



CONVERGENCE NEUROSCIENCE

10.5
AMA PRA
CATEGORY 1
CREDITS™

WESTIN BUCKHEAD
ATLANTA, GA
OCTOBER 24-25, 2017

INTENDED AUDIENCE

Convergence calls for groups within the biomedical, life sciences, physical science, engineering and other fields to come together to solve unmet health needs. This conference is meant to bring together various scientists with the aim of discovery of education gaps inherent to one's own discipline, as well as the potential for creative collaboration in shared problem solving.

COURSE LEARNING OBJECTIVES

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

- Discuss complex neurological conditions and challenges
- Identify emerging innovations and potential converged solutions
- Recognize convergence concepts
- Identify opportunities for scientific collaboration, discovery and problem solving
- Create a growing network of convergence neuroscience teams within Mayo Clinic and abroad

COURSE DESCRIPTION

Convergence: coming together from different directions so as eventually to meet; the integration of different scientists to solve challenging real-world problems.

Storied institutions such as the National Academies, the Institute of Medicine and the Medical Research Council call for the unification of scientists from different disciplines to address problems unsolvable by any single discipline. Neuroscience in particular is ripe for a quantum leap forward— bench scientists, clinical investigators, and engineers are all advancing their respective fields. Imagine merging their investigations, combining the forces of chemistry, medicine, coding, biology, and robotics to penetrate the mysteries of the brain. This is Convergence.

Convergence Neuroscience will bring together researchers in life sciences, physical sciences, engineering and other fields to foster creative collaboration and develop penetrating insight. Join us, your expertise will deepen our experience.

The best interest of the patient is the only interest to be considered, and in order that the sick may have the benefit of advancing knowledge a "union of forces" is necessary.

— William J. Mayo, M.D.

CREDIT

Mayo Clinic College of Medicine and Science is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

Mayo Clinic College of Medicine and Science designates this live activity for a maximum of 10.5 *AMA PRA Category 1 Credits*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

AOA

This program has been accredited by the American Osteopathic Association for 10.5 credits of AOA Category 2-A.

Other Health Care Professionals

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

GRANTS AND EXHIBITS

At the time of this printing, a complete listing of commercial supporters (financial or in-kind) was not available. Appropriate acknowledgment will be given to all supporters at the time of the meeting.

Exhibits will be available for viewing at all scheduled breaks.

DATE AND LOCATION

The Mayo Clinic Convergence Neuroscience conference is held at the Westin Buckhead in Atlanta on October 24 and 25, 2017.

ONLINE REGISTRATION

CE.MAYO.EDU/CN2017

The registration fee includes tuition, electronic course syllabus, continental breakfasts, break refreshments and lunch. Although it is not Mayo Clinic School of Continuous Professional Development (CPD) policy to limit the number of registrants for a course, conference room facilities may necessitate closing of enrollment; therefore, early registration is advised. A letter of confirmation will be sent upon receipt of payment and completed registration.

\$750 USD

Physicians (MD/DO) and Scientists (PhD)

\$600 USD

Residents, Physician Assistants and Nurse Practitioners

CANCELLATION POLICY

If you cancel your participation in this course, your registration fee, less a \$75 administrative fee, will be refunded when written notification is received by Mayo Clinic School of CPD on or before Tuesday, October 10, 2017 (cme-jax@mayo.edu). No refunds will be made after Tuesday, October 10, 2017. Canceled registrations are non-transferable.

Mayo Clinic School of CPD reserves the right to cancel or postpone any course due to unforeseen circumstances. In the unlikely event Mayo Clinic School of CPD must cancel or postpone this course, Mayo Clinic School of CPD will refund the registration fee, but is not responsible for any related costs, charges, or expenses to participants, including fees assessed by airline/travel/lodging agencies.

For additional information, contact:

Mayo Clinic School of Continuous Professional Development

Website: ce.mayo.edu

E-mail: cme-jax@mayo.edu

Phone: 800-462-9633

LODGING ACCOMODATIONS

Westin Buckhead

3391 Peachtree Road, N.E. Atlanta 30326 +1 (800) 937-8461

Resort view rooms are reserved for attendees and their guests at the group rate of \$189 per night plus applicable taxes. In order to receive the special rate, reservations must be made before the room block is filled or before the expiration date of October 1, 2017, whichever comes first.

FACULTY

Course Directors

Kevin Barrett, M.D., W. David Freeman, M.D., Leonard Petrucelli, Ph.D., Michael Pizzi, D.O., Ph.D., Alejandro Rabinstein, M.D., Alfredo Quinones-Hinojosa, M.D.

