



**THE PITTSBURGH COURSE:
COMPREHENSIVE ENDOSCOPIC ENDONASAL
SURGERY OF THE SKULL BASE**

Pittsburgh, Pennsylvania

~ November 3-6, 2024 ~



GUEST FACULTY

Erin L. McKean, MD, MBA
L. Madison Michael, II, MD

COURSE DIRECTORS

Carl H. Snyderman, MD, MBA
Paul A. Gardner, MD
Eric W. Wang, MD
Georgios A. Zenonos, MD
Garret W. Choby, MD

FACULTY

S. Tonya Stefko, MD
Michael M. McDowell, MD

*Sponsored by:
University of Pittsburgh School of Medicine
Department of Neurological Surgery
Department of Otolaryngology
Center for Continuing Education in the Health Sciences*

**THE PITTSBURGH COURSE:
COMPREHENSIVE ENDOSCOPIC ENDONASAL SURGERY OF THE SKULL BASE
November 3-6, 2024**

Course Overview

This 4-day course is a presentation of minimally invasive techniques for endoscopic endonasal surgery of the ventral skull base. Experts on the subject will present the anatomical and technical aspects of this procedure along with the risks, benefits and outcomes.

The course features an interactive live surgery demonstration using indocyanine green fluorescence endoscopy, fresh anatomical specimen dissection, lectures and panel discussions, 3D anatomy lectures, and case presentations. Participants will have an opportunity to enhance their knowledge and skills regarding endoscopic surgery of the ventral skull base.

Learning Objectives

At the conclusion of this course, participants should be able to:

- Describe the anatomic relationships between the ventral skull base, paranasal sinuses and orbit.
- Understand the indications, benefits and risks associated with endoscopic endonasal skull base surgery.
- Utilize endoscopic techniques to approach tumors in the anterior, middle and cranial fossae.

Target Audience

This course is designed for skull base teams (neurosurgeons, otolaryngologists, head and neck surgeons) and senior level residents who wish to learn and practice the technical skills needed to perform comprehensive endoscopic endonasal surgery of the ventral skull base.

Location (unless otherwise noted)

Lecture Room: UPMC Eye & Ear Institute Building/Biomedical Science Tower
203 Lothrop Street, 1st Floor, Room S-120

Lab: University of Pittsburgh School of Medicine Anatomy Lab
Scaife Hall West Wing: 7th Floor, Room 7788
3550 Terrace Street

Course Hotel

Courtyard by Marriott

PLEASE NOTE: This hotel is currently called the Wyndham Pittsburgh University Center. The name will change on July 1 and all reservations made under the Wyndham name will be honored by the Courtyard by Marriott.

**100 Lytton Avenue
Pittsburgh (Oakland) PA 15213**

The Courtyard by Marriott is within walking distance of The Eye & Ear Institute/Biomedical Science Tower. A block of rooms has been reserved for the nights of November 2-7 at the rate of \$158.00/night **until October 12.**

To make a reservation under our room block, you will need to email Mr. Earl Eggleton (earl.eggleton@concordhotels.com), Reservation Coordinator, with your check-in and check-out dates, bed preference (single/double), and that you want to book under the **Group Name: UPMC Skull Base**. If you would prefer to make your reservation by phone, you can reach Earl between the hours of 8:00 AM-4:30 PM Pittsburgh time at: (001) 412-682-6251. If you have any difficulties booking your reservation, please feel free to contact our course manager, Mary Jo, at skullbasecourse@upmc.edu.

Continuing Medical Education Credit

In support of improving patient care, the University of Pittsburgh is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team.

The University of Pittsburgh designates this live activity for 31.25 *AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Other health care professionals will receive a certificate of attendance confirming the number of contact hours commensurate with the extent of participation in this activity.

Audio/Video Recording and Photography Policy

The use of audio/video recording or photographic devices is **NOT** permitted at any time in the lecture room, anatomy lab or hospital.

