



Mayo Clinic School of Continuous Professional Development

Electroencephalography (EEG),  
Electromyography (EMG) and  
Neurophysiology in

# CLINICAL PRACTICE

**MAYO CLINIC FRANKE EDUCATION CENTER**

PHOENIX, ARIZONA

JANUARY 26 – 31, 2020

50

**AMA PRA  
CATEGORY 1  
CREDITS™**

[CE.MAYO.EDU/EEGEMG2020](https://ce.mayo.edu/EEGEMG2020)

## COURSE HIGHLIGHTS

This course will provide a comprehensive review of the techniques and topics pertaining to the clinical practice of neurophysiology, including both basic and advanced theory of practice. Included will be: basic physiology, pathophysiology, electroencephalography, evoked potentials, electromyography, movement disorders and intraoperative monitoring. There is a focus on clinical correlation of various neurophysiological tests used for the evaluation of patients with epilepsy, sleep disorders, movement disorders, peripheral nerve and neuromuscular disorders.

- Case-based presentations
- Interactive learning and use of voting keypads
- Workshops, Breakouts, and Lunch and Learn sessions
- Opportunity to earn MOC credit
- Q & A with Mayo Clinic Faculty from three campus locations

## LEARNING OBJECTIVES

Upon conclusion of this program, participants should be able to:

- Identify commonly encountered interictal and ictal epileptiform findings on EEG.
- Review benign variants commonly mistaken (over-read) for epileptiform activity on EEG.
- Distinguish epileptiform activity from non-epileptiform activity seen in EEG.
- Interpret the findings and clinical significance of abnormalities on EEG studies.
- Identify EEG patterns for different spell types that can be seen during video EEG monitoring.
- Review the indications for long-term EEG monitoring in the acute hospital setting.
- Evaluate reading skills of routine EEG recognizing potentially confounding normal variants, artifacts and normal waveforms versus epileptiform activity.
- Recognize and interpret the significance of EMG waveforms on needle EMG.
- Develop a logical approach to the use of standard clinical electrophysiological techniques in the evaluation of common and uncommon neuromuscular disorders.
- Develop an approach to the use of the EMU.
- Review the application of ultrasound in assessment of neuromuscular disorders.

## TARGET AUDIENCE

Practitioners (MD, DO, NP, PA, RN) interested in advancing their knowledge base in these areas and also technicians, who are expected to perform these procedures and have some understanding of the interpretation, are encouraged to attend.

