

DAC GUIDELINES FOR STUDENTS

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GOALS OF THE DAC

The DAC has four main goals:

1. First and foremost, the DAC is a scientific advisory committee that will provide expert advice on all aspects of the thesis, extending from experimental paradigms to project feasibility within the time frame of a PhD thesis and to the scientific impact of the work.
2. Second, the DAC will help monitor student progress to ensure that the major objectives and standards (discussed below) for completion of a PhD thesis are being met in a timely fashion. In this capacity, the DAC determines whether the student's research meets the requirements of the program and when the student may begin writing the thesis. In addition to evaluating completed experiments and manuscripts, progress will also be considered with respect to maturity in scientific judgment.
3. Third, the DAC will help resolve any conflict between student and advisor or other lab members.
4. And fourth, the DAC serves as a liaison to the BBS program heads and administration.

Notes on forming a DAC Committee

The DAC Committee consists of 3 faculty members, and in some cases, 4. Of the 3 members, 2 should be from BBS. The Chair of the committee **MUST** be from the BBS Program and **MUST** have prior experience as a DAC committee member. The other faculty members on the committee may be from BBS or the DMS Programs, other Harvard departments, or from another university. If a student chooses to have a committee member from outside the BBS program, the Faculty Member must be an official member of an accredited institution's faculty and must be tenure track. We suggest that the student choose committee members who are

generally accessible and whom they would feel comfortable consulting informally. Students should consult with their Dissertation Advisor about possible DAC members very soon after choosing a dissertation lab. The student's Dissertation Advisor as well as other faculty collaborators cannot serve as formal committee members or committee chair – although the Dissertation Advisor is expected to attend all meetings and any faculty collaborators are encouraged to attend as well.

The DAC Chair

The DAC has a key role in charting and facilitating the progress of students in the program. The DAC chair is responsible for making sure that the views of the DAC are effectively communicated to the student and that any major concerns of the DAC are effectively communicated to the advisor and/or to the BBS program. DAC chairs are also expected to guide DAC members in BBS and DMS policies as well as standards of practice for advising. Because of the importance of the chair in overseeing the DAC and maintaining a consistent DAC process, all DAC chairs should have prior experience as members of at least one DAC committee, and **MUST** be a BBS faculty member. In choosing a committee, students should make sure that at least one member of the committee satisfies these criteria. The faculty member serving as DAC chair must be determined prior to the DAC meeting so that Chair responsibilities can be assumed (e.g. reviewing DAC research reports prior to meeting).

Procedures for setting up DAC meetings

Students are responsible for scheduling their DAC meetings. Helpful web-based scheduling services include Doodle (<http://www.doodle.com/>) and When is Good (<http://whenisgood.net/>). Scheduling also includes reserving a room in one's department or in TMEC (this can be done through E-Commons 432-2020, room_scheduling@hms.harvard.edu, <https://hms.emscloudservice.com/web/>) or elsewhere within HMS. TMEC rooms with overhead, slide projector or plasma screen can be requested; LCD projectors require scheduling through E-Commons or Media Services at 432-3899.

Timing and frequency of DAC meetings

Initial meeting: The initial DAC meeting must be held within 4 months of the PQE – preliminary data can take the form of work completed by the student and/or others in the lab. All work completed by the student should be included, even if scientific goals have changed and the student's work is no longer the basis for future experiments – in this way, all accomplishments can be acknowledged. Students should start the process of scheduling this meeting within several weeks of the PQE given the complexities and time often required to establish a date workable for all.

Subsequent meetings (through G4): Subsequent DAC meetings must be held every 9 months, and in some cases more frequently (e.g. every 1-3 months), depending on DAC recommendations.

G5 and after: DAC meetings must be held every 6 months or even more frequently (e.g. every 1-3 months), pending DAC recommendations.

Format of student's Research Progress Report for DAC meetings and outline of thesis.

