

PLEASE NOTE: All program details are preliminary and subject to change/completion.

PRELIMINARY PROGRAM AT-A-GLANCE

	THURSDAY JANUARY 14	FRIDAY JANUARY 15	SATURDAY JANUARY 16	SUNDAY JANUARY 17
7:00 AM		PARALLEL SEMINARS: <u>MRI & CT PHYSICS</u> oo	PARALLEL SEMINARS: <u>FETAL NEUROLOGY</u> oo	<u>NEUROSONOLOGY</u> <u>EXAM</u>
7:30 AM				
8:00 AM		<u>ULTRASOUND PHYSICS</u>	<u>TCD IN THE ICU</u>	
8:30 AM		EXHIBITS	BREAK	
9:00 AM		<u>PARALLEL</u> <u>COURSES</u>	<u>PARALLEL</u> <u>COURSES</u>	
9:30 AM		(MRI & NEUROSONOLOGY)	(MRI & NEUROSONOLOGY)	
10:00 AM		EXHIBITS	BREAK	
10:30 AM		<u>MRI/NS COURSES</u>	<u>MRI/NS COURSES</u>	
11:00 AM		(CONTINUED)	(CONTINUED)	
11:30 AM		PRESIDENTIAL LUNCH	INDUSTRY LUNCH	
12:00 PM		<u>MRI /</u> <u>NEUROSONOLOGY</u>	<u>MRI /</u> <u>NEUROSONOLOGY</u>	
12:30 PM		<u>PARALLEL</u> <u>COURSES</u>	<u>PARALLEL</u> <u>COURSES</u>	
1:00 PM	<u>NEUROIMAGING</u> <u>BOOTCAMP</u> <u>FOR</u> <u>ADVANCED</u> <u>PRACTICE</u> <u>PROVIDERS</u>	<u>ADVOCACY &</u> <u>BUSINESS</u>	<u>SELF ASSESSMENT</u> <u>EXAM</u>	PLEASE NO THIS SCHEDU SUBJECT T CHANGE
1:30 PM		<u>SYMPOSIUM:</u> <u>STROKE</u>	<u>SYMPOSIUM:</u> <u>PET & SPECT</u>	
2:00 PM			BREAK	
2:30 PM		<u>MRI /</u> <u>NEUROSONOLOGY</u>	<u>SYMPOSIUM:</u> <u>TELENEUROLOGY</u>	
2:30 PM		<u>PARALLEL</u> <u>WORKSHOPS</u>	NETWORKING SOCIAL	
3:00 PM				
3:30 PM				
4:00 PM				
4:30 PM				
5:00 PM				
5:30 PM				
6:00 PM		EXHIBITS & RECEPTION		
6:30 PM	AWARDS			
7:00 PM	KEYNOTE: <u>THE FULL SPEED MRI</u>			
7:30 PM				
8:00 PM				
8:30 PM				
9:00 PM				
9:30 PM				

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Thursday, January 14, 2016

Neuroimaging Bootcamp for Advanced Practice Providers and Junior Physicians

CME: 4.75 hours

1:00 pm – 6:00 pm, Thursday, January 14, 2016

Course Directors Ryan Hakimi, DO, MS and Emma Fields APRN-CNP

Course Description

This course will address normal brain anatomy, vascular lesions (strokes, arteriovenous malformation, and cerebral aneurysms), CNS neoplasms, and demyelinating lesions. Case-based learning will be utilized to present correlation of clinical findings and various neuroimaging modalities (MRI/CT/CTA). We will also introduce Transcranial Doppler and carotid ultrasound imaging principles and their clinical applications for both inpatient and outpatient settings.

Learning Objectives

- Identify ischemic versus hemorrhagic lesions on head CT and MRI studies
- Be able to appropriately use neuroimaging studies (CT/CTA/MRI/TCD/Carotid Duplex) to evaluate patients with neurological symptoms
- Be able to interpret/link the patients' clinical neurologic findings in relation to the lesions on the neuro-imaging.

Schedule

1:00 pm – 1:30 pm	Introduction to CT and CTA Imaging Principles Ryan Hakimi, DO, MS and Emma Fields APRN-CNP
1:30 pm – 2:00 pm	Introduction to MRI /MRA Imaging Principles Ryan Hakimi, DO, MS and Emma Fields APRN-CNP
2:00 pm – 2:30 pm	Introduction to TCD and Carotid Duplex Principles Ryan Hakimi, DO, MS and Emma Fields APRN-CNP
2:30 pm – 3:00 pm	Hemorrhagic lesions as seen on Head CT/MRI Ryan Hakimi, DO, MS and Emma Fields APRN-CNP
3:00 pm – 3:30 pm	Ischemic lesions as seen on Head CT/MRI Ryan Hakimi, DO, MS and Emma Fields APRN-CNP
3:30 pm – 3:45 pm	Break
3:45 pm – 5:50 pm	Putting it all together: Case-Based Learning 25 minutes each. Ryan Hakimi, DO, MS and Emma Fields APRN-CNP Case 1: Acute Ischemic Stroke Case 2: Hypertensive Intracranial Hemorrhage Case 3: Aneurysmal Subarachnoid Hemorrhage Case 4: Glioblastoma Multiforme Case 5: Demyelinating Disease
5:50 pm – 6:00 pm	Questions

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The Full-Speed MRI Project

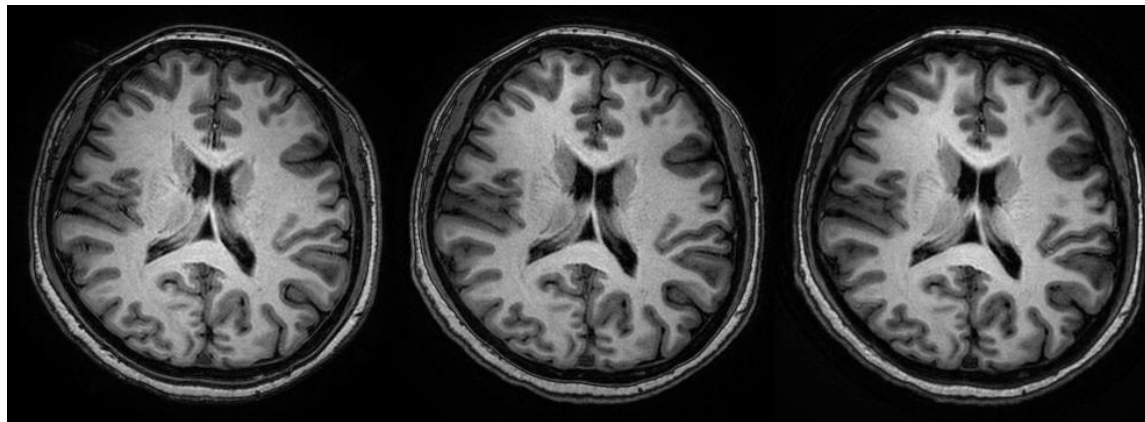
CME: None

7:30 pm – 8:30 pm, Thursday, January 14, 2016

Keynote Lecture James G. Pipe, PhD

Course Description

The "Full Speed MRI" project pursues the aspiration to deliver the diagnostic content of MRI with the cost and convenience of a chest Xray. The immediate goal is the solution of all engineering challenges to increased scanning efficiency using "Spiral MRI", which also maintain or increase the clinical robustness seen today. The MR Technology Design Group (MRTDG) at BNI has shown theoretically, and demonstrated with in-vivo data, that lengthening the data acquisition, or "ADC" time, of many Spiral MR scans allows one to reduce scan time while simultaneously increasing the image SNR. This important and distinct advantage of using Spiral MRI has not been utilized by any vendor to date, due to the requirement of additional calibration and reconstruction computation. The MRTDG has been developing the infrastructure to make this realizable in a clinical setting, using current hardware. An optimistic, but achievable goal is to obtain high resolution (3mm thick, 0.6mm in-plane) contiguous images over the whole brain with good SNR (> 20) in roughly 30 seconds per scan, making possible a complete, high quality brain MRI exam in 5 minutes. Spiral MRI also has the advantages of mitigating motion and pulsatile flow artifact, nearly eliminating "Gibbs ringing" artifact, and is implemented in nearly all cases with full Fat/Water separation. Full Speed MRI is a several-year project, but current data are compelling, and the successes and remaining challenges will be shared in this presentation.



Conventional	Spiral	Spiral
ADC = 5ms	ADC = 6ms	ADC=20ms
Scan time = 4:50	Scan time = 4:26	Scan time = 2:50
SNR = 38	SNR = 37	SNR = 50

Fig. 1. Example images of TFE (MP-RAGE) images from fully-sampled whole brain data sets with comparable contrast, FOV, and resolution. The Spiral scan on the right is both faster, and has higher SNR, than the conventional and Spiral MR images with shorter "ADC" data acquisition time. Within the scope of linear reconstruction methods, there is no other way to achieve these two traits simultaneously using the same hardware.

