Department of Neurobiology and Behavior

Marcelo Wood, Department Chair
Raju Metherate, Department Vice Chair
2205 McGaugh Hall
949-824-8519
http://neurobiology.uci.edu/

Overview
The Department of Neurobiology and Behavior programs provide a broad foundation in neuroscience combined with proficiency in a specific area of research. Faculty members in the Department address questions in neuroscience at the molecular, cellular, systems, and behavioral levels. Research focuses on a range of topics including learning and memory, neurodegenerative disorders, addiction, sensory neurobiology, developmental neurobiology, and neural plasticity.

The Department of Neurobiology and Behavior also participates in the Interdepartmental Neuroscience Program (http://www.inp.uci.edu).

The Department of Neurobiology and Behavior offers the Ph.D. in Biological Sciences. Graduate students must complete a sequence of core courses (lectures and laboratories) during their first year, and maintain an overall GPA of 3.3 or better. They also must take a minimum of four advanced courses before graduation and participate in directed research each year and a minimum of two quarters of teaching by their fourth year. Students will advance to candidacy for the Ph.D. at the end of their third year by means of a written critical review of the literature in the area in which they plan to do their dissertation, a research proposal, and an oral examination. Graduation depends on successful preparation and oral defense of a dissertation based on the student's research. The normative time for completion of the Ph.D. is five years, and the maximum time permitted is seven years.

Ideally, applicants for this program should have taken undergraduate courses in biology (one introductory year plus some advanced work), and/or psychology (experimental, physiological), chemistry through biochemistry, introductory physics, calculus, and statistics. They also must submit GRE Aptitude test scores. Because graduate training emphasizes research, preference is given to applicants having laboratory research experience. Applicants with substantial outside commitments that would curtail laboratory research or prolong the time to degree are not accepted. The deadline for application is December 2.

Undergraduate Major in Neurobiology
The Neurobiology major is designed to teach students how neurobiologists apply cellular, molecular, systems, and behavioral analyses in understanding how the nervous system works. The hallmark of the major is a year-long, in-depth exploration of the intellectual tools used to create, advance, and disseminate knowledge about the nervous system. Through neurobiology satellite courses, students acquire advanced factual knowledge about neurobiology. In addition, Neurobiology majors may choose to participate in research through BIO SCI 199, where they will learn technical skills and receive mentoring from faculty members.

Students completing the Neurobiology major will be well qualified for admission to graduate or professional schools in preparation for careers in biological research, medicine, dentistry, veterinary medicine, nursing, and other related fields. Even without additional education, they will be competitive for positions in the pharmaceutical industry, the health care delivery industry, or in medically or biologically related technologies. The major also provides valuable preparation for students interested in entering other disciplines that increasingly interface with biology and biotechnology, such as law, business administration, and government policy. Additionally, the major provides excellent preparation for students who wish to become high school science teachers.

Requirements for the B.S. in Neurobiology
All students must meet the University Requirements.
All students must meet the School Requirements.

Major Requirements
A. Upper-Division Core:

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<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>BIO SCI N110</td>
<td>Neurobiology and Behavior</td>
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and select one of the following:

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<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>BIO SCI D103</td>
<td>Cell Biology</td>
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<tr>
<td>BIO SCI D104</td>
<td>Developmental Biology</td>
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<tr>
<td>BIO SCI E109</td>
<td>Human Physiology</td>
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B. Required Major Courses:

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<th>Course Code</th>
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<tbody>
<tr>
<td>BIO SCI N115A-N115B</td>
<td>Advanced Neurobiology I</td>
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<td>and Advanced Neurobiology II</td>
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C. Upper-Division Laboratories:

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<th>Course Code</th>
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<tr>
<td>BIO SCI N113L</td>
<td>Neurobiology Laboratory</td>
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and select two of the following:

- BIO SCI D111L: Developmental and Cell Biology Laboratory
- BIO SCI E106L: Habits and Organisms
- BIO SCI E112L: Physiology Laboratory
- BIO SCI E115L: Evolution Laboratory
- BIO SCI E131L: Image Analysis in Biological Research
- BIO SCI E140L: Evolution and the Environment Laboratory
- BIO SCI E161L: Biology of Birds Lab
- BIO SCI E166L: Field Biology
- BIO SCI E179L: Field Freshwater Ecology
- BIO SCI M114L: Biochemistry Laboratory
- BIO SCI M116L: Molecular Biology Laboratory
- BIO SCI M118L: Experimental Microbiology Laboratory
- BIO SCI M121L: Advanced Immunology Laboratory
- BIO SCI M127L: Virology and Immunology Laboratory
- BIO SCI M130L: Advanced Molecular Lab Techniques

One of these two laboratories can be satisfied by completion of Excellence in Research in the Biological Sciences.

