Department of Neurosurgery

Instruction in neurological surgery begins with an introduction to the anatomy and physiology of the nervous system presented in the first-year course in neural sciences directed by the Department of Neuroscience (http://neurosci.wustl.edu), with the participation of the neurosurgery faculty. During the second year, the Department of Neurosurgery (http://www.neurosurgery.wustl.edu) presents the course in Diseases of the Nervous System in conjunction with the departments of Neurology, Pathology & Immunology, Molecular Microbiology, Medicine and Pediatrics. The course emphasizes how knowledge derived from basic or clinical investigations leads to improvements in clinical care. During the third year, students may elect to participate in a two- or four-week Neurosurgery clerkship that introduces them to the clinical care of patients with diseases of the nervous system. Neurosurgical faculty members work with the neurologists to provide lectures, demonstrations and teaching exercises in patients with neurological diagnoses as part of the Clinical Medicine course. Students may elect to fulfill their Neurology requirement by rotating on the neurosurgery service. Students may also choose neurosurgery as part of the Surgical Specialty rotations. Neurosurgical diagnosis, critical care, operative treatment and ethical issues in patient management are emphasized. During the fourth year, students may choose from several advanced electives, including clinical externships in neurosurgery and experiences in basic or clinical/translational research.

Neurosurgical Specialties

As members of one of the most comprehensive neurosurgical programs in both the region and the nation, Washington University neurosurgeons offer exceptional care in a variety of specialties.

Tumors

The Department of Neurosurgery at Washington University School of Medicine offers a comprehensive, multidisciplinary approach for the treatment of all types of neurological tumors, including brain tumors, inoperable tumors, pituitary tumors, skull-base tumors and spine tumors. Depending on the type of tumor, our multidisciplinary team comprises ophthalmologists, otolaryngologists, radiation oncologists, neuroradiologists, neuroanesthesiologists, medical oncologists and other specialists.

Aneurysms and Cerebrovascular Disorders and Diseases

The multidisciplinary medical team focuses on the treatment of aneurysms, ateriovenous fistulas, arteriovenous malformations, carotid stenosis, cavernous malformations, moyamoya and stroke. It includes cerebrovascular surgeons, who perform microsurgical procedures, and interventional radiologists, who offer minimally invasive endovascular treatment options. We also have a team of critical care neurologists, who coordinate postprocedure care in a dedicated neurointensive care unit, as well as neurologists, who coordinate neurorehabilitation care at The Rehabilitation Institute of St. Louis.

Spine Injury and Disorders

Washington University spinal neurosurgeons are recognized as national leaders in the treatment of disorders of the spine, spinal cord and peripheral nervous system. We use a multidisciplinary approach to treating spinal diseases and disorders. The personalized care of each patient is emphasized. Where appropriate, spine patients receive comprehensive, collaborative care from both neurosurgeons and specialists in thoracic surgery; vascular surgery; ear, nose and throat surgery; medical oncology; radiation oncology; anesthesia; pain management; and physiatry.

Peripheral Nerve

Washington University neurosurgeons work with a multidisciplinary group of surgeons, neurologists and therapists to customize patient treatments to maximize functional outcomes. Washington University neurosurgeons have extensive expertise in advanced microsurgical reconstructive techniques and are on the forefront of new and innovative ways to improve patient outcomes.

Pediatric Neurosurgery

The entire spectrum of neurological disorders in children is treated by pediatric neurosurgeons and physicians in related disciplines. Our pediatric neurosurgeons are also part of multidisciplinary teams that provide care in several specialized pediatric centers, including the brachial plexus center, the center for cerebral palsy spasticity, the neurofibromatosis clinic, the pediatric epilepsy center, the pediatric gamma knife program, the pediatric neuro-oncology program, and the spina bifida clinic.

Epilepsy

Our neurosurgeons are nationally recognized for epilepsy patient care and research. They are part of a multidisciplinary team that works together to develop the optimal plan to control or minimize seizures. The Department of Neurosurgery offers care for both adults and children with medically intractable seizures; it provides a full range of surgical options for intractable epilepsy, including implantable seizure-control devices, resection of seizure foci, and vagal nerve stimulation.

