



# *Stimulating Science in a Unique Setting*



## **RESEARCH UPDATE IN NEUROSCIENCE FOR NEUROSURGEONS (RUNN)**

**OCTOBER 25 - NOVEMBER 1, 2014**

**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**

**COURSE COORDINATOR**

**Karen Koenig**

**E. Antonio Chiocca  
Robert J. Dempsey**

## 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 2014 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 2014 Course:

- 1. Zoher Ghogawala, M.D., FACS**, Charles A. Fager Chairman, Department of Neurosurgery Associate Professor, Tufts University School of Medicine, Lecture Title: “What is Comparative Effectiveness Research, Why Should We Care About This Topic?”
- 2. Steve Goldman, M.D., Ph.D.**, URM Distinguished Professor of Neurology and Neuroscience Co-Director, Center for Translational Neuromedicine, University of Rochester Medical Center, Lecture Title: “Progenitor Cell-based Treatment of CNS Disorders: Making Neurological Disease Neurosurgical.”

**3. Takeo Hensch, Ph.D.**, Professor of Molecular and Cellular Biology, Professor of Neurology (Children's Hospital), Center for Brain Science, Harvard University, Lecture Title: "Balancing Plasticity/Stability in the Brain."

**4. Margaret Livingstone, Ph.D.**, Professor of Neurobiology, Department of Neurobiology, Harvard Medical School, Lecture Title: "What Art Can Tell Us About the Brain."



**5. David Reardon, M.D.**, Clinical Director, Center for Neuro-Oncology, Associate Professor of Medicine, Harvard Medical School, Dana-Farber Cancer Institute, Lecture Title: "Clinical Trial Design and Conduct in Neuro-Oncology."

**6. Klaus van Leyen, Ph.D.**, Assistant Professor of Radiology, Massachusetts General Hospital Radiology, Title: "Targeting Mechanisms of Injury and Repair in Stroke."

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) 2014.

## Splendid Cast of Faculty

The faculty are world-class scientists who are able to present their work in a stimulating fashion. There were 27 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 102 neurosurgery residents representing programs throughout the United States, Canada and Puerto Rico 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 Owoicho Adogwa, M.D. Neurosurgical Resident, Duke University Hospital**

The 2014 Research Update in Neuroscience for Neurosurgeons (RUNN) course took place in at the historic Marine Biological Library in Woods Hole. The course brought together well-known scientists from a broad range of disciplines, senior neurosurgeons, as well as enthusiastic residents for a week of lectures and an exchange of ideas. This was perhaps the most intellectually stimulating experience I have had as a resident.



The course directors, Drs. Allan Friedman and Robert Friedlander did a magnificent job. They assembled a list of world-renowned speakers from across the country to share their research interest and experiences with us. Their presentations ranged from the molecular signaling pathways during development to cellular responses to spinal cord injury to the biomechanics of neck injury. The speakers introduced novel

and exciting ideas about how we think about solving neurosurgical problems. Of particular interest were the lectures given by Dr. Gunel discussing the genetics of arteriovenous malformations, and Henry Brem on brain tumor therapy were particularly enlightening. While the information both of these esteemed speakers presented was informative, I was taken aback by their scientific journey and the impact of being an expert in a specific disease process can have on one's career.

As is tradition, prior to each lecture, we learned about how these scientists succeeded in creating the situations that allowed them to have both a successful clinical practice and productive research laboratories.

Although the days were filled with lectures, there was always enough time for social events. Woods Hole offers a great cross-country running trail that was utilized by many of the participants. A few residents made the short trip to Martha's Vineyard, while for others, Captain Kidd, the only off-season bar at Woods Hole, became a second home during the conference week. Even more importantly was the collegiality amongst the participants and the formation of lasting relationships, which will encourage future collaborations. Without question, this was the best week I have had as a resident.

## **Course Report by Vadim (Eddie) Tsvankin, M.D. Neurosurgical Resident, Duke University Hospital**

It's no coincidence that the RUNN meeting falls right around Halloween each year. The annual gathering of young neurosurgeons sees us trade our scrubs for jeans and hoodies, silence our pagers (or, better yet, leave them at home), and emerge from the sterile fluorescence of our hospitals into the crisp sunlight of Woods Hole, MA. Unquestionably, we were still neurosurgeons, but for a week we tried on some new masks – neurobiologists, hypothesis-generators, collaborators, innovators.

