

17th Annual Safar Symposium

Monday April 22, 2019 | 8 am to 5:30 pm | Rangos Research Auditorium

Tuesday April 23, 2019 | 8:30 am to Noon | WISER

Neuroprotection Neurotoxicity & Recovery in the Developing Brain



Peter & Eva Safar Lecturer

David G. Nichols, MD, MBA

President and CEO
American Board of Pediatrics

Complex Chronic Illness: Who will care? Who will cure?

17th Annual Safar Symposium

April 22, 2019

Rangos Research Auditorium, 3rd floor,
UPMC Children's Hospital of Pittsburgh
CME Accredited

7:30	Registration
8:00 – 11:45	NEUROPROTECTION, NEUROTOXICITY, AND RECOVERY IN THE DEVELOPING BRAIN
Moderators:	Robert S.B. Clark, MD Chief, Pediatric Critical Care Medicine, UPMC Children's Hospital of Pittsburgh; Professor, Critical Care Medicine and Pediatrics, University of Pittsburgh School of Medicine, Pittsburgh, PA
	Ericka Fink, MD, MS Associate Professor, Critical Care Medicine and Pediatrics and the Clinical and Translational Science Institute Children's Hospital of Pittsburgh of UPMC, Pittsburgh, PA
8:00 – 8:15	Opening Comments Patrick M. Kochanek, MD, MCCM Grenvik Professor and Vice Chair, Department of Critical Care Medicine, Director, Safar Center for Resuscitation Research University of Pittsburgh School of Medicine, Pittsburgh, PA
8:15 – 8:40	Christopher Giza, MD Professor of Pediatrics and Neurosurgery Director, UCLA Steve Tisch BrainSPORT Program Los Angeles, CA <i>Mild Traumatic Brain Injury in Children—State of the Art</i>
8:40 – 8:45	Discussion

8:45 – 9:10	<p>Alicia K. Au, MD, MS Assistant Professor, Pediatric Critical Care Medicine UPMC Children’s Hospital of Pittsburgh, Pittsburgh, PA <i>Can Serum Biomarkers Identify Unrecognized Brain Injury in the Pediatric ICU?</i></p>	11:00 – 11:25	<p>Michael S. Wolf, MD Clinical Instructor, Division of Pediatric Critical Care Medicine, UPMC Children’s Hospital of Pittsburgh NIH T-32 Postdoctoral Scholar Safar Center for Resuscitation Research, Pittsburgh, PA <i>The Controversial Role of Ascorbate in Acute Pediatric Brain Injury</i></p>
9:10 – 9:15	Discussion		
9:15 – 9:40	<p>Travis C. Jackson, PhD Assistant Professor, Department of Critical Care Medicine Associate Director, Cell Signaling, Safar Center for Resuscitation Research University of Pittsburgh School of Medicine, Pittsburgh, PA <i>Futuristic Approaches to Maximizing Hypothermia as a Neuroprotectant in the Newborn and Beyond</i></p>	11:25 – 11:30	Discussion
		11:30 – 11:45	<p>Nancy Caroline Award Presentation and Morning Session Closing Remarks Patrick M. Kochanek, MD, MCCM</p>
9:40 – 9:45	Discussion	11:45 – 12:00	BREAK
9:45 – 10:00	BREAK	12:00 – 1:00	<p>39th Peter & Eva Safar Annual Lectureship in Medical Sciences and Humanities David G. Nichols, MD, MBA President and CEO The American Board of Pediatrics Chapel Hill, NC <i>Complex Chronic Illness – Who will care? Who will cure?</i></p>
10:00 – 10:25	<p>Karen Choong, MB, FRCP(C), MSc Professor, Departments of Pediatrics and Critical Care, Department of Health Research Methods, Evidence and Impact McMaster University, Hamilton, Ontario, Canada <i>Early Rehabilitation in Children after Acute Brain Injury and Critical Illness</i></p>	1:00 – 1:45	Reception – CME Adjournment
10:25 – 10:30	Discussion		
10:30 – 10:55	<p>R. Scott Watson, MD, MPH Professor of Pediatrics, University of Washington School of Medicine; Associate Division Chief, Pediatric Critical Care Medicine, Seattle Children’s Hospital, Seattle, WA <i>Life After Critical Illness in Children – Are the Kids all right?</i></p>		
10:55 – 11:00	Discussion		

The 39th Peter and Eva Safar Annual Lectureship in Medical Sciences and Humanities

Guest Speaker: **David Nichols, MD, MBA**
President and CEO
American Board of Pediatrics
Chapel Hill, NC

Topic: ***Complex Chronic Illness – Who will care?
Who will cure?***



David G. Nichols, MD, MBA assumed the role of President and CEO in late 2012 but, has been associated with the American Board of Pediatrics for 30 years—as a diplomate, an item writer, subboard chair, committee chair, and a member of the board of directors. Prior to assuming the presidency at the ABP, he was the Mary Wallace Stanton Vice Dean for Education and Professor of Pediatrics, Anesthesiology, and Critical Care at the Johns Hopkins School of Medicine.