General: The student's Research Progress Report must be submitted to the BBS Program office and each member of the DAC 7 days in advance of the DAC meeting. It is expected that the student will receive feedback from their advisor on the report before it is submitted; thus, it is recommended that the student provide a draft of the report to their advisor several days before the report needs to be submitted to the committee and program office.

Prior to each DAC meeting, upon receiving the written documents from the student, the DAC chair has the responsibility of reviewing the documents to assess whether they are acceptable for going forward with the meeting. If there is an issue, the DAC chair should contact the student and PI directly.

For ease of review, the document text should be font 11 with 1.5 line spacing; margins at 0.5" and pages numbered. The Research Progress Report cover sheet should include the title of the project; the student's name, year, e-mail address; the advisor's name; an indication if this is the initial DAC meeting; the names of the members of the DAC committee; and the date, time, and location of the DAC meeting.

Initial DAC meeting Report (G2 year): The student write-up for the initial DAC meeting takes the form of a grant proposal in which a biological question or technology is proposed for in-depth investigation. The PQE proposal can serve as a starting point for this document, but it is not expected that the aims of the DAC meeting write-up will necessarily be the same as those laid out in the PQE proposal. It is also anticipated that the content and focus of the thesis may change during the course of thesis research.

The initial DAC meeting write-up is expected to be a substantial document (no longer than 15 pages excluding figures) and should be structured as follows:

1. Specific Aims: The Aims of the student's dissertation research (~1-2 page).
2. Background and Significance: Concise review of scientific literature relevant to the proposal, with emphasis on critical knowledge gaps likely to be filled, at least in part, by the proposed thesis research (~3 pages).
3. Preliminary Results: Data that is directly relevant to the proposal, including data generated by the student (although in many cases the student will not as yet generated substantial data) and by other members of the laboratory. It is anticipated that this may be an exploratory period. (~2-5 pages).
4. Research Methods: Describe proposed research methods by Aim, include how the data will be interpreted and possible pitfalls and alternative approaches (typically 3-5 pages).

Subsequent DAC meeting Reports should take the form of the 2-to-3-page NIH Progress Report: For each subsequent DAC meeting, the Research Progress Report should not exceed 3 pages (excluding figures) and should consist of:

1. Specific Aims: If the aims have been modified from the original DAC meeting write up, the revised aims should be presented and the reasons for the modifications.
2. Studies and Results: The studies directed toward specific aims and the positive and negative results obtained should be presented, as well as any technical problems encountered and how addressed.
3. Significance: A brief discussion on the significance of the findings to the scientific field.
4. Plans: A summary of plans to address the remaining Specific Aims, including any important modifications to the original plans.

If major changes in thesis aims come to pass it would be appropriate to submit a longer document. In all cases, the initial DAC write-up should be appended to the Progress Report upon distribution to DAC members prior to the DAC meeting.

Thesis Outline (for DAC meetings beginning in G3): Beginning in G3, in addition to the Research Progress Report, the student should prepare a brief (1 page) draft outline conceptualizing how current directions might be compiled into thesis chapters. This outline might take the form of possible titles for chapters of his/her thesis and the hypotheses, questions, or technical developments likely to be addressed. For example, a dissertation often contains chapters structured as follows:

- Chapter 1 - Introduction: Brief review of the scientific literature relevant to the proposal with a clear description of the overall hypothesis being tested in the thesis.
- Chapter 2 – Presentation of a specific question or hypothesis being tested and its relationship to the overall hypothesis of the thesis.
- Chapter 3 etc. – (As for Chapter 2) As appropriate, additional data chapters should be included.
- Chapter 4 (or higher) – Discussion: ultimately to be a summary of accomplishments and significance of findings.
- Appendix – Methods and findings somewhat peripheral to the main thesis but which nonetheless deserve representation within the dissertation as a whole and which can benefit the student and the lab by having this material organized in one easily accessible document.

