

Neuroscience in Intensive Care

INTERNATIONAL SYMPOSIUM

NICIS-America

www.nicis.org

March 2-3, 2017
Washington, DC, USA



ABOUT THE CONFERENCE

The **Neuroscience in Intensive Care International Symposium** is a two-day conference that brings together clinicians and scientists who share a common aspiration to translate discoveries in the neurosciences into effective patient-centered treatments. The 2017 conference will provide an overview of cutting edge research on precision medicine in neurocritical care and stroke. The conference speakers include thought leaders in molecular biology and genetics, proteomics, neurophysiologic monitoring and analysis, brain mapping, molecular imaging, statistical modeling, machine learning, predictive analytics, and advanced clinical trial design. The conference is designed for an interdisciplinary and multiprofessional audience of clinicians and investigators working in neurological injury, critical care and stroke. This includes basic and translational scientists, neuroscientists, intensivists, neurointensivists, neurologists, neurosurgeons, neuroanesthesiologists, neuroradiologists, physiatrists, psychiatrists, and neuropsychologists.

NICIS - America builds on a highly successful conference and networking event held annually in Paris since 2010 (www.nicis.fr). The vision of NICIS is to provide a forum that will promote transformative advances in the care and science of patients with critical neurological illness and injury. NICIS brings together clinicians and scientists who share a common interest in translating discoveries in the neurosciences into better patient-centered outcomes.

Topics to be covered include:

- **The Potential for Transformation:** Systems biology in neurological diseases, precision medicine for critical care
- **Big Science:** The White House Precision Medicine Initiative, the BRAIN initiative, the Human Connectome Project, International Stroke Genetics Consortium, etc.)
- **Methodologies:** Statistical models, machine learning approaches, high-throughput approaches for biomarker discovery and validation, adaptive clinical trial design
- **Management:** biomarkers for neurocritical care, cerebral pressure autoregulation, goal directed blood pressure management
- **Prediction:** EHR-drive predictive analytics, MRI pattern classification for TBI, mapping for coma recovery prediction

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THIS YEAR'S THEME

This year's conference is devoted to the theme of **Precision Medicine for Neurocritical Care and Stroke**. Advances in genetics and in image-guided therapy are already leading to major changes in the classification, management and outcomes of patients with ischemic stroke.

New management paradigms are being actively explored in the domains of acute neurological injury — intracerebral hemorrhage, subarachnoid hemorrhage, anoxic-ischemic brain injury, traumatic brain injury. However, more effective predictive modeling and treatment strategies are desperately needed in these

THE ORGANIZERS

- ▶ **Robert Stevens, MD, Ph.D.**, Associate Professor of Anesthesiology and Critical Care Medicine, **Johns Hopkins University**
- ▶ **Jan Claassen, MD, Ph.D.**, Associate Professor of Neurology, Department of Neurology, **Columbia University**
- ▶ **Jose Suarez, MD**, Professor, Neurology-Vascular Critical Care, **Baylor College of Medicine**
- ▶ **Tarek Sharshar, MD**, Senior Consultant, Department of Intensive Care Medicine, **Raymond Poincaré**



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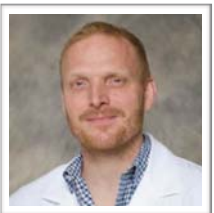
SPEAKING FACULTY



Chetan Bettgowda, MD, Ph.D., Associate Professor of Neurosurgery, **Johns Hopkins University**



Tim Buchmann, Ph.D., MD, Director, Emory Critical Care Center, **Emory University**



Jan Claassen, MD, Ph.D., FNCS, Head of Neurocritical Care, **Columbia University**



Todd Constable, Ph.D., Professor of Radiology and Neurosurgery, Director MRI Research, **Yale University**



Ciprian Crainiceanu, Ph.D., Professor of Biostatistics, **Johns Hopkins University**

SPEAKING FACULTY



Ramon Diaz-Arrastia, MD, Ph.D., Professor of Neurology and Director of Clinical TBI Research, **University of Pennsylvania Perelman School of Medicine**



Dana Edelson, MD, Assistant Professor of Medicine, **University of Chicago**



Allen Dale Everett, MD, Director of the Pediatric Proteome Center, Professor of Pediatrics,



Daniel Hanley, MD, Professor of Neurology, **Johns Hopkins University**



Thomas Heldt, Ph.D., MS, Assistant Professor of Electrical & Biomedical Engineering, **MIT**

