ANNUAL REPORT

Stimulating Science in a Unique Setting

RESEARCH UPDATE IN NEUROSCIENCE FOR NEUROSURGEONS (RUNN)

OCTOBER 29, 2016 - NOVEMBER 5, 2016

SPONSORED BY

The Society of Neurological Surgeons

COURSE DIRECTORS

Allan H. Friedman, M.D.
Robert M. Friedlander, M.D.

CO-DIRECTORS

Bruce Andersen
Issam A. Awad
Henry Brem
E. Antonio Chiocca
Robert J. Dempsey

COURSE COORDINATOR

Karen Koenig

Mission Statement

The Mission of the course, Research Update in Neuroscience for Neurosurgeons (RUNN), is to provide an introduction to and update of the latest concepts, hypotheses and methods of neurobiology and neuroscience relevant to neurological surgery. These are presented by accomplished neuroscientists in an atmosphere emphasizing scientific rigor, highlighting models of career development for neurosurgeon-scientists, and illustrating potential future neurosurgical applications. A milieu of total immersion in scientific discourse is designed to foster creative discussions among neurosurgical trainees and faculty. Participants are instructed on selecting a research topic, identifying a mentor, designing hypothesis driven experiments and writing grants. The course is designed to stimulate neurosurgical trainees to participate in basic, translational, and clinical research relevant to the practice of neurological surgery.

Historical Background and Setting

The RUNN course was the brainchild of Henry Schmidek, formerly of Harvard University and the University of Vermont. The course was conceived in response to the anticipated expansion of neurosciences, which would be applicable to the practice of Neurosurgery. The course was initiated to combat illiteracy in basic neurobiology that he feared would weaken the specialty of Neurosurgery. Dr. Schmidek's RUNN Course has been instrumental in setting the course of many academic neurosurgeons.

As with so many neuroscientists from New England, Dr. Schmidek was very familiar with the Marine Biological Laboratory (MBL) at Woods Hole, Massachusetts. Established in 1888 as a non-profit institution devoted to research and education in basic biology, the MBL has been called "the uniquely national center for biology in this country" (Lewis Thomas, The Lives of a Cell). Scientists and students throughout the world come to the MBL to conduct research, teach, study and collaborate. They often use the diverse and abundant organisms found in surrounding waters as model systems. Here research ships leave everyday to study the pristine waters around Martha's Vineyard sound and to collect and maintain more than 200 species of marine life. There are 230,000 square feet of research space at the MBL and a splendid library with an extraordinary repository of books and journals and incredible electronic connectivity to everything biological. It is here that the giant squid axon was (and continues to be) closely studied unfolding the splendid story of molecular mechanisms of neural function. There are incredible microscopy facilities, numerous amphitheaters and teaching facilities, a quintessential scientific community in true life and work, and a magnificent setting for creativity and scholarly productivity. And there is Swope

Hall, a simple dormitory sleepily straddling a quaint harbor, with a friendly staff that knows how to host students and scholars. It is all in Woods Hole, that lovely little spot and ideal gateway, along the magnificent coast of Cape Cod. With miles of bicycle and jogging trails and nearby ferries, the only competition to diligent scholarship at Woods Hole is the inspiring call of nature.

It is here that Henry Schmidek cast his RUNN course, and lobbied other residency program directors to send their trainees once a year. By the mid-1980's it was an established offering for two weeks each fall, immersing neurosurgery residents from New Orleans to Saint Louis, from Minnesota to Maryland, and from San Francisco to New York City. The faculty included scientists from the MBL, demonstrating microscopy and dissection and scientists from the New England universities who would drive to the MBL for one or two days to participate in RUNN. There would also be neurosurgery's rising academic stars as role models, and wiser icons telling their tales of successes and challenges in the laboratory.

There was nothing like it in neurosurgical education, and there still is not. The founding mission of the RUNN course remains relevant today, and its culture and milieu remain as appealing. This crown jewel of American neurosurgical education was adopted in the late 1980's by the American Association of Neurological Surgeons (AANS) and later by the Joint Committee on Education of the AANS and the Congress of Neurological Surgeons (CNS). This endorsement and administrative oversight by organized neurosurgery heralded an era of expansion and uninterrupted success under the Directorship of Charles Hodge, of Syracuse, New York, with his lovely wife Cathy shepherding the Course as its coordinator. In the mid 1990's Dr. Hodge became Co-Director, passing the helm of Directorship to Cordell Gross, of Burlington, Vermont. Linda Gross served as Course Coordinator.

