Master of Biomedical Informatics Capstone Project
Harvard Medical School

*Program Director: Nils Gehlenborg, PhD | Program Manager: Rebecca Fitzhugh*

**The Capstone Experience**
A mentored, hands-on capstone experience complements the Master of Biomedical Informatics program, tailored to each student’s professional expertise and interests. Our program participants are paired with faculty who are actively bringing quantitative methods and engineering to biomedicine. Working in collaboration with their mentor, students will participate in Biomedical Informatics research. They gain practical, real-life understanding applying what they are learning in the courses as they work alongside a Biomedical Informatics leader in their area of interest. Typical capstone projects include the development of new methods and tools, creation of data resources, and analyses of biomedical data.

Any correspondence regarding capstone projects, including submission of proposals and reports, must be directed to Rebecca Fitzhugh (rebecca_fitzhugh@hms.harvard.edu), MBI Program Manager.

**Process**
**Step 1. Identify Mentor**
Students come up with a list of up to 5 potential mentors who have a computational or quantitative research program focused on biomedical data.

- Mentors need to be Assistant Professors, Associate Professors, or Professors. Instructors may act as mentors with permission of the Program Director.
- Mentors need to have an appointment at Harvard.
- Co-mentors such as postdoctoral fellows or other suitable personnel, as well as faculty at other institutions may be proposed as well.

MBI Program Staff is available to introduce students to potential mentors if no previous relationship exists.

*Interactions with MBI Program Staff*
- Request suggestions for potential mentors.
- Submit list of potential mentors along with email addresses.
- Request introduction to potential mentors if necessary.
- Submit name and contact information of selected mentor.

**Deadlines**
- Standard MBI + Accelerated MBI Part-time
  - List of potential mentors: February 15th
  - Select final mentor: March 1st
- Accelerated MBI
  - Submit list of potential mentors: September 15th
  - Select final mentor: October 1st
Step 2. Propose Project together with Mentor (also see “Proposal Format” below)
Students develop a project proposal with input from their mentor and co-mentors. Once the mentor has approved the proposal, students submit the proposal to the Program Manager for approval by the Program Director.

Interactions with Mentor
- Discuss project idea, identify data sources, and techniques.
- Discuss how to obtain IRB and other approvals required for proposed project.

Interactions with MBI Program Staff
- Email project proposal as PDF to Program Manager. Copy mentor in email to Program Manager.
- Obtain approval for proposed project from Program Director.
- Declare project start date if submitted before deadline listed below.

Deadlines
- Standard MBI + Accelerated MBI Part-time: March 15th
- Accelerated MBI: October 15th

Step 3. Conduct Research under Guidance of Mentor (also see “Progress Report Format” below)
Students conduct research under the guidance of their mentor and co-mentors. Students and mentors meet regularly to discuss the project. Students produce a final report in form of a full-length journal article manuscript.

Interactions with Mentor
- Meet with primary mentor at least once a month to discuss progress, challenges arising in the project, and to address feedback on project reports.
- Obtain signature for progress reports every 6 weeks.
- Agree on a journal that is appropriate for the capstone research.

Interactions with MBI Program Staff
- Submit progress reports as PDF approximately every 6 weeks at fixed dates (see below). A progress report has to be submitted at each deadline after the project proposal deadline or the declared start date if that is earlier than the deadline.

Deadlines
- Standard MBI, Accelerated MBI + Accelerated MBI part-time: May 1st, June 15th, October 1st, December 1st, January 15th, March 1st

Step 4. Submit Report (see “Report Format” below)
Students submit a capstone report in form of a full-length journal article manuscript for their targeted journal. The Program Director may request revisions.

Interactions with MBI Program Staff
- Submit report as PDF to Program Manager by email, copying mentor and co-mentors.
- Receive feedback from Program Director and other staff that needs to be incorporated into the final report.
Deadlines
- Standard MBI: November 1st
- Accelerated MBI + Accelerated MBI part-time: April 1st

Step 5. Defend Capstone Research
Students present and defend their final and approved report at a “Capstone Research Day” that is open to the public and held once per semester. Presentations are 15 minutes plus 5 minutes for questions.

Deadlines
- Standard MBI: approximately December 1st
- Accelerated MBI + Accelerated MBI part-time: approximately May 1st

Proposal Format
The student must prepare a capstone proposal that is reviewed and approved by their mentor. The student must submit the mentored-approved capstone proposal to the Program Manager for approval by the Program Director. The proposal should be 3 to 5 pages in length and include the following sections:
  • Objectives of the research
  • State of the art and significance of the project
  • Approach and methods
  • References
  • Timeline
  • Plans for submitting an IRB proposal, if relevant. Please include the institute where it was submitted and any policies and dates that may need attention.