SPEAKING FACULTY



Costantino Iadecola, MD, Director, Brain & Mind Research Institute, **Cornell University**



Tudor Jovin, MD, Associate Professor of Neurology, Chief, Stroke Division,



Nancy E. Kass, ScD, Professor of Bioethics and Public Health, Berman Institute of Bioethics, **Johns Hopkins University**



Walter Koroshetz, MD, Director, **National Institute of Neurological Disease and Stroke, NIH**



John Krakauer, MA, MD, Professor of Neurology & Rehabilitation Medicine, **Johns Hopkins University**

SPEAKING FACULTY



Christos Lazaridis, MD, Assistant Professor, Neurology, **Baylor College of Medicine**



Yvonne Lui, MD, Associate Professor, Radiology, **New York University**



Paul Nyquist, MD, MPH, Co-Director, Johns Hopkins Bayview Neurocritical Care Unit, Associate Professor of Neurology, Johns Hopkins University
Johns Hopkins University



Soojin Park, MD, FAHA, FNCS, Assistant Professor of Neurology, **Columbia University**



Adnan Qureshi, MD, Professor of Neurology, Neurosurgery and Radiology, **University of Minnesota**

SPEAKING FACULTY



Claudia Robertson, MD, Professor, Department of Neurosurgery, **Baylor College of Medicine**



Jonathan Rosand, MD, MSC, Chief, Div. of Neurocritical Care, **Harvard University**



Joni Rutter, Ph.D., Division Director of Programs and Strategic Implementation, All of Us Research Program, Precision Medicine Initiative, **National Institutes of Health**



Suchi Saria, Ph.D., Assistant Professor, **Johns Hopkins University**

SPEAKING FACULTY



Tarek Sharshar, Ph.D., Senior Consultant, Intensive Care Medicine, **University of Versailles, France**



Robert Stevens, MD, Associate Professor, Anesthesiology & Critical Care Medicine, **Johns Hopkins University**



Jose Suarez, MD, Professor of Neurology-Vascular Critical Care, **Baylor College of Medicine**



Rai Winslow, Ph.D., Director, Center for Cardiovascular Bioinformatics & Modeling, **Johns Hopkins University**



Scott L. Zeger, Ph.D., Professor, Biostatistics, Bloomberg School of Public Health **Johns Hopkins University**

AGENDA

March 2, 2017

THE POTENTIAL FOR TRANSFORMATION

7:30 am Registration

8:00 am Welcome and Introduction

8:05 am KEYNOTE ADDRESS: The BRAIN Initiative

Walter Koroshetz, MD, Director, **National Institute of Neurological Disorders & Stroke (NINDS), NIH**

8:30 am The All of UsSM Research Program in The Precision Medicine Initiative[®]: An Update

The talk will be an overview of the All of UsSM Research Program (formerly known as the Precision Medicine Initiative[®] Cohort Program).

- Overview of the All of Us Program
- Data access and use processes to be expected
- Required data that will be collected
- Potential research questions
- Q & A with group

Joni Rutter, Ph.D., Division Director, Programs & Strategic Implementation, All of Us Research Program, Precision Medicine Initiative, **National Institutes of Health (NIH)**

8:55 am Towards a Molecular Taxonomy of Cancer

With the completion of the human genome project and the advent of next generation sequencing technologies, there has been an incredible advancement in our molecular understanding of cancer. This has led to the deciphering of the genetic basis of cancers at a depth never before possible. We will discuss the impact of these advancements on our ability to classify and treat a variety of cancers.

Chetan Bettegowda, MD, Ph.D., Associate Professor of Neurosurgery, **Johns Hopkins University**

9:20 am Toward a Bioethical Framework for Personalized Medicine

This talk will discuss both the promise of large data analysis and personalized medicine as well as the ethical obligations in conducting this type of research. This will include not only often discussed responsibilities of patient privacy and data security, but also transparency in describing how data will be used, engagement of stakeholders about how and why data are being collected, translating the potential of precision medicine into accessible medical care for all and accountability in keeping promises to patients and the public

Nancy E. Kass, ScD, Phoebe R. Berman Professor of Bioethics and Public Health, Berman Institute of Bioethics and Bloomberg School of Public Health, **Johns Hopkins University**

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AGENDA

9:45 am Panel Discussion

10:00 am Refreshment/Poster Viewing/Networking Break

BIG SCIENCE

10:15 am Cardiovascular Research Grid Project

The CardioVascular Research Grid (CVRG) Project is a multi-institutional effort to establish a national infrastructure to advance seamless sharing and analysis of cardiovascular research data. The infrastructure developed in this project is equally applicable to support research on neuroscience in intensive care. This talk will present an overview of CVRG technologies and their potential uses.