Friday, January 15, 2016

Concurrent Breakfast Seminar: A Practical Approach to Understanding MRI and CT Physics

CME: 1.5 hours

7:00 am – 8:30 am, Friday, January 15, 2016

Course Director Joseph V. Fritz, PhD

Course Description

The purpose of this course is to provide a foundation for how MRI and CT images are created, and extend on basic principles to describe the manipulations that are used to create the extensive varieties of tissue contrast and visualization.

Learning Objectives

- Understanding of MRI Fundamentals. Review the underlying physics of imaging generation using magnetic resonance, and summarize parameters used to define standard and advanced brain and spine MRI protocols, including T1, T2, IR/FLAIR/STIR, SE vs FE vs SWI, EPI, DWI, MRA, Perfusion, fMRI, Spectroscopy and DTI. Be able to appropriately use neuroimaging studies (CT/CTA/MRI/TCD/Carotid Duplex) to evaluate patients with neurological symptoms
- Understanding of CT Fundamentals. Review the underlying physics of current generation CT equipment, including parameters that are used to control tissue contrast, resolution, speed. CT Angiography, CT Perfusion, Metal Artifact Reduction and visualization techniques will also be discussed.
- Recognize and mitigate artifacts. The cause of artifacts in both MRI and CT will be reviewed and techniques that mitigate them will be presented.
- Understand safety considerations related to CT radiation dose and MRI magnetic field affects.

Concurrent Breakfast Seminar: Applied Principles of Ultrasound Physics and Fluid Dynamics

CME: 1.5 hours

7:00 am – 8:30 am, Friday, January 15, 2016

Course Director Andrei Alexandrov, MD, RVT

Course Description

This seminar is being offered to review ultrasound physics and fluid dynamics, demonstrate typical imaging artifacts and waveforms that interpreting physicians and sonographers need to identify and correct and to interact with the audience and answer questions about these typical findings. Course faculty will discuss applied principles of ultrasound physics and fluid dynamics using a set of approximately 50 typical images/waveforms. Discussion format includes brief case/symptom presentation and an ultrasound image. Faculty will ask the audience to interpret the image and engage in discussion of differential diagnosis and common pitfalls that are linked to ultrasound physics and fluid dynamics.

Learning Objectives

- Review most common ultrasound imaging artifacts and spectral waveforms.

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- Learn key principles of applied ultrasound physics and fluid dynamics that are responsible for these findings.
- Learn how to differentiate, optimize, and interpret typical ultrasound imaging artifacts and spectral waveforms.

Concurrent Session: Current Topics in MR/CT Part I

CME: 4.75

9:00 am - 3:00 pm, Friday, January 15, 2016

Course Directors John Bertelson, MD and Gabriella Szatmary, MD, PhD

Course Description

This course will review a variety of neuroimaging topics of particular interest to the practicing neurologist.

Learning Objectives

- New insights into the latest neuroimaging technologies
- New insights into the pathophysiology of a wide range of neurological disorders
- Gain the ability to better apply neuroimaging technologies to the bedside differential diagnosis of various neurological disorders

Schedule

9:00 am – 9:40 am	Use of Newer MRI Sequences in Clinical Practice Bijal Mehta, MD, MPH
9:40 am – 10:20 am	Role of Neuroimaging in Brain Recovery Ramy El Khoury, MD
10:20 am – 10:30 am	Discussion
10:30 am – 10:45 am	BREAK / EXHIBITS
10:45am – 11:20am	Intracranial Cysts John Bertelson, MD
11:20 am – 11:55 am	Critical Care Imaging Joshua P. Klein, MD, PhD
11:55 am – 12:00 pm	Discussion
12:00 pm – 1:00 pm	Lunch Break
1:00 pm – 1:50 pm	Epilepsy Imaging Joshua P. Klein, MD, PhD
1:50 pm – 2:40 pm	Imaging in Dementia John Bertelson, MD
2:40 pm – 3:00 pm	Discussion

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Concurrent Session: Current Topics in Neurosonology Part I and Part II

CME: 4.75

9:00 am - 3:00 pm, Friday, January 15, 2016

Course Directors Zsolt Garami, MD (Part I) and Alexander Razumovsky, PhD, FAHA (Part II)

Course Description

This course will highlight basics of Transcranial Doppler (TCD) and carotid ultrasound physics as well as techniques of examinations, their clinical applications, and interpretations. Part I is for individuals seeking basic knowledge of Neurosonology.

Part II is for individuals interested in performing and interpreting carotid duplex and Transcranial Doppler studies. Exposure to practical application and interpretation in the form of real case presentations will be done. This part of the Advanced Neurosonology Course will provide attendees with an opportunity to review cases with expert faculty. Case materials will include both carotid duplex and Transcranial Doppler examinations, and will highlight examples showing multiple concepts, unusual findings, and artifacts. The format will include team-teaching with presentation of cases and time for discussion and questions between cases.

Learning Objectives

- Demonstrate a basic knowledge of the extra- and intracranial arterial vascular anatomy, physiology, and pathophysiology.
- Recognize characteristic patterns of blood flow in the extra- and intracranial vessels.
- Identify proper techniques for performing comprehensive carotid and TCD studies. Relate normal and abnormal blood flow patterns to clinical presentation.
- Recognize and interpret carotid and TCD ultrasound findings. Understand clinical usefulness and limitations of the carotid and TCD ultrasound evaluations.

Schedule – Part I

9:00 am – 9:20 am	Carotid duplex protocol Esther Collado, RN, RVT
9:20 am – 9:40 am	Transcranial Doppler Protocol Zsolt Garami, MD, RPVI
9:40 am – 10:00 am	Reporting Requirement Marge Hutchisson, RVT, RDCS
10:00 am – 10:20 am	Waveform Recognition Andrei Alexandrov, MD, RVT
10:00 am – 10:20 am	Discussion
10:30 am – 10:45 am	BREAK / EXHIBITS
10:45 am – 11:00 am	Subclavian vs Vertebral Steal Zsolt Garami, MD, RPVI
11:00 am – 11:15 am	TCD in the NICU - Braindeath Alexander Razumovsky, MD, PhD
11:15 am – 11:30 am	Carotid IMT value in cardiovascular risk assessment Esther Collado, RN, RVT
11:30 am – 11:45 am	Waveform Recognition Andrei Alexandrov, MD, RVT

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11:45 am – 12:00 pm	Reporting Requirement Marge Hutchisson, RVT, RDCS
12:00 pm – 1:00 pm	Break Presidential Address Luncheon

Schedule – Part II

1:00 pm – 1:30 pm	Classification of extracranial carotid artery stenosis Charles Tegeler, MD
1:30 pm – 2:00 pm	Classification of intracranial stenosis Andrei Alexandrov, MD, RVT
2:00 pm – 3:00 pm	Role of Transcranial Doppler for Monitoring Cerebral Vasospasm in Neurocritical Care: Time for Reassessment Alexander Razumovsky, PhD, FAHA

Advocacy and Business of Neuroimaging

CME: None

3:00 pm – 4:00 pm, Friday, January 15, 2015

Course Director Joseph V. Fritz, PhD

Course Description

There are quality of care and business advantages to operating advanced imaging within a clinical practice. Tomographic imaging is an important diagnostic tool that is regularly used by all neurologists. A growing number of neurologists are considering ways to form larger groups that can mitigate increasing overhead through economies of scale. Such groups should be able to justify operating imaging in-house. This course aims to clarify the business and regulatory issues involved in operating in-house imaging services. An update will be given on advocacy efforts through the American Academy of Neurology, the Coalition for Patient Centered Imaging, and the American Society of Neuroimaging.

Learning Objectives

- Understand the pro forma analysis to justify the purchase of imaging equipment and identify strategies to improve profitability
- Review regulatory and accreditation requirements.
- Discuss future trends in imaging authorization and appropriate use criteria, and the impact of MACRA on maintaining the in-office ancillary exemption

Schedule

3:00 pm – 3:30 pm	Business of Neuroimaging Joseph V. Fritz, PhD
3:30 pm – 4:00 pm	Advocacy in Neuroimaging Update Vernon D. Rowe, MD

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Symposium: Hyper-acute Imaging of Stroke: New Frontiers and Novel Approaches

CME: 2 hours

4:00 pm – 6:00 pm, Friday, January 15, 2016

Course Director Nerses Sanossian, MD, FAHA

Course Description

In this session we will review imaging of stroke patients in the hyper-acute phase prior to leaving the Emergency Department. We will review what constitutes a standard evaluation, what is the current cutting edge in imaging paradigm, as well as discussing future directions. The course will cover imaging modalities including ultrasound, CT/MRI, angiography, as well as the emerging field of prehospital imaging. Course participants will gain knowledge relating to novel imaging sequences and their integration into a rapid imaging paradigm designed at identifying patients who would benefit from aggressive therapy.

