Master’s of Engineering – Coursework based program

Master’s of Science – Project-based and Thesis-based programs

PhD in Biomedical Engineering - options for international exchanges and industry experiences combined with traditional research

*WPI was ranked #1 in Universities that best combined research and teaching (Wall Street Journal)*
WPI is located in Worcester, MA

Population: 206,518 (2020 census)

Life Sciences and Bioengineering Center (Gateway I)

- Lab space and faculty offices
- Core research facilities
- Vivarium
- 5 academic departments
  - BME; ChemE; Biology/Biotech; Chem/Biochem; Physics
BME Department Information

• ~50 graduate students (Masters and PhD)
• 500+ undergraduate students
• Faculty
  • 12 faculty with active research programs
  • 4 Teaching faculty
  • 1 Professor of Practice
  • 25+ Collaborative Faculty
    • Across 10 departments plus UMass Medical School

WPI BME Graduate Site: https://wp.wpi.edu/bme/grad/
Faculty Research

- Descriptions of faculty research on the BME Department web site (www.wpi.edu/+bme)

- Example general research areas (see WPI Grad Catalog and BME Department web site for detailed descriptions):
  - Bioinstrumentation & Med. Devices (Alatalo, Albrecht, Mensah, Zhang)
  - BioMEMS and Microfluidics (Albrecht, Billiar)
  - Biomaterials and Tissue Engineering (Billiar, Coburn, Mensah, Page, Pins, Rolle, Whittington)
  - Biomechanics (Alatalo, Billiar, Ji, Lammert, Troy)
  - Imaging (Alatalo, Albrecht, Ji, Troy, Zhang)
  - Neuroscience (Albrecht, Lammert)
BME Program Expectations

- Work more independently than undergraduate work
- Original research/work is primary focus in thesis- and project-based graduate programs
- GPA > 3.0 to graduate
- No more than 2 C grades
- Academic Integrity
  - WPI Academic Honesty Policy
  - https://www.wpi.edu/about/policies/academic-integrity
BME Graduate Degree Programs

- **Master of Science (M.S.)** – Thesis OR Project
  - 30 credits total
  - ~ 1-2+ years beyond B.S. degree

- **Master of Engineering (M.E.)**
  - 33 credits total
  - Usually 1 year beyond B.S. degree

- **Ph.D.**
  - 90 credits, 5+ years beyond B.S. degree
  - OR
  - 60 credits beyond Master’s degree
Course Requirements – PhD

- BME 12 credits
- Life Sciences 3 credits
- Advanced Math 3 credits
- Life Science or Advanced Math 3 credits
- Electives 12 credits
- Responsible Conduct of Research 1 credit (usually satisfied by taking BB 551)
- Dissertation Research (BME 699) 30 credits
- BME 591: Graduate Seminar (x 4) Pass/Fail
- Qualifying examination (QE) By end of 5th semester (advance to candidacy)
- Dissertation proposal Within 1 year of passing QE
- Publication requirement 1st author publication on dissertation work
- Lab Rotations Optional

WPI PhD = 90 credits; 60 credits beyond MS
(60 credit PhD students should document prior graduate-level coursework that is similar the list above, and should consult their advisor about specific classes)
PhD Qualifying Examination

• Qualifying Exam covers:
  • Defense of an original research proposal prepared by the student
  • Fundamental knowledge in four content areas (1 Math, 1 Life Science, and 2 BME)
  • Detailed information in the BME Graduate Program Handbook (https://wp.wpi.edu/bme/grad/)

• Must pass QE to advance to candidacy
• Taken before start of 5th semester enrolled
• QE committee members selected by the Graduate Studies Committee
Course Requirements – MEng

- **BME** 12 credits
- **Life Sciences** 3 credits
- **Advanced Math** 3 credits
- **Life Science or Advanced Math** 3 credits
- **Electives** 12 credits
- **BME 591: Graduate Seminar (x 2)** Pass/Fail

**OPTIONAL:**
- Up to 3 credits of Directed Research can count for BME credits
- Up to 3 credits of Directed Research can count for Elective credits
Course Requirements – MS

- BME 12 credits
- Electives 12 credits
- BME 597: MS Thesis or BME 599: Project 6 credits
- BME 591: Graduate Seminar (x 2) Pass/Fail

Additional requirements:
- 15 credits of above courses must be in a Technical Depth (e.g., Biomechanics)
- Must fulfill 5 competency areas through coursework or thesis/project (check box)
  - Regulation and Controls
  - Clinical needs analysis
  - Mathematics
  - Life Science
  - Value Creation, Innovation, Technology Commercialization
# MS Thesis vs Project

<table>
<thead>
<tr>
<th></th>
<th>Thesis</th>
<th>Project</th>
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<tbody>
<tr>
<td><strong>Credits</strong></td>
<td>30 credits</td>
<td>30 credits</td>
</tr>
<tr>
<td><strong>Scope</strong></td>
<td>• Hypothesis-driven research</td>
<td>• More applied work</td>
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<td></td>
<td>• Conducted in one the faculty research labs</td>
<td>• Not limited to research</td>
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<tr>
<td></td>
<td></td>
<td>• Can be done outside of research lab</td>
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<td></td>
<td></td>
<td>(e.g., Co-op/Internship, Clinician)</td>
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<tr>
<td><strong>Final</strong></td>
<td>1. Public presentation</td>
<td>1. Public presentation*</td>
</tr>
<tr>
<td>*<em>Deliverables</em>/</td>
<td>2. Thesis document</td>
<td>2. Written document relevant to project (e.g., report, technical manual, etc.)</td>
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<tr>
<td><strong>Outcomes</strong></td>
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*If MS Project is conducted with a company or entity where confidentiality is required, arrangements can be made for a private presentation with appropriate confidentiality measures put in place.