Rai Winslow, Ph.D., Director, Center for Cardiovascular Bioinformatics & Modeling, **Johns Hopkins University**

10:40 am The Human Connectome Project

Todd Constable, Ph.D., Professor of Radiology and Neurosurgery, Director MRI Research, **Yale University**

11:05 am Consortia to Discover the Role of Genetics in Stroke and Traumatic Brain Injury

Large-scale international collaboration has been the key to the revolution in human genetics that has grown out of the completion of the Human Genome Project and the launch of the GWAS era. The discoveries made by the International Stroke Genetics Consortium have already identified novel targets for stroke prevention and highlighted dozens of biological pathways with a role in both stroke susceptibility and stroke outcome. Multiple groups within the ISGC are now pursuing interdependent research agendas all aimed at exploiting genetic discoveries for the ultimate benefit of patients. The culture of the ISGC—open, welcoming, scientifically ambitious, and highly collegial—has been fundamental to its success. With the launch of the GAIN (Genetic Associations in Neurotrauma) Consortium, we have established a similar infrastructure to elucidate the role of genetic variation in outcome and recovery from traumatic brain injury.

Jonathan Rosand, MD, MSc, Chief, Division of Neurocritical Care & Emergency Neurology, **Harvard University**

11:30 am Early Lessons from TRACK-TBI

TRACK-TBI is a US-based Consortium designed to evaluate biomarkers and outcome measures of traumatic brain injury, across the spectrum of age and severity, starting in the Emergency Department through one year after injury. The long-term goal of TRACK-TBI is to transform research and clinical practice by applying the principles of precision medicine to TBI. Since its inception in the Fall of 2013, TRACK-TBI has enrolled over 1800 participants (as of October, 2016), and several key lessons have been learned. This presentation will provide an update on the activities of the TRACK-TBI Consortium, review the major accomplishments of the first 4 years, and outline a path for the future.

Ramon Diaz-Arrastia, MD, Ph.D., Professor of Neurology and Director of Clinical TBI Research, **University of Pennsylvania Perelman School of Medicine**

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AGENDA

11:55 am Panel Discussion

12:10 pm Lunch

METHODOLOGIES

1:00 pm Statistical Models for Very Large Biological Datasets

This presentation will cover important problems associated with the analysis of very large biological data sets including design of experiments, data storage, statistical analysis, and reproducibility. I will focus on issues related to data visualization, multiplicity testing, the use of reproducible software and methods, and reporting. Special attention will be given to cross-sectional and longitudinal analyses of large studies of clinical brain imaging. The ideas and problems were motivated by and applied to a longitudinal study of multiple sclerosis patients and a clinical trial of stroke patients.

Ciprian Crainiceanu, Ph.D., Professor of Biostatistics, **Johns Hopkins University**

1:25 pm Machine Learning for Clinical Prediction

Suchi Saria, Ph.D., Assistant Professor, **Johns Hopkins University**

1:50 pm Model-based Data Integration in Neurocritical Care

Large volumes of heterogeneous data are now routinely collected and archived from patients in a variety of clinical environments, to support real-time decision-making, monitoring of disease progression, and titration of therapy. This rapid expansion of available physiological data has resulted in a data-rich – but often knowledge-poor – environment. Yet the abundance of clinical data also presents an opportunity to systematically fuse and analyze the available data streams, through appropriately chosen mathematical models, and to provide clinicians with insights that may not be readily extracted from visual review of the available data streams.

In this talk, I will highlight our work in model-based signal processing to derive additional and clinically useful information from routinely available data streams. I will present our model-based approach to noninvasive, patient-specific and calibration free estimation of intracranial pressure, and will elaborate on the challenges of collecting high-quality clinical data for validation.

Thomas Heldt, Ph.D., MS, MPhil, Assistant Professor Electrical and Biomedical Engineering,
Massachusetts Institute of Technology

2:15 pm Multi-omics: A Systems Biology for Biomarker Discovery and Validation

In this presentation, Dr. Everett will review and give examples of the overlapping use of proteomics, peptidomics, lipidomics and metabolomics for brain injury biomarker discovery.