## MAYO CLINIC FACULTY

*Susan Agostini, R. EP T., R. EEG T.*

*Sarah E. Berini, M.D.*

*Jonathan L. Carter, M.D.*

*Greg D. Cascino, M.D.*

*John N. Caviness, M.D.*

*Amy Z. Crepeau, M.D.\**

*Brian A. Crum, M.D.*

*Elliot L. Dimberg, M.D.*

*Joseph F. Drazkowski, M.D.*

*Brent P. Goodman, M.D.*

*Matthew T. Hoerth, M.D.*

*Ernest M. Hoffman, D.O., Ph.D.*

*Mithri Junna, M.D.*

*Julie A. Khoury, M.D.\**

*Ruple S. Laughlin, M.D.*

*Michelle L. Mauer mann, M.D.*

*Iryna M. Muzyka, M.D.*

*Elie Naddaf, M.D.*

*Katherine C. Nickels, M.D.*

*Katherine H. Noe, M.D., Ph.D.*

*Angela M. Parsons, D.O.*

*Devon I. Rubin, M.D.*

*Raj D. Sheth, M.D.*

*Michael H. Silber, M.B., Ch.B.*

*Joseph I. Sirven, M.D.*

*Benn E. Smith, M.D.*

*Elson So, M.D.*

*Eric J. Sorenson, M.D.*

*Scott D. Spritzer, D.O.*

*William Tatum, D.O.*

*James C. Watson, M.D.*

*Gregory A. Worrell, M.D., Ph.D.*

*\*Course Directors*

## GUEST FACULTY

*Mark A. Ross, M.D.*

*Specialty Care*

*Brentwood, TN*

**Three options are offered for registration:****Option 1: EMG, EEG and Neurophysiology in Clinical Practice**

Sunday, January 26 – Friday, January 31, 2020

**Option 2: EEG and Neurophysiology in Clinical Practice**

Sunday, January 26 – Tuesday (half day), January 28, 2020

**Option 3: EMG and Neurophysiology in Clinical Practice**

Tuesday (full day), January 28 – Friday, January 31, 2020

	Register on or before Jan 13, 2020	Register after Jan 13, 2020
Physicians/Scientists – Both EEG and EMG	\$1,350	\$1,425
Physicians/Scientists – EEG only	\$750	\$750
Physicians/Scientists – EMG only	\$925	\$925
Residents, PAs and NPs – Both EEG and EMG	\$900	\$975
Residents, PAs and NPs – EEG only	\$555	\$555
Residents, PAs and NPs – EMG only	\$660	\$660
Neurodiagnostic technicians and students – EEG, EMG or both [must call (480) 301-4580 to register]	\$300 - \$700	
EMG ABPN MOC/SAM	\$75	\$75
EEG ABPN MOC/SAM	\$75	\$75
Printed syllabus – <b>must be pre-ordered by January 8, 2020</b>	\$150	\$150

*Cancellation Policy: Please visit [ce.mayo.edu/cancellation](http://ce.mayo.edu/cancellation) for more information.*

**COURSE DIRECTORS**

*Amy Z. Crepeau, M.D.*



*Julie A. Khoury, M.D.*

**LOCATION AND ACCOMMODATIONS****Mayo Clinic Franke Education Center**

5777 East Mayo Boulevard | Phoenix, Arizona 85054

**Residence Inn Phoenix Desert View at Mayo Clinic**

5665 East Mayo Boulevard | Phoenix, Arizona 85054 | (480) 563-1500

Hotel rooms near Mayo Clinic Hospital are limited. You are urged to make reservations early. A limited block of guest rooms have been reserved for attendees at Residence Inn Phoenix Desert View at Mayo Clinic. Group rates will be honored three days prior and three days following the course dates, based upon space availability.

To receive the special rate of \$239 per night, you must make reservations before the room block is filled and prior to the **cut-off date of December 27, 2019**. Please advise the reservation staff you are part of the Mayo Clinic EEG-EMG room block group. All reservations must be guaranteed with a major credit card. The hotel's room rates are subject to applicable state and local taxes (currently 12.57%) in effect at the time of check out. Parking fee is \$5.00 plus tax, per vehicle per day.

Attendees are responsible for their own reservations. The standard hotel reservation cancellation policy will apply to individual reservations unless otherwise specified. Mayo Clinic School of CPD is not responsible for expenses incurred by an individual who is not confirmed and for whom space is not available at the meeting.

## PROGRAM SCHEDULE

### Sunday, January 26, 2020

**7:00 a.m. Registration and Continental Breakfast**

**7:45 Welcome and Introductions**

Amy Z. Crepeau, M.D.

**8:00 EEG Pretest**

**8:15 Nuts and Bolts: Polarity**

Joseph F. Drazkowski, M.D.

**9:00 Adult EEG: Normal/Variants**

Joseph I. Sirven, M.D.

**9:45 Adult EEG: Coma/Encephalopathy/Brain Death**

Elson So, M.D.

**10:30 Refreshment Break**

**10:45 Adult EEG: Epileptiform Activity and Seizures**

Joseph I. Sirven, M.D.

**11:30 EEG in Status Epilepticus**

Katherine H. Noe, M.D., Ph.D.

**12:15 - 12:45 p.m. Lunch**

**12:45 - 2:15 Lunch and Learn Breakout Sessions (30 minutes each)**

**Basic Approach to Interpretation and Reports** - Scott D. Spritzer, D.O.

**EEG Artifact Challenge** - Matthew T. Hoerth, M.D.

**EEG Epileptiform or Not?** - William Tatum, D.O.

**2:15 Refreshment Break**

**2:30 EEG Billing and Coding**

Susan Agostini, R. EP T., R. EEG T.

**3:15 EEG Misadventures**

William Tatum, D.O.

**4:00 Adjourn**

### Monday, January 27, 2020

**7:00 a.m. Continental Breakfast**

**8:00 Pediatric EEG: Normal**

Raj D. Sheth, M.D.

**8:45 Pediatric EEG: Epileptiform**

Katherine C. Nickels, M.D.

**9:30 Prolonged EEG: Ambulatory and ICU**

Amy Z. Crepeau, M.D.

**10:15 Refreshment Break**

**10:30 Long Term Video EEG Monitoring**

Greg D. Cascino, M.D.

**11:15 Intracranial Monitoring**

Amy Z. Crepeau, M.D.