During this period, Charlie and Cordell cultivated a core of devoted faculty from the MBL, Syracuse, Vermont, Harvard, Brown, the National Institutes of Health (NIH), and other institutions who would participate on a regular basis as faculty. A requirement for faculty participation remains-- that the individual be an active and accomplished scientist, speaking on topics he/she actively investigates, and that he/she be an effective speaker. Only those who are highly rated by the neurosurgical trainees would be invited again. Many would dazzle and inspire casting truly unforgettable lectures or discussions. The days would be filled with lectures, unhurried, with plenty of time for discussion. There would be long blocks of time for reading in the library, or for creative

and vivid discussions with beer, wine and snacks late into the night. Friendships would be forged among attendees, and research ideas and even an occasional scholarly career would be hatched. All attendees stay at the dorm at Swope Hall, where the legendary cafeteria is like no other, and the views from each simple bedroom (many shared by two residents) as memorable.

Because of untimely illness in 1998, Dr. Gross asked to step down from the Directorship of the RUNN Course which he had grown to love so much. The opportunity of change of leadership allowed a re-examination and re-commitment to the Mission and core values of the RUNN Course. The AANS and CNS asked the Society of Neurological Surgeons (SNS) to assume sponsorship and oversight of the course. Established in 1920 the SNS is known in neurosurgical lore as the "Senior Society" or organization of North American Chairmen and Residency Program Directors. The SNS would insure Program Directors' continued commitment to this unique educational offering, and ensure residents' continued participation.

In 1999, the leadership of the RUNN Course was entrusted to Issam A. Awad. Dr. Awad broadened the goals of the RUNN Course to educate neurosurgical residents in formulating hypothesis driven experiments, establishing laboratories and writing grants. To this end, several neurosurgeons who headed successful basic science laboratories were added to the faculty. The Society owes a debt of gratitude to Cathy Awad who administered the Course during Dr. Awad's tenure. Cathy coordinated everything from "T" shirts to accommodations to finances.

RUNN Course Leadership

In 2004, Dr. Awad passed the baton of leadership to Allan H. Friedman (Duke University) and Robert M. Friedlander (University of Pittsburgh) as the new Directors of the Course. The Co-Directors of the Course are Issam A. Awad (University of Chicago), Bruce Andersen (Idaho Neurological Institute), Henry Brem (Johns Hopkins), E. Antonio Chiocca (Harvard) and Robert J. Dempsey (University of Wisconsin). Dr. Bruce Andersen works closely with Jim Galbraith (Oregon Health Sciences) to run a squid giant axon physiology hands-on laboratory experience. Course Coordinator, Karen Koenig, works throughout the year to insure RUNN is executed flawlessly, managing the organization, administration and accounting of the Course.

The 2016 RUNN Course Curriculum: Tradition and Innovation

The founding mission and core values of the RUNN Course remained unchanged. The SNS Executive Committee (representing North American Residency Program Directors) rearticulated its commitment to the course and its leadership.

In response to recent course evaluations and discussions with Program Directors and residents, the course was shortened in 1999 from two weeks to one week with travel days on adjacent weekends. The one and one-half hour length of individual lectures allows for stimulating interaction between the lecturer and the participants. Two such lectures are given each morning, two each afternoon, and one each evening. Curriculum content was reshaped to include lectures covering the spectrum of molecular, cellular and systems neuroscience. Lectures covered topics on molecular genetics, signaling and receptors, stem cells, cell death, regeneration, oncogenesis, glial barriers, vascular tone and phenotype, cognitive information science, circuit modeling, and higher cortical function. Although many of the lecturers return, their material is surprisingly fresh reflecting new discoveries made in their labs. Many of the lectures were given by practicing neurosurgeons with actively funded laboratories. There were tours of the MBL laboratories and the very popular squid giant axon dissection lab. There were discussions on academic career development, grantsmanship, history and philosophy of science and the scientific method, and history of the MBL. And there were the traditional opening get-acquainted reception and Course Orientation, and the farewell Lobster Bake and Diploma ceremony.