Disclaimer Statement

The information presented at this CME program represents the views and opinions of the individual presenters, and does not constitute the opinion or endorsement of, or promotion by, the UPMC Center for Continuing Education in the Health Sciences, UPMC / University of Pittsburgh Medical Center or Affiliates and University of Pittsburgh School of Medicine. Reasonable efforts have been taken intending for educational subject matter to be presented in a balanced, unbiased fashion and in compliance with regulatory requirements. However, each program attendee must always use his/her own personal and professional judgment when considering further application of this information, particularly as it may relate to patient diagnostic or treatment decisions including, without limitation, FDA-approved uses and any off-label uses.

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FACULTY LISTING

GUEST FACULTY

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Program Director, Skull Base Surgery Fellowship
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University of Tennessee Health Science Center
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Assistant Professor of Neurological Surgery

Georgios A. Zenonos, MD

Assistant Professor of Neurological Surgery

Carl H. Snyderman, MD, MBA

Professor of Otolaryngology and Neurological Surgery

UPMC LAB ASSISTANTS

GROUP A

Hussam Abou-Al-Shaar, MD

*Intraresidency Fellow, Center for Cranial Base Surgery
Department of Neurological Surgery*

GROUP B

Jason Crossley, MD

*Fellow, Center for Cranial Base Surgery
Department of Otolaryngology*

Ivo Peto, MD

*Fellow, Center for Cranial Base Surgery
Department of Neurological Surgery*

SUNDAY, NOVEMBER 3, 2024

- 7:15 AM **REGISTRATION & BREAKFAST**
- 7:30 AM **Let's Get Started: Classification and Training (including lab training)**
Carl Snyderman, MD, MBA
- 7:55 AM **Navigating the Nose and Sinuses: Getting to the Skull Base**
Garret Choby, MD
- 8:20 AM **If All Starts at the Sella: Endoscopic Pituitary Surgery**
Paul Gardner, MD
- 9:05 AM ***ALL Transfer from Lecture Room to Lab***
- 9:15 AM **Prosection for Lab Session 1 – Pituitary Surgery**
Erin McKean, MD, MBA and L. Madison Michael, II, MD
- 10:15 AM **Lab Session 1**

<p><u>Group A:</u></p> <p>Anatomical Dissection</p> <ul style="list-style-type: none"> • Intranasal Landmarks • Middle Turbinates • Septal Mucosal Flap • Sphenoidotomy • Sella • Posterior Ethmoidectomy • Suprasellar/Transplanum Approach • Reconstruction: Inlay Biodesign, Overlay with Nasoseptal Flap 	<p><u>Group B:</u></p> <p>Prosection for Lab Sessions 3&4: Sagittal Plane</p> <p><i>After Prosection, transfer from Lab to Lecture Room for:</i></p> <p>3D Surgical Anatomy Lectures Georgios Zenonos, MD</p> <ul style="list-style-type: none"> • Anterior Skull Base • Sinonasal, Sellar and Parasellar Regions
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- 12:45 PM ***GROUP A: Transfer from Lab to Lecture Room***
- 1:00 PM **LUNCH & LECTURE**
Tools for Success: Equipment, Instruments and Set-Up for Endonasal Surgery
Eric Wang, MD
- 1:30 PM **Plumbing Problems Big and Small: Reconstruction of Skull Base Defects**
Carl Snyderman, MD, MBA
- 2:05 PM **Up and Away: Transtuberculum and Transplanum Approaches**
Paul Gardner, MD

SUNDAY, NOVEMBER 3, 2024 (CONTINUED)

