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 epigentic 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.

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.
Paul H. Taghert, PhD
McDonnell Medical Sciences Building, 9th Floor
Phone: 314-362-3641
Neurobiology of circadian rhythms; neurobiology of peptidergic neurotransmission.

David C. Van Essen, PhD
East McDonnell Building, 2nd Floor
Phone: 314-362-7043
Organization, function, and development of primate cerebral cortex, especially in humans; generation and utilization of neuroinformatics tools for data mining.

Jason Yi, PhD
McDonnell Medical Sciences Building, 8th Floor
Phone: 314-273-1664
Molecular pathways shaping nervous system development and function.

Guoyan Zhao, PhD
McDonnell Medical Sciences Building, 8th Floor
Phone: 314-273-9045
My laboratory is interested in understanding the regulatory networks that control the development and proper function of mammalian brains in the context of human health and disease.

Faculty

Interim Department Chair
Paul H. Taghert, PhD
Visit our website for more information about our faculty (http://neurosci.wustl.edu/People/Faculty) and their appointments.

A
Kari Leigh Allen, PhD, MA
Assistant Professor of Anatomy (primary appointment)
Assistant Professor of Anthropology (Courtesy)
PHD Duke University 2014
MA New Mexico St University 2008
BA State Univ of NY Potsdam 2005

Amy Lynn Bauernfeind, M PHIL, PhD
Assistant Professor of Anatomy (primary appointment)
Assistant Professor of Anthropology (Courtesy)
M PHIL George Washington University 2011
BS Vanderbilt University 2004
PHD George Washington University 2014

Azad Bonni, PHD, MD
Adjunct Professor of Neurobiology (primary appointment)
PHD Harvard University 1996
MD Queen's University 1986

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

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, PHD, MS
Assistant Professor of Neuroscience (primary appointment)
Assistant Professor of Cell Biology and Physiology
PHD Harvard University 2009
MS Cambridge University 2006
BS Cambridge University 2002

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

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

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

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

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

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

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

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

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

O
Karen Laurel O'Malley, PHD, MS
Professor of Neuroscience (primary appointment)
PHD University of Texas Austin 1980
MS Portland St University 1973

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

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

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

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

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

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

T
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

**V**
David C Van Essen, PHD
Alumni Endowed Professor of Neurobiology (primary appointment)
Professor of Biomedical Engineering
BS California Institute Technolo 1967
PHD Harvard University 1971

**Y**
Jason Yi, PHD
Assistant Professor of Neuroscience (primary appointment)
BS Dickinson College 2001
PHD Duke University 2009

**Z**
Guoyan Zhao, PHD, MS
Assistant Professor of Neuroscience (primary appointment)
PHD Washington Univ in St. Louis 2003
MS School Not Listed 1998
BS School Not Listed 1995

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

---

**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.

**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.

---

**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.

**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.