New Lectures Presented at the 2016 Course:

1. **Edward Boyden, Ph.D.,** Leader, Synthetic Neurobiology Group, Associate Professor and AT&T Chair, MIT Media Lab and McGovern Institute, Departments of Biological Engineering and rain and Cognitive Sciences, Co-Director, MIT Center for Neurobiological Engineering. **Lecture Title: "Tools for Understanding and Repairing the Brain"**
2. **Neville Hogan, M.S., M.E., Ph.D.,** Professor of Mechanical Engineering, Professor of Brain and Cognitive Sciences, and Director of the Newman Laboratory of Biomechanics and Human Rehabilitation at The Massachusetts Institute of Technology. **Lecture Title: "Robotic Tools for Scientific Neuro-Recovery "**

3. **James D. Kang, M.D.,** Thornhill Family Professor of Orthopaedic Surgery, Harvard Medical School, Chairman, Department of Orthopaedic Surgery, Brigham and Women's Hospital. **Lecture Title: "Novel Advances in Biological Therapies for Disc Degeneration: A Surgeon-Scientist Perspective."**
4. **Richard J. Wurtman, M.D.,** Cecil H. Green Distinguished Professor, Emeritus, Department of Brain & Cognitive Sciences, Massachusetts Institute of Technology. **Lecture: "Enhancing Synaptogenesis in Early Alzheimer's Disease by Administering Phosphatide Precursors."**

The collegial atmosphere at Swope Hall remained unchanged, as were the memorable late night sessions with snacks, beer and wine and the very late night sessions at Captain Kidd's where residents discussed everything from research topics and career paths, to residency training, to NFL football. Each attendee received a hoodie sweatshirt embroidered with Research Update in Neuroscience for Neurosurgeons (RUNN) 2016.

Splendid Cast of Faculty

The faculty are world-class scientists who are able to present their work in a stimulating fashion. There were 30 faculty and 7 directors, representing an extraordinary student/faculty ratio of 3/1. Attendees were mesmerized by the dynamic speakers and post lecture discussions were lively and probing. The residents discussed personal choices in research commitments and career direction with the invited speakers. Many faculty members had participated in the RUNN Course for several years, and all promised to come again if invited. The Course evaluations filled out by the attendees are used to make modifications in the course's speakers and structure.

An Enthusiastic Cast of Attendees

A record number of 110 neurosurgery residents representing programs throughout the United States and Canada attended the course. The reshaped course is ideal for young attending neurosurgeons just embarking on their academic career. Our goal is to attract one neurosurgeon from each neurosurgical program in North America.

Our participants continue to be enthusiastic. It is exciting to see the participants swept up in the lectures and spontaneously confronting the lecturers with insightful questions. If this group is representative of neurosurgical residents, the future of neurosurgery looks very bright.

COURSE REPORT

by Jordan Komisarow, M.D.
Neurosurgical Resident,
Duke University Hospital

Every year a lucky group of select neurosurgery residents attend the Research Update in Neuroscience for Neurosurgeons (RUNN) Course in Woods Hole, Massachusetts. The course is directed by Dr. Allan Friedman of Duke, Dr. Robert Friedlander of UPMC, and organized by Ms. Karen Koenig. All three are long-time supporters of the courses' mission to educate and excite the next generation of neurosurgery residents in the cutting-edge research taking place in our growing field. The RUNN course is an amazing opportunity for residents to take a break from the grind of clinical care to be immersed in ground-breaking basic science, translational research, and clinical research in the neurosciences. We received lectures from world-renowned physician scientists and award-winning bench scientists. The instructor list rivaled that of any major scientific conference. The RUNN course is not only an opportunity to learn the science, it is a primer in learning how to do the science. Each lecturer "pulls back the curtain" to explain how their careers have grown. This is critical for young investigators. As a field, neurosurgery has been marked by, and continues to be pushed forward by, ingenuity and creative solutions to complex problems. Many of us were attracted to neurosurgery by our love of this discovery. The immense amount of clinical responsibility bestowed upon surgery residents can sometimes cause the quest of discovery to be pushed to the back-burner. The RUNN course stands as a pivotal reminder of the importance of this mission. The immersive nature of the RUNN course is one of the secrets to its success. It was humbling to be surrounded by such a talented group of residents. I immensely enjoyed their thoughtful questions during the lectures, and was inspired to hear about their research over coffee or at dinner. I have been fortunate to keep in touch with several of them since the RUNN course has concluded. Each time I reflect upon my time at the RUNN course I feel a renewed sense of purpose and excitement as a young investigator. I hope that this important event continues to serve as a catalyst of neurosurgical discovery for generations to come, and will forever be thankful for the opportunities it has afforded me.