Movement Disorders

The multidisciplinary team specializes in the treatment of movement disorders such as ataxia, catatonia, dystonia, essential tremor, Huntington’s disease, myoclonus, Parkinson’s
disease, and Tourette's syndrome. For some patients with Parkinson's disease or essential tremor, medications are often inadequate to control disabling symptoms. These patients may benefit from stereotactic neurosurgical procedures to improve their function.

Website: http://www.neurosurgery.wustl.edu

Degrees & Requirements

Although the Department of Neurosurgery 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

M40 Neurological Surgery

Michael R. Chicoine, MD
Phone: 314-747-6143

Our focus is on outcomes analysis for adult patients with brain tumors. Current clinical studies focus on the outcomes of patients with benign and malignant brain tumors utilizing a prospective brain tumor database. Particular emphasis includes the impact of intraoperative MRI (iMRI) on outcomes for patients with brain tumors and other diseases. We are establishing a multicenter database pooling data from multiple iMRI centers in North America.

Ian G. Dorward, MD
Phone: 314-747-6142

Our research interests include outcomes analysis in spinal reconstruction surgery, including the impact of age, obesity, and other clinical variables on costs, complications, and patient satisfaction. Another area of interest is the evaluation of novel techniques in spinal deformity correction and minimally invasive spinal surgery. Additional work focuses on etiologic factors of spinal deformity in both adolescents and adults.

Gavin P. Dunn, MD, PhD
Phone: 314-747-6141

Our studies focus on the examination of molecular mechanisms in the endothelial cells and smooth muscle cells in the intracerebral microcirculation and the contribution of glial cells to their impairment after hypoxia/reoxygenation. In vitro techniques for studying isolated perfused microvessels are used to examine questions centered on endothelial smooth muscle and glial cell integration of cerebral blood flow responses.

Ammar H. Hawasli, MD, PhD
Phone: 314-747-6144

Our functional spinal neurosurgery research laboratory aims to understand the physiological and pathophysiological relationships between the spine and the brain. We study brain physiology and connectivity in spinal disorder patients, leveraging expertise in both spinal neurosurgery and brain physiology and a network of high-level collaborators at Washington University School of Medicine.

Albert H. Kim, MD, PhD
Phone: 314-747-6141

I have laboratory and clinical research interests in the cancer stem cell state and the genetics of glioblastoma using human tumor specimens. I additionally have clinical projects examining patient outcomes for two common types of brain tumors: meningiomas and pituitary tumors.

Eric C. Leuthardt, MD
Phone: 314-747-6146

Our lab is pursuing research in the areas of neuroprosthetics, brain computer interfaces (BCIs), and advanced imaging modalities. These include opportunities in basic neurophysiology, engineering for BCIs, and functional MRI imaging research for applications toward brain tumors.

David D. Limbrick, MD, PhD
Phone: 314-454-4630

Our lab investigates clinical and translational research into newborn brain injuries, including posthemorrhagic hydrocephalus. Our main research areas include cerebrospinal fluid protein markers of disease, MRI diffusion tensor imaging, and prospective clinical trials. In addition, multi-institutional clinical research opportunities exist for syringomyelia associated with Chiari I malformation.

T.S. Park, MD
Phone: 314-454-2810

Our ongoing projects include outcome studies of selective dorsal rhizotomies for the treatment of spastic cerebral palsy in children and brachial plexus repair after birth injury. We are also involved in a multicenter outcome study of syringomyelia associated with Chiari I malformation in children.

Wilson Z. Ray, MD
Phone: 314-362-3114

Clinical and translational research on peripheral nerve and spinal cord injuries; lab-based opportunities for longer research electives investigating peripheral nerve regeneration and peripheral neuroprosthetics incorporating transient electronics.
Research on neuronal and glioma cellular apoptosis after treatment with DNA-damaging agents; techniques include growing human brain tumor cells in culture, bioassay for apoptosis with fluorescent staining, protein immunoblotting, and PCR.