Learning Objectives

- Review of the current imaging guidelines and standard of care for acute ischemic stroke
- Review of the current imaging guidelines and standard of care for acute intracerebral hemorrhage
- Utilization of ultrasound in the emergent evaluation of stroke patients in the Emergency Department
- Review of the potential role of prehospital imaging in stroke evaluation and treatment
- Comprehensive review of vessel imaging: when to order angiography and which modality to use

Schedule

4:00 pm – 4:05 pm	Rapid Imaging in the Evaluation and Treatment of Acute Stroke Introduction and broad overview Nerses Sanossian, MD, FAHA
4:05 pm – 4:35 pm	Carotid Ultrasound and TCD for Rapid Diagnosis in the Emergency Department Mark N. Rubin, MD
4:35 pm – 5:05 pm	Advanced Imaging for Mobile Stroke Unit: Exploring the First 60 Minutes of Ischemia Andrei Alexandrov, MD, RVT
5:05 pm – 5:35 pm	Vessel imaging in the Earliest Phase of Stroke Adnan Qureshi, MD
5:35 pm – 5:50 pm	Hyper-acute Imaging of Intracerebral Hemorrhage: Is Non-contrast CT Enough? Nerses Sanossian, MD, FAHA

Concurrent Session: MRI Workshop

CME: 3 hours

7:00 pm – 10:00 pm, Friday, January 15, 2016

Course Directors Eduardo Gonzalez-Toledo, MD and Patrick Capone, MD, PhD
Faculty Christina Ledbetter, PhD

Course Description

This workshop provides participants with an opportunity to become familiar with some of the basic tools of functional imaging that are being used for basic neurological research and are gradually finding increasing clinical utility. The hands-on tutorial will provide both some experience with their use and familiarization with some of the on-line sites and software that assist the interested researcher or clinician with these techniques.

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Strong computer skills are not required. Unlike previous years hands on MRI Workshop this program is not designed to instruct the participants on how to interpret standard clinical studies.

This workshop will train the participants to perform 3D reconstructions of the brain, measure cortical thickness, obtain maps of white matter connectivity, reconstruct white matter tracts, measure fractional anisotropy and obtain maps of resting state fMRI in their computers (preferably PCs) using free software downloaded from internet. Detailed instructions to download, install and operate the software will be provided. We will install the software during the workshop in participant's computers. We will send the basic software to participants by email before the Course. During the workshop participants will follow step-by-step instructions to reach the final result. The participants who don't want to bring their computers will receive the tutorials "for physicians" and will also have the live instruction during the meeting.

Learning Objectives

- Recognize and use file formats DICOM, analyze, NiftI, nrrd
- Review equipment and expertise requirements in performing selected tasks with faculty using hands-on, instructional video, or real-time case recordings.
- Perform cortical reconstruction and obtain brain segmentation, cortical thickness and white matter connectivity
- Perform resting state fMRI with seed methodology and compare patient with normal subjects

Schedule

7:00 pm - 7:30 pm	Image formats: DICOM, analyze, nrrd, NiftI and How to read a DICOM header Eduardo Gonzalez-Toledo, MD
7:30 pm - 8:30 pm	How to reconstruct the cerebral cortex using BrainSuite and Segmentation and cortical thickness Eduardo Gonzalez-Toledo, MD
8:30 pm - 9:00 pm	Working with DTI: 3D-Slicer, Measuring fractional anisotropy, Color coded maps, and Fiber tracking Eduardo Gonzalez-Toledo, MD
9:00 pm - 10:00 pm	Resting state fMRI, Matlab, Statistical parametrical mapping (spm), REST Eduardo Gonzalez-Toledo, MD

Concurrent Session: Neurosonology Workshop

CME: 3 hours

7:00 pm – 10:00 pm, Friday, January 15, 2016

Course Directors Andrei Alexandrov, MD, RVT and Zsolt Garami, MD
Faculty Mark N. Rubin, MD

Course Description

This workshop will provide structured hands-on and question and answer sessions in carotid/vertebral duplex and specific transcranial Doppler techniques complete testing, emboli detection, right-to-left shunt detection and assessment of vasomotor reactivity. Both the beginner and experienced users are encouraged to attend. The workshop will also provide an opportunity to try the latest equipment, to meet experts, and to discuss various aspects of Neurosonology in small groups. The workshop is designed to meet the need for basic and

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advanced knowledge of insonation techniques, technological advances, and practical aspects of cerebrovascular testing.

Learning Objectives

- Review complete scanning protocols for diagnostic carotid/vertebral duplex and TCD examinations, vasomotor reactivity, emboli detection, right-to-left shunt testing, and monitoring procedures (thrombolysis, head-turning, peri-operative testing), and IMT measurements.
- Review equipment and expertise requirements in performing selected tasks with faculty using hands-on, instructional video, or real-time case recordings.

Saturday, January 16, 2016

Concurrent Breakfast Seminar: Diagnostic and Interventional Fetal Neurology

CME: 1.5 hours

7:00 am – 8:30 am, Saturday, January 16, 2016

Course Director Adnan I. Qureshi, MD

Course Description

Antenatal diagnosis of neurological disorders such as spina bifida, hydrocephalus, or intraventricular hemorrhage is currently possible using fetal ultrasound and magnetic resonance imaging (MRI). In utero treatment of myelomeningocele in fetuses with spina bifida may preserve neurologic function by preventing spinal cord exposure to amniotic fluid, reverse hindbrain herniation, and diminish the need for post-natal ventriculoperitoneal shunt placement as shown in the Management of Myelomeningocele Study' (MOMS) trial. While fetal cardiology is a well-developed subspecialty within pediatric cardiology, involvement of neurologists and particularly neuroimagers is required to develop the field of fetal neurology. Currently, both cardiologists and family medicine physicians have a pathway for certification for performing fetal ultrasound. The symposium will lead to recognition and awareness among the neurology community to establish formal certification processes.

Learning Objectives

- To review unique aspects of fetal ultrasound and MRI principles in regards to fetal neuroimaging.
- To review antenatal neuroimaging findings in normal fetuses and in diseases such as spina bifida, hydrocephalus, intraventricular hemorrhage, Chiari malformation, and cortical dysgenesis syndromes.
- To review recent data on imaging of cerebral arteries and veins in fetuses.
- To provide introduction into prenatal interventional procedures with emphasis on minimally invasive spina bifida closure.

Concurrent Breakfast Seminar: TCD in the ICU – TCD for early detection of vasospasm and ICP tailored management

CME: 1.5 hours

7:00 am – 8:30 am, Saturday, January 16, 2016

PLEASE NOTE: All program details are preliminary and subject to change/completion.

Course Director Gregory Kapinos, MD, MS

Course Description

The lecturer will cover the reason why treating all patients with intracranial pressure (ICP) elevation with the same best one-shot therapy, above a certain threshold of mean ICP, has been proven to have limited impact on outcomes after acute cerebral injury. Reducing ICP or elevating mean arterial pressure (MAP) to conserve cerebral perfusion pressure (CPP) has been debated by opposite schools of thoughts.

This course will reveal that a certain group of patients at risk of raised ICP can benefit from ICP reduction by osmotherapy alone, another distinct group can benefit from MAP augmentation alone and finally a third select group usually benefits better from dual-targeted treatment, while a fourth group could receive no treatment. (Table)

The scholar will explain how to ascertain separately with Transcranial Doppler (TCD) if the preponderant pathophysiological issue for one particular patient is decreased cerebral compliance or if the issue is more inadequate cerebral perfusion. The lecturer will cover how TCD can help allocate judicious therapeutic nuanced therapy in the neuro-ICU and ER.

This course will cover technical aspects on how to obtain pulsatility index, resistivity index and end-diastolic velocities by TCD.

This course then teaches how to use the results in all acute neurologic injuries at risk of cerebral edema and/or ischemia in order to tailor/individualize the ICP treatment for that particular patient in the ER or Neuro-ICU. It is supported by one institutional preliminary data on 5 patients.

Learning Objectives

- Understand why brain compliance is more important than true ICP. Understand why Lund and Robertson's concepts on treatment of ICP seem to clash but can be reconciled, once heterogeneity of victims pathophysiology is grasped.
- Learn how to obtain peak systolic velocities, end-diastolic velocities, calculate pulsatility and resistivity index, with classic TCD machines as well as with transcranial echography from regular ICU ultrasound machines. Learn how optic nerve sheath diameter can help refine these assessments of compliance and perfusion.
- Learn how to interpret these results to guide the therapeutic selection for vasospasm as well as for ICP elevation (precision medicine for cerebral ischemia with a novel 4-tier tailored ICP therapy): not all accelerations on TCD deserve a lot of fluids after SAH and certain types of patients may be better suited to mannitol than hypertonic saline for osmotherapy and mechanical ventilation as well as vasopressors can be adjusted to the needs of one particular patient, based on the TCD results for ICP abnormality.