COURSE REPORT

by Theresa Williamson, M.D.
Neurosurgical Resident, Duke University Hospital

I attended the RUNN course in December 2016 as a Duke Resident. The course was informative, fun, and inspiring. As a resident, we are inundated with clinical information; having a week dedicated to thinking about research and how science integrates with our daily practice was invaluable. Interacting with colleagues and meeting role models in the field from all over the country was a crucial part of a great experience.

The week started with a talk from Dr. Friedman introducing a course I had heard so much about and followed by a very inspirational talk by Dr. Dempsey on how to start a project in neurosurgery. His talk made neurosurgery more than the daily routine of neurosurgery and again brought my focus to the issues that I am most passionate about and to being a good person. The next day, we received what we were promised, a great set of lectures, topped off by an amazing talk on connectomics. Dr. Lichtman's talk was humble and awe-inspiring as he described the numerous connections in the brain in an incredibly complex map. We went through the week learning about brain tumor immunotherapy, novel ideas in brain regeneration, degeneration, and CNS response to injury. The last day, there was another great lecture that I will remember from the course by Dr. Beth Stevens on wiring of the brain.

You could learn as much from RUNN in the classroom as you could in the amazing setting of Woods Hole. Walking back and forth between lectures, I had great conversations with residents from other programs, exchanging stories, project ideas, and referring each other to helpful mentors in neurosurgery. Eating as a group led to fun and interesting stories – some of my favorite with colleagues from UNC about shared experiences with patients in NC. We explored the awesome seafood scene in Woods Hole and I even celebrated my 30th birthday at Woods Hole with a great surprise from the Duke Neurosurgery Group. Running every morning in Woods Hole was beautiful and relaxing and a great opportunity to spend time chatting with Dr. Friedman and Dr. Dempsey.

Overall, I am so grateful that I could attend the RUNN course as it reminded me why I came into neurosurgery and how much I love the intersection of science and medicine in our field. Also, the people in neurosurgery are one of a kind, dedicated, passionate, and brilliant and an opportunity to spend a week with them was great. I look forward to seeing the progress of the course in the future!

COURSE REPORT

by Ranjith Babu, M.D.
Neurosurgical Resident, Duke University Hospital

I attended the RUNN course in 2016 as a PGY-3 from Duke University. I had heard so much about the course from senior residents who had thoroughly enjoyed the experience. The course certainly exceeded all of my expectations and was not only refreshing and stimulating but inspiring. The combination of the informative lectures with the collegiality of fellow neurosurgery residents from around the country made the week long course feel all but too short.

The course first started with motivational introductory speeches by Drs. Friedman and Friedlander – both of whom were clearly passionate about the course. The first day was a great overview about starting research in neurosurgery while the second day dove in-depth into connectivity and rewiring of the brain. My favorite lecture of the day was by Dr. Lichtman on Connectomics. In this lecture we learned about the incredibly complex networks formed by neurons and discovered that many of the classical teachings of neuroscience with respect to neuronal functional anatomy are incorrect. The complexity we were shown was personally humbling and clearly demonstrated the how far we are from understanding the brain – a sentiment also shared by the lecturer. Throughout the week we then learned about various aspects of brain tumor research, genomics, and more clinically oriented research. A particularly fascinating lecture was by Kerry Bernstein who stimulated discussion about artificial intelligence, machine learning, and artificial neural networks. In summary, the course was a refreshing exposure to a wide variety of topics which otherwise I would never have been exposed to.

In addition to the great lectures, the course stimulated learning from colleagues. The cafeteria-style meals encouraged residents to interact with each other and form new relationships which otherwise would not have been possible. I certainly gleaned new perspectives on lectures from talking to other residents who were often much more knowledgeable about various topics. Going to dinner in Woods Hole and surrounding areas was also certainly a great experience (especially as a seafood lover!) and allowed for the creation of new friendships. It was also a great time to catch up with other residents who I had not seen since the interview trail. Finally, the beautiful weather and serenity of Woods Hole was the perfect location and allowed me to reflect not only on the lectures but also on the trajectory of my career.