Organization of the actual DAC meeting:

1. Student and faculty alternately leave the room. To provide an opportunity for both the student and the adviser to communicate with the DAC members on a confidential basis, the meeting will start with first the student leaving the room and then the advisor leaving the room. In the absence of the student, the advisor will have a chance to present his/her

assessment of the student's progress and whether the student is on course to graduate in a timely fashion. In the absence of the advisor, the student may likewise communicate his/her own assessment of his/her progress and whether the advisor and the laboratory environment provide the support that he/she needs. This is also an opportunity to share with the committee any other problems of a confidential nature that the student needs help with.

2. Student presentation. The main part of the meeting will consist of a 20–40-minute presentation by the student of results and plans. Committee members will typically interrupt the presentation with questions, and the presentation is followed by a discussion of progress and future plans. The P.I. should interject minimally so that the student has the opportunity to demonstrate mastery of their field and scientific maturity surrounding ongoing and future work.

3. Assessment of student's progress. The student's progress will be assessed by the DAC in several areas:

- Progress on a line (or multiple lines) of experimentation having potential to lead to one or more first-author publications;
- Development of an ability to think independently, including development of hypotheses, practical approaches for testing hypotheses, critical interpretation of data, understanding relevance of results in light of current thinking in the field, and judging how to effectively pursue the line of investigation;
- The DAC Research Progress Report is an opportunity for the committee members to assess the development of the student's ability in science writing and give constructive feedback;
- The DAC Research Progress Report and meeting is an opportunity for the committee members to assess the student's knowledge and analysis of the scientific literature relevant to his/her field of investigation.
- Note that it is helpful to the student that scientific maturity and independence are discussed as these are often areas in which students excel yet are not always adequately reflected by the status of manuscripts.

Timeline and Benchmarks

The thesis proposal should be crafted with the goal of completing all of the work required for a PhD thesis within five years. This takes planning and considered evaluation of the main aims of the project. We realize that progress is unpredictable and sometimes the most fruitful approaches are also the most challenging and take longer to bear fruit. Thus, exceptions are anticipated.

- *Year 1:* Complete rotations, choose thesis lab, complete 5-6 semester-long courses.
- *Year 2:* Complete most course work and TA requirement. Complete the PQE (January-June). Have a clear plan for a thesis project that will be presented at the first DAC meeting (3-4 months after PQE) – it is understood that plans will evolve over the course

of the thesis, especially given that creativity is highly encouraged yet comes with risk and often delays.

- *Year 3:* Have clear evidence of progress toward meeting the goals of the thesis proposal. A preliminary list of potential thesis chapter titles is encouraged as a means to start thinking about the overall dissertation hypothesis and the different ways the evolving work could be packaged as a dissertation.
- *Year 4:* Solidify directions as relates to thesis chapters, which should include a body of work that will form the basis of one or two first author, peer-reviewed, primary research papers. While publication is not a degree requirement, bringing a body of work through to publication is an important skill to learn, thus we encourage that a plan for possible first author publication(s) begin to be discussed at DAC meetings even as early as year 4. Please know that we strongly encourage creativity and realize that it is often accompanied by longer timelines.
- *Year 5 and beyond:* Continue filling in the outline of the thesis with data and discussion. Continue discussions as relates to plans for publication(s). Because bringing a story to closure in the form of a publication is an important skill to learn, we encourage manuscript submission prior to the Ph.D. defense. If deemed helpful to the student or DAC process, an UberDAC (pg 7) may be created to provide additional faculty-student interactions.

Requirement for granting of a Ph.D.

BBS requires each student to complete a body of primary research of publishable quality. While we do not require a first-author research paper for degree attainment, we hope that the vast majority of graduating students will have at least one published first-author, peer-reviewed, primary research paper at least submitted or largely prepared prior to graduation. In addition to evaluating completed experiments and manuscripts, readiness to graduate will also be considered with respect to maturity and independence in scientific judgment – there are indeed cases where maturity outpaces publications and this should be acknowledged positively and considered in regard to box-checking.

Changes to the faculty composition of a DAC

Students should choose a DAC chair able to serve for the duration of the thesis for consistency, regardless of changes in scientific direction of the project or changes to other DAC members. If a DAC member is unable to continue to serve on a DAC, or if the scientific direction of the dissertation project changes, DAC members can be replaced, or additional DAC members added to the committee, at the discretion of the student and advisor, and with the prior agreement of the DAC chair. Approval from BBS Program heads is required for exchange of more than one DAC member.