Co-Course Director

Kevin E. Bennet, Ph.D., M.B.A.

Mayo Faculty

Thomas G. Brott, M.D., *Professor of Neurology and the Applebaum Endowed Neuroscience Professor*

James D. Buntrock, *Instructor of Biomedical Informatics and Vice Chair of information technology at Mayo Clinic leading Enterprise Technology Service*

H. Gordon Deen, M.D., *Professor of Neurosurgery*

David Deyle, M.D., *Assistant Professor of Medical Genetics*

Neil Graff-Radford, M.D., *Professor of Neurology, Director of Alzheimer's Disease Research Center*

Betty Kim, M.D., Ph.D., *Assistant Professor of Cancer Biology and Neuroscience and Neurosurgery*

Leonard Petrucelli, Ph.D., *Professor and Chair of Neuroscience*

Alfredo Quinones-Hinojosa, M.D., *William and Charles Mayo Professor and Chairman of Neurologic Surgery*

Alejandro Rabinstein, M.D., *Professor of Neurology*

Ryan Uitti, M.D., *Professor of Neurology, Deputy Director of Center of Science of Health Care Delivery*

Greg Worrell, M.D., Ph.D., *Professor of Neurology*

Abba Zubair, M.D., Ph.D., *Associate Professor of Laboratory Medicine and Pathology*

Keynote Speaker



Victor J. Dzau, M.D., President of the National Academy of Medicine (NAM) and Vice Chair of the National Research Council

Guest Faculty

David Albert, M.D., *Founder & Chief Medical Officer, AliveCor, Inc.*

Jason Hallstrom, Ph.D., *Professor and Director I-SENSE, Department of Electrical Engineering and Computer Science FAU*

James Hickman, Ph.D., *Professor, NanoScience Technology Center, Chemistry, Biomolecular Science and Electrical Engineering, University of Central Florida*

Mike Huerta, Ph.D., *Associate Director of the US National Library of Medicine and NLM Coordinator of Data and Open Space Initiatives, NIH*

Nick B. Langhals, Ph.D., *Program Director for Neural Engineering within the Repair and Plasticity Cluster at the National Institute of Neurological Disorders and Stroke*

Jin Hyung Lee, Ph.D., *Assistant Professor of Neurology and Neurological Sciences, Bioengineering, Neurosurgery, and Electrical Engineering (Courtesy), Stanford University*

Babak Kateb, M.D., *Founding Chairman of the Board of SBMT and Brain Mapping Foundation, Scientific Director of SBMT and Brain Mapping Foundation*

Hugh Lloyd-Jukes, *CEO of Oxehealth*

Guru Madhavan, Ph.D., *Program Director National Academies of Sciences, Engineering and Medicine*

Brad Rabinovitz, *Director of Research and Business Development, Longevity Neuro Solutions*

Ravinder Sajwan, *CEO and Board Member, Renew Group*

Theodore Willich, *CEO NLP Logix, Machine Learning*

Matt Berseth, *NLP Logix Machine Learning*

TUESDAY, OCTOBER 24, 2017

Global Impact of Neuroscience Disorders and Opportunities for Convergence Discoveries

7:15 a.m. Registration and Continental Breakfast

Thematic Global Challenges in Human Neuroscience Diseases: Cognitive, Artificial Intelligence and Bioinformatics