In conclusion, the RUNN course was an invaluable experience and I am certainly grateful for having the opportunity to attend.

We acknowledge generous grants from:

Education Grants 2016 RUNN Course	
Integra Foundation	$5,000.00
Stryker Corporation (CMF & Neuro, Spine, ENT (NSE)	$5,000.00
Zimmer/Biomet Microfixation	$3,000.00
Arbor Pharmaceutical, L.L.C.	$2,500.00
Brainlab, Inc.	$2,500.00
DePuy Synthes Codman Neuro	$2.500.00
DePuy Synthes Power Tools/Anspach.	$2,500.00
Marathon Medical, Inc.	$2,500.00
Leica Microsystems, Inc.	$1,500.00
Kirwan Surgical	$1,000.00
Carl Zeiss Meditec, Inc.	$2,500.00
Mizuho America	$1,000.00
TOTAL	$31,500.00

These grants subsidized audio-visual, lab, faculty travel and honoraria expenses.

Toward RUNN 2017 and Beyond!

We have finalized space contract with the MBL for 2017. RUNN 2017 will take place from October 28 to November 4, 2017. The SNS and the Course Co-Directors and Coordinator are committed to maintaining the best of the RUNN Course, while continuing to strive to enhance curriculum content and value to each registrant. We continue to call on Residency Program Directors to support this unique gem of North American Neurosurgical Education, by providing their residents the opportunity of exposure to, and update on the best of neurobiology. We hope that future courses will also attract fellows and young faculty at formative states of their academic careers, and to practicing neurosurgeons who want to get reacquainted with the future of neurosurgery!

RUNN Web Site

http://www.societyns.org

RUNN Course 2016 Attendees:

Abdullah, Kalil	University of Pennsylvania
Agarwal, Nitin	University of Pittsburgh Medical Center
Agyei, Justice	State University of New York at Buffalo
Akbar, Muhammad	University of Toronto
Altshuler, David	University of Michigan
Amburgy, John	University of Alabama at Birmingham
Amin, Anubhav	New York Medical College / Westchester Medical Ctr
Anderson, Brian	Penn State Neurosurgery
Babu, Ranjith	Duke University
Badhiwala, Jetan	University of Toronto
Bagley, Jacob	Oregon Health & Science University
Banks, Garrett	Columbia University
Barry, James	LSU Health Sciences Center-Shreveport
Bender, Matthew	Johns Hopkins Hospital
Beutler, Timothy	Upstate Medical University
Bodden, Larry	University of Wisconsin
Brown, Desmond	Mayo Clinic Rochester MN
Busch, Christopher	Carilion Clinic
Calnan, Daniel	Dartmouth-Hitchcock Medical Center
Carlton, William	University of Florida
Carr, Kevin	University of Texas Health Science Ctr. San Antonio
Chivukula, Srinivas	UCLA, David Geffen School of Medicine
Chow, Kwong-Hon	Stanford University Medical Center
Clifton, William	Mayo School of Graduate Medical Education
Cools, Michael	University of North Carolina
Crutcher, Clifford	LSU Health Sciences Center New Orleans
Davanzo, Justin	Penn State Neurosurgery
Davis, Greg	George Washington University
Davis, Nathan	University of North Carolina
Dillen, William	University of Kentucky
Divito, Anthony	University of Texas Medical School at Houston

