

# BIOMEDICAL ENGINEERING: RESEARCH, M.S.

This is a named option within the Biomedical Engineering M.S. (<http://guide.wisc.edu/graduate/biomedical-engineering/biomedical-engineering-ms/>)

The Research named option in the Biomedical Engineering M.S. is designed for students who want to conduct research during their program. A thesis is required.

## ADMISSIONS

Please consult the table below for key information about this degree program's admissions requirements. The program may have more detailed admissions requirements, which can be found below the table or on the program's website.

Graduate admissions is a two-step process between academic programs and the Graduate School. **Applicants must meet** the minimum requirements (<https://grad.wisc.edu/apply/requirements/>) **of the Graduate School as well as the program(s)**. Once you have researched the graduate program(s) you are interested in, apply online (<https://grad.wisc.edu/apply/>).

Requirements	Detail
Fall Deadline	December 15
Spring Deadline	September 1
Summer Deadline	December 15
GRE (Graduate Record Examinations)	Not required.
English Proficiency Test	Every applicant whose native language is not English or whose undergraduate instruction was not in English must provide an English proficiency test score and meet the Graduate School minimum requirements ( <a href="https://grad.wisc.edu/apply/requirements/#english-proficiency">https://grad.wisc.edu/apply/requirements/#english-proficiency</a> ).
Other Test(s) (e.g., GMAT, MCAT)	n/a
Letters of Recommendation Required	3

Applicants should have a bachelor's degree in engineering (biomedical, chemical, electrical, industrial, mechanical, etc.) or science (biology, biochemistry, chemistry, genetics, immunology, physics, etc.). Each application is judged on the basis of:

- Official academic transcripts
- English Proficiency Test scores (<https://grad.wisc.edu/apply/requirements/#english-proficiency>) (if applicable)
- Three letters of recommendation, including one letter from your prospective MS research advisor

- Statement of purpose (<https://grad.wisc.edu/apply/prepare/>)
- Resume

All applicants must satisfy requirements that are set forth by the Graduate School (<https://grad.wisc.edu/>). Students admitted to the program may be required to make up deficiency course requirements.

To apply to the BME program, complete applications (<https://grad.wisc.edu/apply/>), including supportive materials, must be submitted as described below and received by the following deadline dates:

- Fall Semester—December 15
- Spring Semester—September 1
- Summer Session<sup>1</sup>—December 15

<sup>1</sup>Please note that summer admissions are generally limited to continuing BME students at UW–Madison or applicants who have research assistantships already arranged with UW faculty.

## OFFICIAL ACADEMIC TRANSCRIPT

Electronically submit one copy of your transcript of all undergraduate and previous graduate work in your online application to the Graduate School. Unofficial copies of transcripts will be accepted for review. Official copies are required after an applicant is recommended for admission. Please do not send transcripts or any other application materials to the Graduate School or the BME department unless requested. If you have questions, please contact [bmegradadmission@engr.wisc.edu](mailto:bmegradadmission@engr.wisc.edu).

## ENGLISH PROFICIENCY TEST SCORES (IF APPLICABLE)

The TOEFL is required for international students unless a degree from a U.S. educational institution is held. Scores should be sent using **institution code 1846**.

An applicant whose TOEFL (iBT) score is below 92; TOEFL (PBT) score is below 580; or IELTS score is below 7 must take an English assessment test upon arrival. Depending on the result, an applicant may need to register for recommended English as a Second Language (ESL) courses in the first semester of enrollment.

Any international applicant who will hold a teaching assistantship (TA), and whose native language is not English must take the SPEAK test (<https://esl.wisc.edu/ita-training/speak/>) when arriving on campus.

## THREE LETTERS OF RECOMMENDATION

These letters are required from people who can accurately judge the applicant's academic or research performance. Students should identify a lab prior to the application process. One letter of recommendation should be from the prospective MS research advisor. Letters of recommendation are submitted electronically to graduate programs through the online application. Applicants should not send any more than three letters (if more than three are sent, only the first three will be considered). See the Graduate School for FAQs (<https://grad.wisc.edu/apply/>) regarding letters of recommendation.