Allen Dale Everett, MD, Director of the Pediatric Proteome Center, Professor of Pediatrics, **John Hopkins University**

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AGENDA

2:40 pm Panel Discussion

2:55 pm Refreshment/Poster Viewing/Networking Break

BIOLOGICAL METHODS

3:10 pm The Gut-Brain Connection in Stroke and Dementia: More Than Meets the Eye

Owing to the blood-brain barrier, the brain has traditionally been considered an “immune privileged” organ, nearly impenetrable to immune cells. However, a growing body of evidence indicates that cells of the immune system traffic in and out of the brain and can have either beneficial or detrimental effects on the brain tissue. The gut is a major reservoir of immune cells, and is emerging as a key player in acute and chronic brain pathologies. Whereas innate immunity contributes to the acute phase of the tissue damage associated with experimental cerebral ischemia, immune cells originating from the gut protect the brain from impending damage in models of intestinal dysbiosis. In addition, intestinal immune cells play a critical role in the vascular dysregulation associated with cognitive impairment, a model of vascular dementia. The realization that the gut immune system is critically involved in the pathobiology of major brain diseases provides the opportunity to modulate immune function in order to reset the balance between its protective and destructive effects, and to develop new approaches for the prevention or treatment of stroke and dementia.

Costantino Iadecola, MD, Director, Brain & Mind Research Institute, **Cornell University**

3:35 pm Computational Modeling of Stroke Recovery in Humans

Data and ideas will be presented related to the notion of spontaneous biological recovery and how motor learning and brain repair relate to each other.

John Krakauer, MA, MD, Professor of Neurology & Rehabilitation Medicine, **Johns Hopkins University**

4:00 pm Genetic Models of Ischemic Stroke

Paul Nyquist, MD, MPH, Johns Hopkins Bayview Neurocritical Care Unit, Associate Professor of Neurology, **Johns Hopkins University**

4:25 pm Biological Model of Brain Dysfunction in Sepsis

In this presentation, Dr. Sharshar will discuss animal models, neurobiological techniques and behavioral tests that enables the reproduction of the main features of sepsis related acute and long-term brain dysfunction, in order to better phenotype the pathogenic mechanisms with their clinical correlates.

Tarek Sharshar, Ph.D., Senior Consultant, Intensive Care Medicine, **University of Versailles, France**

4:50 pm Panel Discussion

5:05 pm End of Day's Proceedings

AGENDA

March 3, 2017

8:00 am Opening Remarks

8:05 am KEYNOTE ADDRESS: The Johns Hopkins Individualized Health Initiative

Scott L. Zeger, Ph.D., Professor, Biostatistics, Bloomberg School of Public Health **Johns Hopkins University**

PREDICTION

8:30 am Predictive Analytics for Impending Clinical Deterioration

Dana Edelson, MD, Assistant Professor of Medicine, **University of Chicago**

8:55 am Quantitative Electroencephalographic Signatures for Prediction in Severe Brain Injury

The presentation will focus on reviewing insights into quantitative electroencephalographic signatures that help assess and predict recovery of patients with severe brain injury. Specifically, Dr Claassen will investigate emerging application of quantitative EEG analysis for the detection of seizures, ischemia, and recovery of consciousness in acutely brain injured patients.

Jan Claassen, MD, Ph.D., FNCS, Head of Neurocritical Care and Medical Director of Neurological ICU, **Columbia University**

9:20 am Leveraging MRI Advances in Concussion Patients: Machine Learning and More

In this presentation, Dr. Lui will discuss how to better understand concussions using MRI (macrostructure, microstructure, functional and metabolic imaging). She will also discuss how machine learning can be applied to help aid diagnosis and treatment (classification, prediction, dealing with artifacts).

Yvonne Lui, MD, Associate Professor, Radiology, **New York University**

9:45 am Multiparametric Prediction of Vasospasm After Subarachnoid Hemorrhage

Soonjin Park, MD, FAHA, FNCS, Assistant Professor of Neurology, Neurocritical Care Fellowship Director, **Columbia University College of Physicians and Surgeons**

10:10 am Discriminative Mapping for Coma Recovery Prediction

Recent investigations on the structure and function of the brain have yielded fundamental insights into the neuroscience of conscious awareness. This discovery is driven by advances in our ability to map the brain including anatomical and functional neuroimaging, electroencephalography and event-related potentials. Inferences from mapping are intrinsically constrained by the technology used for signal acquisition and the analytical paradigms employed to interpret the signal.