Schedule

7:00 am – 8:00 am	TCD for management of vasospasm Gregory Kapinos, MD, MS
8:00 am – 8:30 am	TCD for management of ICP Gregory Kapinos, MD, MS

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Concurrent Session: Current Topics in MR/CT Part II

CME: 4.75

9:00 am – 3:00 pm, Saturday, January 16, 2016

Course Directors John Bertelson, MD and Gabriella Szatmary, MD, PhD

Course Description

This course will review a variety of neuroimaging topics of particular interest to the practicing neurologist.

Learning Objectives

- New insights into the latest neuroimaging technologies
- New insights into the pathophysiology of a wide range of neurological disorders
- Gain the ability to better apply neuroimaging technologies to the bedside differential diagnosis of various neurological disorders

Schedule

9:00 am – 9:40 am	Neuro-oncology Laszlo Mechtler, MD, FAAN
9:40 am – 10:20 am	Imaging in Patients with Visual Complaints Gabriella Szatmary, MD, PhD
10:20 am – 10:30 am	Discussion
10:30 am – 10:45 am	BREAK / EXHIBITS
10:45am – 11:20 am	Congenital Malformations Jennifer McVige, MD, MA
11:20 am – 11:55am	Case Presentation DENT Fellows
11:55 am – 12:00 pm	Discussion
12:00 pm – 1:00 pm	Lunch Break
1:00 pm – 1:50 pm	Imaging of Toxic-Metabolic Disorders Dara G. Jamieson, MD
1:50 pm – 2:40 pm	Spine Imaging Patrick Capone, MD, PhD
2:40 pm – 3:00 pm	Discussion

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Concurrent Session: Current Topics in Neurosonology Part II

CME: 4.75

9:00 am – 3:00 pm, Saturday, January 16, 2016

Course Director Alexander Razumovsky, PhD, FAHA

Course Description

This section of the advanced Neurosonology course will include discussion of the clinical value of the intima-media thickness evaluation, advanced studies for specific TCD applications, like for patients after SAH, traumatic brain injuries, ischemic stroke, cryptogenic stroke, application and interpretation of TCD for patients with PFO. Advanced TCD monitoring during cardiovascular and cardiothoracic surgeries. The faculty will discuss TCD ultrasound technique and interpretation of different procedures. Ample time will be left for questions and discussion. Upon completion of this course, participants will be able to identify abnormal findings. Interpretation and clinical applications of the above-mentioned specific carotid duplex and TCD applications will be provided. The course material is designed for participants seeking advanced knowledge of Neurosonology and its current clinical applications.

Learning Objectives

- Identify techniques and protocols for performing advanced cerebrovascular studies using carotid duplex scans, real-time spectral Doppler analysis and understand the clinical usefulness and limitations of the carotid duplex and TCD examinations.
- Achieve experience in acquiring and interpreting advanced carotid duplex and TCD testing in patients with cerebrovascular abnormalities, i.e., acute stroke, extra- and intracranial stenosis, subarachnoid and intracerebral hemorrhage, traumatic brain injury.
- Recognize characteristic patterns of cerebral blood flow velocities pattern through cerebral vessels and relate normal and abnormal cerebrovascular blood flow to clinical presentations, thus improving quality of diagnostic testing and patients' outcomes

Schedule

9:00 am – 10:30 am	TCD and Carotid Duplex Studies Interpretations Charles Tegler, MD and faculty
10:30 am – 10:45 am	Break
10:45 am – 12:00 pm	TCD and Carotid Duplex Studies Interpretations (cont.) Charles Tegler, MD and faculty
12:00 pm – 1:00 pm	Break Industry-Sponsored Lunch
1:00 pm – 1:20 pm	From carotid intima-media thickness to plaque: consensus and new developments Alexander Razumovsky, MD, PhD
1:20 pm – 2:00 pm	TCD in the Out Patient and Ambulatory Settings Mark N. Rubin, MD
2:00 pm – 2:20 pm	Specific TCD applications for Patients with acute stroke Andrei Alexandrov, MD, RVT
2:20 pm – 2:40 pm	Specific TCD Applications for Patients after Traumatic Brain Injury Alexander Razumovsky, PhD, FAHA
2:40 pm – 3:00 pm	TCD Monitoring during invasive cardiovascular procedures Zsolt Garami, MD

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Self Assessment Exam

CME: 1.5

3:00 pm – 4:30 pm, Saturday, January 16, 2016

Course Director Dara G. Jamieson, MD

Course Description

The Neuroimaging Self-Assessment Examination (SAE) is intended to be a Neuroimaging self-assessment tool, providing participants with a structured opportunity to gain insight into their own personal strengths and weaknesses relative to their peers in the provision and clinical evaluation of Neuroimaging studies. Knowledge and skills to be assessed in this setting will include identification of normal anatomical structures, accuracy in the identification of specific pathologies on MRI and CT studies, formulation of Neuroimaging differential diagnoses, basic MRI and CT physics knowledge, and the ability to correlate imaging findings with clinical history. Subject matter covered by the SAE will include diagnostic neuroimaging of common neurological disorders such as cerebrovascular disease, multiple sclerosis, CNS trauma, tumors and cysts, infections, toxic/metabolic disorders and diseases of the spinal cord and surrounding tissues. Knowledge of basic MRI and CT physics principles essential for protocol design, safety, recognition of artifact and differentiation of tissue types based upon CT density and MRI signal characteristics will also be assessed. The SAE will be presented in a multiple choice PowerPoint format projected on a screen to the audience with one minute allotted per question. The subject matter will include clinical neuroimaging questions as well as questions related to imaging physics and technology. Each question will consist of a short text passage describing a clinical vignette or set of specific imaging-related parameters, accompanied by images or diagrams, followed by five answer options in multiple-choice format. Attendees will mark the single best answer to each question on a provided answer sheet, which will be self-graded at the end of the testing period. Each question will be reviewed quickly, with an explanatory answer provided at the end of the one hour testing period. Clinical cases will incorporate detailed, high-resolution MRI and CT images of the brain and spine (including MR and CT angiography).

Learning Objectives

- Become more familiar with personal strengths and weaknesses in the identification of normal versus abnormal imaging findings.
- Become more familiar with personal strengths and weaknesses in formulating a differential diagnosis pertaining to specific imaging presentations.
- Achieve greater levels of confidence in acquiring and interpreting MRI and CT studies in the assessment of common neurological disorders such as MS, stroke, tumor and trauma.
- Be able to identify areas of future study to increase levels of competence in the interpretation of diagnostic Neuroimaging cases.
- Be able to identify areas of future study to increase levels of competence in MRI and CT physics.

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Symposium: Current Clinical Nuclear Neurology with PET, SPECT and Scintigraphy

CME: 1 hour

4:30 pm – 5:30 pm, Saturday, January 16, 2016

Course Director Robert S. Miletich, MD, PhD

Course Description

Although most in the neurology and clinical neuroscience communities have some familiarity with positron emission tomography (PET) and single photon emission computed tomography (SPECT), knowledge of the practical utilization of these modalities for clinical patients is not as prevalent. This lack of knowledge of applied Nuclear Neurology extends to what clinical questions can be addressed by PET, SPECT and scintigraphy, what radiopharmaceuticals are clinically available (ie. approved by FDA) and what types of studies can be performed. This course focuses on practical, present day, clinical application of Nuclear Neurology, presenting some basic science, but illustrating concepts and applications through clinical material from the speaker's daily clinical practice. The capacity of Nuclear Neurology to address management questions which arise in multiple disease states will be discussed. Radiopharmaceuticals available clinically will be presented. Imaging indications in the disease states of dementia, neurodegenerative disease, neuro-oncology, epilepsy, parkinsonism, movement disorders, cerebrovascular disease, neuropsychiatric disorders and other less common settings will be reviewed. Many third-party payers currently make reimbursements based on these indications. Standard and newly developed imaging techniques will be discussed. Finally, government-mandated training requirements for Nuclear Neurology will be presented. By measuring some aspect of nervous system function, Nuclear Neurology provide information that often is unobtainable from other sources, thus facilitating more rationale and cost-effective management.

Learning Objectives

- Know what kind of Nuclear Neurology studies are currently available to help manage patients, including which radiopharmaceuticals are FDA-approved.
- Understand what clinical questions can be addressed in different neurologic disease states by clinically available PET, SPECT and scintigraphy.
- Decide how best to incorporate Nuclear Neurology into clinical practice, either through collaboration with other physician groups or pursuing government-mandated nuclear training.

Symposium: Imaging in Teleneurology

CME: 2 hours

6:00 pm – 8:00 pm, Saturday, January 16, 2016

Course Director Neeraj Dubey, MD, FAAN

Course Description

The purpose of this course is to integrate imaging and teleneurology. Teleneurology is increasingly becoming an important tool in community hospitals to evaluate patients with acute neurological events and the role of imaging in teleneurology is substantial. The treating teleneurologist has to rely on wide-ranging radiological services, including CT CTA, MRI, MRA, EEG, and Doppler studies to provide prompt, effective, and meaningful acute care. The role of teleneurologists in assessing patients with stroke, cord compression, epilepsy, neuro ICU care, change in mental status, etc. depends largely on being able to confidently read images, make meaningful interpretation, and direct care.