D. Upper-Division Biology Electives:
Select three of the following:

- BIO SCI N119–N190

and select one four-unit course from the following:

- BIO SCI D103–D190, E106–E190, M114–M190, N110–N190
- PHYSICS 147A: Principles of Imaging

No course may be used to satisfy more than one requirement.

E. Honors Track of the Neurobiology Major: BIO SCI H195 in the area of neurobiology and Excellence in Research in the Biological Sciences - presenting neurobiology related research.

1 Requirements to enter the Honors Track: A 3.3 or better average GPA in BIO SCI N115A-BIO SCI N115B and a 3.0 or better average GPA in all required biology courses.

If the number of eligible students who apply for the Honors Track exceeds the number that can be accommodated in the neurobiology related H195, the department will try to open an additional section. If this is not feasible, the Neurobiology Major Faculty Advisory Committee will select the top applicants, based mainly on the students' BIO SCI N115A-BIO SCI N115B grades and biology GPA.

Application Process to Declare the Major: The major in Neurobiology is open to junior- and senior-level students only. Applications to declare the major can be made at any time, but typically in the spring of the sophomore year. Review of applications submitted at that time and selection to the major by the Neurobiology Faculty Board is completed during the summer. Information can also be found at the http://www.changeofmajor.uci.edu.

Double majors within the Francisco J. Ayala School of Biological Sciences or with Public Health Sciences, Biomedical Engineering: Premedical, Nursing Science, or Pharmaceutical Sciences are not permitted.

Sample Program — Neurobiology

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<th>Freshman</th>
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<td>Fall</td>
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<tr>
<td>BIO SCI 93</td>
<td>BIO SCI 94</td>
<td>MATH 2A or 5A</td>
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<tr>
<td>CHEM 1A</td>
<td>CHEM 1B</td>
<td>CHEM 1C-1LC</td>
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<tr>
<td>Lower-Division Writing</td>
<td>Lower-Division Writing</td>
<td>Lower-Division Writing</td>
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<td>BIO SCI 2A</td>
<td>General Education</td>
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<td>Sophomore</td>
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<td>Fall</td>
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<td>BIO SCI 97</td>
<td>BIO SCI 98</td>
<td>BIO SCI 99</td>
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<td>CHEM 51A</td>
<td>CHEM 51B-51LB</td>
<td>CHEM 51C-51LC</td>
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<td>CHEM 1LD</td>
<td>STATS 7, 8, MATH 2D, or MATH 3A</td>
<td>BIO SCI N110</td>
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<td>MATH 2B or 5B</td>
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<td>BIO SCI 194S</td>
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<tr>
<th>Junior</th>
<th>Winter</th>
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<td>Fall</td>
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<tr>
<td>Bio. Sci. Elective</td>
<td>BIO SCI N113L</td>
<td>PHYSICS 3C-3LC</td>
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<tr>
<td>BIO SCI 100</td>
<td>PHYSICS 3B-3LB</td>
<td>Research/Elective</td>
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Students have the option of taking HUMAN 1AS, HUMAN 1BS, HUMAN 1CS or WRITING 39A, WRITING 39B, WRITING 39C in order to fulfill the lower-division writing requirement.

### Faculty

Ruth M. Benca, Ph.D. University of Chicago Pritzker School of Medicine, *Professor of Neurobiology and Behavior*

Mathew M. Blurton-Jones, Ph.D. University of California, San Diego, *Assistant Professor of Neurobiology and Behavior*

Jorge A. Busciglio, Ph.D. Universidad Nacional de Córdoba, *Professor of Neurobiology and Behavior*

Lawrence F. Cahill, Ph.D. University of California, Irvine, *Professor of Neurobiology and Behavior*

Susana Cohen-Cory, Ph.D. The Rockefeller University, *Professor of Neurobiology and Behavior*

Carl W. Cotman, Ph.D. Indiana University, *Professor of Neurology; Biomedical Engineering; Neurobiology and Behavior*

Karina S. Cramer, Ph.D. California Institute of Technology, *Professor of Neurobiology and Behavior*

Howard J. Federoff, M.D. Ph.D. Albert Einstein College of Medicine, *Vice Chancellor for Health Affairs and Professor of Neurobiology and Behavior*

Norbert Fortin, Ph.D. Boston University, *Associate Professor of Neurobiology and Behavior*