Matthew Smyth, MD
Phone: 314-454-4454

Clinical outcomes studies for pediatric epilepsy surgery and craniosynostosis surgery, basic and translational research in advanced clinical imaging, and translational research in the development of focal brain cooling devices for the treatment of epilepsy.

Gregory J. Zipfel, MD
Phone: 314-747-6141

My NIH-funded research program involves both basic and clinical research efforts focused on two main conditions: (1) cerebral amyloid angiopathy and its contribution to ischemic stroke, vascular dementia, and Alzheimer's disease; and (2) vasospasm-induced delayed cerebral ischemia and long-term cognitive deficits after aneurysmal subarachnoid hemorrhage. My work includes the following: basic experimental methods, including cell culture and ex vivo vascular techniques; in vivo studies utilizing animal models of ischemic stroke and subarachnoid hemorrhage and live animal epifluorescent and confocal imaging; and phase I clinical trials in patients.

Faculty

Department Head

Ralph G. Dacey, MD

Visit our website for more information about our faculty (http://www.neurosurgery.wustl.edu/patient-care/find-a-physician/clinical-faculty-243) and their appointments.

C

Michael R Chicoine, MD
Professor of Neurological Surgery (primary appointment)
August A. Busch, Jr. Distinguished Professor
BS University of Illinois 1985
MD University of California 1990

D

Ralph G Dacey Jr, MD
Henry G and Edith R Schwartz Professor of Neurological Surgery (primary appointment)
BA Harvard University 1970

MD University of Virginia 1974

Ian G Dorward, MD
Assistant Professor of Neurological Surgery (primary appointment)
Assistant Professor of Orthopaedic Surgery
BS University of Colorado Boulder 2000
MD Washington Univ in St. Louis 2005

Joshua L Dowling, MD
Professor of Neurological Surgery (primary appointment)
MD Tulane University 1989
BA Yale University 1985

Gabriel E. Haller, PHD
Assistant Professor of Neurosurgery (Pending Executive Faculty Approval) (primary appointment)
PHD Washington Univ in St. Louis 2013
BS University of Chicago 2008

Ammar H Hawasli, PHD, MD
Assistant Professor of Neurological Surgery (primary appointment)
Assistant Professor of Neuroscience
Assistant Professor of Orthopaedic Surgery
PHD University of Texas Southwest 2009
BA Washington Univ in St. Louis 2002
MD University of Texas Southwest 2009

Matthew A Howard
Adjunct Assistant Professor of Neurological Surgery (primary appointment)

Sarah C. Jost
Adjunct Assistant Professor of Neurological Surgery (primary appointment)

Albert H Kim, MD, PHD, MA
Associate Professor of Neurological Surgery (primary appointment)
Associate Professor of Developmental Biology
Associate Professor of Neurology
MD New York U. School of Medicine 2003
PHD New York U. School of Medicine 2002
MA Washington Univ in St. Louis 1999
Eric Claude Leuthardt, MD  
Professor of Neurological Surgery (primary appointment)  
Professor of Mechanical Engineering and Applied Science.  
Professor of Neuroscience  
BS Saint Louis University 1995  
MD University of Pennsylvania 1999

David D Limbrick Jr, MD, PHD  
Professor of Neurological Surgery (primary appointment)  
Professor of Pediatrics  
BS College of William and Mary 1995  
MD Virginia Comm University 2001  
PHD Virginia Comm University 2001

Matthew R. MacEwan, PHD  
Assistant Professor of Neurological Surgery (primary appointment)  
BS Case Western Reserve Univ 2004  
PHD Washington Univ in St. Louis 2015

James Patterson McAllister, PHD  
Professor of Neurological Surgery (primary appointment)  
BA Earlham College 1970  
PHD Purdue University 1976

Sean David McEvoy, MHS, MD  
Assistant Professor of Neurosurgery (primary appointment)  
Assistant Professor of Pediatrics  
BS University of Iowa 2005  
MHS Yale University 2010  
MD Yale University 2010

