Neuroscience

See Neurobiology, Physiology, and Behavior, on page 443; and Neuroscience (A Graduate Group), below.

Neuroscience (A Graduate Group)

W. Martin Usrey, Ph.D., Chairperson of the Group

Group Office. 148 Center for Neuroscience
530-757-8845; http://neuroscience.ucDavis.edu/grad

Faculty

Leonard J. Abbeduto, Ph.D., Professor
(Psychiatry and Behavioral Sciences)

David Amaral, Ph.D., Professor
(Neuroscience)

Julie Barkmeier-Kraemer, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)

Karen Sigvardt, Ph.D., Adjunct Professor
(Psychiatry)

Robert Berman, Ph.D., Professor
(Neurological Surgery)

Laura Baradinsky, Ph.D., Assistant Professor
(Physiology and Membrane Biology)

Kenneth H. Britten, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)

Marie Burns, Ph.D., Professor
(Otolaryngology and Vision Science)

Earl E. Carstens, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)

Cameron Carter, M.D., Professor
(Psychiatry and Behavioral Science)

Tsung-Yi Chen, Ph.D., Professor (Neurology)

Hwa-Jiang Cheng, M.D., Ph.D., Professor
(Neurobiology, Physiology, and Behavior)

Gina Cortopassi, Ph.D., Professor
(Cell Biology and Human Anatomy)

Jacqueline Crawley, Ph.D., Professor (Psychiatry)

William DeBello, Ph.D., Associate Professor
(Neurobiology, Physiology, and Behavior)

Charlie DeCurtis, M.D., Professor (Neurology)

Wenbin Deng, Ph.D., Associate Professor
(Cell Biology and Human Anatomy)

Elva Diaz, Ph.D., Associate Professor
(Pharmacology)

Jochen Ditterich, Ph.D., Professor Assistant Professor
(Neurobiology, Physiology, and Behavior)

Arne Ekstrom, Ph.D., Assistant Professor
(Psychology)

Michael Ferns, Ph.D., Professor
(Anesthesiology and Pain Medicine)

Joy Geng, Ph.D., Assistant Professor (Psychology)

Mark Goldman, Associate Professor
(Neurobiology, Physiology, and Behavior)

Qizhi Gong, Ph.D., Associate Professor
(Cell Biology and Human Anatomy)

Frederic Gorin, M.D., Ph.D., Professor (Neurology)

John Gray, M.D., Ph.D., Assistant Professor
(Neurology)

Bruce Lyeth, Ph.D., Professor
(Neurological Surgery)

G. R. Mangun, Ph.D., Professor
(Psychology)

Martinez-Cerdeno, Veronica, Ph.D., Assistant Professor
(Pathology)

A. Kimberley McAllister, Ph.D., Professor
(Neurology, and Neurobiology, Physiology, and Behavior)

Lee Miller, Ph.D., Associate Professor
(Neurobiology, Physiology, and Behavior)

Brian Mullenoy, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)

Liping Nie, Ph.D., Assistant Professor
(Otolaryngology)

Stephen Noctor, Ph.D., Assistant Professor
(Psychiatry and Behavioral Sciences)

Edward N. Pugh, Ph.D., Professor
(Physiology and Membrane Biology)

J. Daniel Ragland, Ph.D., Professor
(Psychiatry and Behavioral Sciences)

Charan Ranganath, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)

Gregg H. Recanzone, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)

David Richman, M.D. Professor
(Neurology)

Johannes Hell, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)

Karen Sigmard, Ph.D., Adjunct Professor
(Neurology)

Fredric Gorin, M.D., Ph.D., Professor
(SocSci)

Andrew Yonelinas, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)

Ebenezer Yamoah, Ph.D., Professor
(Neurology)

W. Martin Usrey, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)

Paul S. Knoepfler, Ph.D., Associate Professor
(Neurobiology, Physiology, and Behavior)

Karen Sigvardt, Ph.D., Adjunct Professor
(Neurology)

Graduate Study. The Graduate Group in Neuroscience offers programs of study leading to the Ph.D. degree. Neuroscience is a broad, interdepartmental program with faculty interests ranging from molecular biophysics of channels to cortical organization and cognition. A major goal of the program is to prepare students for careers as research scientists. Details of the program may be obtained from the Group office.