3:00 PM *GROUP B: Transfer from Lecture Room to Lab*

3:15 PM Lab Session 2

<p><i>Group A:</i></p> <p>3D Surgical Anatomy Lectures Georgios Zenonos, MD</p> <ul style="list-style-type: none"> • Anterior Skull Base • Sinonasal, Sellar and Parasellar Regions <p><i>After Lectures, transfer from Lecture Room to Lab for:</i></p> <p>Prosection for Lab Sessions 3&4: Sagittal Plane</p>	<p><i>Group B:</i></p> <p>Anatomical Dissection</p> <ul style="list-style-type: none"> • Intranasal Landmarks • Middle Turbinates • Septal Mucosal Flap • Sphenoidotomy • Sella • Posterior Ethmoidectomy • Suprasellar/Transplanum Approach • Reconstruction: Inlay Biodesign, Overlay with Nasoseptal Flap
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5:45 PM ADJOURNMENT

EVENING AT LEISURE (For complete information about events, shopping areas, or restaurants in or near Oakland, please feel free to visit the following websites (<http://www.pittsburghmagazine.com> or <http://www.visitpittsburgh.com/>) or feel free to ask us for recommendations!)

MONDAY, NOVEMBER 4, 2024

- 7:00 AM **BREAKFAST**
- 7:15 AM **The New Workhorses: Transclival, Transodontoid Approaches**
Paul Gardner, MD
- 8:00 AM **Case Presentations & Live Surgery**
Garret Choby, MD, Paul Gardner, MD, Carl Snyderman, MD, MBA, Eric Wang, MD, Georgios Zenonos, MD
Moderator
Erin McKean, MD, MBA and L. Madison Michael, II, MD
- 12:00 PM **LUNCH**
- 1:00 PM ***ALL Transfer from Lecture Room to Lab***
- 1:15 PM **Lab Session 3**

<p><u><i>Group A:</i></u> Prosection for Lab Sessions 5 & 6: Sagittal Plane <i>After Prosection, transfer from Lab to Lecture Room for:</i> Craniofacial Resection for Sinonasal Malignancy and Meningioma Eric Wang, MD Challenges and Considerations of Pediatric Endonasal Surgery Michael McDowell, MD</p>	<p><u><i>Group B:</i></u> Anatomical Dissection</p> <ul style="list-style-type: none"> • Anterior Ethmoidectomy • Medial Orbital Decompression • Optic Nerve Decompression • Ethmoid Artery Ligation • Frontal Sinusotomy (Draf 3 Procedure) • Craniofacial Resection
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- 3:00 PM ***GROUP B: Transfer from Lab to Lecture Room***
- 3:15 PM **PANEL DISCUSSION: Behind the Scenes – Perioperative Care**
Moderator: Garret Choby, MD
Panelists: All Faculty

MONDAY, NOVEMBER 4, 2024 (CONTINUED)

3:45 PM ***GROUP A: Transfer from Lecture Room to Lab***

GROUP B:

Lecture – Craniofacial Resection for Sinonasal Malignancy and Meningioma

Eric Wang, MD

Lecture – Challenges and Considerations of Pediatric Endonasal Surgery

Michael McDowell, MD

4:00 PM Lab Session 4

<p><i>Group A:</i> Anatomical Dissection</p> <ul style="list-style-type: none"> • Anterior Ethmoidectomy • Medial Orbital Decompression • Optic Nerve Decompression • Ethmoid Artery Ligation • Frontal Sinusotomy (Draf 3 Procedure) • Craniofacial Resection 	<p><i>Group B:</i> <i>After Lecture, transfer from Lecture Room to Lab for:</i> Prosection for Lab Sessions 5 & 6: Sagittal Plane</p>
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5:45 PM AFTERNOON PROGRAM ADJOURNMENT

EVENING PROGRAM ***(Registrants Only Please)***

LOCATION: Courtyard by Marriott
Schenley I-IV Ballrooms
100 Lytton Avenue
Pittsburgh (Oakland) PA 15213

