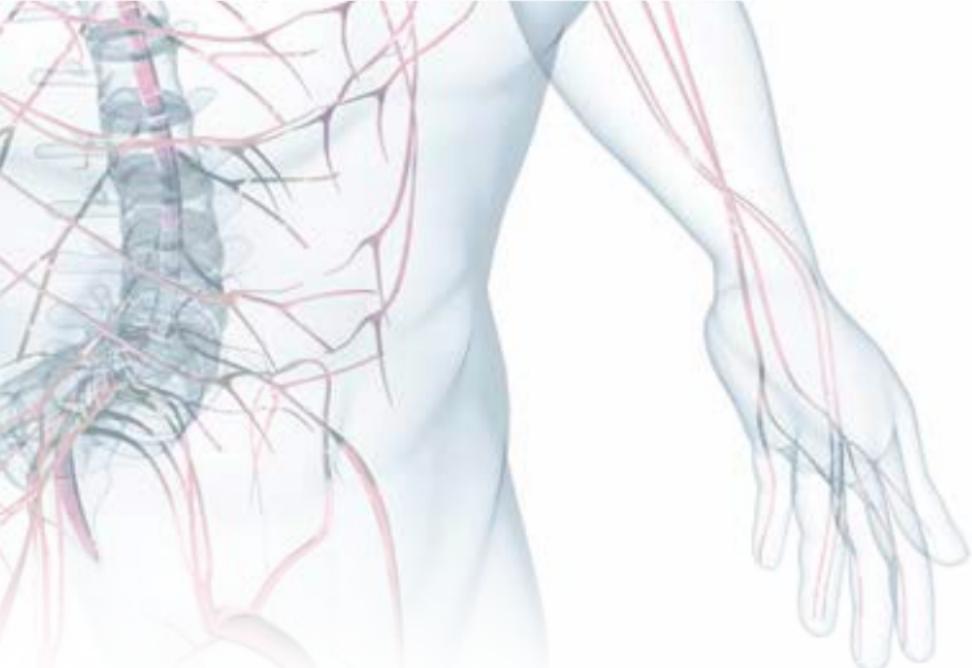




PRINCIPLES AND PRACTICE OF  
**INTRAOPERATIVE  
NEUROMONITORING**

NOVEMBER 12 - 14, 2021



**UPMC**  
LIFE CHANGING MEDICINE

# Course Objectives

Principles and Practice of Intraoperative Neuromonitoring is designed for advanced professionals who perform or support intraoperative neuromonitoring (IONM) procedures. This includes but is not limited to:

- Neurologists
- Surgical Neurophysiologists
- PM&R Physicians
- Neurological Surgeons
- Anesthesiologists
- Orthopedic Surgeons
- Board Certified Neurophysiologists
- Vascular Surgeons
- Senior Neurophysiology Technologists
- ENT Surgeons
- Cardiac Surgeons

The course will highlight practice specifications, multimodality protocols, recent advances in the field, pre-/post-operative neurological evaluation and management, and telemedicine. Presentations will make reference to current literature, technical developments, methodologies and clinical efficacy. The faculty includes University of Pittsburgh Medical Center physicians and neurophysiologists with extensive clinical and academic expertise in IONM. The course exposes participants to material that will allow them to acquire a comprehensive understanding of IONM and how it relates to:

- Advanced principles for neurophysiological monitoring, including instrumentation, neuromonitoring protocols, alarm criteria and clinical efficacy
- Minimally invasive spine surgery, including transpsoas approaches
- Pre-, peri- and post-operative evaluation of neurological complications including stroke, cognitive deficits, seizure and spinal cord injury
- Multimodality monitoring techniques for a broad array of procedures including spine and vascular
- Cranial nerve monitoring during skull base procedures
- Interpretation and communication with surgical team
- Development of a Policy & Procedure manual; documentation and communication with the technologist; development of quality assurance metrics; and staff training
- Problem based learning with real-time data analysis and formulation of differential diagnoses

