



Professional Enrichment Course

University of Pittsburgh School of Medicine
Office of Medical Education

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Brain and Blade: The World of Neurosurgery

Enrollment Period:	Fall 2025
Course Dates:	08/13, 08/20, 08/27, 09/03, 09/24, 09/29, 10/01, 10/06, 10/29 (6-8PM)
Student Max:	16
Class Year:	MS2
Course Director:	Nitin Agarwal, MD (nitin.agarwal@upmc.edu) David Fernandes Cabral, MD (fernandescabraldt@upmc.edu)
Course Administrator:	Shovan Bhatia (bhatia.shovan@medstudent.pitt.edu) Sirisha Nouduri (nouduri.sirisha@medstudent.pitt.edu)
Location:	7 th Floor Scaife Anatomy Lab and 1 st Floor Gamma Knife Conference Room. In person only.
Registration:	Registration will open on August 5th at NOON via SLATE – You will receive an email with instructions.
Course Description:	<p>This nine-week course will provide a unique experience in which second-year students will be exposed to the world of invasive procedures concerning the brain, spinal cord, and surrounding associated structures: neurological surgery. Students will learn key concepts and procedures from course instructors consisting of both attending neurosurgeons and residents. This setup will provide students with sources of factual and technical expertise, offer opportunities to become familiar with the department, and present different paths to practicing neurosurgery.</p> <p>Offering both didactic sessions and practical sessions, this course will allow students to learn about procedures and disorders that lie within the realm of neurological surgery. Students will attend didactics to learn about neurosurgery via lectures and case presentations, while practical sessions involving cadavers and simulation models will provide hands-on experience. Each week, a different topic will be highlighted. By the end of this course, each student will have practiced lumbar punctures, external ventricular drain placement, and even virtual planning of a radiosurgery procedure.</p> <p>Classes in the course will cover neuroradiology, vascular neurosurgery, spinal surgery and lumbar punctures, Gamma Knife radiosurgery, and external ventricular drains. This course will also showcase the exciting neurosurgical research and innovations developed here at UPMC —</p>

	students will be encouraged to develop and plan potential research projects.
Objectives:	<ul style="list-style-type: none"> • Introduce students to central disciplines of neurological surgery. • Sharpen skills in clinical/radiological diagnosis, evaluation, and presentation. • Allow practice of simple practical procedures used in neurological surgery. • Increase student familiarity with the UPMC department of neurological surgery. • Facilitate involvement in research and foster interest in the subspecialty.
Pre-Requisites:	None
Requirements:	None
Texts:	Coordinators will share learning materials for all weeks during Session 1.

Session 1 – Course Introduction, Suture Skills, Lumbar Punctures

Instructor: Dr. Nitin Agarwal, MD and Dr. David Fernandes Cabral, MD

Date: 8/13/25

Hands-on practice session to learn and practice how to insert lumbar punctures, how to suture, and how to scrub with sterile techniques. Learn about proper insertion trajectory, indications, complications, and management. Models will be used to provide realistic conditions for LPs. Suture models will also be available to practice basic suturing skills. Expired gowns and gloves will be used for practicing how to scrub.

Objectives: Students will:

- 1) Learn and understand indications, common complications, and risks of a few common procedures in neurosurgery
- 2) Learn and practice placing lumbar punctures
- 3) Learn and practice suturing techniques
- 4) Learn and practice key scrubbing techniques

Location: Gamma Knife Conference Room, 1st floor UPMC Presbyterian

Session 2 – History and Practice of Stereotactic Radiosurgery

Instructor: Dr. L. Dade Lunsford, MD and Dr. Ajay Niranjana, MD

Date: 8/20/25

An introduction to the quickly-growing field of stereotactic radiosurgery, presented by UPMC Neurosurgery Program Director L. Dade Lunsford, MD, Lars Leksell Professor and Distinguished Professor of Neurosurgery. Dr. Lunsford brought GKRS to the United States after working with Lars Leksell, the inventor of the technique, in Sweden. This will be a unique opportunity to learn about the specific advantages offered by radiosurgery from a leading world expert in the field. There will be a practical component in which GKRS staff will teach students the radiosurgery planning process using UPMC CME course materials.

Objectives: Students will:

- 1) Learn about the history and development of radiosurgery
- 2) Understand the diseases for which GKRS is indicated and its risks vs. benefits
- 3) Gain experience in the Gamma Knife planning process with software used by UPMC for its radiosurgery CME courses

Location: Gamma Knife Conference Room, 1st floor UPMC Presbyterian

Session 3 – Pediatric Neurosurgery

Instructor: Dr. Taylor Abel, MD and Dr. Martin Piazza, MD

Date: 8/27/25

This session will include both lecture and practical components to gain understanding of pineal region tumors, posterior fossa conditions, and epilepsy. Tumors of the pineal region require a similar approach that focuses on traveling below the tentorium but above the cerebellum. Epilepsy can be treated by a variety of novel surgical techniques including stereoelectroencephalography (sEEG) using the ROSA Robot as well as hemispherotomies.