Joshua William Osbun, MD  
Assistant Professor of Neurological Surgery (primary appointment)  
BA Texas A&M University 2002  
MD University of Texas Southwest 2007  
BA Texas A&M University 2002

Tae Sung Park, MD  
Shi Hui Huang Professor of Neurological Surgery (primary appointment)  
Professor of Neuroscience  
Professor of Pediatrics  
BS Yonsei University 1967  
MD Yonsei University 1971

Wilson Z Ray, MD  
Associate Professor of Neurological Surgery (primary appointment)  
Associate Professor of Biomedical Engineering  
Associate Professor of Orthopaedic Surgery  
MD University of Iowa 2004

Keith M Rich, MD  
Professor of Neurological Surgery (primary appointment)  
Professor of Neuroscience  
Professor of Radiation Oncology  
BA Taylor University 1974  
MD Indiana University Bloomington 1977

Paul Santiago, MD  
Professor of Neurological Surgery (primary appointment)  
Professor of Orthopaedic Surgery  
MD Yale University 1995  
BS Stanford University 1990

Gerwin Schalk  
Adjunct Assistant Professor of Neurological Surgery (primary appointment)

Matthew D Smyth, MD  
Professor of Neurological Surgery (primary appointment)  
Professor of Pediatrics  
BA Cornell University 1992  
MD University of CA San Francisco 1996

Jennifer Mae Strahle, MD  
Assistant Professor of Neurological Surgery (primary appointment)  
Assistant Professor of Orthopaedic Surgery  
Assistant Professor of Pediatrics  
MD University of Minnesota 2008  
BS Bates College 2002

Neill Marshall Wright, MD  
Herbert Lourie Professor of Neurological Surgery (primary appointment)  
Professor of Orthopaedic Surgery  
BA University of California 1989  
MD University of California 1993

Hiroko Yano, PHD, MS  
Assistant Professor of Neurological Surgery (primary appointment)  
Assistant Professor of Genetics  
Assistant Professor of Neurology  
BS Science University of Tokyo 1991  
PHD University of Tokyo 1996  
MS University of Tokyo 1993  
Liya Yuan, MS, PHD
Instructor in Neurological Surgery (primary appointment)
MS Tongji University 1987
PHD Tongji University 1994

Gregory Joseph Zipfel, MD
Professor of Neurological Surgery (primary appointment)
Professor of Neurology
BS University of Illinois 1991
MD Northwestern University Med 1995

Courses


Clerkship Opportunities

Students may elect to obtain their neurology clerkship experience on the neurosurgery service, or they can choose neurosurgery as part of the surgical specialty rotations. Third-year students participate with the residents and attendings on hospital rounds, evaluate patients in the neurosurgery outpatient department and participate in the neurosurgical operating room. The main objectives of the rotation include: 1) the evaluation of comatose or head-injured patients; 2) clinical presentation, diagnostic work-up and treatment of cervical and lumbar disc disease; and 3) evaluation and treatment of patients with hemorrhagic and ischemic stroke.

M40 NeurSurg 805 Neurosurgery Subinternship

The goal of this elective is to provide an overview of neurological surgery. The fourth-year medical student will participate in patient work-ups, pre-, intra- and postoperative care, and diagnostic procedures. Students will also scrub in cases with senior-level and chief residents assisting with neurosurgical procedures and observing the more critical portions of these procedures. It is expected that they will learn how to perform basic neurosurgical procedures such as lumbar punctures, ICP monitor placement, and ventricular drain placement. Fourth-year medical students are encouraged to participate in Grand Rounds, Neurosurgery Resident Curriculum conference, and Journal Club with the neurosurgery residents. At least one day/week is spent in an outpatient neurosurgery office setting. A week spent on the pediatric service at St. Louis Children's Hospital is a component of this fourth-year elective.

M40 NeurSurg 900 Research Elective — Neurosurgery

Research opportunities may be available. If interested, please contact the Department of Neurosurgery.