Department of Neuroscience

The structure of the human body is presented in two courses: Human Body: Anatomy, Embryology, Imaging (Neurosci 501B), offered during the first semester, and Histology and Cell Biology (Neurosci 502A), which extends over the first and second semesters. A third course, Neural Science (Neurosci 554), is taught at the end of the second semester.

The Human Body: Anatomy, Embryology, Imaging is largely a laboratory course, and lectures deal with anatomical principles and human growth and development. Histology and Cell Biology focuses on cell and tissue biology, with laboratory sessions paralleling the lectures in these areas. Neural Science is an integrated course that deals with the structure, function and development of the nervous system from molecular, cellular and systems perspectives. Throughout all three courses, attention is paid to the results of recent investigations and to major developments in each field. In addition, the departmental faculty have a lead role in many graduate courses that may be taken as electives by students during any of the four years.

The department is well equipped for specialized work in several areas, including gross anatomy, tissue culture and all aspects of neurobiology.

Website: http://neurosci.wustl.edu

Degrees & Requirements

Although the Department of Neuroscience does not offer its own degree, some of the department’s courses are open to students in the MD and MSTP (MD/PhD) programs. Further information about the MD and MSTP degrees can be found in the Degrees & Programs (http://bulletin.wustl.edu/medicine/degrees) section of this Bulletin.

Research

M05 Neurosci 900

Cross-listed with L41 Biol 590

Kari Allen, PhD
North Building, 3rd Floor
Phone: 314-747-6572

Paleoanthropology and phylogenetic statistics; comparative analyses of primate craniodental morphology and the evolution of brain size.

Martha Bagnall, PhD
McDonnell Medical Sciences Building, 4th Floor
Phone: 314-362-9695

Molecular, electrophysiological, and behavioral analyses of neural circuits for vestibular control of spinal function.

Amy Bauernfeind, PhD
North Building, 3rd Floor
Phone: 314-747-6566

Biological bases of human cognition; comparative neurobiology of primates.

Azad Bonni, MD, PhD
McDonnell Medical Sciences Building, 8th Floor
Phone: 314-362-3033

Principles and mechanisms governing the assembly and function of neural circuits; deregulation of mechanisms in neurological diseases.

Paul Bridgman, PhD
McDonnell Medical Sciences Building, 8th Floor
Phone: 314-362-3449

Cell biology of the developing nervous system.

Andreas Burkhalter, PhD
North Building, 4th Floor
Phone: 314-362-4068

Organization and function of neuronal circuits in mouse visual cortex.

Harold Burton, PhD
East McDonnell Building, 3rd Floor
Phone: 314-362-3556

Cortical functional reorganization in response to sensory changes due to unilateral deafness or strabismus.

Valeria Cavalli, PhD
McDonnell Medical Sciences Building, 9th Floor
Phone: 314-362-3540

Cellular, molecular and epigenetic mechanisms controlling axon regeneration.

Yao Chen, PhD
McDonnell Medical Sciences Building, 9th Floor
Phone: 314-273-7739

We aim to understand how the dynamics of neuromodulators and intracellular signals contribute to the function of neuromodulators, to learning, and to the function of sleep.
Krikor Dikranian, MD, PhD
North Building, 3rd Floor
Phone: 314-362-3548
Development and morphology of the amyloid plaques in experimental animals; neuropathological changes after head trauma.

James Fitzpatrick, PhD
McKinley Research Building, Basement
Phone: 314-747-0838
Optical and charged particle multiscale microscopy application method development.

Harrison Gabel, PhD
McDonnell Medical Sciences Building, 8th Floor
Phone: 314-362-3531
Gene regulation in the developing nervous system; molecular mechanisms of neurodevelopmental disorders.

Edward Han, PhD
McDonnell Medical Sciences Building, 9th Floor
Phone: 314-747-2505
Learning-related hippocampal network activation.

Timothy E. Holy, PhD
North Building, 4th Floor
Phone: 314-362-0086
Neural mechanisms of action of mammalian pheromones.

Ilya Monosov, MS, PhD
East McDonnell Building, 2nd Floor
Phone: 314-362-3740
Neuronal mechanisms of voluntary behavior.

Ashley Morhardt, PhD
North Building, 3rd Floor
Phone: 314-273-1859
Evolution of neural diversity within and across non-mammalian vertebrate clades, especially dinosaurs.

Michael L. Nonet, PhD
McDonnell Medical Sciences Building, 9th Floor
Phone: 314-747-1176
Molecular genetic analysis of synaptic development and function.

