BIOMEDICAL IMAGE COMPUTING, MS

for the degree of Master of Science in Biomedical Image Computing (on-campus and online)

The M.S. in Biomedical Image Computing blends together the fields of biomedical imaging science and machine learning. Students will receive a rigorous training in imaging systems and analysis, computational imaging, and machine learning, in preparation for an industry career.

Department Research
Bioengineering faculty perform research in the areas of Bio-Imaging at Multi-Scale, Molecular, Cellular and Tissue Engineering, Bio-Micro and Nanotechnology, Computational and Systems Bioengineering, and Synthetic Bioengineering. In addition to Bioengineering faculty, the Department of Bioengineering has more than 50 affiliate faculty (http://bioengineering.illinois.edu/directory/).

The Department of Bioengineering offers studies leading to the Master of Engineering in Bioengineering (MEng), the Master of Science in Biomedical Image Computing (MS in BIC), and the Doctor of Philosophy (PhD) in Bioengineering. The Bioengineering Graduate Program provides students with educational and research experiences that integrate the sciences of biology and medicine with the practices and principles of engineering. For the MS and PhD programs, areas of focus include Bio-Imaging at Multi-Scale, Molecular, Cellular and Tissue Engineering, Bio-Micro and Nanotechnology, Computational and Systems Bioengineering, and Synthetic Bioengineering.

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<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BIOE 483</td>
<td>Biomedical Computed Imaging Systems</td>
<td>4</td>
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<tr>
<td>BIOE 484</td>
<td>Statistical Analysis of Biomedical Images</td>
<td>4</td>
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<tr>
<td>BIOE 485</td>
<td>Computational Mathematics for Machine Learning and Imaging</td>
<td>4</td>
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<tr>
<td>BIOE 486</td>
<td>Applied Deep Learning for Biomedical Imaging</td>
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<td>BIOE 488</td>
<td>Applied High-Performance Computing for Imaging Science</td>
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<td>BIOE 489</td>
<td>Regulations, Ethics and Logistics in Biomedical Applications of Machine Learning</td>
<td>4</td>
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<tr>
<td>BIOE 580</td>
<td>Foundations of Imaging Science</td>
<td>4</td>
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<tr>
<td>BIOE 588</td>
<td>Biomedical Image Computing Capstone Project Literature Review</td>
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<tr>
<td>BIOE 589</td>
<td>Biomedical Image Computing Capstone Project</td>
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<th>Code</th>
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<tr>
<td>BIOE 586</td>
<td>Deep Generative Models in Bioimaging</td>
<td>4</td>
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Other Requirements

Student learning objectives will be as follows:

- Ability to apply quantitative skills, engineering principles, and computational principles to propose novel and practical solutions to biomedical imaging problems
- Ability to recognize and understand professional and ethical responsibilities
- Ability to identify and communicate real-world biomedical imaging problems with bigger vision and offer solutions, as well as their impact, effectively to a diverse audience and stakeholders, both orally and in writing
- Ability to develop effective leadership skills in order to foster the ability to collaborate and work with a diverse team, which is essential for a career in either academia or industry

Admission Requirements

Information listed in this catalog is current as of 06/2023
Applicants should have a bachelor's degree in an engineering or other quantitative discipline from an accredited college or university. Students should have a minimum grade point average of 3.00 (A=4.00) or equivalent for the last two years of undergraduate study and show evidence of strong quantitative skills and of serious interest in imaging and machine learning through their personal statement. Students in the program do not have automatic admission to the Ph.D. program in any engineering department.

All applicants whose native language is not English must submit a minimum TOEFL score of 102 (iBT), 257 (CBT), or 613 (PBT); or minimum International English Language Testing System (IELTS) academic exam scores of 7.0 overall and 6.0 in all subsections. Applicants may be exempt from the TOEFL if certain criteria are met. Applicants with lesser scores may still apply. Limited status is granted for lesser scores and requires enrollment in English as a Second Language (ESL) courses based on an ESL Placement Test (EPT) taken upon arrival to campus.

**Financial Aid**
The tuition and fees for the M.S. in Biomedical Image Computing are the standard Graduate and Professional Programs rates for the College of Engineering. Students in the M.S. in Biomedical Image Computing program are not eligible for tuition-waiver generating assistantships.

### Graduate Programs in Bioengineering

- **Majors**
  - Bioengineering, MEng (http://catalog.illinois.edu/graduate/engineering/bioengineering-meng/)
    - concentrations
      - Bioinstrumentation (http://catalog.illinois.edu/graduate/engineering/bioengineering-meng/bioinstrumentation/)
      - General Bioengineering (http://catalog.illinois.edu/graduate/engineering/bioengineering-meng/general-bioengineering/)
    - Bioengineering, MS (http://catalog.illinois.edu/graduate/engineering/bioengineering-ms/)
    - Bioengineering, PhD (http://catalog.illinois.edu/graduate/engineering/bioengineering-phd/)
    - optional concentration
      - Computational Science and Engineering (http://catalog.illinois.edu/graduate/engineering/concentration/computational-science-engineering/)
  - Biomedical Image Computing, MS (p. 1)

- **Concentrations**
  - Bioinstrumentation (http://catalog.illinois.edu/graduate/engineering/bioengineering-meng/bioinstrumentation/)
    - available for:
      - Bioengineering, MEng (http://catalog.illinois.edu/graduate/engineering/bioengineering-meng/)

The Department of Bioengineering offers studies leading to the Master of Engineering in Bioengineering (MEng), the Master of Science in Bioengineering (MS), the Master of Science in Biomedical Image Computing (MS in BIC), and the Doctor of Philosophy (PhD) in Bioengineering. The Bioengineering Graduate Program provides students with educational and research experiences that integrate the sciences of biology and medicine with the practices and principles of engineering. For the MS and PhD programs, areas of focus include Bio-

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### Bioengineering Department
Department Head: Mark Anastasio (maa@illinois.edu)
Director of Graduate Studies: Wawrzyniec Dobrucki (dobrucki@illinois.edu)

### Bioengineering Master of Science in Biomedical Image Computing
Director of Bioengineering Computing: Fan Lam (fanlam1@illinois.edu)
Bioengineering Department website (https://bioengineering.illinois.edu/)
Department Faculty (https://bioengineering.illinois.edu/directory/)
Biomedical Image Computing website (https://bioengineering.illinois.edu/academics/graduate/msbic/)

### Grainger College of Engineering
Grainger College of Engineering website (https://grainger.illinois.edu/)

### Admissions
Departmental Admissions Requirements (https://bioengineering.illinois.edu/admissions/graduate/process-and-requirements.html)
Graduate College Admissions Requirements (https://grad.illinois.edu/admissions/apply/)

### Graduate Contact
Liezl Bowman (liezlb@illinois.edu)
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(217) 300-8066

Bioengineering email (bioengineering@illinois.edu)

Information listed in this catalog is current as of 06/2023