Graduate Advisers. R. Berman (Neurological Surgery), A. Ekstrom (Psychology), A. K. McAllister (Neurology and Neurobiology, Physiology, and Behavior), W. M. Usrey (Neurobiology, Physiology, and Behavior), B. Wilten (Psychology)

Courses in Neuroscience (NSC)

Upper Division

160. Molecular and Cellular Neurobiology (3)
Lecture—1.5 hours; discussion—1.5 hours. Prerequisite: Neurobiology, Physiology, and Behavior 100, Biological Sciences 101 and consent of instructor. Selected topics in neurobiology. Topics include channel biophysics, action potential propagation, intracellular signal transduction pathways, synaptic physiology and quantal analysis, cellular mechanisms of synaptic plasticity, and neuromodulation of synaptic circuitry. (Same course as Neuroscience, Physiology, and Behavior 160.) GE credit: VL. III. (I.II.) Burns, Mulloney

Graduate

200LA. Laboratory Methods in Neurobiology (6)
Laboratory—18 hours. Prerequisite: graduate standing in the Neuroscience Graduate Group. Individual research in the laboratory of a faculty member. Research problems emphasize the use of contemporary methods and good experimental design. May be repeated three times for credit. (S/U grading only)—I, II, III. (I, II, III.)

200LB. Laboratory Methods in Neurobiology (3)
Laboratory—9 hours. Prerequisite: graduate standing in the Neuroscience Graduate Group. Individual research in the laboratory of a faculty member. Research problems emphasize the use of contemporary methods and good experimental design. May be repeated for credit. (S/U grading only)—I, II, III. (I, II, III.)

201. Neuroanatomy (3)
Lecture—2 hours; laboratory/discussion—1 hour. Prerequisite: consent of instructor. Mix of lectures, demonstrations, and dissections, emphasizing functional significance of neuroanatomy from a biological perspective, with comparisons between human and non-human brains. Emphasis placed on functional anatomy of the nervous system, integrated with cellular, molecular, cognitive, and developmental concepts. Limited enrollment—II. (I.)

211. Advanced Topics in Neuroimaging (2)
Seminar—2 hours. Prerequisite: Psychology 210 or consent of instructor. Restricted to 16 students. Critical presentation and discussion of the most influential advanced issues in neuroimaging, emphasizing fMRI design/analysis and the integration of fMRI with EEG/MEG. (Same course as Neurobiology, Physiology, and Behavior 211.) (S/U grading only)—I. III. (II, III.) Miller

220. How to Give a Scientific Seminar (3)
Lecture/discussion—3 hours. Prerequisite: consent of instructor. Presentation of effective seminars. Student presentations of selected neuroscience topics in seminar format. Must be taken in two consecutive quarters. Offered in alternate years—II, III. (II, III.) DeBello, McAllister

221. Cellular Neurophysiology (4)
Lecture—4.5 hours. Prerequisite: graduate standing or consent of instructor. Physiological aspects of cellular and subcellular organization of the nervous system. Neuronal cell biology, the structure and function of ion channels, electrical excitability, signaling cascades, sensory transduction and, mechanisms of synaptic transmission, and the cellular basis of learning and memory. I. (I.) Burns
226. Molecular and Developmental Neurobiology (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Introduction to molecular and developmental neurobiology. Topics range from general to current research in the field of neurobiology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.) Ishida

227. Topics in Functional Neurogenomics (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Critical presentation and analysis of recent journal articles in neuroscience. May be repeated for credit. (S/U grading only.)—II, III, (II, III, III). Choudary