PLEASE NOTE: All program details are preliminary and subject to change/completion.

Learning Objectives

- Role of imaging in teleneurology consults
- Challenges in imaging and management of patients with teleneurology services

Schedule

6:00 pm – 7:00 pm	University of Pittsburgh Medical Center Review – Teleneurology and Imaging Maxim D. Hammer, MD
7:00 pm – 8:00 pm	Private Practice Teleneurology – Management of ICH and Acute Stroke, Case Reviews Leonard D. DaSilva, MD

Neuroimaging Bootcamp for Advanced Practice Providers and Junior Physicians

CME: 4.75 hours

1:00 pm – 6:00 pm, Thursday, January 14, 2016

Course Directors Ryan Hakimi, DO, MS and Emma Fields APRN-CNP

Course Description

This course will address normal brain anatomy, vascular lesions (strokes, arteriovenous malformation, and cerebral aneurysms), CNS neoplasms, and demyelinating lesions. Case-based learning will be utilized to present correlation of clinical findings and various neuroimaging modalities (MRI/CT/CTA). We will also introduce Transcranial Doppler and carotid ultrasound imaging principles and their clinical applications for both inpatient and outpatient settings.

Learning Objectives

- Identify ischemic versus hemorrhagic lesions on head CT and MRI studies
- Be able to appropriately use neuroimaging studies (CT/CTA/MRI/TCD/Carotid Duplex) to evaluate patients with neurological symptoms
- Be able to interpret/link the patients' clinical neurologic findings in relation to the lesions on the neuro-imaging.

Schedule

1:00 pm – 1:30 pm	Introduction to CT and CTA Imaging Principles Ryan Hakimi, DO, MS and Emma Fields APRN-CNP
1:30 pm – 2:00 pm	Introduction to MRI /MRA Imaging Principles Ryan Hakimi, DO, MS and Emma Fields APRN-CNP
2:00 pm – 2:30 pm	Introduction to TCD and Carotid Duplex Principles Ryan Hakimi, DO, MS and Emma Fields APRN-CNP
2:30 pm – 3:00 pm	Hemorrhagic lesions as seen on Head CT/MRI Ryan Hakimi, DO, MS and Emma Fields APRN-CNP
3:00 pm – 3:30 pm	Ischemic lesions as seen on Head CT/MRI Ryan Hakimi, DO, MS and Emma Fields APRN-CNP
3:30 pm – 3:45 pm	Break
3:45 pm – 5:50 pm	Putting it all together: Case-Based Learning 25 minutes each. Ryan Hakimi, DO, MS and Emma Fields APRN-CNP Case 1: Acute Ischemic Stroke Case 2: Hypertensive Intracranial Hemorrhage Case 3: Aneurysmal Subarachnoid Hemorrhage

PLEASE NOTE: All program details are preliminary and subject to change/completion.

	Case 4: Glioblastoma Multiforme
	Case 5: Demyelinating Disease
5:50 pm – 6:00 pm	Questions

PLEASE NOTE: All program details are preliminary and subject to change/completion.

The Full-Speed MRI Project

CME: 1 hour

7:30 pm – 8:30 pm, Thursday, January 14, 2016

Keynote Lecture James G. Pipe, PhD

Course Description

The "Full Speed MRI" project pursues the aspiration to deliver the diagnostic content of MRI with the cost and convenience of a chest Xray. The immediate goal is the solution of all engineering challenges to increased scanning efficiency using "Spiral MRI", which also maintain or increase the clinical robustness seen today. The MR Technology Design Group (MRTDG) at BNI has shown theoretically, and demonstrated with in-vivo data, that lengthening the data acquisition, or "ADC" time, of many Spiral MR scans allows one to reduce scan time while simultaneously increasing the image SNR. This important and distinct advantage of using Spiral MRI has not been utilized by any vendor to date, due to the requirement of additional calibration and reconstruction computation. The MRTDG has been developing the infrastructure to make this realizable in a clinical setting, using current hardware. An optimistic, but achievable goal is to obtain high resolution (3mm thick, 0.6mm in-plane) contiguous images over the whole brain with good SNR (> 20) in roughly 30 seconds per scan, making possible a complete, high quality brain MRI exam in 5 minutes. Spiral MRI also has the advantages of mitigating motion and pulsatile flow artifact, nearly eliminating "Gibbs ringing" artifact, and is implemented in nearly all cases with full Fat/Water separation. Full Speed MRI is a several-year project, but current data are compelling, and the successes and remaining challenges will be shared in this presentation.

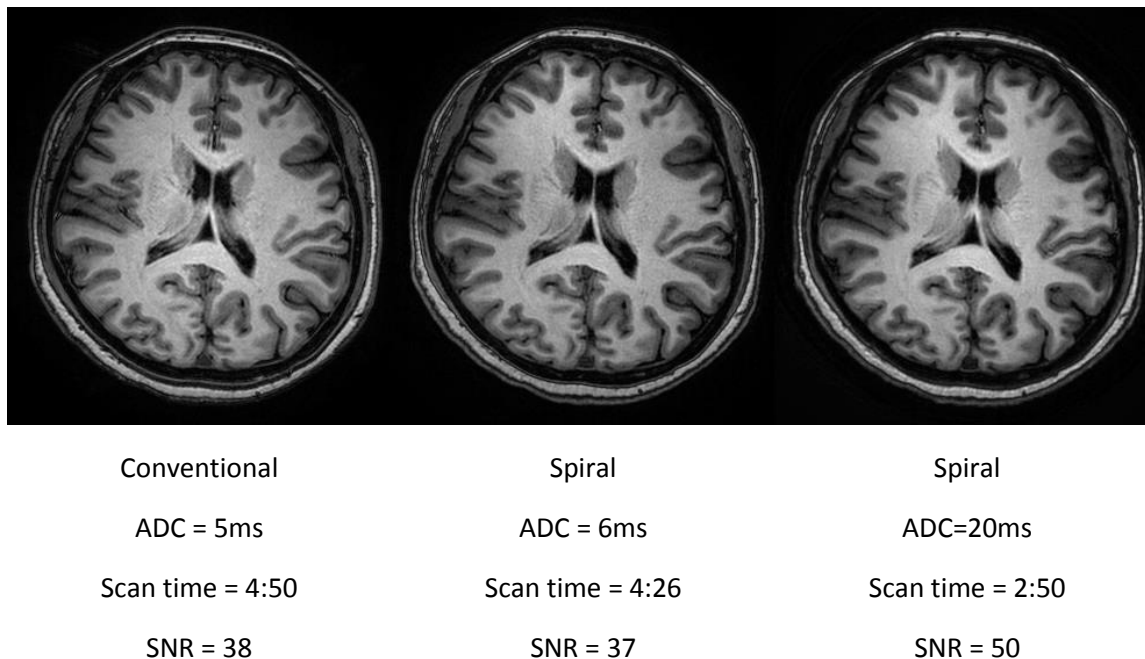


Fig. 1. Example images of TFE (MP-RAGE) images from fully-sampled whole brain data sets with comparable contrast, FOV, and resolution. The Spiral scan on the right is both faster, and has higher SNR, than the conventional and Spiral MR images with shorter "ADC" data acquisition time. Within the

PLEASE NOTE: All program details are preliminary and subject to change/completion.

scope of linear reconstruction methods, there is no other way to achieve these two traits simultaneously using the same hardware.

Friday, January 15, 2016

Concurrent Breakfast Seminar: A Practical Approach to Understanding MRI and CT Physics

CME: 1.5 hours

7:00 am – 8:30 am, Friday, January 15, 2016

Course Director Joseph V. Fritz, PhD

Course Description

The purpose of this course is to provide a foundation for how MRI and CT images are created, and extend on basic principles to describe the manipulations that are used to create the extensive varieties of tissue contrast and visualization.

Learning Objectives

- Understanding of MRI Fundamentals. Review the underlying physics of imaging generation using magnetic resonance, and summarize parameters used to define standard and advanced brain and spine MRI protocols, including T1, T2, IR/FLAIR/STIR, SE vs FE vs SWI, EPI, DWI, MRA, Perfusion, fMRI, Spectroscopy and DTI. Be able to appropriately use neuroimaging studies (CT/CTA/MRI/TCD/Carotid Duplex) to evaluate patients with neurological symptoms
- Understanding of CT Fundamentals. Review the underlying physics of current generation CT equipment, including parameters that are used to control tissue contrast, resolution, speed. CT Angiography, CT Perfusion, Metal Artifact Reduction and visualization techniques will also be discussed.
- Recognize and mitigate artifacts. The cause of artifacts in both MRI and CT will be reviewed and techniques that mitigate them will be presented.
- Understand safety considerations related to CT radiation dose and MRI magnetic field effects.