6:30 PM Cocktail Reception

7:00 PM Dinner & Guest Faculty Lectures

7:30 PM T/B/A
Erin McKean, MD, MBA

8:00 PM T/B/A
L. Madison Michael, II, MD

8:45 PM ADJOURNMENT

TUESDAY, NOVEMBER 5, 2024

- 7:30 AM BREAKFAST
- 7:45 AM Transpterygoid Approach: Gateway to the Coronal Plane
Eric Wang, MD
- 8:15 AM ***GROUP A: Transfer from Lecture Room to Lab***
- GROUP B: 3D Surgical Anatomy Lecture – Posterior Skull Base
Georgios Zenonos, MD
- 8:30 AM Lab Session 5

<p><u>Group A:</u></p> <p>Anatomical Dissection</p> <ul style="list-style-type: none"> • Palatosphenoidal Artery and Vidian Nerve Identification • Pituitary Transposition • Transclival Approach (Extradural/Intradural) • Transodontoid Approach • Medial Transpetrous Approach • Cavernous Sinus Approaches 	<p><u>Group B:</u></p> <p><i>After Lecture, transfer from Lecture Room to Lab for:</i></p> <p>Prosection: Orbital Approaches S. Tonya Stefko, MD</p> <p>Prosection for Lab Sessions 7 & 8: Coronal Plane Equipment Demonstrations</p>
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- 12:00 PM ***ALL TRANSFER FROM LAB TO LECTURE ROOM***
- 12:15 PM LUNCH & PANEL DISCUSSION
Putting it all Together: Case-Based Discussion and Q&A
Moderator: Erin McKean, MD, MBA and L. Madison Michael, II, MD
Panelists: All Faculty
***** Attendees are encouraged to bring cases for discussion *****
- 12:50 PM Group Photo
- 1:00 PM GROUP A: 3D Surgical Anatomy Lecture – Posterior Skull Base
Georgios Zenonos, MD
- GROUP B: Transfer from Lecture Room to Lab***

TUESDAY, NOVEMBER 5, 2024 (CONTINUED)

1:15 PM Lab Session 6

<p><u>Group A:</u> <i>After Lecture, transfer from Lecture Room to Lab for:</i> Prosection: Orbital Approaches S. Tonya Stefko, MD Prosection for Lab Sessions 7 & 8: Coronal Plane Equipment Demonstrations</p>	<p><u>Group B:</u> Anatomical Dissection</p> <ul style="list-style-type: none"> • Palatosphenoidal Artery and Vidian Nerve Identification • Pituitary Transposition • Transclival Approach (Extradural/Intradural) • Transodontoid Approach • Medial Transpetrous Approach • Cavernous Sinus Approaches
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4:45 PM ADJOURNMENT

6:10 PM Transportation Departs Courtyard by Marriott Hotel for Course Banquet

6:30 PM Course Banquet
(Registrants Only Please)

LOCATION: **Monterey Bay Fish Grotto**
Skyline Room
 1411 Grandview Avenue
 Mount Washington
<https://www.montereybayfishgrotto.com/>

9:30 PM Transportation Departs Course Banquet for Courtyard by Marriott Hotel

WEDNESDAY, NOVEMBER 6, 2024

8:00 AM BREAKFAST

8:15 AM Outside the Box: Coronal Plane Approaches
Paul Gardner, MD

9:15 AM ***GROUP A: Transfer from Lecture Room to Lab***

GROUP B: 3D Surgical Anatomy Lecture – Cavernous Sinus and Middle Fossa
Georgios Zenonos, MD

9:30 AM Lab Session 7

<p><u>Group A:</u> Anatomical Dissection</p> <ul style="list-style-type: none"> • Antrostomy • Sphenopalatine Artery Ligation • Middle Cranial Fossa Approaches: Transpterygoid • Cavernous Sinus • Meckel's Cave • Infratemporal Skull Base 	<p><u>Group B:</u> <i>After Lecture, transfer from Lecture Room to Lab for:</i></p> <p>Prosection: Alternative Reconstructive Flaps: Pericranial Flap, Inferior Turbinate Wall Flap</p> <p>Equipment Demonstrations</p>
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11:30 AM ***ALL TRANSFER FROM LAB TO LECTURE ROOM***