228. Systems Neuroscience (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Integrative and functional aspects of neural system organization. Topics include sensory systems, motor function, sensorimotor integration, the limbic system, and the neurobiology of learning and memory. (Same course as Neurobiology, Physiology, and Behavior 222.)—II. (II.) DeBello, Ditterich, Usrey

229. Cognitive Neuroscience (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate student standing in Psychology or Neuroscience or consent of instructor. Graduate core course for neuroscience. Neurobiological bases of higher mental function including attention, memory, language. One of three in three-quarter sequence. (Same course as Psychology 261.)—III. (III.) Swoab

244A. Molecular and Developmental Neurobiology (2)
Lecture/discussion—2 hours. Prerequisite: consent of instructor. Key issues in developmental and molecular neurobiology. Discussion emphasis on critical evaluation of the experiments and methods described in research papers. Readings of seminal, primary research papers, reviews, and book chapters. Reading materials will be distributed one week in advance. —II. (II.) Cheng, Diaz

244B. Molecular and Developmental Neurobiology (2)
Lecture/discussion—2 hours. Prerequisite: course 244A or consent of instructor. Continuation of course 244A. Key issues in developmental and molecular neurobiology, focusing on developmental topics. Discussion emphasis on critical evaluation of experiments and methods described in associated literature. —II. Cheng, Diaz

225. Translational Research in the Neurobiology of Disease (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: Past or concurrent enrollment in Neuroscience courses 221, 222, 223, or permission of instructor; restricted to current graduate student enrollment or permission of instructor. This course will provide an overview of major neuropsychiatric and neurological disorders from both the clinical and fundamental science perspectives. Offered in alternate years. —II. McAllister

226. Molecular and Developmental Neurobiology (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Introduction to molecular and developmental neurobiology. Topics range from general to current research in the field of neurobiology. May be repeated for credit. (S/U grading only.)—III. (III.) Ishida

247. Topics in Functional Neurogenomics (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: graduate standing or consent of instructor. The theory, methods and principles of functional neurogenomics with emphasis on the relationship to molecular mechanisms involved in development and disease of the nervous system. (Same course as Neurobiology, Physiology, and Behavior 247.)—II. Choudary

250. Biology of Neuroglia (2)
Lecture/discussion—1.5 hours. Prerequisite: consent of instructor. The properties and functions of nonneuronal cells in the mammalian central nervous system with relevance to neuronal development, physiology and injury response. Offered in alternate years. (Same course as Cell Biology and Human Anatomy 250.) (S/U grading only.)—III.

261A. Topics in Vision: Eyes and Retinal Mechanisms (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing, Neurobiology, Physiology, and Behavior 100 or 112 or the equivalent. Structure and function of the visual system, with emphasis on the eye and retina, including optics, anatomy, transduction, retinal signals, adaptation, and parallel processing. (Same course as Neurobiology, Physiology, and Behavior 261A and Molecular, Cellular, and Integrative Physiology 261A.) (S/U grading only.)—Offered in alternate years. —II. Britten

261B. Topics in Vision: Systems Psychophysics, Computational Models (2)
Lecture/discussion—2 hours. Prerequisite: consent of instructor, course 261A recommended. Functions of the central visual pathways and their underlying mechanisms. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system. (Same course as Neuroscience, Physiology, and Behavior 261C and Molecular, Cellular, and Integrative Physiology 261C.) (S/U grading only.)—Offered in alternate years. —III. Werner

267. Computational Neurosciences (5)
Lecture—4 hours; lecture/laboratory—3 hours. Prerequisite: one course in general neuroscience at the level of course 100; one year college-level Calculus at the level of Math 16A, B, C; one year Physics at the level of Physics 7A, B, C, strongly recommended, students from other departments should consult the instructor. Mathematical models and data analysis techniques used to describe computations performed by nervous systems. Lecture topics include single-neuron biophysics, neural coding, network dynamics, memory, plasticity, and learning. Lab topics include programming mathematical models and data analysis techniques in MATLAB. Offered in alternate years. (Same course as Neurobiology, Physiology & Behavior 267.)—I. Goldman