Dr. Nichols is a graduate of Yale University (BA '73) and the Mount Sinai School of Medicine (MD '77). He has authored more than 100 journal articles, chapters and books, including Rogers' Textbook of Pediatric Intensive Care and Critical Heart Disease in Infants and Children—two leading textbooks in the field. He is the recipient of the Society for Critical Care Medicine's Shubin-Weil Master Clinician/Teacher: Excellence in Bedside Teaching Award, as well as the American Academy of Pediatrics Section on Critical Care Lifetime Achievement Award.

Dr. Nichols is board certified in three disciplines: pediatrics, pediatric critical care medicine, and in anesthesiology. He is meeting the requirements for continuing certification and maintenance of certification.

Multi-Departmental Trainees' Research Day

April 22, 2019

Rangos Research Auditorium, 3rd floor
UPMC Children's Hospital of Pittsburgh
(*Non CME*)

- 1:00 – 1:45 Registration and Poster Setup
- 2:00 – 2:05 **Opening Comments**
Patrick M. Kochanek, MD, MCCM
Grenvik Professor and Vice Chair, Dept. Critical Care Medicine;
Director, Safar Center for Resuscitation Research
- 2:05 – 3:20 Poster Session
- 3:20 – 3:30 BREAK
- 3:30 – 4:45 Oral Presentations
- Moderators:** **Travis C. Jackson, PhD**
Assistant Professor, Dept. of Critical Care Medicine
Associate Director, Cell Signaling, Safar Center for Resuscitation
Research, University of Pittsburgh School of Medicine
- Yan Xu, PhD**
Professor & Vice Chair for Basic Sciences,
Dept. of Anesthesiology and Perioperative Medicine,
University of Pittsburgh School of Medicine
- Department of Anesthesiology and Perioperative Medicine
- Joel Aldo Caporoso, PhD**
Non-opioid analgesics for the treatment of chronic pain targeting the cannabinoid binding site glycine receptors
- Michael P. Schnetz, MD, PhD**
Response to inhaled anesthetics as measured by triple variable index reveals population-level patterns of intraoperative hypotension exposure
- Department of Critical Care Medicine
- Aisha Rasool Saand, MD**
CSF Inflammatory and Vasoactive Mediators Associated with Poor Functional Outcome in Subarachnoid Hemorrhage (SAH) Patients
- Department of Emergency Medicine
- Onome Oghifobibi, MD, MSc**
Epinephrine produces brisk cerebral reperfusion and worsens neurological outcome in experimental pediatric asphyxial cardiac arrest
- Department of Physical Medicine & Rehabilitation
- Anna Iouchmanov**
The effect of experimental brain trauma on sustained attention in female rats
- 4:45 – 5:15 Judges Meeting
- 5:15 – 5:30 **Awards Presentation**

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Neuroprotection, Neurotoxicity, and Recovery in the Developing Brain



Dr. Christopher C. Giza grew up in nearby Wheeling, WV, and is a lifelong Pittsburgh Steelers fan. Dr. Giza received his M.D. from West Virginia University and completed Adult and Pediatric Neurology training at UCLA. He then worked on the Yosemite Search and Rescue team before joining the UCLA Brain Injury Research Center in 1998. He served on the California State Athletic Commission from 2005-2015, and traveled to Afghanistan in 2011 as a civilian advisor to the Department of Defense. He directs the UCLA

Steve Tisch BrainSPORT program and the Operation Mend mild TBI program. Dr. Giza co-authored concussion/mild TBI guidelines for the AAN, CDC (for youth) and the Concussion in Sport Group (Berlin Guidelines). His research focuses on basic and translational mechanisms of developmental plasticity after pediatric TBI of all severities, from concussion to severe TBI. He is a Professor of Pediatric Neurology and Neurosurgery at the UCLA Mattel Children's Hospital.