Concurrent Breakfast Seminar: Applied Principles of Ultrasound Physics and Fluid Dynamics

CME: 1.5 hours

7:00 am – 8:30 am, Friday, January 15, 2016

Course Director Andrei Alexandrov, MD, RVT

Course Description

This seminar is being offered to review ultrasound physics and fluid dynamics, demonstrate typical imaging artifacts and waveforms that interpreting physicians and sonographers need to identify and correct and to interact with the audience and answer questions about these typical findings. Course faculty will discuss applied principles of ultrasound physics and fluid dynamics using a set of approximately 50 typical images/waveforms. Discussion format includes brief case/symptom presentation and an ultrasound image. Faculty will ask the audience to interpret the image and engage in discussion of differential diagnosis and common pitfalls that are linked to ultrasound physics and fluid dynamics.

PLEASE NOTE: All program details are preliminary and subject to change/completion.

Learning Objectives

- Review most common ultrasound imaging artifacts and spectral waveforms.
- Learn key principles of applied ultrasound physics and fluid dynamics that are responsible for these findings.
- Learn how to differentiate, optimize, and interpret typical ultrasound imaging artifacts and spectral waveforms.

Concurrent Session: Current Topics in MR/CT Part I

CME: 4.75

9:00 am - 3:00 pm, Friday, January 15, 2016

Course Directors John Bertelson, MD and Gabriella Szatmary, MD, PhD

Course Description

This course will review a variety of neuroimaging topics of particular interest to the practicing neurologist.

Learning Objectives

- New insights into the latest neuroimaging technologies
- New insights into the pathophysiology of a wide range of neurological disorders
- Gain the ability to better apply neuroimaging technologies to the bedside differential diagnosis of various neurological disorders

Schedule

9:00 am – 9:40 am	Use of Newer MRI Sequences in Clinical Practice Bijal Mehta, MD, MPH
9:40 am – 10:20 am	Role of Neuroimaging in Brain Recovery Ramy El Khoury, MD
10:20 am – 10:30 am	Discussion
10:30 am – 10:45 am	BREAK / EXHIBITS
10:45am – 11:20am	Intracranial Cysts John Bertelson, MD
11:20 am – 11:55 am	Critical Care Imaging Joshua P. Klein, MD, PhD
11:55 am – 12:00 pm	Discussion
12:00 pm – 1:00 pm	Lunch Break
1:00 pm – 1:50 pm	Epilepsy Imaging Joshua P. Klein, MD, PhD
1:50 pm – 2:40 pm	Imaging in Dementia (TBD) John Bertelson, MD / Joseph Masdeu, MD, PhD OR Jennifer McVige / Bob Moorjani
2:40 pm – 3:00 pm	Discussion

PLEASE NOTE: All program details are preliminary and subject to change/completion.

Concurrent Session: Current Topics in Neurosonology Part I and Part II

CME: 4.75

9:00 am - 3:00 pm, Friday, January 15, 2016

Course Directors Zsolt Garami, MD (Part I) and Alexander Razumovsky, PhD, FAHA (Part II)

Course Description

This course will highlight basics of Transcranial Doppler (TCD) and carotid ultrasound physics as well as techniques of examinations, their clinical applications, and interpretations. Part I is for individuals seeking basic knowledge of Neurosonology.

Part II is for individuals interested in performing and interpreting carotid duplex and Transcranial Doppler studies. Exposure to practical application and interpretation in the form of real case presentations will be done. This part of the Advanced Neurosonology Course will provide attendees with an opportunity to review cases with expert faculty. Case materials will include both carotid duplex and Transcranial Doppler examinations, and will highlight examples showing multiple concepts, unusual findings, and artifacts. The format will include team-teaching with presentation of cases and time for discussion and questions between cases.

Learning Objectives

- Demonstrate a basic knowledge of the extra- and intracranial arterial vascular anatomy, physiology, and pathophysiology.
- Recognize characteristic patterns of blood flow in the extra- and intracranial vessels.
- Identify proper techniques for performing comprehensive carotid and TCD studies. Relate normal and abnormal blood flow patterns to clinical presentation.
- Recognize and interpret carotid and TCD ultrasound findings. Understand clinical usefulness and limitations of the carotid and TCD ultrasound evaluations.

Schedule – Part I

9:00 am – 9:20 am	Carotid duplex protocol Esther Collado, RN, RVT
9:20 am – 9:40 am	Transcranial Doppler Protocol Zsolt Garami, MD, RPVI
9:40 am – 10:00 am	Reporting Requirement Marge Hutchisson, RVT, RDCS
10:00 am – 10:20 am	Waveform Recognition Andrei Alexandrov, MD, RVT
10:00 am – 10:20 am	Discussion
10:30 am – 10:45 am	BREAK / EXHIBITS
10:45 am – 11:00 am	Subclavian vs Vertebral Steal Zsolt Garami, MD, RPVI
11:00 am – 11:15 am	TCD in the NICU - Braindeath Alexander Razumovsky, MD, PhD
11:15 am – 11:30 am	Carotid IMT value in cardiovascular risk assessment Esther Collado, RN, RVT
11:30 am – 11:45 am	Waveform Recognition Andrei Alexandrov, MD, RVT

PLEASE NOTE: All program details are preliminary and subject to change/completion.

11:45 am – 12:00 pm **Reporting Requirement**
Marge Hutchisson, RVT, RDCS

12:00 pm – 1:00 pm **Break**
Presidential Address Luncheon

Schedule – Part II

1:00 pm – 1:30 pm **Classification of extracranial carotid artery stenosis**
Charles Tegeler, MD

1:30 pm – 2:00 pm **Classification of intracranial stenosis**
Andrei Alexandrov, MD, RVT

2:00 pm – 3:00 pm **Role of Transcranial Doppler for Monitoring Cerebral Vasospasm in Neurocritical Care: Time for Reassessment**
Alexander Razumovsky, PhD, FAHA

Advocacy and Business of Neuroimaging

CME: None

3:00 pm – 4:00 pm, Friday, January 15, 2015

Course Director Joseph V. Fritz, PhD

Course Description

There are quality of care and business advantages to operating advanced imaging within a clinical practice. Tomographic imaging is an important diagnostic tool that is regularly used by all neurologists. A growing number of neurologists are considering ways to form larger groups that can mitigate increasing overhead through economies of scale. Such groups should be able to justify operating imaging in-house. This course aims to clarify the business and regulatory issues involved in operating in-house imaging services. An update will be given on advocacy efforts through the American Academy of Neurology, the Coalition for Patient Centered Imaging, and the American Society of Neuroimaging.

Learning Objectives

- Understand the pro forma analysis to justify the purchase of imaging equipment and identify strategies to improve profitability
- Review regulatory and accreditation requirements.
- Discuss future trends in imaging authorization and appropriate use criteria, and the impact of MACRA on maintaining the in-office ancillary exemption

Schedule

3:00 pm – 3:30 pm **Business of Neuroimaging**
Joseph V. Fritz, PhD

3:30 pm – 4:00 pm **Advocacy in Neuroimaging Update**
Vernon D. Rowe, MD

PLEASE NOTE: All program details are preliminary and subject to change/completion.

Symposium: Hyper-acute Imaging of Stroke: New Frontiers and Novel Approaches

CME: 2 hours

4:00 pm – 6:00 pm, Friday, January 15, 2016

Course Director Nerses Sanossian, MD

Course Description

In this session we will review imaging of stroke patients in the hyper-acute phase prior to leaving the Emergency Department. We will review what constitutes a standard evaluation, what is the current cutting edge in imaging paradigm as well as discussing future directions. The course will cover imaging modalities including ultrasound, CT/MRI, angiography as well as the emerging field of prehospital imaging. Course participants will gain knowledge relating to novel imaging sequences and their integration into a rapid imaging paradigm designed at identifying patients who would benefit from aggressive therapy.

Learning Objectives

- Review of the current imaging guidelines and standard of care for acute ischemic stroke
- Review of the current imaging guidelines and standard of care for acute intracerebral hemorrhage
- Utilization of ultrasound in the emergent evaluation of stroke patients in the ED
- Review of the potential role of prehospital imaging in stroke evaluation and treatment
- Comprehensive review of vessel imaging: when to order angiography and which modality to use

Schedule

4:00 pm – 4:05 pm	Rapid Imaging in the Evaluation and Treatment of Acute Stroke: Sound and Light Introduction and broad overview Nerses Sanossian, MD
4:05 pm – 4:35 pm	Carotid Ultrasound and TCD for Rapid Diagnosis in the Emergency Department Mark N. Rubin, MD
4:35 pm – 5:05 pm	Advanced Imaging for Mobile Stroke Unit: Exploring the First 60 Minutes of Ischemia Andrei Alexandrov, MD, RVT
5:05 pm – 5:35 pm	Vessel imaging in the Earliest Phase of Stroke Adnan Qureshi, MD
5:35 pm – 5:50 pm	Hyperacute Imaging of Intracerebral Hemorrhage: Is Non-contrast CT Enough? Nerses Sanossian, MD

Concurrent Session: MRI Workshop

CME: 3 hours

7:00 pm – 10:00 pm, Friday, January 15, 2016

Course Directors Eduardo Gonzalez-Toledo, MD and Patrick Capone, MD, PhD
Faculty Christina Ledbetter, PhD

Course Description

This workshop provides participants with an opportunity to become familiar with some of the basic tools of functional imaging that are being used for basic neurological research and are gradually finding increasing clinical utility. The hands-on tutorial will provide both some experience with their use and familiarization with some of the on-line sites and software that assist the interested researcher or clinician with these techniques.