Karen L. O’Malley, PhD
McDonnell Medical Sciences Building, 9th Floor
Phone: 314-362-7087
Molecular mechanisms underlying neurodegenerative processes; signaling mechanisms associated with intracellular receptors.

Camillo Padoa Schioppa, PhD
East McDonnell Building, 3rd Floor
Phone: 314-362-3530
Neuronal bases of economic choice and decision making.

Thomas Papouin, PhD
McDonnell Medical Sciences Building, 9th Floor
Phone: 314-273-7738
Role played by the 80 to 90 percent of non-neuronal cells (glial cells) in brain function.

Carlos Ponce, MD, PhD
East McDonnell Building, 2nd Floor
Phone: 314-273-2746
The goal of our lab is to define how neurons from different cortical areas interact to realize our perception of shape and motion.

Terry Ritzman, PhD
North Building, 3rd Floor
Phone: 314-273-1861
Comparative anatomy of the skull in primates as it relates to human evolution.

Lawrence B. Salkoff, PhD
McDonnell Medical Sciences Building, 9th Floor
Phone: 314-362-3644
Roles of ion channels in neuronal long-term excitability changes.

Paul J. Shaw, PhD
McDonnell Medical Sciences Building, 9th Floor
Phone: 314-362-2703
Molecular genetics of sleep and circadian rhythms.

Lawrence H. Snyder, MD, PhD
East McDonnell Building, 3rd Floor
Phone: 314-747-3530
Computational and cognitive issues in cortical control of eye and arm movement investigated via electrophysiology and imaging.
Azad Bonni, MD, PhD  
Adjunct Professor of Neurobiology (primary appointment)  
MD Queen's University 1986  
PHD Harvard University 1996

Paul C Bridgman, MS, PhD  
Professor of Neuroscience (primary appointment)  
Associate Professor of Biomedical Engineering  
MS University of CA San Diego 1976  
PHD Purdue University 1980  
BA University of San Diego 1974

Andreas H Burkhalter, MS, PhD  
Professor of Neuroscience (primary appointment)  
Associate Professor of Biomedical Engineering  
Associate Professor of Neurobiology in Neurological Surgery  
MS University of Zurich 1973  
PHD University of Zurich 1977

Harold Burton, PHD  
Professor of Neuroscience (primary appointment)  
Professor of Biomedical Engineering  
Professor of Cell Biology and Physiology  
Professor of Radiology  
PHD Univ of Wisconsin Madison 1968  
BA University of Michigan 1964

Valeria Cavalli, MS, PHD  
Professor of Neuroscience (primary appointment)  
BS University of Geneva 1991  
MS University of Geneva 1992  
PHD University of Geneva 2000

Yao Chen, MS, PHD  
Assistant Professor of Neuroscience (primary appointment)  
MS Cambridge University 2006  
BS Cambridge University 2002  
PHD Harvard University 2009

Krikor T Dikranian, MD, PHD  
Professor of Anatomy (primary appointment)  
Professor of Physical Therapy  
MD Medical University - Varna 1978  
PHD Medical University - Sofia 1992

James Alexander John Fitzpatrick, PHD  
Professor of Neuroscience (primary appointment)  
Professor of Cell Biology and Physiology  
BS King's College London 2000  
PHD University of Bristol 2003

Susan M Fitzpatrick, PHD  
Adjunct Associate Professor of Neuroscience (primary appointment)
Adjunct Associate Professor of Occupational Therapy
BS St Johns University 1978
PHD Cornell University 1984

Harrison W. Gabel, AB, PHD
Assistant Professor of Neuroscience (primary appointment)
AB Princeton University 2001
PHD Harvard University 2008

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Harrison W. Gabel, AB, PHD
Assistant Professor of Neuroscience (primary appointment)
AB Princeton University 2001
PHD Harvard University 2008

Edward B. Han, PHD
Assistant Professor of Neuroscience (primary appointment)
Assistant Professor of Anesthesiology
BS Cornell University 1995
PHD University of CA San Diego 2004

Martha B. Han, PHD
Assistant Professor of Neuroscience (primary appointment)
PHD University of CA San Diego 2008
BS Yale University 2000

Timothy E. Holy, PHD, MA
Professor of Neuroscience (primary appointment)
Alan A and Edith L Wolff Professor of Neuroscience
BA Rice University 1991
PHD Princeton University 1997
MA Princeton University 1992

Ilya E. Monosov, MS, PHD
Associate Professor of Neuroscience (primary appointment)
MS NewSchool Architecture Design 2005
BS University of CA San Diego 2004
PHD Brown University 2009