Dr. Alicia Au is an Assistant Professor in Pediatrics and Critical Care Medicine at the University of Pittsburgh. She completed her Pediatric Residency at Children's National Medical Center, and her Pediatric Critical Care Medicine Fellowship and Masters of Science in Clinical Research at the University of Pittsburgh. She trained as a post-doctoral scholar on Dr. Patrick Kochanek's T32 in Pediatric Neurointensive Care and Resuscitation Research with an emphasis on biomarker research and cell death pathways.

Dr. Au was awarded a mentored patient-oriented research career development award from the NIH entitled "Mixed Graphical Models for the Prediction of Neurological Morbidity in the PICU."



Dr. Travis C. Jackson is an Assistant Professor in the Department of Critical Care Medicine at the University of Pittsburgh. He is also Associate Director of Cell Signaling at the Safar Center for Resuscitation Research (SCRR). Dr. Jackson completed his undergraduate work in neuroscience at the University of Pittsburgh in 2005. Subsequently he earned his doctorate in biomedical science in 2010 from the Department of Neuroscience at the University of Florida in Gainesville. He then returned to

Pittsburgh to complete his postdoctoral work prior to joining the faculty.

Dr. Jackson's NIH funded laboratory uses molecular (e.g. lentivirus and transgenic KO) and pharmacological approaches to elucidate novel therapeutic cell signaling targets that may have the potential to reverse neurological dysfunction after a brain injury. His work employs both *in vitro* and *in vivo* models of traumatic brain injury (TBI). A chief focus of his research involves the study of RNA binding motif (RBM) proteins in the normal and in the injured brain. RBMs are pleiotropic regulators of RNA homeostasis. RBM3 is a potent neuroprotective cold shock protein which mediates, in part, the cerebroprotective effects of therapeutic hypothermia. Conversely, RBM5 is a novel pro-death protein, increased by brain injury, which promotes neuronal apoptosis by altering exon splicing of pro-death gene targets.



Dr. Karen Choong is a Professor in the Departments of Pediatrics and Critical Care, and the Department of Health Research Methods, Evidence and Impact at McMaster University. She is a graduate of the Royal College of Surgeons in Ireland, and received her pediatric training at Queen's University, Kingston, Ontario. She completed fellowships in Neonatology as well as Pediatric Critical Care at the University of Toronto. Dr. Choong is a member of the Canadian Critical Care Trials Group, the Pediatric

Director of the Canadian Critical Care Society, and an associate editor for the *Journal of Pediatric Intensive Care*. Dr. Choong's current research is focused on PICU based rehabilitation and patient centered outcomes.

Her list of publications is available at http://www.researchgate.net/profile/Karen_Choong



Dr. R. Scott Watson is Professor of Pediatrics at the University of Washington School of Medicine, Associate Division Chief of Pediatric Critical Care Medicine at Seattle Children's Hospital, and PI in the Center for Child Health, Behavior, and Development at the Seattle Children's Research Institute. He received his MD from the University of Pennsylvania and underwent Pediatrics residency and Pediatric Critical Care fellowship training at the University of Washington/Seattle Children's Hospital, where he also

received an MPH in Epidemiology. From 2000-2014, he was on faculty at the University of Pittsburgh in Pediatric Critical Care Medicine and in the CRISMA Center, after which he moved to Seattle Children's/University of Washington. As a pediatric intensivist who conducts research on the epidemiology and long-term outcomes of critical illness and critical care in children, Dr. Watson has conducted or been a co-investigator on multiple NIH-funded long-term outcomes studies and is currently co-PI of an NICHD-funded study of neurocognitive outcomes 3 to 5 years after sedation for respiratory failure.



Dr. Michael S. Wolf earned his B.A. degree in molecular and cell biology, with a neuroscience emphasis, from the University of California at Berkeley in 2012, with a goal of gaining a basic understanding of nervous system physiology and anatomy to guide his further scientific and clinical training. He completed his M.D. at the Vanderbilt University School of Medicine, and residency in general pediatrics at the Monroe Carrell Jr. Children's Hospital at Vanderbilt. Dr. Wolf completed his fellowship in pediatric

critical care at the Children's Hospital of Pittsburgh of UPMC, where he now works as a Clinical Instructor and T32 Post-Doctoral Scholar. He currently works with Dr. Robert Clark in the Department of Critical Care Medicine and the Safar Center for Resuscitation research at the University of Pittsburgh. Michael's research interests include studying the role of ascorbate in oxidative stress in the brain after cardiac arrest, characterizing the clearance of fluid and macromolecules through the brain in experimental models of brain injury, as well as developing novel neuromonitoring techniques in children with traumatic brain injury.