- 8:00 Introduction and Welcome
Moderator: W. David Freeman, MD
- 8:05 History of Neurosciences Evolution and Global Neuroscience Challenges
W. David Freeman, MD
- 8:30 Global Impact of Brain Cancer and the Cancer Moonshot: A Call to Action
Alfredo Quinones-Hinojosa, MD
- 9:00 Global Epilepsy: Current Challenges and Potential Future Solutions
Greg Worrell, MD
- 9:30 Advancing Global Health through Patient Centered Outcomes: ICHOM
Ryan Utti, MD
- 10:00 Global Impact of Spine Disorders on Human Population by 2050
H. Gordon Deen, MD
- 10:30 Speaker Q&A Panel
- 10:45 Break
- 11:00 Global Impact of Stroke and Cerebrovascular Disorders: World Health Organization and Advances
Thomas G. Brott, MD
- 11:30 NINDS-Update on BRAIN Initiative & Neural Engineering
Nick Langhals, PhD
- 12:00 pm Lunch and Networking Tracks and Meetings
- 1:00 The Future of Health Care in Your Home
Hugh Lloyd Jukes
- 1:30 Alzheimer's Disease- Future Therapies
Neil Graff-Radford, MD
- 2:00 Machine Learning
David E. Albert, MD
- 2:30 **Theme #1** - History of Convergence Science, Engineering, and National Academies
Panel CEO and Academicians, Governmental and Industry
Guru Madhavan, PhD
Moderator: Alejandro Rabinstein, MD and Michael Pizzi, DO, PhD
- 3:00 **Theme #2** - Translating Big Data to Action and Future of Big Data and the Precision Medicine Initiative - Q&A
James D. Buntrock, Jason Hallstrom, PhD, Paul Terry, PhD, Mike Huerta PhD
Moderator: W. David Freeman, MD
- 3:30 **Theme #3** - NINDS BRAIN initiative and Neural Engineering Challenges -
Nick Langhal, PhD, Betty Kim, MD, PhD, Babek Kateb MD, Society for Brain Mapping and Therapeutics (SBMT)/Brain Mapping, Jin Hyung Lee, PhD, Kevin Bennet, PhD, Chair Division of Engineering, Co-director Mayo Neural Engineering Labs, Mayo Clinic
Moderator: Alfredo Quinones-Hinojosa, MD
- 4:00 e-Posters
- 4:30 Adjourn

WEDNESDAY, OCTOBER 25, 2017

Neuroscience & Convergence of Other Science Disciplines: Neuroscience, Physical, Engineering, and Cognitive Computing Science Challenges Discoveries

Moderators: Leonard Petrucelli, PhD, W.David Freeman, MD

- 8:00 Registration and Continental Breakfast
- Thematic Global Challenges Facing Basic, Translational, and Materials Neuroscience**
- 8:30 Introduction and Welcome
Moderator: W. David Freeman, M.D. and Len Petrucelli, PhD
- 8:35 **Convergence Keynote:**
History of the National Academy of Medicine and Facilitating Neuroscience Convergence
Victor J. Dzau, MD
- 9:00 3-D Brain Tissue Visualization Technique
Betty Kim, MD, PhD
- 9:30 Ontogenetic fMRI and the Investigation of Global Brain Circuit Mechanisms
Jin Hyung Lee, PhD
- 10:00 Genome Editing- CRISPr-Cas9 Challenges in Treating Neurological Diseases
David Deyle, MD
- 10:30 Q&A
- 10:45 Break
- 11:00 Neuroregeneration using Mesenchymal Stem Cells-Mayo Regenerative Update
Abba Zubair, MD, PhD
- 11:40 Break/Speaker Q&A
- 12:00 p.m. Lunch and Networking
- 1:00 Neuroscience Organ on a Chip Design for Rapid Phase I Drug Discovery
James Hickman, PhD
- 1:30 Neural Circuits and Mayo Neural Engineering Research
Kevin Bennet, PhD, MBA Mayo Clinic
- 2:00 **Theme #4** - Artificial Intelligence and Machine Learning CEOs and Scientists: AI Experiments with Google – Machine Learning and Drawing Art
David Albert, MD; Jason Hallstrom, PhD
Moderator: W. David Freeman, MD
- 2:30 **Theme #5** - Mobile Health: The US \$300Billion Pendulum Swing from Sick care to Wellness Care and Monitoring Patients at Home
David Albert, MD; Hugh Lloyd Jukes, Ravinder Sajwan, panelists TBA
Moderator: W. David Freeman, MD
- 3:00 **Theme #6** - Bench to Bedside Translation: What is the Next Quantum Jump? Q&A Session
Panelists- CRISPR—David Deyle MD, James Hickman, PhD, Brad Rabinovitz, Margaret Sutherland, PhD
Moderators: W. David Freeman, MD and Len Petrucelli, PhD
- 3:30 Questions and Answers/ Online Examination /Adjourn

SAVE THE DATE

CONVERGENCE NEUROSCIENCE

RITZ-CARLTON

ST. THOMAS, U.S. VIRGIN ISLANDS

NOVEMBER 8-10, 2018

MAYO CLINIC
4500 San Pablo Rd
Jacksonville, FL 32224

NON-PROFIT ORG.
U.S. POSTAGE
PAID
MAYO CLINIC

CONVERGENCE NEUROSCIENCE

CE.MAYO.EDU/CN2017

©2017 Mayo Foundation for Medical Education and Research. | MC8100-117