**12:00 - 12:30 p.m. Lunch**

**12:30 - 2:00 Lunch and Learn Breakout Sessions (45 minutes each)**

**Adult Cases** - Joseph F. Drazkowski, M.D.

**Pediatric Cases** - Katherine C. Nickels, M.D.

**2:00 Refreshment Break**

**2:15 Devices**

Gregory A. Worrell, M.D., Ph.D.

**3:00 Beyond Status Epilepticus**

Amy Z. Crepeau, M.D.

**3:45 EEG Jeopardy**

Angela M. Parsons, D.O.

**4:30 Post Test**

**4:45 Adjourn**

### Tuesday, January 28, 2020

**7:00 a.m. Continental Breakfast**

**7:45 Welcome (EMG Pre-Test)**

Julie A. Khoury, M.D.

**8:00 Neurophysiology of Sleep**

Michael H. Silber, M.B., Ch.B.

**8:45 Sleep Cases**

Mithri Junna, M.D.

**9:30 Movement Disorder Neurophysiology and Cases**

John N. Caviness, M.D.

**10:15 Refreshment Break**

**10:30 Visual and Brainstem Evoked Potentials**

Jonathan L. Carter, M.D.

**11:00 Somatosensory Evoked Potentials**

Ernest M. Hoffman, D.O., Ph.D.

**11:30 IOM Spine and Cranial**

Iryna M. Muzyka, M.D.

**12:15 - 1:00 p.m. Lunch (EEG 1:00 p.m. Adjourns)**

**1:00 Nerve Conduction Study Basics**

Brent P. Goodman, M.D.

**1:45 Uncommon Motor Nerve Conduction Studies**

Elie Naddaf, M.D.

**2:30 Refreshment Break**

**2:45 Uncommon Sensory Studies Technique and Utility**

Mark A. Ross, M.D.

**3:30 Repetitive Nerve Stimulation**

Brian A. Crum, M.D.

**4:30 Adjourn**

### Wednesday, January 29, 2020

**7:00 a.m. Continental Breakfast**

**8:00 Pitfalls of Nerve Conduction Studies**

Devon I. Rubin, M.D.

**8:45 Evaluation of Cranial Nerves**

Benn E. Smith, M.D.

**9:30 Refreshment Break**

**9:45 Technique of Needle Examination**

Devon I. Rubin, M.D.

**10:30 Neuromuscular Ultrasound in the EMG Lab**

James C. Watson, M.D.

*Continued*



**11:30 Lunch****12:30 p.m. NCS Workshops**

**Upper Extremity Motor: Common**  
**Upper Extremity Motor: Uncommon**  
**Upper Extremity: Sensory**  
**Lower Extremity: Motor and Sensory**

Brian A. Crum, M.D.  
 Devon I. Rubin, M.D.  
 Benn E. Smith, M.D.  
 James C. Watson, M.D.

**4:30 Adjourn****Thursday, January 30, 2020****7:00 a.m. Continental Breakfast****8:00 EMG of Uncommon Muscles**

Eric J. Sorenson, M.D.

**9:00 EMG Waveform Analysis: Introduction**

Devon I. Rubin, M.D.

**10:30 Refreshment Break****10:45 EMG Report Writing and Billing**

Benn E. Smith, M.D.

**11:15 Carpal Tunnel Syndrome**

James C. Watson, M.D.

**12:00 p.m. Lunch****12:45 EMG Workshops**

**Common Upper Extremity**  
**Common Lower Extremity**  
**Uncommon Upper Extremity**  
**Miscellaneous and Needle Technique**

Ruple S. Laughlin, M.D.  
 Devin I. Rubin, M.D.  
 Benn E. Smith, M.D.  
 Eric J. Sorenson, M.D.

**4:15 Break for Dinner****5:00 An Evening of EMG Waveforms**

Ruple S. Laughlin, M.D.  
 Devon I. Rubin, M.D.