**FAQ:** Project-Based MS or Thesis MS - [https://wp.wpi.edu/bme/files/2022/05/Frequently-Asked-Questions-about-the-BME-MS-Program-Updated_5_2022.pdf](https://wp.wpi.edu/bme/files/2022/05/Frequently-Asked-Questions-about-the-BME-MS-Program-Updated_5_2022.pdf)
Independent Research Credits

• Includes Directed Research, Lab Rotations, and Thesis/Dissertation Credit
  • Must be arranged individually with faculty research advisor for timing and number of credits

• Lab Rotations (PhD) – no formal rotation program
  • Optional
  • Usually 2 rotations (1 rotation per semester)
  • Identify research advisor at end of 2nd rotation
How will I be funded for PhD?

• **Teaching Assistantships (TA) - Department-level**
  • **TA assignment**: Each term of the academic year (4 total)
    • 10-20 hours per week; Responsibilities vary with course
  • **Funding duration**: 9 month contract + Additional summer funding (PI-funded)
  • **Stipend level (current as of 12/2022)**: $1,248.48 (per biweekly cycle)
    • 20 cycles for the academic year; 6 cycles for summer

• **Research Assistantship (RA) – Advisor-level**
  • Funding from advisor grants
  • No teaching assignment required (unless required as part of the grant)
  • **Funding duration**: Dependent on the grant
  • **Stipend level**: Dependent on the grant
How will I be funded for PhD?

• **Presidential Fellowship** – *Institution-level*
  • Nominated by WPI Graduate Studies for 1st year incoming PhD students
  • Funding duration: 12 months (Year 1)

• **External Fellowships**
  • Many federal and foundation opportunities
  • NSF GRFP Workshop held in Fall and additional programs held other times during the academic year (*WPI Graduate Studies*)

• **MEng/MS students are typically self-funded**
  • Any funding support is dependent on the advisor and project (case-by-case)
  • May have opportunities to be a Peer Learning Assistant in the department for a term (not guaranteed)
    • TA/course support; 10 hrs/week
WPI BME Community

Get involved! Build your network

- BMES Chapter, officers
- Local/Regional meetings
- BME and Gateway “Happy Hours”
- BME cookouts
- WPI BME DEI Committee (student rep)
Other Opportunities for Graduate Students

• Internships or Co-ops as a graduate students
  • Summer or semester
  • Arranged by students and should be done cooperatively with advisor (no formal program or placement)

• Mentoring
  • Women’s Research and Mentorship Program (WRAMP) *(WPI STEM Education Center)*

• Teaching
  • ASPIRE – Education training to develop inclusive and diverse STEM faculty
Other Opportunities for Graduate Students

• Community building
  • Mélange – women of color support group (undergrad, grad, staff, faculty)
  • Mosaic – men of color support group (undergrad, grad, staff, faculty)
  • Graduate Research Organization for Women (GROW)
    • Includes a mentoring program
    • Graduate Student Government
• Scientific presentation
  • WPI Graduate Research Innovation Exchange – campus research symposium
• Educational outreach
  • Launch and Frontiers – Summer programs for high school students where graduate students can assist (*WPI Pre-Collegiate Outreach*)
Student Resources and Campus Spaces

• Graduate Studies office – Resources
  • NSF GRFP fall workshop
  • Professional development sessions
    • Grad Student Training and Readiness Sessions (STARS)
    • Grad Student Academic Success Series
  • Travel awards for conferences
• Graduate Student Union (formed Fall 2022)
• WPI Center for Well-Being
• Student Development and Counseling Center
Student Resources and Campus Spaces

• Office of Accessibility Services
• Morgan Teaching and Learning Center
• Office of Diversity, Inclusion, and Multicultural Education
• International House
• Identity Centers (new in 2022)
  • Center for Black Excellence
  • Lavender Lounge (LGBTQIA+)
Applying to the BME Program

• Fill out the application!
  • No GRE required
  • TOEFL required for English language proficiency (where applicable)
  • Documents: Personal statement, Resume, 3 Letters of reference

• Application review timeline *(by BME Graduate Committee)*
  • Start reviewing in January 2023
  • Campus preview visit in early February 2023 (Invitation)
  • Offers sent out soon after the preview visit
  • Decisions due to WPI – April 15, 2023
WPI BME Application Tips – Tell us….

• Who YOU are.
  • Don’t just give facts, tell your story.
    • Why you did in a certain experience?
    • What you learned from that experience?
    • How you are using what you learned now and in the future?
• Why you want to be at WPI.
• Who you want to work with OR your research interests.
• What you want to do in the future and how a graduate degree will help you get there.
We are looking for students who...

- Want to learn and contribute to scientific innovation and advancement
- Value a close community
- Are open to working collaboratively
- Think critically
- Feel like WPI will be the right place for them