283. Neurobiological Literature (1)
Seminar—2 hours. Prerequisite: consent of instructor. Critical presentation and analysis of recent journal articles in neuroscience. May be repeated for credit. (S/U grading only.)—II, III, (II, III, III)

284. Development of Sensory Systems (1)
Seminar—2 hours. Prerequisite: consent of instructor. Presentation and discussion of recent literature on the development of sensory systems. May be repeated for credit. (S/U grading only.)—II, III, (II, III, III)

285. Literature in Visual Neuroscience (2)
Seminar—2 hours. Critical presentation and discussion of current literature in neuroscience. (Same course as Neuroscience, Physiology, and Behavior 285.) May be repeated for credit if topic differs. (S/U grading only.)—II, III, (II, III, III). Usrey, Britten

287A. Topics in Theoretical Neuroscience (2)
Seminar—2 hours. Prerequisite: consent of instructor. In-depth exploration of topics in theoretical neuroscience. Topic varies each year. Fall quarter (287A); foundational material from books and review articles. Spring quarter (287B); continuation of year’s topic through readings of seminal articles from the primary literature. May be repeated for credit. (Same course as Neuroscience, Physiology & Behavior 287A.) (S/U grading only.)—II, (II) Ditterich, Goldmann

287B. Topics in Theoretical Neuroscience (2)
Seminar—2 hours. Prerequisite: consent of instructor. In-depth exploration of topics in theoretical neuroscience. Topic varies each year. Fall quarter (287A); foundational material from books and review articles. Spring quarter (287B); continuation of year’s topic through readings of seminal articles from the primary literature. May be repeated for credit. (Same course as Neuroscience, Physiology & Behavior 287B.) (S/U grading only.)—II, (III) Ditterich, Goldmann

289. Topics in Molecular and Developmental Neurobiology (2)
Seminar—2 hours. Analysis and discussion of seminal and current research papers in molecular and developmental neurobiology. Different topics will be covered each quarter. In the past topics have included, “Synaptic vesicle dynamics,” “Neuronal polarity,” and “Glutamate receptors.” May be repeated ten times for credit when topics differ. (S/U grading only.)—I, II, III, (I, II, III)

290C. Research Conference in Neuroscience (1)
Discussion—1 hour. Prerequisite: graduate standing in Neuroscience or consent of instructor; course 299 (concurrently). Presentation and discussion of faculty and graduate student research in neuroscience. May be repeated for credit. (S/U grading only.)—I, II, III, (II, III, III)

292. Cortical Plasticity and Perception (2)
Lecture/discussion—2 hours. Prerequisite: Neurobiology, Physiology, and Behavior 100 or 112 or equivalent or consent of instructor. Examination of research articles on cortical plasticity and changes in perception. Examples drawn from studies of the somatosensory, visual, auditory, and motor cortex. (Same course as Neurobiology, Physiology, and Behavior 292.) Offered in alternate years. (S/U grading only.)—II

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Neurology
See Medicine, School of, on page 396.

Neurosurgery
See Medicine, School of, on page 396.

Nursing, School of, Betty Irene Moore
Heather M. Young, Ph.D., R.N., F.A.A.N.; Associate Vice Chancellor for Nursing, UC Davis, and Dean, Betty Irene Moore School of Nursing
Deborah Ward, Ph.D., R.N., F.A.A.N., Associate Dean for Academics and Clinical Professor
Jill G. Joseph, M.D., Ph.D., Heather M. Young, Ph.D., R.N., F.A.A.N.; Associate Dean for Research and Professor
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Mission Statement
The Betty Irene Moore School of Nursing at UC Davis cultivates academic excellence through research, teaching, and practice that advances nursing and health care to improve health and quality of life for the diverse communities served by UC Davis.

Quarter Offered: Fall, Winter, Spring, Summer; 2015-2016 offering in parentheses.
Pre-Fall 2011 General Education (GE): Arts/Humanities, Sciences/Science and Engineering, Social/Social Sciences, AA-D Domestic Diversity; Writing Experience