
- The readers are typically OEB faculty members (though very occasionally we feel the need to bring in people from outside)
- They are chosen to be as close as possible to your area, but that match may well be somewhat remote, meaning that you should write your thesis with a scientifically informed reader in mind rather than an infield expert— you should therefore create appropriate big-picture introductory material
- Readers are given the choice to sign their reviews or submit them anonymously



Time Line: Snr Spring

- OEB has no particular requirements for thesis presentation/ style
- One important consideration: be explicit about what you did by yourself and what you did as part of a team or a collaboration. I suggest using the active voice: I/we. (Some people however prefer to use the passive voice in writing up scientific results). I also recommend including a section on "Attribution of Work" in which you break down who did what.
- Length? A thesis shouldn't be too dense (it's got to be comprehensible to people from outside of your immediate field) but it should also convey what it has to succinctly, efficiently. Imagine a reader who has six theses to plough through. She is not going to appreciate an unnecessarily whimsical, discursive tone.
- You are required to submit one hard copy (for archival purposes). Again, we have no stipulations. Most people go with a Kinko's or Staples spiral binding (because it's the cheapest). The real submission is as a pdf.





Party! On submission day, the day before spring break

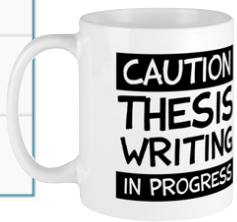


The sense of achievement can be overwhelming (even debilitating)

Grading Process

- The review process is equivalent to peer review
- Readers do not award grades
- Grades are awarded by OEB's Curriculum Committee, which reviews the reviews
- Your thesis grade can contribute to your Honors status for departmental (ie English) Honors

IB Honors Track				
GPA within Concentration	No thesis or No credit	Laudable	Praiseworthy	Excellent or Exceptional
3.500	honors	honors	high	high
3.667	honors	high	high	highest
3.833	high	high	highest	highest



Grades

F See me after class!

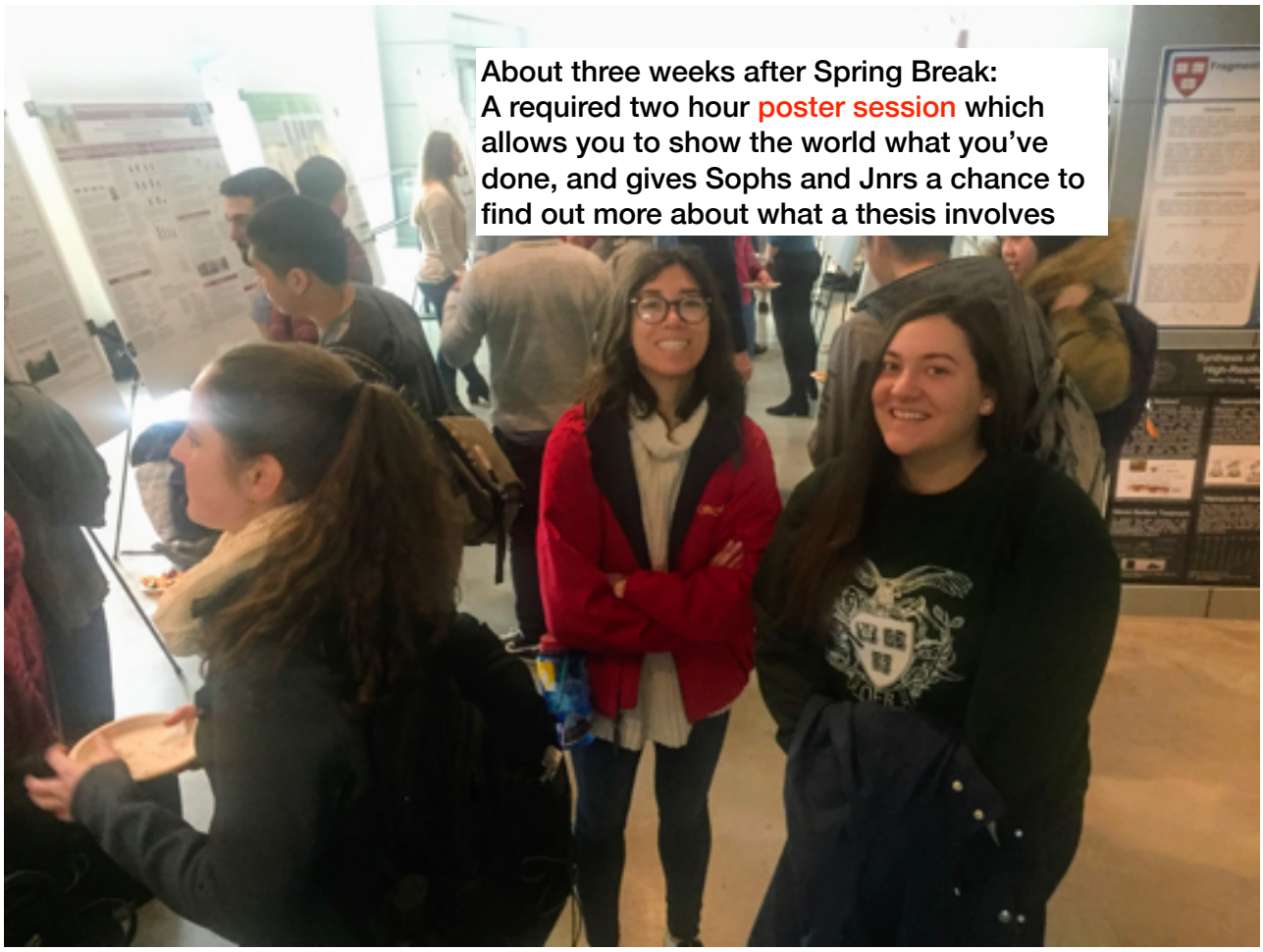
EXCEPTIONAL*:* This grade is reserved for truly outstanding theses. Note that "Exceptional" does not differ, in terms of Honors, from "Excellent." Approximately: Publishable, major journal?

EXCELLENT*:* This grade distinguishes well-written theses that report scientific research of very high quality. The thesis should be without serious flaw in both the design and the execution of the project. Publishable, first author?

PRAISEWORTHY*:* This grade distinguishes clearly written theses which reflect a very good effort. The result obtained may be publishable. Most theses are expected to fall into this category. Publishable, later author in list?

LAUDABLE*:* This grade acknowledges that a serious effort was made to test a good hypothesis. The rationale, methods, and results should be clearly described.

NO CREDIT*:* This grade is reserved for theses that do not meet the standards expected of an IB undergraduate thesis, either in the writing of the thesis or in the quantity and quality of research undertaken for the thesis.



About three weeks after Spring Break:
A required two hour poster session which allows you to show the world what you've done, and gives Sophs and Jnrs a chance to find out more about what a thesis involves



- A thesis is a big deal. It's a huge commitment. It's hard, stressful
- But, for most thesis writers, it's the most significant (and proudest) thing they do at Harvard
- And I'm here to help to make it happen. Don't hesitate to be in touch