PLEASE NOTE: All program details are preliminary and subject to change/completion.

Strong computer skills are not required. Unlike previous years hands on MRI Workshop this program is not designed to instruct the participants on how to interpret standard clinical studies.

This workshop will train the participants to perform 3D reconstructions of the brain, measure cortical thickness, obtain maps of white matter connectivity, reconstruct white matter tracts, measure fractional anisotropy and obtain maps of resting state fMRI in their computers (preferably PCs) using free software downloaded from internet. Detailed instructions to download, install and operate the software will be provided. We will install the software during the workshop in participant's computers. We will send the basic software to participants by email before the Course. During the workshop participants will follow step-by-step instructions to reach the final result. The participants who don't want to bring their computers will receive the tutorials "for physicians" and will also have the live instruction during the meeting.

Learning Objectives

- Recognize and use file formats DICOM, analyze, NiftI, nrrd
- Review equipment and expertise requirements in performing selected tasks with faculty using hands-on, instructional video, or real-time case recordings.
- Perform cortical reconstruction and obtain brain segmentation, cortical thickness and white matter connectivity
- Perform resting state fMRI with seed methodology and compare patient with normal subjects

Schedule

7:00 pm - 7:30 pm	Image formats: DICOM, analyze, nrrd, NiftI and How to read a DICOM header Eduardo Gonzalez-Toledo, MD
7:30 pm - 8:30 pm	How to reconstruct the cerebral cortex using BrainSuite and Segmentation and cortical thickness Eduardo Gonzalez-Toledo, MD
8:30 pm - 9:00 pm	Working with DTI: 3D-Slicer, Measuring fractional anisotropy, Color coded maps, and Fiber tracking Eduardo Gonzalez-Toledo, MD
9:00 pm - 10:00 pm	Resting state fMRI, Matlab, Statistical parametrical mapping (spm), REST Eduardo Gonzalez-Toledo, MD

Concurrent Session: Neurosonology Workshop

CME: 3 hours

7:00 pm – 10:00 pm, Friday, January 15, 2016

Course Directors Andrei Alexandrov, MD, RVT and Zsolt Garami, MD

Course Description

This workshop will provide structured hands-on and question and answer sessions in carotid/vertebral duplex and specific transcranial Doppler techniques complete testing, emboli detection, right-to-left shunt detection and assessment of vasomotor reactivity. Both the beginner and experienced users are encouraged to attend. The workshop will also provide an opportunity to try the latest equipment, to meet experts, and to discuss various aspects of Neurosonology in small groups. The workshop is designed to meet the need for basic and advanced knowledge of insonation techniques, technological advances, and practical aspects of cerebrovascular testing.

PLEASE NOTE: All program details are preliminary and subject to change/completion.

Learning Objectives

- Review complete scanning protocols for diagnostic carotid/vertebral duplex and TCD examinations, vasomotor reactivity, emboli detection, right-to-left shunt testing, and monitoring procedures (thrombolysis, head-turning, peri-operative testing), and IMT measurements.
- Review equipment and expertise requirements in performing selected tasks with faculty using hands-on, instructional video, or real-time case recordings.

Saturday, January 16, 2016

Concurrent Breakfast Seminar: Diagnostic and Interventional Fetal Neurology

CME: 1.5 hours

7:00 am – 8:30 am, Saturday, January 16, 2016

Course Director Adnan I. Qureshi, MD

Course Description

Antenatal diagnosis of neurological disorders such as spina bifida, hydrocephalus, or intraventricular hemorrhage is currently possible using fetal ultrasound and magnetic resonance imaging (MRI). In utero treatment of myelomeningocele in fetuses with spina bifida may preserve neurologic function by preventing spinal cord exposure to amniotic fluid, reverse hindbrain herniation, and diminish the need for post-natal ventriculoperitoneal shunt placement as shown in the Management of Myelomeningocele Study' (MOMS) trial. While fetal cardiology is a well-developed subspecialty within pediatric cardiology, involvement of neurologists and particularly neuroimagers is required to develop the field of fetal neurology. Currently, both cardiologists and family medicine physicians have a pathway for certification for performing fetal ultrasound. The symposium will lead to recognition and awareness among the neurology community to establish formal certification processes.

Learning Objectives

- To review unique aspects of fetal ultrasound and MRI principles in regards to fetal neuroimaging.
- To review antenatal neuroimaging findings in normal fetuses and in diseases such as spina bifida, hydrocephalus, intraventricular hemorrhage, Chiari malformation, and cortical dysgenesis syndromes.
- To review recent data on imaging of cerebral arteries and veins in fetuses.
- To provide introduction into prenatal interventional procedures with emphasis on minimally invasive spina bifida closure.

Concurrent Breakfast Seminar: TCD in the ICU – TCD for early detection of vasospasm and ICP tailored management

CME: 1.5 hours

7:00 am – 8:30 am, Saturday, January 16, 2016

Course Director Gregory Kapinos, MD, MS

PLEASE NOTE: All program details are preliminary and subject to change/completion.

Course Description

The lecturer will cover the reason why treating all patients with intracranial pressure (ICP) elevation with the same best one-shot therapy, above a certain threshold of mean ICP, has been proven to have limited impact on outcomes after acute cerebral injury. Reducing ICP or elevating mean arterial pressure (MAP) to conserve cerebral perfusion pressure (CPP) has been debated by opposite schools of thoughts.

This course will reveal that a certain group of patients at risk of raised ICP can benefit from ICP reduction by osmotherapy alone, another distinct group can benefit from MAP augmentation alone and finally a third select group usually benefits better from dual-targeted treatment, while a fourth group could receive no treatment. (Table)

The scholar will explain how to ascertain separately with Transcranial Doppler (TCD) if the preponderant pathophysiological issue for one particular patient is decreased cerebral compliance or if the issue is more inadequate cerebral perfusion. The lecturer will cover how TCD can help allocate judicious therapeutic nuanced therapy in the neuro-ICU and ER.

This course will cover technical aspects on how to obtain pulsatility index, resistivity index and end-diastolic velocities by TCD.

This course then teaches how to use the results in all acute neurologic injuries at risk of cerebral edema and/or ischemia in order to tailor/individualize the ICP treatment for that particular patient in the ER or Neuro-ICU. It is supported by one institutional preliminary data on 5 patients.

Learning Objectives

- Understand why brain compliance is more important than true ICP. Understand why Lund and Robertson's concepts on treatment of ICP seem to clash but can be reconciled, once heterogeneity of victims pathophysiology is grasped.
- Learn how to obtain peak systolic velocities, end-diastolic velocities, calculate pulsatility and resistivity index, with classic TCD machines as well as with transcranial echography from regular ICU ultrasound machines. Learn how optic nerve sheath diameter can help refine these assessments of compliance and perfusion.
- Learn how to interpret these results to guide the therapeutic selection for vasospasm as well as for ICP elevation (precision medicine for cerebral ischemia with a novel 4-tier tailored ICP therapy): not all accelerations on TCD deserve a lot of fluids after SAH and certain types of patients may be better suited to mannitol than hypertonic saline for osmotherapy and mechanical ventilation as well as vasopressors can be adjusted to the needs of one particular patient, based on the TCD results for ICP abnormality.

Schedule

7:00 am – 8:00 am	TCD for management of vasospasm Gregory Kapinos, MD, MS
8:00 am – 8:30 am	TCD for management of ICP Gregory Kapinos, MD, MS

Concurrent Session: Current Topics in MR/CT Part II

PLEASE NOTE: All program details are preliminary and subject to change/completion.

CME: 4.75

9:00 am – 3:00 pm, Saturday, January 16, 2016

Course Directors John Bertelson, MD and Gabriella Szatmary, MD, PhD

Course Description

This course will review a variety of neuroimaging topics of particular interest to the practicing neurologist.

