

# Honors Research in Biochemistry and Molecular Biology (BMB)

The Honors Research in BMB Program (HRBMBP) provides students with an opportunity to work closely with faculty who serve as intellectual and technical mentors in their exploration of molecular biology and biomedical research. The potential for learning, scholarship, and academic growth afforded by the HRBMBP is a unique opportunity for BMB students to translate formal class work into research practice.

Undergraduates fully engage in research in the biomolecular sciences performing scientific inquiry as independent researchers. Students will gain first-hand experience in what is required in terms of dedication, commitment, and perseverance in a project they can call their own. They will learn how to develop a hypothesis, test that hypothesis, deal with inevitable setbacks that are part of any scientific endeavor worth pursuing, and experience the excitement of scientific discovery. The end result is one of learning first-hand the scientific method, mastering modern technologies, and learning how to collect and analyze data, all under the apprenticeship of a BMB faculty member. In many cases, students will be credited for their research as co-authors on peer-reviewed scientific publications or meeting abstracts.

## **Eligibility Requirements:**

- 1.) GPA in BMB courses  $\geq 3.5$
- 2.) Overall GPA  $\geq 3.5$
- 3.) Sponsorship in program by a BMB faculty member
- 4.) Approval of the Honors Research Program application by the BMB Research & Honors Committee and Director of BMB.

## **Program Requirements:**

- 1.) Graduation with a GPA of  $\geq 3.5$  in BMB courses
- 2.) Participation in two semesters of the 1-credit Honors Seminar, CAS BB 497/498
- 3.) Completion of CAS BB 401/402
- 4.) Completion and defense of a written senior thesis

## **Program Guidelines:**

The program will require completion of the full 10-credit course sequence of BB 401/402 (4-credits per semester) and BB 497/498 (1-credit per semester).

### **Research:**

BB 401/402 will require that students complete a minimum of 12 hours per week in the laboratory performing research. This time does not include preparation, evaluation, or group meetings. A “J” grade is issued for BB 401 if satisfactory progress is being made. A minimum grade of B+ is required in BB 401/402 to graduate with Honors in BMB.

Completion of BB 401/402 satisfies the BMB advanced laboratory requirement, counting as 4 credits towards the major and 8 credits towards the BA.

**Note:** If the research project will be held outside of the laboratory of a BMB faculty member, then an evaluation by both the research laboratory head and the BMB faculty-member sponsor will be required.

### **Seminar:**

Students are required to participate in the Honors in Biochemistry and Molecular Biology Seminars CAS BB 497/498. If accepted into the program, students will automatically be registered for these courses. These seminars will be organized and directed by the Chair of the BMB Research and Honors Committee, given approximately every two weeks. A minimum grade of B+ is required in both BB 497 and BB 498 to graduate with Honors in BMB.

The objective of this course is to provide students an enrichment opportunity as they become engaged in exploration of biomolecular research through the BB 401/402 experience. These students will form a community and learn about a broad range of current research. Specifically, this course will: 1) expose students to each other's research across areas of Biology and Chemistry; 2) help students develop the ability to process and critically evaluate ideas and data in current biological research; 3) help students prepare and present scientific problems and data; and 4) strengthen students' scientific writing skills using their thesis writing project due at the end of the second term.

### **Symposium:**

As part of BB 497/498, students are required to participate in an oral presentation of their research in the Annual BMB Senior Symposium held during the study period of the spring semester. The presentation is a 15-20 minute public presentation of their research followed by questions.

**Thesis/Defense:**

The Honors Research in BMB Program culminates in a written senior thesis successfully presented and defended before a faculty committee of three, which includes your research mentor and BMB faculty sponsor.

The senior thesis will be based on the student's laboratory research and will be written in the general format of a standard MA/PhD research thesis, as follows: Title page, Committee Signature page, 1-page Abstract, Table of Contents, list of Figures and Tables, Introduction, Materials & Methods, Results (with Figures, Tables, and legends), Discussion, and References (with full citations). Although there are no formal page requirements for this document, such theses are likely to be at least 50 pages in length including figures and tables, plus 35-70 references. Most importantly, such documents should demonstrate the student's comprehensive mastery of the current literature on a given topic, as well as the identification of research trends, inconsistencies, and unanswered questions.