11:45 AM LUNCH & LECTURE
Code Red: Carotid Artery Injury
Paul Gardner, MD

12:45 PM GROUP A: 3D Surgical Anatomy Lecture – Cavernous Sinus and Middle Fossa
Georgios Zenonos, MD

GROUP B: Transfer from Lecture Room to Lab

WEDNESDAY, NOVEMBER 6, 2024 (CONTINUED)

1:00 PM Lab Session 8

<p><i>Group A:</i> <i>After Lecture, transfer from Lecture Room to Lab for:</i> Prosection: Alternative Reconstructive Flaps: Pericranial Flap, Inferior Turbinate Wall Flap Equipment Demonstrations</p>	<p><i>Group B:</i> Anatomical Dissection</p> <ul style="list-style-type: none"> • Antrostomy • Sphenopalatine Artery Ligation • Middle Cranial Fossa Approaches: Transpterygoid • Cavernous Sinus • Meckel's Cave • Infratemporal Skull Base
<p>3:00 PM Disaster Plan: ICA Injury Simulation Exercise Paul Gardner, MD</p>	

3:15 PM COURSE ADJOURNMENT

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ANATOMICAL DISSECTION SCHEDULE

Sunday, November 3, 2024: Lab Sessions 1 & 2

1. **Intraoperative navigational device.** Familiarize yourself with the function of the image guidance system.
2. Identify the following **intranasal landmarks**: inferior turbinate, middle turbinate, superior turbinate, middle meatus, hiatus semilunaris, uncinate process, bulla ethmoidalis, sphenoid rostrum, sphenoid ostium, olfactory sulcus.
3. Resect the **middle turbinates**.
4. Elevate a **septal mucosal flap** on one side. It should be pedicled on the ipsilateral posterior nasal artery. Displace the flap into the nasopharynx during the other procedures.
5. **Endonasal approaches for pituitary surgery.** Transect the posterior nasal septum and expose the sphenoid rostrum. Remove rostrum and open sphenoid air cells. Enlarge the opening maximally in all directions. Resect the posterior edge of the nasal septum to enhance bilateral exposure. Identify sphenoid sinus landmarks: planum sphenoidale, optic canal, lateral optic-carotid recess, carotid canal, medial optic-carotid recess, sella, clival recess. Remove sphenoid septations and note relationship to carotid canal.
6. **Pituitary.** Open the sella to the margins of the cavernous sinus in all directions. Remove sphenoid rostrum inferiorly and note how it improves access to the sella.
7. **Posterior ethmoidectomy.** Skeletonize the posterior medial orbit and ethmoid roof by removing the posterior ethmoid air cells. Identify the increased visualization and exposure to the sphenoid planum.
8. **Suprasellar/transplanum approach.** Thin and remove the bone of the planum sphenoidale. Thin and remove the bone of the “tuberculum strut” bilaterally. Open the suprasellar dura and identify the optic chiasm, infundibulum, and ICA. Identify the superior hypophyseal artery.

ANATOMICAL DISSECTION SCHEDULE

Monday, November 4, 2024: Lab Sessions 3 & 4

1. **Anterior ethmoidectomy.** Open the bulla ethmoidalis and remove anterior ethmoid air cells in an anterior to posterior direction. Identify the lamina papyracea. Expose the nasofrontal recess and identify the anterior ethmoid artery. Repeat the ethmoidectomy on the opposite side.
2. **Medial orbital decompression.** Make an opening in the lamina papyracea and remove the medial orbital wall from the fovea ethmoidalis superiorly to the orbital floor and as far posteriorly as the anterior wall of the sphenoid sinus.
3. **Optic nerve decompression.** Decompress the orbital apex and follow the optic canal posteriorly. Use the drill to thin the bone over the optic nerve without exposing the carotid artery.
4. **Anterior and posterior ethmoid artery ligation.** Elevate the periorbita along the skull base and identify the anterior and posterior ethmoid arteries.
5. **Frontal sinusotomy (Draf procedure).** Perform a Draf Type 3 procedure. Resect the anterior nasal septum superiorly, anterior to the middle turbinates. Remove the floor of the frontal sinuses across the midline and anterior to the crista galli.
6. **Anterior craniofacial resection.** Resect the superior attachment of the nasal septum from the crista galli to the sphenoid. Resect attachments of middle turbinates. Thin and remove bone of anterior cranial base from ethmoid roof laterally and to planum sphenoidale posteriorly. Drill out crista galli. Incise dura bilaterally and then transect falx attachment anteriorly. Reflect dura posteriorly and identify olfactory bulbs. Elevate olfactory tracts and transect nerves posteriorly. Identify the interhemispheric fissures, frontopolar vessels, and anterior communicating artery.

