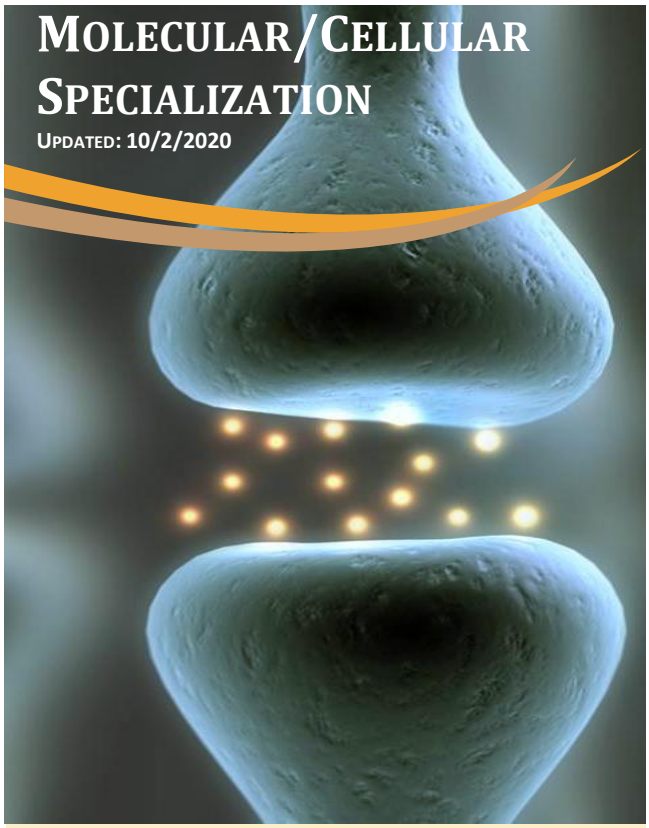
Molecular/Cellular Specialization

Updated: 10/2/2020



What is Molecular/Cellular Neuroscience?

Molecular/Cellular Neuroscience is a subfield of neuroscience that examines the mechanisms related to the basic biological processes of neurons and support cells of the nervous system. Molecular/Cellular neuroscientists tend to study how neurons communicate, how parts of neurons (e.g., axons and dendrites) function, and explore the anatomy/physiology of neurons.

Declaration Requirements

In order to declare the Pre-Major, students must meet with a Neuroscience Advisor to discuss the requirements. To set up an appointment:

- Request an appointment via our website: **NeuroscienceMajor.osu.edu/appointment**

Students in the Pre-Major must complete the following requirements to transition from the Pre to the Full Major:

- Meet with an advisor to officially be declared as a pre-neuroscience major
- Complete 24 total semester credit hours
- At least 12 of those semester credit hours must be from graded OSU coursework
- An overall GPA greater than or equal to 3.0
- Earn at least a " **B** " in Psych 3313, Neuro 3000, and Neuro 1100(H)

The requirements for the 36 semester hour (12 classes) neuroscience major are distributed across four categories: Core, Data Analysis, Specialization, and Breadth.

I. Professional Survey

- **Neuro 1100(H) Neuroscience Honors Survey**
  1hr | Au, Sp | (Pre-reqs: Permission of Instructor)

II. Core Requirements

Take all 4 of the courses below

- **Psych 3313 Introduction to Behavioral Neuroscience**
  3hrs | Au, Sp, Su | (Pre-reqs: Psych 1100 and Pre-Major)
  Students must earn a B or higher in this class
- **Neuro 3000 Introduction to Molecular/Cellular Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: Bio 1113 and Pre-Major)
  Students must earn a B or higher in this class
- **Psych 3513 Introduction to Cognitive Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: Psych 1100)
- **Neuro 3050 Structure & Function of the Nervous System**
  3hrs | Au, Sp | (Pre-reqs: Bio 1113 & Neuro 3000)

III. Data Analysis Requirement

Take 1 of the 4 courses below

- **Psych 2220 Introduction to Data Analysis in Psychology**
  3hrs | Au, Sp, Su | (Pre-reqs: Psych 1100 & Math 1148)
- **Stats 2480 Statistics for Life Sciences**
  3hrs | Sp | (Pre-reqs: Math 1151)
- **Stats 2450 Introduction to Statistical Analysis**
  3hrs | Au | (Pre-reqs: Math 1151)
- **MolGen 5650 Analysis & Interpretation of Biological Data I**
  3hrs | Au | (Pre-reqs: Math 1150 & 10hrs 3000-level Bio)

IV. Specialization Requirements

Choose at least 5 specialization courses from the options below

- **Neuro 3010 Neurophysiology**
  3hrs | Au | (Pre-reqs: Neuro 3000)
- **Neuro 4050H Neurogenetics**
  3hrs | Au | (Pre-reqs: Neuro 3000)
- **Psych 5603 Stem Cells and the Brain**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 4100 Basic & Clinical Foundations of Neurological Disease**
  3hrs | Au | (Pre-reqs: Neuro 3000)
- **Neuro 4640 Neuronal Signal Transduction**
  3hrs | Sp | (Pre-reqs: Neuro 3000 & 3050)
- **Psych 4644 Hormones & Behavior**
  3hrs | Au Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
  Not Open to Students with Credit For Neuro 5644
- **Chem 5230 Neurotransmitter Chemistry**
  3hrs | Sp | (Pre-reqs: Chem 2510, 2540, & 2520)
- **Neuro 4623 Biological Clocks and Behavior**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **Neuro 5790H Developmental Neuroscience**
  3hrs | Sp | (Pre-reqs: Neuro 3000 & 3050)
- **Biochem 4511 Intro to Biological Chemistry**
  4hrs | Au, Sp Su | (Pre-reqs: Chem 1210/1220 & 2510)
- **MolGen 4500 General Genetics**
  3hrs | Au, Sp, Su | (Pre-reqs: Bio 1113 & 3+ hrs Bio)
- **Biophrm 5824/Psych 4305 Pharmacology of the Nervous System**
  3hrs | Au, Sp | (Pre-reqs: Permission of Instructor)
  Not Open to students with Credit for PHR 4440, Psych 4305 or BioPhrm 5824