RUNN Course 2016 Attendees: continues

Dupepe, Esther	University of Alabama at Birmingham
Folzenlogen, Zach	University of Colorado School of Medicine
Fomchenko, Elena	Yale School of Medicine
Frenkel, Mark	Wake Forest School of Medicine
Freyvert, Yevgeniy	UCLA, David Geffen School of Medicine
Gahramanov, Seymur	University of New Mexico
Gandhoke, Gurpreet	University of Pittsburgh Medical Center
Garzon-Muvdi, Tomas	Johns Hopkins Hospital
Gattozzi, Domenico	University of Kansas Medical Center
Gianaris, Thomas	Indiana University
Goh, Jo Ling	Oregon Health & Science University
Gorrepati, Ramana	Yale School of Medicine
Hafez, Daniel	Washington University in St. Louis
Haldeman, Clayton	University of Wisconsin Hospitals and Clinics
Hartnett, Sara	University of South Florida
Hatef, Jr., Jeffrey	Ohio State University
Henderson, Fraser	Medical University of South Carolina
Hernandez, Robert	Rutgers University
Ho, Sze Chun Winson	National Institutes of Health
Hussain, Ibrahim	Weill Cornell Medical College
Iyer, Rajiv	Johns Hopkins University
Jafrani, Ryan	Houston Methodist Hospital
Juraschka, Kyle	University of Toronto
Karsy, Michael	University of Utah Neurosurgery
Katsevman, Gene	West Virginia University SOM
Khan, Adam	University of Minnesota
Kobets, Andrew	Montefiore Medical Center/Albert Einstein College
Komisarow, Jordan	Duke University
Kramer, Daniel	University of Southern California
Kwan, Kevin	North Shore University Hospital
Lane, Brandon	Indiana University
Leschke, John	University of Minnesota
Li, Daphne	Loyola University Medical Center
Li, Xun	Brown University
Link, Thomas	Weill Cornell Medical College
Liogier-Weyback, Luis	Medical University of South Carolina
Lynes, John	Georgetown University Hospital
Makler, Vyacheslav	University of Missouri
McDowell, Michael	University of Pittsburgh Medical Center
McMahon, Paul	Oregon Health & Science University

RUNN Course 2016 Attendees: continues

Michael, Alex	Southern Illinois University School of Medicine
Milano, Vanessa	University of Rochester
Miller, Christopher	University of Kansas Medical Center
Mistry, Akshitkumar	Vanderbilt University Medical Center
Neira, Justin	Columbia University
Nguyen, Khoi	Medical College of Georgia @ Augusta University
Pace, Jonathan	University Hospitals Case Medical Ctr
Prashant, Giyarpuram	UCLA, David Geffen School of Medicine
Pratt, Nathan	University of Maryland Neurosurgery
Price, Richard	Washington University in St. Louis
Renfrow, Jackie	Wake Forest School of Medicine
Richardson, Angela	University of Miami - Jackson Health System
Rogers, Cara	Carilion Clinic
Rubino, Sebastian	Albany Medical Center
Saadeh, Yamaan	University of Michigan
Schmidt, Tyler	University of Rochester
Shutran, Max	Tufts Medical Center
Simpson, Brett	University of Texas Medical School at Houston
Smith, Luke	Ohio State University
Stone, Jeremy	University of Pittsburgh Medical Center
Strand, Adam	University of Vermont Medical Center
Strickland, Allison	University of Oklahoma
Taccone, Michael	University of Ottawa
Tafel, Ian	The Brigham and Women's Hospital
Tenny, Steven	University of Nebraska
Tonetti, Daniel	University of Pittsburgh Medical Center
Tran, Diem Kieu	University of California, Irvine
Travers, Sarah	University of Missouri
Umansky, Derrick	Tulane/Ochsner Clinic Foundation
Vasenina, Valentina	University of Chicago
Vedantam, Aditya	Baylor College of Medicine
Viers, Angela	Medical College of Georgia @ Augusta University
Vigneswaran, Krishanthan	Emory University School of Medicine
Wagner, Katherine	Hofstra Northwell SOM Neurosurgery Program
Wallace, David	UT Health Science Center San Antonio
Wessell, Aaron	University of Maryland Medical Center
Williamson, Theresa	Duke University
Willsey, Matthew	University of Michigan
Wu, Kyle	Brigham and Women's Hospital

Faculty and Topics

Bruce Andersen, M.D., Ph.D.
Saint Alphonsus Neuroscience Institute
"Squid Lab"

Issam A. Awad, M.D., MSc, FACS
University of Chicago
Lecture Title: "Philosophy of Science in Relevance to Neurosurgery" and "Deconstructing a Neurosurgical Disease: A Path to Therapy for Cerebral Cavernous Malformation"

Larry Benowitz, Ph.D.
Harvard University
Lecture Title: "Rewiring the Injured CNS"

Kerry Bernstein, Ph.D.
Lecture Title: "A Matter of TRUST"