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April 22, 2019

WISER, 230 McKee Place, Suite 300
CME Accredited

8:00 – 8:30

Registration

8:30 – 12:00

WISER – 25 YEARS OF SIMULATION EXCELLENCE

Moderators:

Deborah Farkas, PhD

Director, Educational Development, Winter Institute for Simulation, Education and Research (WISER), University of Pittsburgh, Pittsburgh, PA

John M. O'Donnell, CRNA, MSN, DrPh

Professor and Chair, Department of Nurse Anesthesia
Director, Nurse Anesthesia Program, University of Pittsburgh School of Nursing, Associate Director, WISER, Pittsburgh, PA

8:30 – 8:45

Welcome

Patrick M. Kochanek, MD, MCCM

Grenvik Professor and Vice Chair, Department of Critical Care Medicine, Director, Safar Center for Resuscitation Research, University of Pittsburgh School of Medicine, Pittsburgh, PA

8:45 – 9:00

Paul Phrampus, MD

Director, Winter Institute for Simulation, Education and Research (WISER), University of Pittsburgh School of Medicine, Pittsburgh, PA
WISER – 25 Years of Excellence in Healthcare Education

9:00 – 9:30

Ross J. Scalese, MD, FACP

Associate Professor of Medicine
University of Miami Miller School of Medicine
Director, Educational Technology and Development
Gordon Center for Simulation and Innovation in Medical Education, Miami, FL
The Questions We Need to be Asking in Simulation-based Educational Research

9:30 – 10:00

William C. McGaghie, PhD

Professor of Medical Education and Preventive Medicine
Northwestern University Feinberg School of Medicine
Department of Medical Education
Northwestern Simulation and
Feinberg Academy of Medical Educators
Chicago, IL
Medical Education Research as Translational Science

10:00 – 10:15

BREAK

10:15 – 10:45

(Virginia) Chris Muckler, DNP, CRNA, CHSE

NLN Simulation Leader
Associate Clinical Professor; Assistant Program Director
Duke University Nurse Anesthesia Program
Durham, NC
Mentoring DNP Students' Simulation Projects

10:45 – 11:15

Joseph S. Goode, Jr., BA, MSN, RN, CRNA, PhD

PP Department of Perioperative Medicine and Anesthesiology
University of Pittsburgh School of Nursing, Nurse Anesthesia
Program, Pittsburgh, PA
*Simulation as a Dissertation Focus: A Reflection on the Twisting
Road of Doctoral Education*

11:15 – 11:45

Morning Wrap Up / Highlights

John M. O'Donnell, CRNA, MSN, DrPh

11:45 – 12:00

Closing Comments

Patrick M. Kochanek, MD, MCCM

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WISER—25 YEARS OF SIMULATION EXCELLENCE



Dr. Ross J. Scalese is Associate Professor of Medicine at the University of Miami (UM) Miller School of Medicine and Director of Educational Technology Development at the Gordon Center for Simulation and Innovation in Medical Education.

Dr. Scalese received his undergraduate degree from Princeton University and the M.D. degree from the University of Pennsylvania School of Medicine. He completed residency training in Internal Medicine in the U.S. Air Force and served more than seven years on active duty as an internist and flight surgeon. In 2000 Ross began work at the UM/Jackson Memorial Medical Center, and in 2003 he joined the full-time faculty of the Gordon Center, where he completed a Research Fellowship in Medical Education. He maintains board certification in Internal Medicine and is a Fellow of the American College of Physicians. Dr. Scalese is active clinically and as a teacher of medical students and residents, as well as physician assistant and nursing students, particularly in the areas of cardiology and clinical skills. At UM's medical school Ross serves on the Executive Faculty Curriculum Steering Committee, co-directs major competency assessment programs, and is a founding Fellow of the Academy of Medical Educators.

His research focuses on innovative uses of simulation for competency-based training, and he has a special interest in the development and implementation of simulations for assessment. Ross has served on test material development committees of the National Board of Medical Examiners in the U.S., and for more than a decade collaborated with the Royal College of Physicians of Canada to incorporate simulations into their high-stakes national certification exams.

