Understanding, engineering, and interfacing with biological systems are among mankind's most important challenges, impacting numerous fields from basic science to health. Motivated by this larger vision, the bioECE track is focused on the intersection of electrical and computer engineering with biology and medicine.

Track advisor: David Soloveichik
bioECE vs Biomedical Engineering Department

The bioECE researcher applies **ECE engineering principles to the solution of problems of biological or medical origin**. This is in contrast to Biomedical Engineering research in the sense that they solve problems of biological or medical origin using appropriate engineering and scientific principles, whichever the specific engineering discipline.
The University of Texas at Austin
Cockrell School of Engineering

Electrical and Computer Engineering

Best City to Live
U.S. News and World Report

Best Graduate Electrical Engineering Programs in the U.S.
U.S. News and World Report

Best Graduate Computer Engineering Programs in the U.S.
U.S. News and World Report

#1
#9
#6
#11
David Soloveichik
Molecular programming, DNA nanotechnology, unconventional computing

José del R. Millán
Brain-machine interfaces, especially based on electroencephalogram signals (non-invasive). Design of brain-controlled robots.

Emily Porter
Measurement of dielectric properties of biological tissues, therapeutic and diagnostic applications of electromagnetic waves

Alan Bovik
Digital television, digital photography, and image and video processing, visual perception
Two Emmy Awards!

Shwetadwip Chowdhury
Optical imaging technologies, algorithms and hardware

Nan Sun
Electromagnetic sensors, low-cost medical imaging systems

Yaoyao Jia
analog/mixed-signal, implantable and wearable devices, neural interface
Jon Tamir
Computational magnetic resonance imaging, signal processing, machine learning, and clinical translation

Edison Thomaz
Activity-centered sensor data using commodity devices, personal health informatics

Jonathan Valvano
Medical instrumentation and devices

Haris Vikalo
Signal processing, machine learning, and bioinformatics

Sriram Vishwanath
Machine learning, big data analytics

Ahmed Tewfik
Man–machine symbiosis, brain computing interfaces, and applied machine learning

Joydeep Ghosh
Data mining, machine learning, health informatics
Plus many associated faculty members, including in other departments...

MS/PhD supervisor doesn’t have to be one of these bioECE core faculty. Could be outside of ECE.
# Course Requirements for MS Students

<table>
<thead>
<tr>
<th>Three MS Options</th>
<th>Number of Formal Courses Required</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Major Work</td>
<td>Supporting Work</td>
</tr>
<tr>
<td>Thesis</td>
<td>4 to 6</td>
<td>2 to 4</td>
</tr>
<tr>
<td>Report</td>
<td>5 to 7</td>
<td>2 to 4</td>
</tr>
<tr>
<td>No Thesis or Report</td>
<td>5 to 8</td>
<td>2 to 5</td>
</tr>
<tr>
<td>Min GPA Required</td>
<td>3.0</td>
<td>3.0</td>
</tr>
</tbody>
</table>

- No required courses in bioECE
Examples of bioECE Major Courses

**Listed or cross-listed in ECE:**
- EE381V: Genomics Signal Processing and Data Science [Haris Vikalo]
- EE381V: Programming with Molecules [David Soloveichik]
- EE380L: Data Mining [Joydeep Ghosh]
- EE380L1V: Advanced Data Mining [Joydeep Ghosh]
- EE371R: Digital Image & Video Processing [Al Bovik]
- EE381K: Digital Video [Al Bovik]
- EE351M: Digital Signal Processing [Haris Vikalo]
- EE281K-6: Estimation Theory [Haris Vikalo]
- EE374K/385J-3i: Biomed Elect Instrument Design [John Pearce]
- EE338L/382V: Analog Integrated Circuit Design [Nan Sun]
- EE382V: Activity Sensing and Recognition [Edison Thomaz]
- EE385J: Biomedical Imaging Modalities [Tom Yankeelov]
- EE385J: Biomedical Instrumentation [Emily Porter]
- EE374L: Applications of Biomedical Engineering [H. Grady Rylander III]
- EE385J-32: Projects in Biomedical Eng
- EE385V: Brain Computer Interaction [Jose del R. Millan]
- EE382V: Complex Networks In Real World
- EE381V: Computational Magnetic Resonance Imaging [Jon Tamir]
- EE385V: Neural Engineering [Jose del R. Millan]
- EE381V: Spoken Language Technologies [David Harwath]

**Courses outside ECE:**
- BME358 / BME385J: Medical Decision Making [Mia Markey]
- BME381J / ME382P2: Optics and Lasers Laboratory [Adela Ben-Yakar]
- BME383J: Dynamic Modeling [Marcelo Behar]
- CS395T: Neural Computation [Alexander Huth]
- BME384J 7-Introduction to Neural Engineering [Samantha Santacruz]

**Important:** This is not an exhaustive list. Other classes can be considered major work with Track Advisor approval.
Course Requirements for PhD Students

- 10 graduate courses
- GPA in each category ("Major" and "Supporting") should be at least 3.5
- No required courses in bioECE
Academic Progress of PhD Students

For details, see: https://www.ece.utexas.edu/academics/guides-and-procedures
Advising

- **ECE Graduate Office**
  - Invaluable help in navigating paperwork and deadlines

- **bioECE Area Advisor and Coordinator (David Soloveichik)**
  - Approval of MS programs of work, etc
  - Application for Ph.D. candidacy, appointment of qualifying exam committee, etc
  - On my website: [bioECE advising notes (MS/PhD)](#)

- **ECE Graduate Advisor (Frank Register)**
  - Tough issues the above can not resolve