ANATOMICAL DISSECTION SCHEDULE

Tuesday, November 5, 2024: Lab Sessions 5 & 6

1. **Palatosphenoidal artery and vidian nerve identification.** At the floor of the sphenoid sinus, identify the palatosphenoidal artery as it exits the pterygopalatine fossa and enters the nasopharynx. The vertical process of the palatine bone covering the palatosphenoidal artery should be removed. At this level, dissect laterally until you identify the vidian canal.
2. **Pituitary transposition.** Lift up the pituitary gland and drill out the posterior clinoids.
3. **Transclival approach (extradural).** Remove the bone of the clivus to expose the dura from the sella to the lower clivus.
4. **Transclival approach (intradural).** Open the dura to expose the vertebral and basilar arteries.
5. **Transodontoid approach.** Remove the soft tissues between the Eustachian tubes to the level of the soft palate. Remove cortical bone of the clivus from the sphenoid floor to the foramen magnum. Remove the lower edge of the clivus (foramen magnum). Expose the ring of C1 and remove the central portion. Drill out the dens down to the level of the body of C2.
6. **Reconstruction with mucosal flap.** Position mucosal flap in different areas of the skull base to see limits of reach and surface area of reconstruction.
7. **Medial petrous apex.** Drill the bone medial and deep to the ICA at the level of the clival recess. Open air cells of the petrous apex. Identify the course of the 6th cranial nerve.

ANATOMICAL DISSECTION SCHEDULE

Wednesday, November 6, 2024: Lab Sessions 7 & 8

1. Perform a middle meatal **antroostomy** on each side. Remove the uncinate process and enlarge the opening posteriorly and inferiorly. Make sure that you preserve the sphenopalatine arteries.
2. **Sphenopalatine artery ligation.** Expose the sphenopalatine and posterior nasal arteries and transect them.
3. **Transpterygoid approach.** Transect the sphenopalatine and posterior nasal arteries and open the pterygopalatine space. Elevate the soft tissue to expose the bone of the base of the pterygoids. Identify the vidian artery and nerve.
4. Exposure of **petrous ICA.** Drill the bone inferior and medial to the vidian artery and follow the vidian artery to the 2nd genu of the internal carotid artery.
5. **Middle cranial fossa approach (suprapetrous).** Identify V2 and drill the bone between V2 and the vidian artery to expose the petrous ICA. Open Meckel's cave lateral to the vertical segment of the ICA.
6. **Lateral cavernous sinus.** Dissect superior to Meckel's cave, lateral to the ICA. Identify the contents of the cavernous sinus.
7. **Infratemporal skull base.** Identify the medial and lateral pterygoid plates inferior to the base of the pterygoids. Follow the lateral pterygoid plate to foramen ovale and identify V3. Resect the medial portion of the Eustachian tube. Open the space between the pterygoid plates and dissect the medial and lateral pterygoid muscles. Follow the Eustachian tube along the skull base and identify the ICA where it enters the skull base.
8. **Infrapetrous approach.** Transect V3 and drill the bone along the inferior aspect of the petrous bone to expose the petrous ICA.
9. **[your name here] approach.** Discover a new approach to the cranial base and put your name on it.