Dr. Scalese has been an invited speaker at numerous international conferences addressing topics related to simulation-based health professions education. He has co-authored some of the most frequently cited papers in the field, including the Best Evidence Medical Education (BEME) Collaboration systematic review on features of high-fidelity simulation that lead to effective learning.



Dr. William C. McGaghie is Professor of Medical Education at the Northwestern University Feinberg School of Medicine in Chicago, Illinois where he served from 1992 to 2012, returning in 2015. He has previously held faculty positions at the University of Illinois College of Medicine at Chicago (1974 to 1978), the University of North Carolina School of Medicine (1978 to 1992), and the Loyola University Chicago Stritch School of Medicine (2013 to 2015). Dr. McGaghie's research and writing in medical

education and preventive medicine ranges widely covering such topics as personnel and program evaluation, research methodology, medical simulation, attitude measurement, medical student selection, concept mapping, curriculum development, faculty development, standardized patients, and geriatrics. He has been awarded research and training grants from a variety of NIH Institutes (e.g., NHLBI, NIA) and eight private foundations (e.g., Josiah C. Macy, Jr., Foundation, Charles E. Culpeper Foundation). McGaghie has served on several National Institutes of Health and Agency for Healthcare Research and Quality Study Sections (NHLBI, NIA, HUD) and as a grant application referee for several private foundations including the NBME Stemmler Fund and the Spencer Foundation. He has served as a consultant to a variety of professional organizations, e.g., the American Board of Medical Specialties, the American Board of Internal Medicine, the American Physical Therapy Association and to universities and medical schools worldwide. Dr. McGaghie has authored or edited nine books including two recent edited volumes, *International Best Practices for Evaluation in the Health Professions* (London: Radcliffe Publishing, Ltd. [now Taylor and Francis], 2013); and [with Louis N. Pangaro], *Handbook on Medical Student Evaluation and Assessment* (North Syracuse, NY: Gegensatz Press, 2015). McGaghie has published over 300 journal articles, textbook chapters, and book reviews in health professions education, simulation-based education, preventive medicine, and related fields. Recent journal articles include [with SB Issenberg, JH Barsuk, and DB Wayne] A critical review of simulation-based medical education with translational outcomes. *Medical Education* 2014; 48: 375-385; Varieties of integrative scholarship: why rules of evidence, criteria, and standards matter. *Academic Medicine* 2015; 90: 294302; and guest editor for a thematic cluster of nine articles on mastery learning in medical education for the November 2015 issue of *Academic Medicine*. Dr. McGaghie's latest national and international (Europe, South Korea) speaking engagements have addressed "Medical education research as translational science," the evidence-based argument that powerful simulation-based educational programs with mastery learning can produce significant downstream results in terms of better patient care practices and patient outcomes.



Dr. (Virginia) Chris Muckler is an Associate Professor and the Assistant Director of the Duke University Nurse Anesthesia Program in Durham, North Carolina. She is a veteran of the United States Air Force, a member of the Duke University Health System Institutional Review Board and has held state and national elected positions. Dr. Muckler serves on the Continued Professional Certification Airway Panel for the National Board of Certification and Recertification of Nurse Anesthetists, as a reviewer

for multiple journals, is a National League for Nursing Simulation Leader, and has served as a simulation consultant within the continental United States and abroad. Her primary research interests are focused on simulation-based education including diverse populations, interprofessional education, peer-to-peer teaching in simulation, and concepts relative to suspension of disbelief.

Dr. Muckler is the recipient of the Mary Hanna Memorial Award for Journalism from the American Society of PeriAnesthesia Nurses (ASPAN) for her article *Focused Anesthesia Interview Resource to Improve Efficiency and Quality*, the Auburn University Montgomery 2016 Alumna of the Year; 2018 Duke Nurse Anesthesia Faculty of the Year; and was named as one of Auburn University Montgomery's (AUM) Top 50 at Fifty alumni in celebration of the university's 50th anniversary.



Dr. Joseph Goode is an adjunct faculty member of the University of Pittsburgh School of Nursing, Nurse Anesthesia Program and a staff CRNA with the University of Pittsburgh Department of Perioperative Medicine and Anesthesiology and has been involved in the healthcare simulation field since 2000 and in clinical and laboratory research since 1979. He holds BSN and MSN and PhD degrees from the University of Pittsburgh and a BA from the University of Michigan. His current primary

areas of interest in simulation include the use of Hierarchical Task Analysis in healthcare simulation educational methodology, the quantitative and qualitative measurement of translation from the simulation setting to clinical practice and its impacts on patient safety. His clinical research is focused on applications of High Frequency Jet Ventilation. Mr. Goode has presented or been published nationally and internationally in areas as diverse as anesthesia, artificial organ development, emergency medicine, healthcare simulation and the history of anesthesia and simulation. He is also interested in the history and philosophy of science and medicine, and is currently pursuing his Doctoral degree in Nursing at the University of Pittsburgh.