Christie Fowler, Ph.D. Florida State University, *Assistant Professor of Neurobiology and Behavior*

Ron D. Frostig, Ph.D. University of California, Los Angeles, *Professor of Neurobiology and Behavior; Biomedical Engineering*

Christine M. Gall, Ph.D. University of California, Irvine, *Department Chair and Professor of Anatomy and Neurobiology; Neurobiology and Behavior*

Sunil P. Gandhi, Ph.D. University of California, San Diego, *Assistant Professor of Neurobiology and Behavior*

Kim Green, Ph.D. University of Leeds, *Associate Professor of Neurobiology and Behavior*

Joshua Grill, Ph.D. Wake Forest University School of Medicine, *Associate Professor of Neurobiology and Behavior*

John F. Guzowski, Ph.D. University of California, Irvine, *Associate Professor of Neurobiology and Behavior*

Claudia H. Kawas, M.D. University of Louisville, *Nichols Term Chair in Neuroscience and Professor of Neurology; Neurobiology and Behavior*

Herbert P. Killackey, Ph.D. Duke University, *Professor Emeritus of Neurobiology and Behavior*

Frank M. Laferla, Ph.D. University of Minnesota, *Dean of the Francisco J. Ayala School of Biological Sciences and Professor of Neurobiology and Behavior; Neurology*

Michael Leon, Ph.D. University of Chicago, *Professor of Neurobiology and Behavior*

Stephen V. Mahler, Ph.D. University of Michigan, *Assistant Professor of Neurobiology and Behavior*

John F. Marshall, Ph.D. University of Pennsylvania, *Professor Emeritus of Neurobiology and Behavior*

James L. McGaugh, Ph.D. University of California, Berkeley, *Research Professor and Professor Emeritus of Neurobiology and Behavior; Logic and Philosophy of Science*

Bruce L. McNaughton, Ph.D. Carleton University, *UCI Distinguished Professor of Neurobiology and Behavior*

Raju Metherate, Ph.D. McGill University, *Professor of Neurobiology and Behavior*

John Middlebrooks, Ph.D. University of California, San Francisco, *Professor of Otolaryngology; Biomedical Engineering; Cognitive Sciences; Linguistics; Neurobiology and Behavior* (hearing research, neurophysiology, psychophysics, auditory prosthesis, computational neuroscience)

Ricardo Miledi, M.D. Universidad Nacional Autonoma De Mexico, *Professor Emeritus of Neurobiology and Behavior*
Andrea C. Nicholas, Ph.D. University of Chicago, Lecturer with Potential Security of Employment of Neurobiology and Behavior

Ian Parker, Ph.D. University College London, Professor of Neurobiology and Behavior; Physiology and Biophysics

Steven L. Small, M.D. University of Rochester, Dr. Stanley van den Noort Endowed Chair and Professor of Neurology; Cognitive Sciences; Neurobiology and Behavior

George Sperling, Ph.D. Harvard University, UCI Distinguished Professor of Cognitive Sciences; Neurobiology and Behavior (empirical studies of human information processing: short-term visual memory systems, attention, visual perception, 3-D object recognition; mathematical, computational, and neural models of visual processes: light adaptation, temporal sensitivity, contrast-D)

Craig Stark, Ph.D. Carnegie Mellon University, James L. McGaugh Chair in the Neurobiology of Learning and Memory and Professor of Neurobiology and Behavior

Arnold Starr, M.D. New York University, Research Professor of Neurobiology and Behavior

Oswald Steward, Ph.D. University of California, Irvine, Reeve-Irvine Chair in Spinal Cord Injury Research and Professor of Anatomy and Neurobiology; Neurobiology and Behavior

Georg F. Striedter, Ph.D. University of California, San Diego, Professor of Neurobiology and Behavior

Katumi Sumikawa, Ph.D. Imperial College London, Professor of Neurobiology and Behavior

Andrea Tenner, Ph.D. University of California, San Diego, Professor of Molecular Biology and Biochemistry; Neurobiology and Behavior

Leslie M. Thompson, Ph.D. University of California, Irvine, Professor of Psychiatry and Human Behavior; Biological Chemistry; Neurobiology and Behavior

Marcelo A. Wood, Ph.D. Princeton University, UCI Chancellor's Fellow and Department Chair and Professor of Neurobiology and Behavior

Michael Yassa, Ph.D. University of California, Irvine, UCI Chancellor's Fellow and Director of the Center for the Neurobiology of Learning and Memory and Associate Professor of Neurobiology and Behavior