Checking the box

When the Dissertation Committee agrees that the student has met the requirements for earning a Ph.D. and is ready to begin writing his/her thesis, the Committee will "check the box" on the student's DAC meeting form that indicates this. The student's dissertation defense must take place within 3-6 months of the date on which the box is checked; to delay the defense beyond this time point requires that the student petition the BBS Head for permission.

Attributions to the Dissertation (DMS policy)

In some cases, the student has done all of the work in the dissertation; more often portions of the dissertation result from collaborative research. In all dissertations containing collaborative results, the dissertation should indicate concisely who contributed the work. For example, a chapter containing multi-authored, published work must include a complete reference and a brief description of the candidate's and the colleagues' contributions. For work that is not published but which resulted from multiple researchers, the contributors must be named and respective attributions made clearly. This policy allows stylistic flexibility; depending on the amount of collaborative work in the dissertation and the status of publication(s), the attributions can be together at the end of either the Acknowledgments or Introduction sections of the dissertation or before each relevant chapter. It is permissible for more than one student to include work from the same collaboration or publication as long as the required attributions are clear, justified, and complete.

UberDAC committee

Should concerns (e.g. surrounding progress to degree) raised by the student, DAC chair, or PI benefit from an elevated level of attention, a supportive mechanism will be engaged by which one or multiple BBS program heads join the DAC to form an "UberDAC" in order to facilitate establishment and execution of a plan for helping the student move forward. Such a plan will routinely involve greater delineation of experimental goals, a timeline by which they are expected to be completed, more frequent DAC meetings and meetings with a program head to help support the process.

DMS Policy on Conflict of Interest

The below DMS policy should be discussed at the beginning of each DAC meeting. Should concerns arise, please bring them to the attention of the BBS program office and heads.

<https://ari.hms.harvard.edu/outside-activities>

MENTORS' OBLIGATIONS TO STUDENTS AND TRAINEES IN INDUSTRIAL SPONSORED RESEARCH

(a) Trainees (medical students, graduate students and post-doctoral fellows) must always be encouraged to conduct research in areas that optimize their training. Special care must be taken to assure that a trainee's research is not designed to (and does not appear to) enhance their mentor's Financial Interest, and is not adversely affected by that interest or by contractual aspects of the Sponsored Research agreement that inhibit scientific communication or that commit intellectual property rights to the industrial sponsor.

(b) Before embarking on a research project, a trainee must be provided by the mentor with a clear description of 1) any corporate support of the research to be undertaken, 2) any personal Financial Interest the mentor has in a sponsoring Business, and 3) any restrictions that might be imposed on the scientific communication of the data.

(c) Written approval must be obtained before a trainee can be assigned to conduct research which is sponsored by a Business or which involves a Technology to which the Business has license rights, and in which the mentor has any Financial Interest. In the case of graduate students (Ph.D., M.D./Ph.D., M.P.H., and D.M.Sc. candidates), permission must be given by the chairperson (or designated Faculty member or committee) for the graduate program and by the mentor's department chairperson. In the case of medical and dental students (M.D., and D.M.D. degree candidates), permission must be given by the mentor's Medical School department chairperson. Additionally, for research in the Quadrangle departments, permission must be given by the Executive Dean for Academic Programs. For research in the Hospital, permission must be given by the appropriate Faculty Dean.

(d) A trainee may appeal his/her involvement in any industrially Sponsored Research or research which involves Technology to which a Business has license rights when the trainee believes that he or she is being adversely affected by any conflict of interest (real or apparent) resulting from the mentor's relations with the sponsoring Business or with any Business that may benefit from the trainee's research or from the Sponsored Research agreement. The appeal should be made as appropriate to the Executive Dean for Academic Programs, the Hospital's Faculty Dean, and or the School's or Hospital's Ombudsperson.