General Guidelines for Human Biology Research Projects: Laboratory Research and Independent Study

Introduction

Research projects acceptable to the DMP in Human Biology program can stem from a variety of questions students may ask in their attempt to explore the interface between science and society. Many times these questions come from observing something in the world and wondering how that something came to be. Sometimes the questions are prompted by conversations with others or ideas presented in class. The key is to be curious and when an interesting idea comes along, grab hold of it. The guidelines contained in this document do not tell you how to come up with the question; rather, the guidelines are administrative and designed to cut down on any potential bureaucratic problems students and faculty might encounter. If you need help with the question, talk to anyone on the faculty advisory committee or any of your other academic professors.

The research performed is intended to be the basis of the thesis that will be submitted in partial fulfillment of the requirements for the BA degree in human biology. The thesis must be a substantial written work presenting the results of a critical and rigorous exploration of your chosen topic/question. The “style” of the thesis will depend on what type of project you are doing: policy analysis, social science research, legal analysis, ethical analysis or laboratory research. Each one of these “styles” has specific criteria that must be met in order to produce a document worthy of the respective field. You will need to work closely with your mentor to identify those specific requirements needed to produce such a thesis. A policy analysis must be done in a specific manner, just as laboratory research must be performed in a particular manner. For all projects you will need to clearly define the question, state your hypothesis or claim that answers your question, devise a rubric to investigate your hypothesis, figure out what kind of “data” you will collect, devise a rubric to interpret your data to get “results” and then determine what it all means (did you answer your question?). Questions and investigations should not be superficial – you are expected to delve deeply into the biological and sociological implications of your work and make the attempt to weave the two sides of your story together.

Regardless of the origin of your project, all projects must have a clearly definable biological issue that you are examining in relation to its relevant societal, political, ethical and/or legal ramifications. Furthermore, all biological problems must have some relevance to humans and be presented in terms of human societal impact. Biological problems addressed can be broad or narrow, but must in some way be definable in its human context.
Course Requirements for Research

Students must enroll in the HBIO Independent Research/Study courses HBIO497 (fall of the 4th year) and HBIO498 (spring of the 4th year) to receive credit for the research component of the major. Students wishing to start their research in the third year may sign up for HBIO495 and/or HBIO496. In the 4th year, students must concurrently enroll in HBIO481 and HBIO482 (fall and spring capstone/thesis courses, respectively). Students are generally expected to be performing active research in the fall semester in conjunction with HBIO487 and will be required to present a progress report at the end of the fall term. Students should be actively writing their thesis by the spring semester of their 4th year. Students will be required to finish the thesis and present it by the end of the term.

Options that cannot be used to satisfy the Research/Independent Study Requirement

The options presented below cannot be used to directly satisfy the research / independent study requirement for the DMP in Human Biology. Most of these options have limitations in time, limitations in space, or limitations in supervision that make them difficult to apply to the objectives of the major. You may participate in any or all of these options as they may provide useful ideas or solutions to your actual research project, but they cannot be used to satisfy the 3 credit hour research/study requirement for the major. Options excluded from the research requirement consist of the following:

- Bioethics Internships
- Center for Global Health Internship/Fellowships
- Extramural internships or fellowships at other institutions (NIH, other universities, companies, corporations, firms, medical practices, etc.)

Laboratory Research Options

Independent laboratory research projects must be conducted in a research laboratory (they cannot be performed in a clinical laboratory) including laboratories in the Department of Biology or research Departments associated with the Medical School (Neuroscience, Biochemistry & Molecular Genetics, Cell Biology, Microbiology, Pharmacology, Beirne Carter Immunology Center, Thaler HIV Center and others). The research must be conducted under the direction of full-time tenure-track or tenured UVA faculty member and may be on any organism or topic so long as the relevance to human biology and societal issues can be established. Of key importance is that your project must be in an area that can be linked to a biological issue of significance. Studying a random cellular protein simply because it is part of the human “need to know” ideal is not an issue of significance; studying a protein that might allow early diagnosis of Alzheimer’s risk is significant because it poses numerous questions concerning genetic testing, discrimination, health benefits, and others.
Laboratory space should be reserved in the academic semester prior to when you actually plan on beginning to work to ensure there is space for you. Most research faculty will expect 10-15 hrs per week (minimum) of laboratory time so you should plan accordingly. Furthermore, for many research projects, much more than this time allotment is actually needed in order to do anything substantial. The expectation is that at the end of one year you should have done enough work to at least partially answer your research question. Students who work in labs in the summer may do so for credit OR money (not both) and register for HBIO497 in the fall with the expectation that research will continue into the fourth year.

**Non-Laboratory Research Options**

Independent Study conducted in a non-laboratory setting can be done through various departments across grounds including Philosophy, Religious Studies, Anthropology, Government/Foreign Affairs, and others. Projects may be primarily analytical (policy, ethics or law) or based off of established social science research practices. Depth is expected more than breadth and in all cases a definite biological issue must be analyzed with the same attention to detail and rigor as would be expected from a laboratory project. Social science projects, for example, should stand up to the same statistical expectations as any other research project where data is collected. Policy decisions based on poor recognition of biological realities can have health as well as societal “fallout”. Regardless of the type of project you choose, attention to rigor is essential as non-laboratory research projects should not be any less substantial than laboratory projects.

Independent study is to be conducted under the direction of full-time tenure-track or tenured UVA faculty member preferably with an individual from your Area Concentration. Students wishing to do non-laboratory based research projects using faculty outside of Arts and Sciences must still choose full-time tenure-track or tenured UVA faculty and are strongly advised to find mentors who have worked with undergraduate students before.

Mentors should be approached about independent study in the academic semester prior to when you actually plan on beginning to work to ensure that they have the time to work with you. Students should set aside the same time commitment for independent study as is required of those performing laboratory-based research (10-15 hr/week). Independent study projects may also be started in the summer.

**Role of the Mentor**

It is expected that the mentors you choose will be actively involved in your research projects and that you will be responsible for arranging meetings with your mentor, meeting your mentor’s expectations, inviting your mentor to class when appropriate, and essentially being actively engaged in maintaining your relationship with your mentor. You will need to work
together to outline your question, how you will attempt to answer it, outline the types of analyses you need to do, etc. This is not a passive process. Your mentor’s job is not to tell you everything you need to do but rather to guide you in the right direction. Your thesis projects are independent research projects meaning that you need to display self-motivation, self-activation, and self-discovery characteristics to produce a good thesis.

In addition to providing intellectual aid, your mentor should also be involved in the production of your thesis and your final presentation. You need to show them drafts of your work, sample slides, and other projects as you work your way through the academic year to get their input, suggestions, and corrections. This should be an ongoing process starting early in the second semester of the 4th year. Ultimately, your mentor will be assigning grades to your work and so it is vital that you meet their approval.

**Thesis Declaration Form**

Students must devise their research project and obtain two mentors prior to the start of the first semester, 4th year. Students will not be allowed to enroll in HBIO497 until the Director of the Human Biology Program approves their Declaration Form. Failure to submit the form or obtain approval will result in your being denied entrance into HBIO497 and will thus constitute a failure to meet the requirements of the degree. The result will be dismissal from the program.

**Scholarship and Fellowship Information**

Various scholarships and fellowships are available for undergraduate research projects through the University and outside sources. The Center for Undergraduate Excellence (B5 Garrett Hall; (434) 924-7727) has listings for these opportunities (see also sites listed on the Human Biology website).