Progress Report Format
The student must prepare a capstone progress report every 6 weeks that is reviewed and approved by their mentor. The student must submit the mentor-approved capstone progress report to the MBI Program Manager.
The progress report must outline what has been accomplished so far and detail issues that have been encountered in data collection, analysis, writing, and IRB approval. The report must describe the next steps and explain possible changes to the plan resulting from issues encountered during the project. The final progress report must indicate which journal the student and mentor have selected for the project and a link to the “Instructions for Authors” must be included.

Report Format
The completed capstone paper should be consistent with the requirements of the specific journal to which it could be submitted and will generally include the following sections:
  • Introduction
  • Methods
  • Results
  • Discussion
  • References
  • Acknowledgments

The mentor must approve the completed written manuscript in advance of the submission to the Program Manager. It is strongly encouraged that students submit their manuscript to the selected journal.
### Timeline

Dates shown here are the latest possible dates. Students may start and complete their capstone projects before the dates shown here. Asterisks (*) indicate approximate dates.

<table>
<thead>
<tr>
<th>Deadline</th>
<th>Standard MBI</th>
<th>Accelerated MBI</th>
<th>Accelerated MBI (part-time)</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep 1</td>
<td><strong>Start 1st Year</strong>*</td>
<td><strong>Start 1st Year</strong>*</td>
<td><strong>Start 1st Year</strong>*</td>
<td>Sep 1</td>
</tr>
<tr>
<td>Sep 15</td>
<td><strong>Submit Mentor Shortlist</strong></td>
<td><strong>Submit Mentor Shortlist</strong></td>
<td></td>
<td>Sep 15</td>
</tr>
<tr>
<td>Oct 15</td>
<td><strong>Select Final Mentor</strong></td>
<td><strong>Select Final Mentor</strong></td>
<td></td>
<td>Oct 15</td>
</tr>
<tr>
<td>Dec 1</td>
<td></td>
<td><strong>Submit Project Proposal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec 1</td>
<td></td>
<td><strong>Submit Progress Report</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 15</td>
<td></td>
<td><strong>Submit Progress Report</strong></td>
<td></td>
<td>Jan 15</td>
</tr>
<tr>
<td>Feb 15</td>
<td><strong>Submit Mentor Shortlist</strong></td>
<td><strong>Submit Project Proposal</strong></td>
<td><strong>Submit Project Proposal</strong></td>
<td></td>
</tr>
<tr>
<td>Mar 1</td>
<td><strong>Select Final Mentor</strong></td>
<td><strong>Submit Progress Report</strong></td>
<td><strong>Select Final Mentor</strong></td>
<td>Mar 1</td>
</tr>
<tr>
<td>Mar 15</td>
<td><strong>Submit Project Proposal</strong></td>
<td></td>
<td></td>
<td>Mar 15</td>
</tr>
<tr>
<td>Apr 1</td>
<td><strong>Submit Project Proposal</strong></td>
<td></td>
<td></td>
<td>Apr 1</td>
</tr>
<tr>
<td>May 1</td>
<td><strong>Submit Progress Report</strong></td>
<td><strong>Submit Final Report</strong></td>
<td><strong>Submit Project Proposal</strong></td>
<td>May 1</td>
</tr>
<tr>
<td>Jun 15</td>
<td><strong>Submit Progress Report</strong></td>
<td></td>
<td></td>
<td>Jun 15</td>
</tr>
<tr>
<td><strong>Summer Break</strong></td>
<td></td>
<td><strong>Summer Break</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sep 1</td>
<td><strong>Start 2nd Year</strong>*</td>
<td><strong>Start 2nd Year</strong>*</td>
<td><strong>Start 2nd Year</strong>*</td>
<td>Sep 1</td>
</tr>
<tr>
<td>Oct 1</td>
<td><strong>Submit Progress Report</strong></td>
<td><strong>Submit Progress Report</strong></td>
<td><strong>Submit Progress Report</strong></td>
<td>Oct 1</td>
</tr>
<tr>
<td>Nov 1</td>
<td><strong>Submit Final Report</strong></td>
<td></td>
<td><strong>Submit Progress Report</strong></td>
<td>Nov 1</td>
</tr>
<tr>
<td>Dec 1</td>
<td><strong>Give Presentation</strong>*</td>
<td></td>
<td><strong>Submit Progress Report</strong></td>
<td>Dec 1</td>
</tr>
<tr>
<td>Jan 15</td>
<td></td>
<td></td>
<td><strong>Submit Progress Report</strong></td>
<td>Jan 15</td>
</tr>
<tr>
<td>Mar 1</td>
<td></td>
<td></td>
<td><strong>Submit Progress Report</strong></td>
<td>Mar 1</td>
</tr>
<tr>
<td>Apr 1</td>
<td><strong>Submit Final Report</strong></td>
<td><strong>Give Presentation</strong>*</td>
<td><strong>Submit Final Report</strong></td>
<td>Apr 1</td>
</tr>
<tr>
<td>May 1</td>
<td></td>
<td><strong>Give Presentation</strong>*</td>
<td><strong>Give Presentation</strong>*</td>
<td>May 1</td>
</tr>
</tbody>
</table>