## STATEMENT OF PURPOSE

In this document, applicants should explain why they want to pursue further education in BME and discuss which UW faculty members they would be interested in doing research with during their graduate study. See the Graduate School for more advice on how to structure a personal statement (<https://grad.wisc.edu/apply/prepare/>),

## RESUME

Upload your resume in your application.

## APPLICATION FEE

Submission must be accompanied by the one-time application fee. It is non-refundable and can be paid by credit card (Master Card or Visa) or debit/ATM. This fee cannot be waived or deferred. Fee grants are available through the Graduate School under certain conditions.

## FUNDING

## GRADUATE SCHOOL RESOURCES

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information (<https://grad.wisc.edu/funding/>) is available from the Graduate School. Be sure to check with your program for individual policies and restrictions related to funding.

## REQUIREMENTS

### MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (<http://guide.wisc.edu/graduate/#policiesandrequirements>), in addition to the program requirements listed below.

### NAMED OPTION REQUIREMENTS MODE OF INSTRUCTION

Face to Face	Evening/ Weekend	Online	Hybrid	Accelerated
Yes	No	No	No	No

#### Mode of Instruction Definitions

**Accelerated:** Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

**Evening/Weekend:** Courses meet on the UW–Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

**Face-to-Face:** Courses typically meet during weekdays on the UW–Madison Campus.

**Hybrid:** These programs combine face-to-face and online learning formats. Contact the program for more specific information.

**Online:** These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

## CURRICULAR REQUIREMENTS

### Requirement Detail

Minimum Credit Requirement 30 credits

Minimum Residence Credit Requirement	16 credits
Minimum Graduate Coursework Requirement	15 credits must be graduate-level coursework. Details can be found in the Graduate School's Minimum Graduate Coursework (50%) policy ( <a href="https://policy.wisc.edu/library/UW-1244">https://policy.wisc.edu/library/UW-1244</a> ).
Overall Graduate GPA Requirement	3.00 GPA required. This program follows the Graduate School's GPA Requirement policy ( <a href="https://policy.wisc.edu/library/UW-1203">https://policy.wisc.edu/library/UW-1203</a> ).
Other Grade Requirements	n/a
Assessments and Examinations	There are no degree-specific assessments and examinations outside of those given in individual courses.
Language Requirements	n/a

## REQUIRED COURSES

Specific course selection is very flexible and draws upon a variety of courses. The required coursework is designed to complement each student's interests and background in biomedical engineering.

Code	Title	Credits
<b>Research (such as B M E 790)</b>		<b>6</b>
<b>Coursework</b>		<b>24</b>
Two semesters of B M E 701 Seminar in Biomedical Engineering		
At least 12 credits of College of Engineering courses, numbered 400 or above		
At least 15 credits, numbered 400 or above, in one area of specialization <sup>1</sup>		
<i>At least 3 credits of bioscience from the following list (or other bioscience course with advisor approval):</i>		
ANAT&PHY 335	Physiology	
ANAT&PHY 435	Fundamentals of Human Physiology	
BIOCHEM 501	Introduction to Biochemistry	
CRB 640	Fundamentals of Stem Cell and Regenerative Biology	
CRB 650	Molecular and Cellular Organogenesis	
CRB/B M E 670	Biology of Heart Disease and Regeneration	
NTP/NEURODPT 610	Cellular and Molecular Neuroscience	
ZOOLOGY/BIOCHEM/PHMCOL-M 630	Cellular Signal Transduction Mechanisms	
ZOOLOGY/PSYCH 523	Neurobiology	
BIOCHEM/GENETICS/MICROBIO 612	Prokaryotic Molecular Biology	
BIOCHEM/GENETICS/MD GENET 620	Eukaryotic Molecular Biology	

ONCOLOGY 401	Introduction to Experimental Oncology
M M & I/PATH-BIO 528	Immunology
PATH 750	Cellular and Molecular Biology/ Pathology
ZOOLOGY 625	Development of the Nervous System
NEUROL/ NTP 735	Neurobiology of Disease
ZOOLOGY 570	Cell Biology

**Total Credits** **30**

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Areas of specialization are defined by the student and faculty advisor in relation to each student's research. Please keep written communication (emails are acceptable) of approvals from your faculty advisor.