Learning Objectives

- New insights into the latest neuroimaging technologies
- New insights into the pathophysiology of a wide range of neurological disorders
- Gain the ability to better apply neuroimaging technologies to the bedside differential diagnosis of various neurological disorders

Schedule

9:00 am – 9:40 am	Neuro-oncology Laszlo Mechtler, MD, FAAN
9:40 am – 10:20 am	Imaging in Patients with Visual Complaints Gabriella Szatmary, MD, PhD
10:20 am – 10:30 am	Discussion
10:30 am – 10:45 am	BREAK / EXHIBITS
10:45am – 11:20 am	Congenital Malformations Jennifer McVige, MD, MA
11:20 am – 11:55am	Case Presentation DENT Fellows
11:55 am – 12:00 pm	Discussion
12:00 pm – 1:00 pm	Lunch Break
1:00 pm – 1:50 pm	Imaging of Toxic-Metabolic Disorders Dara G. Jamieson, MD
1:50 pm – 2:40 pm	Spine Imaging Patrick Capone, MD, PhD
2:40 pm – 3:00 pm	Discussion

Concurrent Session: Current Topics in Neurosonology Part II

CME: 4.75

9:00 am – 3:00 pm, Saturday, January 16, 2016

Course Director Alexander Razumovsky, PhD, FAHA

Course Description

This section of the advanced Neurosonology course will include discussion of the clinical value of the intima-media thickness evaluation, advanced studies for specific TCD applications, like for patients after SAH, traumatic brain injuries, ischemic stroke, cryptogenic stroke, application and interpretation of TCD for patients with PFO.

PLEASE NOTE: All program details are preliminary and subject to change/completion.

Advanced TCD monitoring during cardiovascular and cardiothoracic surgeries. The faculty will discuss TCD ultrasound technique and interpretation of different procedures. Ample time will be left for questions and discussion. Upon completion of this course, participants will be able to identify abnormal findings. Interpretation and clinical applications of the above-mentioned specific carotid duplex and TCD applications will be provided. The course material is designed for participants seeking advanced knowledge of Neurosonology and its current clinical applications.

Learning Objectives

- Identify techniques and protocols for performing advanced cerebrovascular studies using carotid duplex scans, real-time spectral Doppler analysis and understand the clinical usefulness and limitations of the carotid duplex and TCD examinations.
- Achieve experience in acquiring and interpreting advanced carotid duplex and TCD testing in patients with cerebrovascular abnormalities, i.e., acute stroke, extra- and intracranial stenosis, subarachnoid and intracerebral hemorrhage, traumatic brain injury.
- Recognize characteristic patterns of cerebral blood flow velocities pattern through cerebral vessels and relate normal and abnormal cerebrovascular blood flow to clinical presentations, thus improving quality of diagnostic testing and patients' outcomes

Schedule

9:00 am – 10:30 am	TCD and Carotid Duplex Studies Interpretations Charles Tegler, MD and faculty
10:30 am – 10:45 am	Break
10:45 am – 12:00 pm	TCD and Carotid Duplex Studies Interpretations (cont.) Charles Tegler, MD and faculty
12:00 pm – 1:00 pm	Break Industry-Sponsored Lunch
1:00 pm – 1:20 pm	TBD TBD
1:20 pm – 2:00 pm	TCD in the Out Patient and Ambulatory Settings Mark N. Rubin, MD
2:00 pm – 2:20 pm	Specific TCD applications for Patients with acute stroke Andrei Alexandrov, MD, RVT
2:20 pm – 2:40 pm	Specific TCD Applications for Patients after Traumatic Brain Injury Alexander Razumovsky, PhD, FAHA
2:40 pm – 3:00 pm	TCD Monitoring during invasive cardiovascular procedures Zsolt Garami, MD

Self Assessment Exam

CME: 1.5

3:00 pm – 4:30 pm, Saturday, January 16, 2016

Course Director Dara G. Jamieson, MD

Course Description

PLEASE NOTE: All program details are preliminary and subject to change/completion.

The Neuroimaging Self-Assessment Examination (SAE) is intended to be a Neuroimaging self-assessment tool, providing participants with a structured opportunity to gain insight into their own personal strengths and weaknesses relative to their peers in the provision and clinical evaluation of Neuroimaging studies. Knowledge and skills to be assessed in this setting will include identification of normal anatomical structures, accuracy in the identification of specific pathologies on MRI and CT studies, formulation of Neuroimaging differential diagnoses, basic MRI and CT physics knowledge, and the ability to correlate imaging findings with clinical history. Subject matter covered by the SAE will include diagnostic neuroimaging of common neurological disorders such as cerebrovascular disease, multiple sclerosis, CNS trauma, tumors and cysts, infections, toxic/metabolic disorders and diseases of the spinal cord and surrounding tissues. Knowledge of basic MRI and CT physics principles essential for protocol design, safety, recognition of artifact and differentiation of tissue types based upon CT density and MRI signal characteristics will also be assessed. The SAE will be presented in a multiple choice PowerPoint format projected on a screen to the audience with one minute allotted per question. The subject matter will include clinical neuroimaging questions as well as questions related to imaging physics and technology. Each question will consist of a short text passage describing a clinical vignette or set of specific imaging-related parameters, accompanied by images or diagrams, followed by five answer options in multiple-choice format. Attendees will mark the single best answer to each question on a provided answer sheet, which will be self-graded at the end of the testing period. Each question will be reviewed quickly, with an explanatory answer provided at the end of the one hour testing period. Clinical cases will incorporate detailed, high-resolution MRI and CT images of the brain and spine (including MR and CT angiography).

Learning Objectives

- Become more familiar with personal strengths and weaknesses in the identification of normal versus abnormal imaging findings.
- Become more familiar with personal strengths and weaknesses in formulating a differential diagnosis pertaining to specific imaging presentations.
- Achieve greater levels of confidence in acquiring and interpreting MRI and CT studies in the assessment of common neurological disorders such as MS, stroke, tumor and trauma.
- Be able to identify areas of future study to increase levels of competence in the interpretation of diagnostic Neuroimaging cases.
- Be able to identify areas of future study to increase levels of competence in MRI and CT physics.

Symposium: Current Clinical Nuclear Neurology with PET, SPECT and Scintigraphy

CME: 1 hour

4:30 pm – 5:30 pm, Saturday, January 16, 2016

Course Director Robert S. Miletich, MD, PhD

Course Description

Although most in the neurology and clinical neuroscience communities have some familiarity with positron emission tomography (PET) and single photon emission computed tomography (SPECT), knowledge of the practical utilization of these modalities for clinical patients is not as prevalent. This lack of knowledge of applied Nuclear Neurology extends to what clinical questions can be addressed by PET, SPECT and scintigraphy, what radiopharmaceuticals are clinically available (ie. approved by FDA) and what types of studies can be performed. This course focuses on practical, present day, clinical application of Nuclear Neurology, presenting some basic science, but illustrating concepts and applications through clinical material from the speaker's daily clinical

PLEASE NOTE: All program details are preliminary and subject to change/completion.

practice. The capacity of Nuclear Neurology to address management questions which arise in multiple disease states will be discussed. Radiopharmaceuticals available clinically will be presented. Imaging indications in the disease states of dementia, neurodegenerative disease, neuro-oncology, epilepsy, parkinsonism, movement disorders, cerebrovascular disease, neuropsychiatric disorders and other less common settings will be reviewed. Many third-party payers currently make reimbursements based on these indications. Standard and newly developed imaging techniques will be discussed. Finally, government-mandated training requirements for Nuclear Neurology will be presented. By measuring some aspect of nervous system function, Nuclear Neurology provide information that often is unobtainable from other sources, thus facilitating more rationale and cost-effective management.

Learning Objectives

- Know what kind of Nuclear Neurology studies are currently available to help manage patients, including which radiopharmaceuticals are FDA-approved.
- Understand what clinical questions can be addressed in different neurologic disease states by clinically available PET, SPECT and scintigraphy.
- Decide how best to incorporate Nuclear Neurology into clinical practice, either through collaboration with other physician groups or pursuing government-mandated nuclear training.

Symposium: Imaging in Teleneurology

CME: 2 hours

6:00 pm – 8:00 pm, Saturday, January 16, 2016

Course Director Neeraj Dubey, MD, FAAN

Course Description

The purpose of this course is to integrate imaging and teleneurology. Teleneurology is increasingly becoming an important tool in community hospitals to evaluate patients with acute neurological events and the role of imaging in teleneurology is substantial. The treating teleneurologist has to rely on wide-ranging radiological services, including CT CTA, MRI, MRA, EEG, and Doppler studies to provide prompt, effective, and meaningful acute care. The role of teleneurologists in assessing patients with stroke, cord compression, epilepsy, neuro ICU care, change in mental status, etc. depends largely on being able to confidently read images, make meaningful interpretation, and direct care.

Learning Objectives

- Role of imaging in teleneurology consults
- Challenges in imaging and management of patients with teleneurology services

Schedule

Time – Time	University of Pittsburgh Medical Center Review – Teleneurology and Imaging Maxim D. Hammer, MD
Time – Time	Private Practice Teleneurology – Management of ICH and Acute Stroke, Case Reviews Leonard D. DaSilva, MD