



# Professional Enrichment Course

University of Pittsburgh School of Medicine

Office of Medical Education

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## Brain and Blade: The World of Neurosurgery

<b>Enrollment Period:</b>	Fall 2022
<b>Course Dates:</b>	(All dates 5-7PM) Mon 9/19/2022 Mon 9/26/2022 Mon 10/10/2022 Mon 10/17/2022 Mon 10/31/2022 Mon 11/14/2022 Wed 11/16/2022 Mon 11/21/2022 Wed 11/30/2022 Mon 12/5/2022 Mon 12/12/2022
<b>Student Max:</b>	16
<b>Class Year:</b>	MS2
<b>Course Director:</b>	Michael McDowell, MD ( <a href="mailto:mcdowellmm2@upmc.edu">mcdowellmm2@upmc.edu</a> )
<b>Course Administrator:</b>	Akanksha Chilukuri <a href="mailto:chilukuri.akanksha@medstudent.pitt.edu">chilukuri.akanksha@medstudent.pitt.edu</a> Tito Onyekweli <a href="mailto:oto6@pitt.edu">oto6@pitt.edu</a>
<b>Location:</b>	Scaife anatomy lab and 1 <sup>st</sup> Floor Gamma Knife Conference Room
<b>Registration:</b>	Via Amp Up – Registration open date will be announced via email
<b>Course Description:</b>	<p>This ten-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</p>

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

### **Session 1 – Course Introduction, Suture Skills, Lumbar Punctures**

**Instructor:** Michael McDowell, MD

**Date:** 9/19/2022

Hands-on practice session to insert lumbar punctures. 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.

**Objectives:** Students will:

- 1) Learn and understand indications, common complications, and risks of a few common procedures in neurosurgery
- 2) Practice placing lumbar punctures

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

**Student Preparation:** None

### **Session 2 – History and Practice of Stereotactic Radiosurgery**

**Instructor:** L. Dade Lunsford, MD

**Date:** 9/26/2022

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 – ACDFs and Posterior Fusions**

**Instructor:** Peter Gerszten, MD

**Date:** 10/10/2022

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, 3rd floor Scaife Hall

**Student Preparation:** None

### **Session 4 – Carotid Endarterectomy**

**Instructor:** Robert Friedlander, MD

**Date:** 10/17/2022

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, 3rd floor Scaife Hall

**Student Preparation:** None

### **Session 5 – Cervicothoracic Deformity**

**Instructor:** D. Kojo Hamilton, MD

**Date:** 10/31/22

This class will cover the anatomy and radiology of the cervico-thoracic spine, with a neurosurgical slant. Concepts will be illustrated using patient cases: Corrective osteotomies for deformity correction, anatomic landmarks for cervico-thoracic instrumentation, and principles of spinal deformity. Students

will learn about common spine neurosurgery techniques, approaches, and assessment. Finally, there will be hands-on practice with spinal instrumentation and osteotomes.

**Objectives:** Students will:

- 1) Review spinal anatomy and radiology, with emphasis on cervico-thoracic structures encountered during surgical approaches.
- 2) Become familiar with common causes and presentations of spinal deformity.
- 3) Practice with spinal instrumentation for osteotomies, thoracic pedicle screw fixation, and lateral mass screw placement

**Location:** Gamma Knife Conference Room, 1st floor UPMC Presbyterian & Anatomy Lab, 3rd floor Scaife Hall

**Student Preparation:** None

### **Session 6 – Posterior Fossa Approaches**

**Instructor:** Stephanie Greene, MD

**Date:** 11/14/22

This session will include both lecture and practical components to gain understanding of pineal region tumors and posterior fossa conditions such as Chiari malformations, a common condition in the realm of pediatric neurosurgery. Treatment for Chiari I malformations in children is a decompressive procedure of the posterior fossa to allow release of pressure on the brainstem and improved CSF flow at the foramen magnum. Posterior fossa decompression classically involves suboccipital craniectomy, cervical laminectomy at the level of the tonsillar herniation, and a Y-shaped dural opening from the tonsillar herniation to the foramen magnum. Tumors of the pineal region require a similar approach that focuses on traveling below the tentorium but above the cerebellar.

**Objectives:** Students will:

- 1) Become familiar with, pineal tumors, Chiari Malformation and other common pediatric neuropathologies
- 2) Practice performing posterior fossa craniotomies.

**Location:** Gamma Knife Conference Room, 1st floor UPMC Presbyterian & Anatomy Lab, 3rd floor Scaife Hall

**Student Preparation:** None

### **Session 7 – Skull Base Neurosurgery**

**Instructor:** Georgios Zenonos, MD

**Date:** 11/16/2022

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 weakness 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, 3rd floor Scaife Hall

**Student Preparation:** None

### **Session 8 – Hemicraniectomies and EVDs**

**Instructor:** Bradley Gross, MD

**Date:** 11/21/22

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, 3rd floor Scaife Hall

**Student Preparation:** None

### **Session 9- Complex Cranial Approaches for Epilepsy**

**Instructor:** Jorge Gonzalez-Martinez, MD, PhD

**Date:** 11/30/22

This session will focus on anatomy and approaches to deep surgeries such as corpus callosotomies. Cortical and deep brain anatomy will be heavily emphasized in this session.

**Objectives:** Students will:

- 1) Learn about epilepsy surgery options for non-temporal lobe epilepsy.
- 2) Learn about deep and surface anatomy.

**Location:** Gamma Knife Conference Room, 1st floor UPMC Presbyterian & Anatomy Lab, 3rd floor Scaife Hall

**Student Preparation:** None

### **Session 10 – Temporal Lobectomies**

**Instructor:** Taylor Abel, MD

**Date:** 12/12/2022

Temporal lobectomies involve removal of the temporal lobe of the brain, used as a treatment option for epilepsy resistant to anticonvulsant medications. Students will practice on the cadavers to stimulate a realistic condition.

**Objectives:** Students will:

- 1) Learn the indications and benefits of Temporal Lobectomy
- 2) Review anatomy of the temporal lobe and surrounding structures
- 3) Practice performing Temporal Lobectomies

**Location:** Gamma Knife Conference Room, 1st floor UPMC Presbyterian & Anatomy Lab, 3rd floor Scaife Hall

**Student Preparation:** None

Optional Session- **Principles and Practice of Neuro-oncology**

**Instructor: Pascal Zinn, MD**

**Date: TBD**

Optional lecture on the practice of neuro-oncology as well insight into the development of a successful basic science lab while maintaining a clinical practice.