

# WPI

## Department of Biomedical Engineering

@WPI\_BME

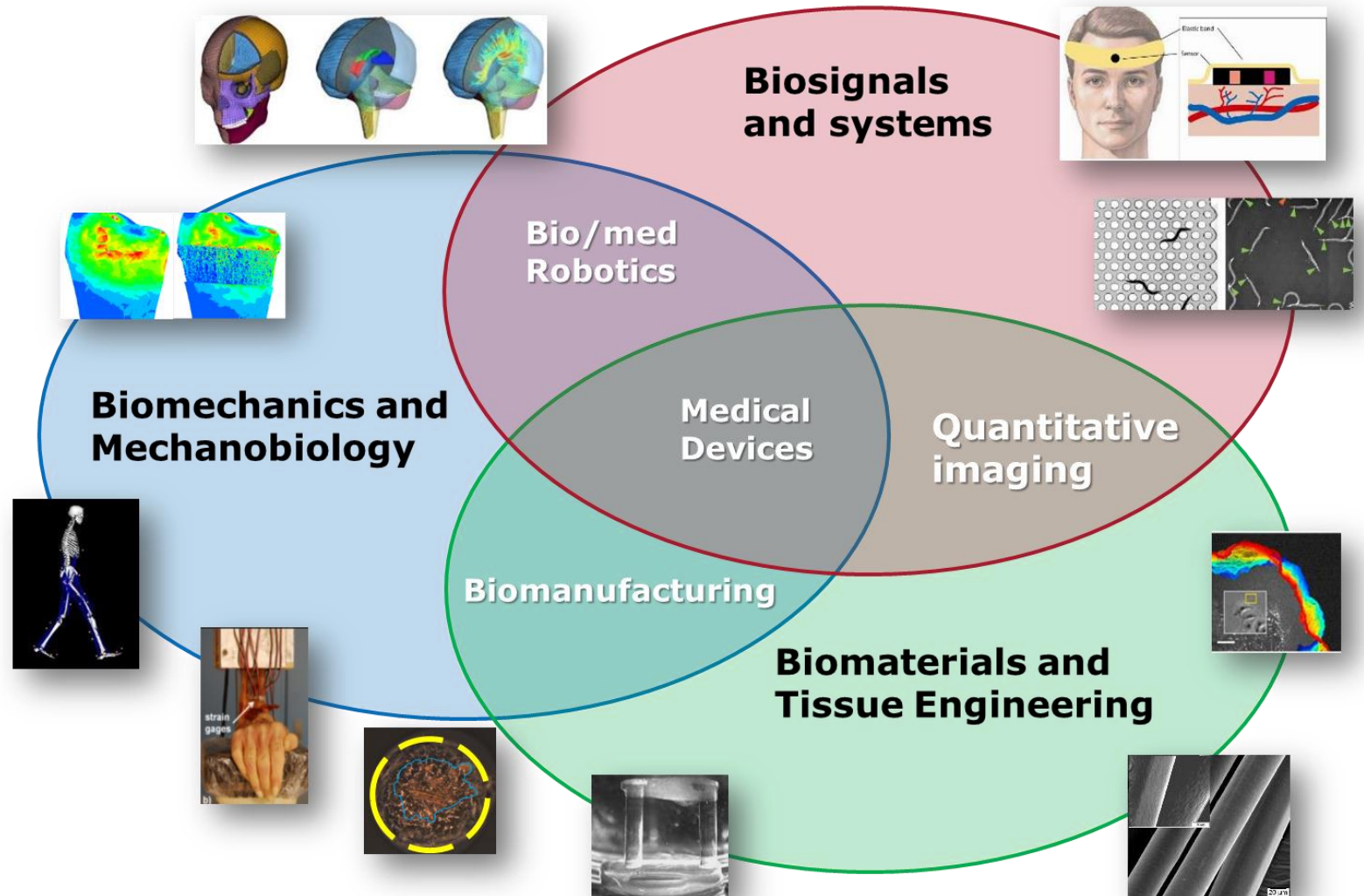
[www.wpi.edu/+bme](http://www.wpi.edu/+bme)