Ashley C. Morhardt, PHD, MS
Assistant Professor of Anatomy (primary appointment)
PHD Ohio University 2016
BS Illinois College, Jacksonville 2006
MS Western Illinois University 2009

Michael L Nonet, PHD
Associate Professor of Neuroscience (primary appointment)
BS University of CA Davis 1984
PHD Mass Inst of Technology (MIT) 1989

Karen Laurel O’Malley, MS, PHD
Professor of Neuroscience (primary appointment)
BA Sonoma State University 1971
MS Portland St University 1973
PHD University of Texas Austin 1980

Camillo Padoa-Schioppa, PHD, MS
Associate Professor of Neuroscience (primary appointment)
Associate Professor of Economics (Courtesy)
PHD Mass Inst of Technology (MIT) 2002
MS La Sapienza University 1996

Thomas J Papouin, PHD, MS
Assistant Professor of Neuroscience (primary appointment)
PHD University of Bordeaux 2 2011
MS Ecole Normale Superieure Lyon 2007
BS Ecole Normale Superieure Lyon 2005

Carlos Ramon Ponce, PHD, MD
Assistant Professor of Neuroscience (primary appointment)
PHD Harvard University 2008
MD Harvard University 2010
BS University of Utah 2001

Terrence Bradley Ritzman, MA, PHD
Assistant Professor of Anatomy (primary appointment)
Assistant Professor of Anthropology
BA University of Illinois 1999
MA Colorado St University 2005
PHD Arizona State University 2014

Lawrence B Salkoff, PHD
Professor of Neuroscience (primary appointment)
Professor of Genetics
PHD University of CA Berkeley 1979
BA University of CA Los Angeles 1967

Paul Joseph Shaw, PHD, MA
Professor of Neuroscience (primary appointment)
PHD University of Chicago 1996
BA Niagara University 1985
MA San Jose State University 1990

Lawrence H Snyder, PHD, AB, MS, MD
Professor of Neuroscience (primary appointment)
Professor of Psychological & Brain Sciences
PHD University of Rochester 1992
AB Princeton University 1982
MS University of Rochester 1992
MD University of Rochester 1992

Paul H Taghert, PHD
Professor of Neuroscience (primary appointment)
Interim Head of the Department of Neuroscience
BA Reed College 1975
PHD University of Washington 1981
**Courses**

Visit online course listings to view offerings for M05 Neurosci (https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M05).

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**M05 Neurosci 501B Human Body: Anatomy, Embryology, Imaging**

The course is primarily lab-based, focusing on dissection of the human body. Lectures on functional and topographic anatomy emphasize the principles of organization of the various systems of the body. Lectures on developmental anatomy stress organogenesis as an adjunct to understanding the normal and abnormal anatomy. Small group discussions emphasize radiological anatomy and clinical correlations. Frequent use of CT, MRI, and X-ray images aid in the synthesis of knowledge gained through dissection. Cross-listed with L41 (Biol) 501. Credit 140 units.

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**M05 Neurosci 502A Histology and Cell Biology**

The structures of cells, tissues, and major organ systems are studied in relationship to their functions. Lectures integrate histology with cell biology and physiology. The laboratories consist of the study of prepared slides and electron micrographs using an iBook or eBook (ePub) guide. An extensive online digital annotated atlas (SlideAtlas (https://slide-atlas.org)) and a video library are used to supplement the slides and electron micrographs. Presentations of case studies provide examples of clinical relevance. A dual-view microscope and slide set will be issued for each pair of students. Limited space is available for non-medical students, who must have permission from the course director to enroll. The topics in this course are timed to integrate with the physiology course and span the fall and winter semesters. Credit 66 units.

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**M05 Neurosci 554 Neural Science**

This is an intensive seven-week course that covers the structure, function, and development of the nervous system as seen from molecular, cellular, and systems-oriented perspectives. The emphasis is on the organization and function of the nervous system in health, but there is frequent reference to the clinical relevance of the material presented. The course includes regular lectures, conference sessions, and laboratories, plus a number of clinically oriented presentations and special topics sessions that address selected issues in greater depth. Computer-aided instructional programs, which are accessible from a variety of locations, provide auxiliary modes of self-paced learning and review. The midterm and final emphasize the core body of important facts and principles presented in the lectures and laboratories. Limited space is available for non-medical students with the instructor's permission. Non-medical students should register under the cross-listed number L41 554. Spring only. Credit 109 units.

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**M05 Neurosci 810 Advanced Dissection**

Different regions of the body will be dissected in detail. A period of four weeks should be allowed for each region: head and neck, thorax and abdomen, and superior and inferior limbs. Surgical approaches, cross-sections, X-rays, and CT scans can be studied.