The thesis committee will include the student's research advisor and two additional faculty members. At least two members of the committee must be BMB faculty members. In certain cases, a student may elect to carry out his or her research in an academic laboratory at an off-campus site.

Grades in BB 401/402 are based on the student's performance in the laboratory, the written thesis, and the student's oral defense. A minimum grade of a B+ in both BB 401/402, and BB 497/498 are required to graduate with Honors.

**Application:**

The application is a fillable pdf file. Parts I & II should be filled out, signed, and submitted to your BMB faculty sponsor along with your Part II text. Part III should be completed by your faculty sponsor. Please print and provide all three parts to your BMB faculty sponsor.

## **Part I. Information**

### **Student Information**

*(please print all information)*

First and Last name: \_\_\_\_\_

BU ID Number: \_\_\_\_\_

Phone Number: \_\_\_\_\_

E-mail Address: \_\_\_\_\_

Expected date of graduation (month/year): \_\_\_\_\_

GPA: Overall: \_\_\_\_\_ BMB Courses: \_\_\_\_\_

Indicate the semester you will start the Honors Research in BMB Program:

Fall       Spring

Project Title: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### **Faculty Project Advisor information**

*(please print all information)*

First and Last name: \_\_\_\_\_

Department Affiliation: \_\_\_\_\_

E-mail Address: \_\_\_\_\_

Office Phone Number: \_\_\_\_\_

*Faculty Sponsor (if primary research mentor is not in BMB):* \_\_\_\_\_

*Institution/School:* \_\_\_\_\_

*Sponsor E-mail Address (if applicable):* \_\_\_\_\_

*Sponsor Signature (if applicable):* \_\_\_\_\_

## Part II. Application

**Please respond to the following questions:**

*(responses should be typed and attached to application)*

1. Provide a statement describing your relationship with your research advisor and other prior research experience. This statement should end with a personal statement describing how you think Honors Research in BMB will help you with your career goals.
2. Write a detailed description of the planned research project. Include an introduction to the problem that includes appropriate background information, an experimental section that includes a description of the techniques planned, and a section on the expected results that includes a plan for how your data will be analyzed. This part of the application should be written in consultation with your research supervisor. **Importantly, it should be a scholarly work that is written in your own words and includes all the appropriate citations.** A bibliography should be provided as the last part of this section. Overall, this portion of the application should be several pages in length.
3. *If applicable:* If the research project will be held outside of the laboratory of a BMB faculty member, please attach a letter of evaluation written by your research supervisor on your behalf. They can submit this directly to you or to your BMB faculty sponsor. Your BMB faculty sponsor should fill out Part III of this application.
4. Attach an unofficial copy of your BU Transcript.

Student Signature: \_\_\_\_\_ Date: \_\_\_\_\_

### **Part III. Evaluations & Approvals**

*(to be completed by the faculty project advisor)*

Student's name: \_\_\_\_\_

How long and in what capacity have you known the student?

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Please evaluate the applicant's aptitude for independent research according to the criteria listed below. Please add any applicable comments.

	Exceptional	Good	Fair	Poor	Unable to Judge
Intellectual ability					
Breadth of knowledge in subject					
Written communication skills					
Ability to work independently					
Level of initiative					
Laboratory skills (if applicable)					

Comments:

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*I have read the student's proposal and recommend that it be accepted as a Honors Research in BMB project.*

BMB Faculty Project Advisor (Print): \_\_\_\_\_

BMB Faculty Project Advisor (Signature): \_\_\_\_\_

Chair of BMB Research and Honors Committee (Print): \_\_\_\_\_

Chair of BMB Research and Honors Committee (Signature): \_\_\_\_\_

Director of BMB (Print): \_\_\_\_\_

Director of BMB (Signature): \_\_\_\_\_

Undergraduate Program Specialist (Print): \_\_\_\_\_ Date of Submission: \_\_\_\_\_