# Interactive Workshop Stations

- Instruction and the opportunity to practice placing cranial nerve EMG electrodes on a cadaver (including the extra-ocular muscles)
- Case study review session where participants will work through differential diagnoses
- Cerebrovascular anatomy and the role of IONM in Neurointerventional procedures
- Explore technical problems in IONM and how to develop algorithms for troubleshooting

# Course Directors

**Katherine Anetakis, MD**  
University of Pittsburgh Department of Neurological Surgery

**Jeffrey R. Balzer, PhD, FASNM, DABNM**  
Associate Professor of Neurological Surgery, Neuroscience and Acute and Tertiary Care Nursing  
Director, Clinical Operations, Center for Clinical Neurophysiology  
Director, Cerebral Blood Flow Laboratory  
University of Pittsburgh Medical Center

**Partha Thirumala, MD, FACNS, FAAN**  
Professor of Neurology, Associate Professor of Neurological Surgery  
Medical Director, Center for Clinical Neurophysiology  
University of Pittsburgh Medical Center

**Donald J. Crammond, PhD**  
Associate Professor of Neurological Surgery, University of Pittsburgh  
Associate Director, Movement Disorder Surgery

# Course Coordinator

**R. Joshua Sunderlin, MS, CNIM**

Director of Neurodiagnostic Education – Procirca Center for Clinical Neurophysiology