John Bookvar, M.D.
Cornell University
Lecture Title: "Intra-arterial Chemotherapy After Blood Brain Barrier Disruption to Target the Glioma Stem Cell Niche"

Edward Boyden, Ph.D.
Massachusetts Institute of Technology
Lecture Title: "Tools for Understanding and Repairing the Brain"

Henry Brem, M.D.
The Johns Hopkins Hospital
Lecture Title: "Brain Tumor Therapy"

Mark P. Burns, Ph.D.
Georgetown University
Lecture Title: "Acute CNS Injury and Chronic Neurodegenerative Disease: Common Pathways and Therapeutic Targets"

E. Antonio Chiocca, M.D., Ph.D.
Harvard University
Lecture Title: "Translational Therapeutics for Brain Tumors: From the Lab to the Clinic and Back"

Robert Dempsey, M.D.
University of Wisconsin
Lecture Title: "Inspiration and Neurosurgical Research – How to Start a Project, Grant or Paper"

V. Reggie Edgerton, Ph.D.
UCLA Medical Center
Lecture Title: "Activity Dependent Mechanisms that Enhance Sensorimotor Function Following Spinal Cord Injury"

Robert M. Friedlander, M.D.
University of Pittsburgh
Lecture Title: "Mechanisms of Cell Death in Neurologic Diseases"

James Galbraith, Ph.D.
Oregon Health Sciences
Laboratory Experience: "Squid Lab"

Zoher Ghogawala, M.D., FACS
Tufts University School of Medicine
Lecture Title: "What is Comparative Effectiveness Research, Why Should We Care About This Topic?"

Murat Günel, MD
Yale University
Lecture Title: "Next Generation Genomics"

Michael M. Haglund, M.D., Ph.D., FAANS, FCS (ECSA)
Duke University Medical Center
Lecture Title: "Academic Neurosurgery and Global Health"

Faculty and Topics continues

Robert E. Harbaugh, MD, FACS, FAHA
Penn State University
Lecture Title: "Issues in Neurosurgical Clinical Research"

Neville Hogan, M.S., M.E., Ph.D.
Massachusetts Institute of Technology
Lecture Title: "Robotic Tools for Scientific Neuro-Recovery"

James D. Kang, M.D.
Harvard Medical School
Lecture Title: "Novel Advances in Biological Therapies for Disc Degeneration: A Surgeon-Scientist Perspective"

Jeff W. Lichtman, M.D., Ph.D.
Harvard University
Lecture Title: "Connectomics"

Nir Lipsman, M.D.
University of Toronto
Lecture Title: "Brain Circuitry and Human Behavior: What Can Go Wrong and What Can We Do About It?"

L. Dade Lunsford, M.D., F.A.C.S.
The University of Pittsburgh
Lecture: "The Expanding Role of Radiosurgery as a Part of Neurosurgery."

Joseph R. Madsen, M.D.
Harvard Medical School
Lecture Title: "Signals and Systems in the Human Brain: Water and Electricity"

James T. Rutka, MD, PhD, FRCSC, FACS, FAAP
University of Toronto
Lecture Title: "Glioblastoma Multiforme: Advances Beyond the Leading Edge"

Walter Schneider, Ph.D.
University of Pittsburgh
Lecture Title: "Clinically Actionable Fiber Tracking in Neurosurgery & Traumatic Brain Injury: MRI Tract Visualizations with Quality Exceeding Microdissection"

Andrew B. Schwartz, Ph.D.
University of Pittsburgh
Lecture Title: "Advances in High Performance Brain-Controlled Prosthetics"

Marc Simard, M.D., Ph.D.
University of Maryland
Lecture Title: "The SUR1-TRPM4 Channel – a Critical Player in CNS Ischemia and Trauma"

Beth Stevens, Ph.D.
Harvard University, Children's Hospital Boston
Lecture Title: "Wiring and Unwiring the Brain: Role of Glia and Immune Molecules"

Peter L. Strick, Ph.D.
University of Pittsburgh
Lecture Title: "Basal Ganglia and Cerebellar 'Loops' with the Cerebral Cortex: Circuits for Movement, Cognition and Affect"

Richard J. Wurtman, M.D.
Massachusetts of Technology
Lecture Title: "Enhancing Synaptogenesis in Early Alzheimer's Disease by Administering Phosphatide Precursors"