CONTINUING MEDICAL EDUCATION INFORMATION

Program Overview

The Safar Symposium is a two-day multi-departmental research conference held jointly by the Safar Center for Resuscitation Research and the Peter M. Winter Institute for Simulation Education and Research (WISER) in the University of Pittsburgh School of Medicine. The first day of the Symposium will feature CME accredited a block of lectures titled *The Opioid Epidemic: Implications for Resuscitation Medicine* presented by national authorities. The Peter & Eva Safar Annual Lectureship in Medical Sciences and Humanities will follow at noon, presented by Lewis S. Nelson, MD, Professor and Chair, Department of Emergency Medicine; Chief, Division of Medical Toxicology, Rutgers New Jersey Medical School. The first day of the Symposium will close with the Multi-Departmental Trainees' Research Day, with poster and oral presentations by trainees from the Departments of Anesthesiology, Critical Care Medicine, Emergency Medicine, Neurological Surgery, and Physical Medicine and Rehabilitation. The second Day of the Safar Symposium will feature a block of CME accredited lectures and simulation sessions, which will end at 12:00 pm.

Learning Objectives

1. To become familiar with factors that contributed to the development of the opioid epidemic in the USA.
2. To gain insight into alternative strategies for pain management both in the acute phase, and in rehabilitation of critically ill patients.
3. To gain a new understanding of cardiac arrest phenotype, and how the pathophysiology of arrest of cardiac origin differs from asphyxia.
4. To gain a new understanding of current therapeutic approaches to the treatment of asphyxia cardiac arrests, including arrests from opioid overdose.
5. To become familiar with novel therapies for cardiac arrest such as aquaporin antagonists and other novel neuroprotective agents.

Target Audience

The target audience is clinical practitioners in the fields of Critical Care Medicine, Anesthesiology, Physical Medicine and Rehabilitation, Neurosurgery, Neurology, Emergency Medicine, Surgery, and Trauma Specialists. In addition, the program is relevant to allied care givers such as nurses, respiratory therapists, and pharmacists.

The Safar Symposium is sponsored by the Safar Center for Resuscitation Research, the Peter M. Winter Institute for Simulation, Education, and Research (WISER), the Department of Critical Care Medicine, and the Department of Anesthesiology at the University of Pittsburgh, and the University of Pittsburgh School of Medicine Center for Continuing Education in the Health Services.

CME Accreditation and Designation Statement

The University of Pittsburgh School of Medicine is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

The University of Pittsburgh School of Medicine designates this live activity for a maximum of **7.75 AMA PRA Category 1 Credits™**. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Other health care professionals are awarded 0.7 continuing education units (CEU's) which are equal to 7.7 contact hours.

The Americans with Disabilities Act Information:

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 the Safar Center at 412-692-3254.

Disclaimer Statement

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

Faculty Disclosure:

All individuals in a position to control the content of this education activity are required to disclose all relevant financial relationships with any entity producing, marketing, re-selling, or distributing health care goods or services, used on, or consumed by, patients.

The following relevant financial relationships were disclosed:

Cameron Dezfulian, MD, has disclosed that he has received a grant research support from Mallinckrodt Pharmaceuticals: Investigator Initiated Grant for iNO after OHCA.

Erica Fink, MD, MS, has disclosed a PCORI grant from the NIH.

John M. O'Donnell, RN, CRNA, MSN, DRPH, has disclosed that he is a private consultant in simulation accreditation and speaking, and that he is a stockholder in the Lumis Corp., an augmented reality simulation company.

No other planners, members of the planning committee, speakers, presenters, authors, content reviewers and/or anyone else in a position to control the content of this education activity have relevant financial relationships to disclose.

The University of Pittsburgh is an affirmative action, equal opportunity institution.

The Safar Center for Resuscitation Research gratefully
acknowledges the support of our sponsors:

Dr. Ake N. Grenvik Endowed Chair in Critical Care Medicine
Department of Anesthesiology & Perioperative Medicine
Department of Critical Care Medicine
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