# Faculty

**Gregory Adams, CNIM**  
Procirca Center for Clinical Neurophysiology

**Katherine Anetakis, MD**  
University of Pittsburgh Department of Neurological Surgery

**Jeffrey Balzer, PhD**  
University of Pittsburgh Department of Neurological Surgery

**James Castellano, MD, PhD**  
University of Pittsburgh Department of Neurological Surgery

**Mindy Corridoni, CNIM**  
Procirca Center for Clinical Neurophysiology

**Donald Crammond, PhD**  
University of Pittsburgh Department of Neurological Surgery

**Wendy Fellowes-Mayle, PhD**  
University of Pittsburgh Department of Neurological Surgery

**Jorge Gonzalez-Martinez, MD, PhD**  
University of Pittsburgh Department of Neurological Surgery

**Anthony Gossett, CNIM**  
Procirca Center for Clinical Neurophysiology

**Carly Kleynen, CNIM**  
Procirca Center for Clinical Neurophysiology

**Anthony Kyte**  
President of Australasia Association for Intraoperative Neuromonitoring (AAIN)

**Michael Lang, MD**  
University of Pittsburgh Department of Neurological Surgery

**Bradford Mahon, PhD**  
Carnegie Mellon University Department of Psychology

**Vincent Miele, MD**  
University of Pittsburgh Department of Neurological Surgery

**Andrew Moyer, CNIM**  
Procirca Center for Clinical Neurophysiology

**Varun Shandal, MD**  
University of Pittsburgh Department of Neurological Surgery

**Jeremy Shaw, MD**  
University of Pittsburgh Department of Orthopedic Surgery

**Ibrahim Sultan, MD**  
University of Pittsburgh Department of Cardiovascular Surgery

**R. Joshua Sunderlin, MS, CNIM**  
Procirca Center for Clinical Neurophysiology

**Partha Thirumala, MD**  
University of Pittsburgh Department of Neurological Surgery

**Ulkatan Sedat, MD**  
Mount Sinai West Hospital

**Silvia Mazzali Verst, MD, PhD**  
Brain Spine Neurofisiologia, Brazil

**Shyam Visweswaran, MD, PhD**  
University of Pittsburgh

**Xuhui Wang, MD**  
Xinhua Hospital Department of Neurosurgery, Peoples Republic of China

**Marshal Wilkinson, PhD**  
University of Manitoba Department of Neurosurgery; President of the CANM

**Pascal Zinn, MD, PhD**  
University of Pittsburgh Department of Neurological Surgery

**Nathan Zwagerman, MD**  
Medical College of Wisconsin Department of Neurosurgery

# Keynote Speaker

**Bryan Wilent, PhD**

SpecialtyCare, President of ASNM

## DAY 1 FRIDAY NOV 12

7-7:30AM	Continental breakfast	
7:30-7:45AM	Welcome address (Jeff Balzer PhD/ Josh Sunderlin MS, CNIM)	
<b>Principles of Intraoperative Neuromonitoring:</b>		
7:45-8:15AM	IONM: The History and Physiological Basis	Partha Thirumala, MD
8:15-8:45AM	Principles of EEG Monitoring During Surgery	Katherine Anetakis, MD
8:45-9:15AM	Principles of SSEP Monitoring During Surgery	Donald Crammond, PhD
9:15-9:30AM	BREAK (15 min)	
9:30-10AM	Principles of TcMEP Monitoring During Surgery	Jeffrey Balzer, PhD
10-10:30AM	Principles of BAER Monitoring During Surgery	James Castellano, MD, PhD
10:30-11AM	Principles of EMG Monitoring During Surgery	Varun Shandal, MD
11AM-Noon	LUNCH BREAK	

## IONM For Spinal Surgery:

Noon-12:30PM	Pediatric Spinal Procedures	Taylor Abel, MD
12:30-1PM	MIS Procedures	Vincent Miele, MD
1-1:30PM	Spinal Fusion Procedures	Jeremy Shaw, MD
1:30-1:45PM	BREAK (15 min)	

## Supratentorial Mapping:

1:45-2:15PM	Craniotomy Procedures with Mapping	Pascal Zinn, MD, PhD
2:15-2:45PM	Techniques for Direct Cortical and Subcortical Mapping	Silvia Verst, MD, PhD
2:45-3:15PM	Functional Speech Assessment in Awake Craniotomy	Bradford Mahon, PhD

## Skull base Procedures:

3:15-3:45PM	Monitoring of Skull Base Procedures	Ulkatan Sedat, MD
3:45-4:30PM	Skull base procedures	Nate Zwagerman, MD
4:30PM		
Break for Change of Venue Reconvene at Hilton Garden Inn at 5:30PM		
5:30-7:30PM	Meet and Greet with Faculty & Exhibitors, Hilton Garden Inn	
6-7PM	KEYNOTE SPEECH: TcMEP for Lumbar Nerve Root IONM	Bryan Wilent, PhD
7:30PM	Adjournment (Day 1)	

## DAY 2 SATURDAY NOV 13

7-7:30AM	Continental Breakfast	
7:30-7:45AM	Day 2 Announcements	Jeffrey Balzer PhD/ Josh Sunderlin MS, CNIM
<b>International IONM:</b>		
7:45-8:15AM	IONM in Australia	Anthony Kyte
8:15-8:45AM	IONM in China	Xuhai Wang, MD
8:45-9:15AM	IONM in Canada	Marshall Wilkinson, PhD
9:15-9:30AM	BREAK (15min)	Exhibitor Area

## IONM for Stroke Prevention:

9:30-10AM	IONM for Stroke Prevention	Partha Thirumala, MD
10-10:30AM	IONM for Cardiovascular Procedures	Ibrahim Sultan, MD
10:30-11AM	Neurointerventional Procedures	Michael Lang, MD
11AM-Noon	Lunch in Exhibitor Area	

## Workshops:

Noon-12:30PM	Bloodborne Pathogens Lecture and Exam	Josh Sunderlin, MS
12:30-5PM Workshops:		

<b>Station 1:</b> Placing Cranial Nerve EMG Electrodes on Cadavers	Wendy Fellows-Mayle PhD / Gregory Adams, CNIM
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<b>Station 2:</b> Interactive Case Study Review Session	Partha Thirumala, MD / Josh Sunderlin, MS, CNIM
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<b>Station 3:</b> Cerebrovascular Anatomy and Interactive Case Studies	Jeffrey Balzer, PhD / Carly Brog, CNIM
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<b>Station 4:</b> Troubleshooting Technical Problems with IONM Equipment	Katherine Anetakis, MD / Andrew Moyer, CNIM
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5PM Adjournment (Day 2)

## DAY 3 SUNDAY NOV 14

7-7:30AM	Continental Breakfast	
7:30-7:45AM	Day 3 Announcements	Jeffrey Balzer, PhD/ Josh Sunderlin, MS, CNIM