## POLICIES

### GRADUATE SCHOOL POLICIES

The Graduate School's Academic Policies and Procedures (<https://grad.wisc.edu/acadpolicy/>) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

### NAMED OPTION-SPECIFIC POLICIES

#### PRIOR COURSEWORK

##### Graduate Work from Other Institutions

This program follows the Graduate School's policy for Satisfying Requirements with Prior Graduate Coursework from Other Institutions. (<https://policy.wisc.edu/library/UW-1216/>)

Reach out to the BME Graduate Coordinator for more information.

##### UW–Madison Undergraduate

A student who has completed their bachelor's degree at UW–Madison may transfer 6 credits of coursework with program approval. These courses must be engineering or advanced biological sciences coursework numbered 400 or above. Coursework earned five or more years prior to admission to a M.S. degree is not allowed to satisfy requirements. These courses may not be used toward the Graduate School's Minimum Graduate Residence Credit.

##### UW–Madison University Special

This program follows the Graduate School's policy for Transfer from UW–Madison University Special Student Career at UW–Madison. (<https://policy.wisc.edu/library/UW-1216/>)

### PROBATION

This program follows the Graduate School's Probation policy. (<https://policy.wisc.edu/library/UW-1217/>)

### ADVISOR / COMMITTEE

Every BME graduate student must have a faculty advisor. A faculty advisor provides the student with academic guidance in their course program and research oversight. The advisor must be a primary BME faculty or a BME affiliate; if the advisor is a BME affiliate, the student must identify a primary BME faculty to serve as co-advisor. Graduate students should always seek advice from their advisor prior to enrolling for courses.

### CREDITS PER TERM ALLOWED

15 credits

### TIME LIMITS

Full-time students take approximately 18–24 months to complete the M.S. Research.

### GRIEVANCES AND APPEALS

These resources may be helpful in addressing your concerns:

- Bias or Hate Reporting (<https://doso.students.wisc.edu/bias-or-hate-reporting/>)
- Graduate Assistantship Policies and Procedures (<https://hr.wisc.edu/policies/gapp/#grievance-procedure>)
- Hostile and Intimidating Behavior Policies and Procedures (<https://hr.wisc.edu/hib/>)
  - Office of the Provost for Faculty and Staff Affairs (<https://facstaff.provost.wisc.edu/>)
- Dean of Students Office (<https://doso.students.wisc.edu/>) (for all students to seek grievance assistance and support)
- Employee Assistance (<http://www.eao.wisc.edu/>) (for personal counseling and workplace consultation around communication and conflict involving graduate assistants and other employees, post-doctoral students, faculty and staff)
- Employee Disability Resource Office (<https://employee disabilities.wisc.edu/>) (for qualified employees or applicants with disabilities to have equal employment opportunities)
- Graduate School (<https://grad.wisc.edu/>) (for informal advice at any level of review and for official appeals of program/departmental or school/college grievance decisions)
- Office of Compliance (<https://compliance.wisc.edu/>) (for class harassment and discrimination, including sexual harassment and sexual violence)
- Office of Student Conduct and Community Standards (<https://conduct.students.wisc.edu/>) (for conflicts involving students)
- Ombuds Office for Faculty and Staff (<http://www.ombuds.wisc.edu/>) (for employed graduate students and post-docs, as well as faculty and staff)
- Title IX (<https://compliance.wisc.edu/titleix/>) (for concerns about discrimination)

### BME Grievance Procedures

If a student feels unfairly treated or aggrieved by faculty, staff, or another student, the University offers several avenues to resolve the grievance.

#### Step 1

The student is encouraged to speak first with the person toward whom the grievance is directed to see if a situation can be resolved at this level. Students are also encouraged to talk with their faculty advisors regarding concerns or difficulties, or reach out to the Graduate Student Services Coordinator or Associate Chair of BME Graduate Advising for additional

assistance. These activities do not rise to the level of a formal grievance; however, the student is encouraged to keep documentation of these interactions as they may be useful if a formal grievance is pursued.