V. Breadth Requirement

Choose at least 2 additional courses from the list below

- **Neuro 3025** **History of Neuroscience**
  3hrs | Sp | (Pre-reqs:Psych 3313 & Neuro 3000)
- **Neuro 4550** **Autism & Related Neurodevelopmental Disorders**
  3hrs | Au | (Pre-reqs: Neuro 3000)
- **Psych 4501** **Advanced Behavioral Neuroscience**
  3hrs | Sp | (Pre-reqs: B or higher in 3313 & Neuro 3000)
- **Psych 5613** **Biological Psychiatry**
  3hrs | Sp | (Pre-reqs: B or higher in Psych 4501)
- **Psych 5602** **Behavioral Genetics**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5604** **Sex Differences in the Brain and Behavior**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5622** **The Development of Brain and Behavior**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5898** **Seminar in Behavioral Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 4501 & Ins. Permission)
- **EEOB 4550** **Neurobiology of Behavior**
  3hrs | Au | (Pre-reqs: 2 courses in Bio)
- **Ling 3701** **Language and the Mind**
  3hrs | Au, Sp | (Pre-reqs: Psych 1100)
- **Psych/CSE/Ling/Philos 5612** **Introduction to Cognitive Science**
  3hrs | Au | (Pre-reqs: 12hr in Psych/CSE/Ling/Philos)
- **Psych 5614** **Cognitive Neuroscience**
  3hrs | Au | (Pre-reqs: Psych 3313 or 3513)
- **Psych 5618** **Introduction to Computational Cognitive Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5628** **Developmental Cognitive Neuroscience**
  3hrs | Au | (Pre-reqs: Psych 3313 or 3513)
- **SHS 5760** **Neurology of Speech and Hearing Mechanisms**
  3hrs | Sp | (Pre-reqs: Permission of Instructor)
- **Psych 3321** **Quantitative and Statistical Methods in Psychology**
  3hrs | Au, Sp | (Pre-reqs: B or higher in 2220)
- **Math 4350** **Quantitative Neuroscience**
  3hrs | Sp | (Pre-reqs: Math 1151 &1152)
- **Psych 5608** **Intro to Mathematical Psychology**
  3hrs | Au | (Pre-reqs: Psych 3321)
- **CSE 5052** **Survey of Artificial Intelligence for Non-Majors**
  3hrs | Au | (Pre-reqs: Psych CSE 2221)
- **CSE 5526** **Introduction to Neural Networks**
  3hrs | Au | (Pre-reqs: CSE 3521)
- **Econ 5870** **Neuroeconomics and Decision Neuroscience**
  3hrs | Sp | (Pre-reqs: Stat 2450 & Psych 3313)
- **ECE 5070** **Neuroengineering and Neuroprosthetics**
  3hrs | Au | (Pre-reqs: Permission of Instructor)
- **Psych 5089** **Cog. Aging, Neurodegeneration, and Neuroplasticity**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 4998/3193** **Undergraduate Research & Individual Studies**
  Pre-approval required.
  Up to 3 credit hours of any combination of Undergraduate Research (4998) and Individual Studies (3193) can be applied to the breadth requirement.

Honors Students

Must take at least one honors or graduate level course. Approved courses can be found here: http://neurosciencemajor.osu.edu/honors

Important information about the Neuroscience Major

1. **Students must meet the following requirements to declare the neuroscience major:**
   - First, meet with an advisor to officially be declared as a pre-neuroscience major
   - Complete 24 total semester credit hours
   - At least 12 of those semester credit hours must be from graded OSU coursework
   - An overall GPA greater than or equal to 3.0
   - Earn at least a " **B** " in Psych 3313, Neuro 3000, and Neuro 1100(H)
2. **Honors students** must take at least one honors or graduate level course. Approved courses can be found here: http://neurosciencemajor.osu.edu/honors
3. Thirty-six (36) semester credits in approved Neuroscience coursework.
4. At least half of the major's curriculum must be completed at Ohio State.
5. Majors will follow the Bachelor of Science curriculum for GE and other degree requirements.
6. Students are encouraged to focus on completion of core requirements before beginning their specialization coursework.
7. For courses to apply toward the major, you must earn at least a " **C** ".
8. To earn your degree you will need an overall GPA of at least a 2.0.
9. Research experience is also strongly encouraged for students considering graduate and professional training. You may enroll in a variety of 4998 opportunities. http://neurosciencemajor.osu.edu/4998
10. Up to 3 hours of experiential coursework can be applied to the breadth requirements of the major. This experiential coursework can be from any combination of the following classes: Undergraduate Research (4998) and Individual Studies). Pre-approval from your neuroscience major advisor is required.
11. Students planning to graduate "With Honors in Arts and Sciences" should visit our website for information on Honors Contract requirements for neuroscience majors. http://neurosciencemajor.osu.edu/honors
12. Courses cannot count for both a minor and a major.