## Functional Neurosurgery:

7:45-8:15AM	Functional Neurosurgery	Jorge Gonzales-Martinez, MD, PhD
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## Artificial Intelligence:

8:15-8:45AM	Artificial Intelligence in IONM	Shyam Visweswaran, MD, PhD
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## Review Submitted Data:

8:45-9:45AM	Attendees submit data in advance to be reviewed and discussed collaboratively–Katherine Anetakis, MD; Jeffrey Balzer, PhD; Donald Crammond, PhD; Partha Thirumala, MD	
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9:45-10AM BREAK (15min)

## Improving IONM Practice:

10-10:30AM	Training Process Improvement	Anthony Gossett, CNIM
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10:30-11AM	Teaching Troubleshooting	Josh Sunderlin, MS, CNIM
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11-11:30AM	Quality Assurance	Katherine Anetakis, MD, & Mindy Corridoni, CNIM
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11:30AM-Noon	Communication and Documentation (Medico-legal Implications)	Jeffrey Balzer, PhD
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Noon Conference Adjournment

# Sponsored by Procirca and University of Pittsburgh School of Medicine Center for Continuing Education in the Health Sciences

## Tuition

\$600 for physicians and other attendees seeking CME credits  
\$400 for all other healthcare professionals seeking CEU credits

## Registration and Payment

Please register and pay directly from our website:

<https://procirca.com/neuromonitoring/neuromonitoring-workshop/>

On-site registration will not be permitted.

## CME Accreditation and Designation

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.

## Physician (CME)

The University of Pittsburgh designates this live activity for a maximum of 21 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

## Other Healthcare Professionals:

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.

ASET – The Neurodiagnostic Society has granted 21.5 Continuing Education Units [ASET-CEUs] for this program. Such crediting, however, should not be construed by program participants as an endorsement of any type of instruments or supplies mentioned or involved in these presentations.

## Special Needs

Participation by all individuals is encouraged. Advance notification of any special needs will help us provide better service. Please notify us of your needs at least two weeks in advance of the program by calling 412-647-3450.

## Cancellation Policy

- Registration fee is 100% refundable up until October 6, 2021.
- Registration fee is 50% refundable up to 15 days prior to the start date of the course.
- If you cancel within 15 days of the start of the course, NO REFUNDS will be granted.

## Cancellation requests should be sent to:

Josh Sunderlin, Course Coordinator  
Procirca Center for Clinical Neurophysiology

Phone: 412-647-3450

Email: [sunderlinj@procirca.com](mailto:sunderlinj@procirca.com)

## Course location and hotel accommodations

### Location:

UPMC Presbyterian Hospital  
Biomedical Science Tower  
Room S120  
Pittsburgh, PA 15213

### Hotels within walking distance of campus:

Hilton Garden Inn Pittsburgh University Place  
3454 Forbes Avenue  
Pittsburgh, PA 15213  
Phone: (412) 683-2040

Distance from campus is 0.3 miles;  
travel time on foot is five minutes.

A block of rooms is being held at the Hilton Garden Inn University Place at a rate of \$144.00/night.

[https://hiltongardeninn.hilton.com/en/gi/groups/personalized/PITUCGI-PPIN-20211111/index.jhtml?WT.mc\\_id=POG](https://hiltongardeninn.hilton.com/en/gi/groups/personalized/PITUCGI-PPIN-20211111/index.jhtml?WT.mc_id=POG)

Wyndham Pittsburgh University Center  
100 Lytton Avenue  
Pittsburgh (Oakland), PA 15213  
Phone: (412) 682-6200

Distance from campus is 0.7 miles;  
travel time on foot is 10 minutes.

Wyndham nightly parking charge: \$10.00

**Please note: the 2021 course offers both an in-person and virtual option for participation.**

# Procirca Center for Clinical Neurophysiology

Phone: 412-647-3450  
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Katherine Anetakis, MD



Jeffrey Balzer, PhD



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CNIM



Partha Thirumala, MD



Register today at  
[procirca.com/neuromonitoring/  
neuromonitoring-workshop](http://procirca.com/neuromonitoring/neuromonitoring-workshop)