Objectives: Students will:

- 1) Become familiar with, pineal tumors, Chiari Malformation and other common pediatric neuropathologies
- 2) Practice performing posterior fossa craniotomies.
- 3) Practice planning trajectories for sEEG placement using the ROSA robot

Location: Gamma Knife Conference Room, 1st floor UPMC Presbyterian & Anatomy Lab, 7th floor Scaife Hall

Session 4 – Hemicraniectomies and EVDs

Instructor: Dr. Bradley Gross, MD

Date: 9/3/25

Students will learn the basic principles guiding the management of neurosurgical emergencies related to the intracranial compartment. Hands-on practice session to insert extraventricular drains. Learn about Kocher's point, proper insertion trajectory, indications, complications, and management. Cadavers will be used to provide realistic conditions for EVDs.

Objectives: Students will:

- 1) Learn and understand indications, common complications, and risks of hemicraniectomy and EVDs
- 2) Practice placing extraventricular drains and performing hemicraniectomies

Location: Gamma Knife Conference Room, 1st floor UPMC Presbyterian & Anatomy Lab, 7th floor Scaife Hall

Session 5 – Skull Base Neurosurgery

Instructor: Dr. Georgios Zenonos, MD and Dr. David Fernandes Cabral, MD

Date: 9/24/25

This session will elucidate the basic concepts around approaches to the base of the skull with particular emphasis on the challenges and pitfalls. Endoscopic and open approaches will be highlighted, and the strengths and weaknesses of each will be discussed. Relevant anatomy involved with these approaches will also be discussed.

Objectives: Students will:

- 1) Learn about open skull base, endoscopic endonasal skull base, and pituitary surgery
- 2) Apply neuroanatomy concepts to these surgical techniques by performing orbitozygomatic craniotomies

Location: Gamma Knife Conference Room, 1st floor UPMC Presbyterian & Anatomy Lab, 7th floor Scaife Hall

Session 6 – Posterior Cervicothoracic Procedures

Instructor: Dr. Kojo Hamilton, MD and Dr. Nitin Agarwal, MD

Date: 9/29/25

This class will cover the anatomy and radiology of the spine, with a neurosurgical slant. Concepts will be illustrated using patient cases: cervical and lumbar disc herniation, stenosis, fractures, etc. Students will learn about common spine neurosurgery techniques, approaches, and assessment. Finally, there will be hands-on practice with spinal instrumentation.

Objectives: Students will:

- 1) Review spinal anatomy and radiology, with emphasis on structures encountered during surgical approaches.
- 2) Become familiar with common spinal pathologies and their respective surgical and non-surgical treatments, including some surgical approaches.
- 3) Practice with spinal instrumentation for pedicle screw fixation

Location: Gamma Knife Conference Room, 1st floor UPMC Presbyterian & Anatomy Lab, 7th floor Scaife Hall

Session 7 – ACDs, Posterior Lumbar Fusions, and Augmented Reality Guided Pedicle Screws

Instructor: Dr. Peter C. Gerszten, MD and Dr. Edward G. Andrews, MD

Date: 10/01/25

This class will cover the anatomy and radiology of the spine, with a neurosurgical slant. Concepts will be illustrated using patient cases: cervical and lumbar disc herniation, stenosis, fractures, etc. Students will learn about common spine neurosurgery techniques, approaches, and assessment. Finally, there will be hands-on practice with spinal instrumentation. There will be a component where students will also learn how to place lumbar pedicle screws using augmented reality.

Objectives: Students will:

- 1) Review spinal anatomy and radiology, with emphasis on structures encountered during surgical approaches.
- 2) Become familiar with common spinal pathologies and their respective surgical and non-surgical treatments, including some surgical approaches.
- 3) Practice with spinal instrumentation for pedicle screw fixation
- 4) Learn how to place pedicle screws using augmented reality guided techniques

Location: Gamma Knife Conference Room, 1st floor UPMC Presbyterian & Anatomy Lab, 7th floor Scaife Hall

Session 8 – Trans-callosal approach (Neuro-Oncologic Surgery) via the Exoscope

Instructor: Dr. Costas Hadjipanayis, MD, PhD

Date: 10/06/25

This class will focus on the transcallosal approach for resection of deep-seated brain tumors, emphasizing both anatomical orientation and operative technique. Students will review relevant cerebral anatomy with a focus on interhemispheric and pericallosal corridors and will apply this knowledge in cadaveric dissection exercises. Instruction will highlight key decision-making principles in neuro-oncologic surgery, including tumor localization, trajectory planning, and minimizing injury to eloquent structures. The course will also introduce participants to the use of the 3D exoscope, a high-definition visualization tool that enhances depth perception and ergonomics during complex cranial surgery.

Objectives: Students will:

- 1) Understand key concepts related to decision making and techniques in brain tumor patients.
- 2) Practice performing the trans-callosal approach on cadavers
- 3) Familiarize themselves with the 3D exoscope

Location: Gamma Knife Conference Room, 1st floor UPMC Presbyterian & Anatomy Lab, 7th floor Scaife Hall

Session 9 – Carotid Endarterectomy

Instructor: Dr. Robert Friedlander, MD and Dr. David Fernandes Cabral, MD

Date: 10/29/25

This session will begin with an overview of surgically relevant disorders of the vasculature of the nervous system. The practical component will include exposure of the carotid as well as practice of a carotid endarterectomy.

Objectives: Students will:

- 1) Learn about common vascular imaging studies
- 2) Outline technological aspects and specific challenges of a carotid endarterectomy
- 3) Expose the carotid and perform arteriotomies followed by closure of arteriotomies

Location: Gamma Knife Conference Room, 1st floor UPMC Presbyterian & Anatomy Lab, 7th floor Scaife Hall