**Master's of Engineering** –  
Coursework based program

**Master's of Science** – Project-  
based and Thesis-based programs

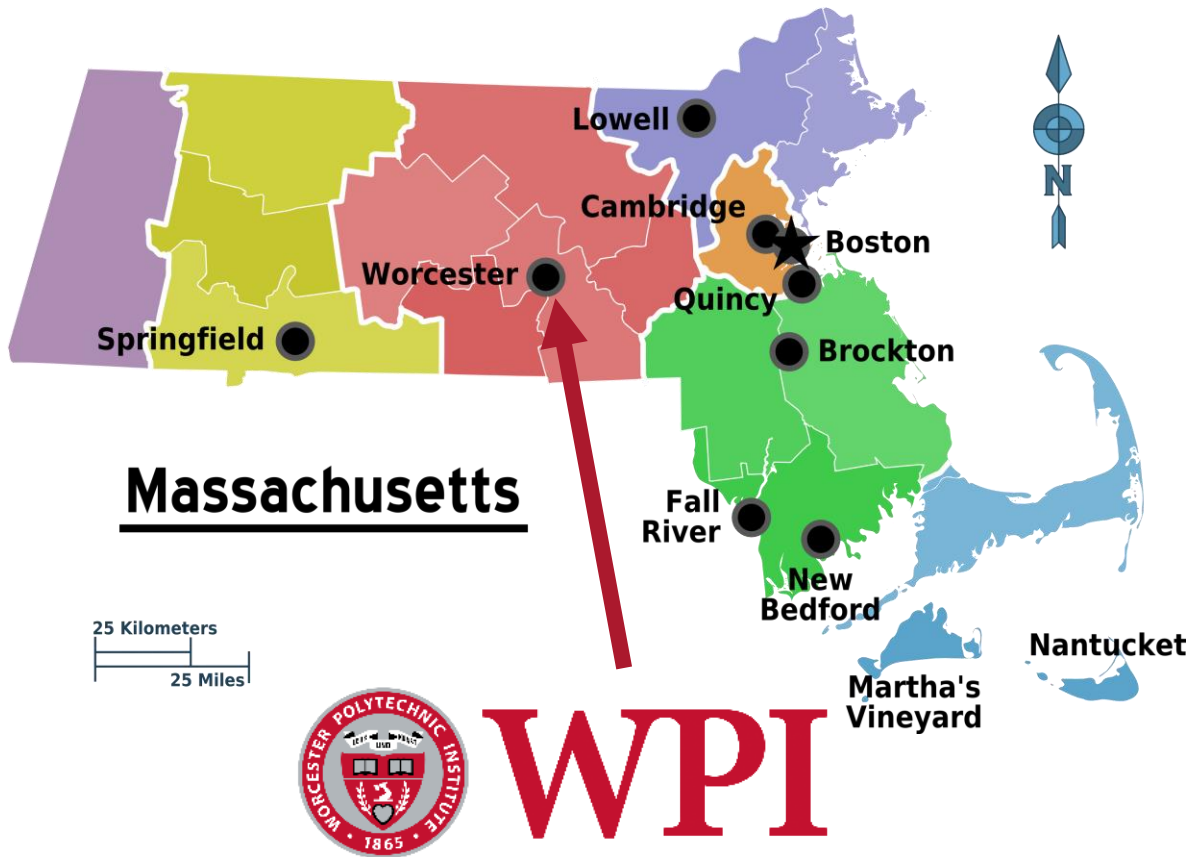
**PhD in Biomedical Engineering** -  
options for international exchanges  
and industry experiences combined  
with traditional research

*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

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- ~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

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- Descriptions of faculty research on the BME Department web site ([www.wpi.edu/+bme](http://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

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- 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

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- **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

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– BME	12 credits
– Life Sciences	3 credits
– <b>Advanced</b> Math	3 credits
– Life Science or <b>Advanced</b> Math	3 credits
– Electives	12 credits
– Responsible Conduct of Research	1 credit ( <i>usually satisfied by taking BB 551</i> )
– Dissertation Research (BME 699)	30 credits
– BME 591: Graduate Seminar (x 4)	Pass/Fail
– Qualifying examination (QE)	By end of 5 <sup>th</sup> semester (advance to candidacy)
– Dissertation proposal	Within 1 year of passing QE
– Publication requirement	1 <sup>st</sup> 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

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- 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 5<sup>th</sup> semester enrolled
- QE committee members selected by the Graduate Studies Committee



# Course Requirements – MEng

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- 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

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– 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

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	Thesis	Project
<b>Credits</b>	30 credits	30 credits
<b>Scope</b>	<ul style="list-style-type: none"><li>• Hypothesis-driven research</li><li>• Conducted in one the faculty research labs</li></ul>	<ul style="list-style-type: none"><li>• More applied work</li><li>• Not limited to research</li><li>• Can be done outside of research lab (e.g., Co-op/Internship, Clinician)</li></ul>
<b>Final Deliverables/ Outcomes</b>	<ol style="list-style-type: none"><li>1. Public presentation</li><li>2. Thesis document</li></ol>	<ol style="list-style-type: none"><li>1. Public presentation*</li><li>2. Written document relevant to project (e.g., report, technical manual, etc.)</li></ol>

*\*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

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- 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 2<sup>nd</sup> rotation

# How will I be funded for PhD?

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- **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?

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- **Presidential Fellowship – *Institution-level***
  - Nominated by WPI Graduate Studies for 1<sup>st</sup> 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

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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

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- 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



ASPIRE Fellows 22-23 (Front Left: Bryhannah Young, WPI BME MS Student)



# Other Opportunities for Graduate Students

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- 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

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- 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

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- 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

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- 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....

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- 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...

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- 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