### Step 2

Should a satisfactory resolution not be achieved, a formal grievance can be filed with the BME Grievance Committee. To do so, the student contacts the Department Administrator, who will provide the student with the name of the current chair of the Grievance Committee. The student will then contact the Chair of the Grievance Committee, who will reply within seven calendar days. If the grievance is with the current Chair of the Grievance Committee, please let the Department Administrator know and they will identify an alternate committee member to contact. It is advised that grievances are filed within 60 calendar days of the alleged unfair treatment to enable a thorough investigation.

### Step 3

If the student does not feel comfortable working through the departmental process, they are encouraged to seek out other campus resources including:

- The Assistant Dean for Graduate Affairs in the College of Engineering
- The Graduate School
- UW Division of Diversity, Equity & Educational Achievement (DDEEA)
- McBurney Disability Resource Center
- Employee Assistance Office
- Ombuds Office
- University Health Services

### Step 4

At this point, if either party (the student or the person toward whom the grievance is directed) is unsatisfied with the decision of the faculty committee, the party may file a written appeal. Either party has ten working days to file a written appeal to the School/College. For more information, students should consult the College of Engineering Academic Advising Policies and Procedures.

### Step 5

Documentation of the grievance will be stored for at least seven years. Significant grievances that set a precedent will be stored indefinitely. The Graduate School has procedures for students wishing to appeal a grievance decision made at the school/college level. These policies are described in the Graduate School's Academic Policies and Procedures.

## OTHER

n/a

## PROFESSIONAL DEVELOPMENT

## GRADUATE SCHOOL RESOURCES

Take advantage of the Graduate School's professional development resources (<https://grad.wisc.edu/pd/>) to build skills, thrive academically, and launch your career.

## PROGRAM RESOURCES

### THE INDIVIDUAL DEVELOPMENT PLAN (IDP)

An Individual Development Plan (IDP) (<https://grad.wisc.edu/pd/idp/>) helps graduate students and postdoctoral researchers:

- assess current skills, interests, and strengths;
- make a plan for developing skills to meet academic and professional goals; and
- communicate with supervisors, advisors, and mentors about evolving goals and related skills.

The IDP is a document to be revisited again and again, to update and refine as goals change and/or come into focus, and to record progress and accomplishments.

The university **recommends** IDPs for all postdoctoral researchers and graduate students, and **requires** IDPs for all postdoctoral researchers and graduate students supported by National Institutes of Health (NIH) funding. See the Graduate School for more information and IDP resources (<https://grad.wisc.edu/pd/idp/>).

## ENGINEERING CAREER SERVICES

The Engineering Career Services (<https://ecs.wisc.edu/>) staff offers assistance to students searching or preparing for internships, co-ops, and jobs with well-recognized organizations.

## THE WRITING CENTER

The Writing Center (<https://writing.wisc.edu/>) is a campus-wide organization that provides free of charge, face-to-face and online consultations for students writing papers, reports, resumes, and applications.

## PEOPLE

### FACULTY

Paul Campagnola (Chair)  
 Randolph Ashton  
 David Beebe  
 Walter Block  
 Christopher Brace  
 Kevin Eliceiri  
 Shaoqin 'Sarah' Gong  
 Aviad Hai  
 Melissa Kinney  
 Pamela Kreeger  
 Wan-ju Li  
 Kip Ludwig  
 Kristyn Masters  
 Megan McClean  
 Beth Meyerand  
 William Murphy  
 Krishanu Saha  
 Melissa Skala  
 Darryl Thelen  
 Justin Williams  
 Colleen Witzenburg  
 Filiz Yesilkoy

## **INSTRUCTIONAL STAFF AND TEACHING FACULTY**

Amit Nimunkar

John Puccinelli

Tracy Jane Puccinelli

Darilis Suarez-Gonzalez

Aaron Suminski

See also Biomedical Engineering Faculty Directory ([http://  
directory.engr.wisc.edu/bme/](http://directory.engr.wisc.edu/bme/)).