**9:00 Adjourn****Friday, January 31, 2020****7:00 a.m. Continental Breakfast**

**8:00 Lower Limb Mononeuropathies**  
 Julie A. Khoury, M.D.

**8:45 Ulnar Neuropathy**  
 Ruple S. Laughlin, M.D.

**9:30 Brachial Plexopathy**  
 Sarah E. Berini, M.D.

**10:15 Refreshment Break**

**10:30 Evaluation of Radiculopathies**  
 Eric J. Sorenson, M.D.

**11:15 Evaluation of Peripheral Neuropathy**  
 Michelle L. Mauermann, M.D.

**12:00 p.m. Lunch**

**12:30 Lunch and Learn: Evaluation of Uncommon and Atypical Peripheral Neuropathies**  
 Michelle L. Mauermann, M.D.

**1:15 Neurophysiology of Motor Neuron Disease**  
 Mark A. Ross, M.D.

**2:00 Evaluation of Neuromuscular Junction Disorders**  
 Brent P. Goodman, M.D.

**2:45 Refreshment Break**

**3:00 EMG Approach to Muscle Disease**  
 Elliot L. Dimberg, M.D.

**3:45 Workshops (choose 2)**

**Ultrasound; Repetitive Nerve Stimulation; Single Fiber EMG; Cranial Nerve Conduction Studies**

Sarah E. Berini, M.D.  
 Brent P. Goodman, M.D.  
 Benn E. Smith, M.D.  
 Eric J. Sorenson, M.D.

**5:45 Post-test**

Julie A. Khoury, M.D.

**6:00 Adjourn**

Mayo Clinic College of Medicine and Science designates this live activity for a maximum of 50.0 *AMA PRA Category 1 Credits*<sup>™</sup>. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

**AMA PRA Category 1 Credits<sup>™</sup> Breakdown:**

Option 1 - EMG, EEG and Neurophysiology in Clinical Practice (January 26 – 31, 2020): 50.0 credits

Option 2 - EEG and Neurophysiology in Clinical Practice (January 26 – 28, 2020): 18.75 credits

Option 3 - EMG and Neurophysiology in Clinical Practice (January 28 – 31, 2020): 35.25 credits

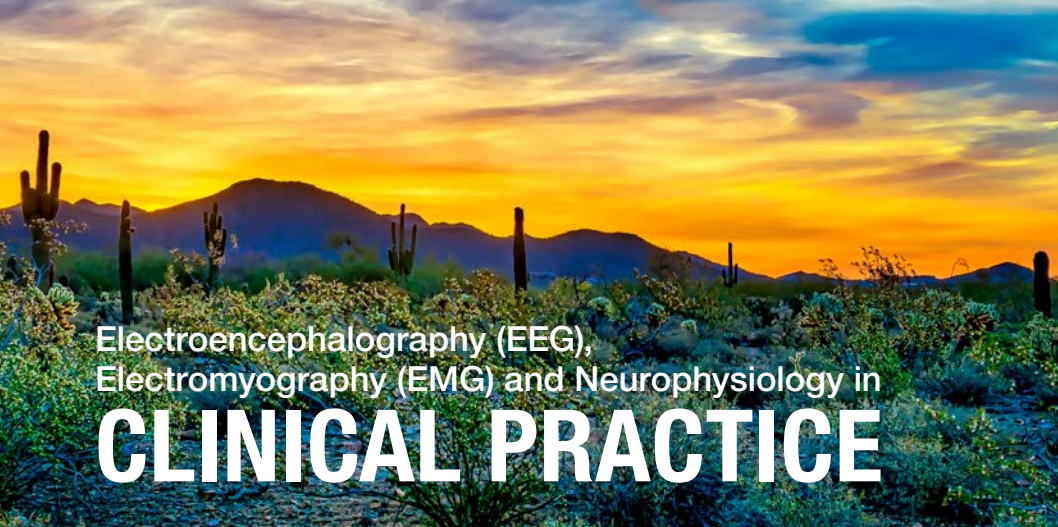
**ABPN** The American Board of Psychiatry and Neurology has reviewed the Electromyography (EMG), Electroencephalography (EEG), and Neurophysiology in Clinical Practice 2020 course and has approved this program as part of a comprehensive Self-Assessment Part II program, which is mandated by the ABMS as a necessary component of Maintenance of Certification.

The activity awards up to 50 Category 1 CME and 8 Self-Assessment credits. The approval period is for October 6, 2017 – October 6, 2020. Diplomates must achieve a score of 80 percent within two attempts in order to receive credit.

**AOA** The American Osteopathic Association designates this program for a maximum of 50.0 AOA Category 2-A credits.

**Other Healthcare Professionals**

A certificate of attendance will be provided to other healthcare professionals for requesting credits in accordance with state nursing boards, specialty societies, or other professional associations.



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In support of improving patient care, Mayo Clinic College of Medicine and Science 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.

**MAYO CLINIC**

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**Phone:** (480) 301-4580

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(Phone registrations not accepted—online only)