AGENDA (Continued)

Across different paradigms including sleep, anesthesia, seizures and brain injury, a model emerges in which changes in the conscious state are intrinsically linked to modifications in the degree of functional segregation and integration of distributed neuronal systems.

Robert Stevens, MD, Associate Professor, Anesthesiology & Critical Care Medicine, **Johns Hopkins University**

10:35 am Panel Discussion

10:50 am Refreshment/Poster Viewing/Networking Break

CLINICAL TRIALS I

11:05 am Selection of Ischemic Stroke Patients for Reperfusion

Tudor Jovin, MD, Associate Professor of Neurology, Chief, Stroke Division, Director, UPMC Stroke Institute, **University of Pittsburgh**

11:30 am Selection of Intracerebral Hemorrhage Patients for Minimally Invasive Surgery

Daniel Hanley, MD, Professor of Neurology, **Johns Hopkins University**

11:55 am Panel Discussion

12:10 pm Lunch

CLINICAL TRIALS II

1:00 pm KEYNOTE ADDRESS: Right Care, Right Now, Every Patient, Every Time: Towards Precision Medicine in Critical Care

Clinical decision-making in critical care has two foundations: knowledge and data. Knowledge is typically derived from randomized clinical trials, presented as guidelines and used as order sets and algorithms. Data reside in data warehouses, are typically recovered through structured queries and are only infrequently used on an ad hoc, patient-specific basis. This lecture focuses on the convergence of knowledge-driven and data-driven decision making as a strategy to customize and personalize acute and critical care. Considerations will include data types, reasoning frameworks and enabling technologies.

Tim Buchman, Ph.D., MD, Director, Emory Critical Care Center, **Emory University**

1:25 pm Adaptive Clinical Trial Design in Acute Neurology

The goal of the presentation is to describe novel adaptive clinical trial designs that can be applied to Phase II clinical trials investigating promising neuroprotective agents.

Jose Suarez, MD, Professor of Neurology-Vascular Critical Care, **Baylor College of Medicine**

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AGENDA (Continued)

1:50 pm Biomarkers for Predictive Enrichment in Neurocritical Care Trials

Clinical trials in traumatic brain injury have been disappointing. One reason is that traumatic brain injury is so heterogeneous and not every patient may respond to the same treatment. Biomarkers may be useful to select patients that will have the greatest chance for benefit from a treatment.

Claudia Robertson, MD, Professor, Department of Neurosurgery, **Baylor College of Medicine**

2:15 pm Goals for Blood Pressure Management in Intracerebral Hemorrhage

Adnan Qureshi, MD, Professor of Neurology, Neurosurgery and Radiology, **University of Minnesota**

2:40 pm Personalized Targets for Hemodynamic Management in Neurocritical Care

In this presentation Dr. Lazaridis will cover the physiologic background, monitoring techniques, and clinical interventions aimed at managing brain dysoxia and organ-systems physiologic conflicts.

Christos Lazaridis, MD, Assistant Professor of Neurology, **Baylor College of Medicine**

3:05 pm Panel Discussion

3:20 pm Concluding Remarks

3:25 pm End of Conference

THE VENUE

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POSTER SESSION

The Neuroscience in Intensive Care International Symposium Poster Session will provide the opportunity for individuals to present their research and offers an excellent venue for extended informal discussion with meetings.

Requirements

Abstracts should be no longer than 1000 words and follow a standard format (background, methods, results, conclusion).

Please include the following in your submission:

- Full name and affiliation
- Poster Title
- Abstract

Deadlines/Other Information

Please email your submission to enquiries@nicis.org by February 10, 2017. Posters are reviewed and accepted for presentation on a rolling basis. Allow 3 business days for notification of acceptance.

Guidelines for Presenters

Information regarding physical dimensions/specifications for accepted submissions will be communicated to presenters via email.

*Regular registration rates apply for all accepted poster session presenters.

PRICING/REGISTRATION

STUDENT RATE

Early Bird (through Jan. 3, 2017): \$250
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Your registration may be transferred to a member of your organization up to 24 hours in advance of the conference. Refunds (minus a \$140 processing fee) are available if cancellation is received by January 27, 2017. No cancellations can be accepted after this date, but voucher will be issued for attendance at a future Arrowhead event. Please fax, email or mail notice of cancellation to Arrowhead Publishers, 5780 Lincoln Drive, Suite 205, Edina, MN 55436, fax: 866-945-0263, email: enquiries@arrowheadpublishers.com

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