The lecture series itself was a living highlight reel of genius, and the main (really, only) attraction of the course. I had forgotten what a privilege it was to simply show up and learn, and each lecturer was a pioneer in their respective fields, painstakingly whittling their life's work down to a ninety-minute talk palatable to a group of bleary-eyed residents. In a word, they were masterful. But the lectures were far from the best part. The real substance happened in the thirty-minute intervals between lectures, at meals, and over beers at Captain Kidd well after sunset. Every resident – something like one hundred and two in all – viewed each lecture through unique lenses. Everyone brought subtly different areas of expertise and interest. And as we communally digested the content of the lectures, whether it was neuroprosthetics or frontiers in immunotherapy, we were simultaneously generating and refining ideas of our own. Which, in retrospect, is probably the goal of the experience – not learning science, but providing the environment for us to learn to think as scientists, together.

Though my fund of declarative knowledge certainly grew during my week in Woods Hole, the greatest gift of the RUNN course was the inspiration I found in my peers. It reminded me of why I gravitated toward neurosurgery in the first place – each individual is a fountain of quiet brilliance. I learned something from literally every single person I met. Only as neurosurgeons do we not only get to stand on the shoulders of giants, but among them. I left Woods Hole energized about my own research endeavors, and with a new network of collaborators and friends. It was a week invaluable to my development as a neurosurgeon – one which no resident should be deprived of.



## We acknowledge generous grants from:

Education Grants 2014 RUNN Course	
Integra Foundation.....	\$5,000.00
Stryker Corporation (CMF & Neuro, Spine, ENT (NSE) .....	\$5,000.00
Aesculap, Inc.....	\$1,000.00
Selective Surgical Inc. ....	\$3,000.00
Brainlab, Inc.....	\$2,500.00
Codman Neuro, Division of DePuy Orthopedics, Inc. ....	\$2,500.00
Globus Medical, Inc.....	\$2,500.00
IMIRS, Inc.....	\$2,500.00
Leica Microsystems, Inc.....	\$2,500.00
DePuy Synthes Power Tools/Anspach .....	\$2,500.00
Mizuho America, Inc. ....	\$1,000.00
TOTAL	\$30,000.00

These grants subsidized faculty travel and honoraria costs.

## Toward RUNN 2015 and Beyond!

We have finalized space contract with the MBL for **2015**. **RUNN 2015** will take place from **October 24, 2015 – October 31, 2015**. 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 2014 Attendees:

Adogwa, Owoicho . . . . .	Duke University Medical Center
Ahuja, Christopher . . . . .	University of Toronto
Akture, Erinc. . . . .	Fletcher Allen Health Care, VT
Alexiades, Nikita . . . . .	Columbia University – New York Presbyterian Hospital
Ali, Rushna . . . . .	Henry Ford Hospital
Ares, William . . . . .	University of Pittsburgh Medical Center
Arko, Leopold. . . . .	Temple University Hospital
Arnone, Gregory . . . . .	University of Illinois at Chicago
Aucoin, Jeffrey . . . . .	UNC Department of Neurosurgery
Barks, Ashley . . . . .	University of Illinois Chicago
Basheer, Azam . . . . .	Henry Ford Hospital
Bodman, Alexa . . . . .	SUNY Upstate Medical University
Bonow, Robert . . . . .	University of Washington
Brandman, David . . . . .	Dalhousie University, Halifax, Nova Scotia, Canada
Burrows, Anthony. . . . .	Mayo Clinic Rochester
Camara-Quintana, Joaquin . . . . .	Yale University School of Medicine
Cohen, Michael. . . . .	Rutgers, The State University of New Jersey
Cord, Branden. . . . .	Yale University School of Medicine
Crisman, Celina . . . . .	Rutgers, The State University of New Jersey
Dayton, Orrin . . . . .	University of Florida
Elder, Benjamin . . . . .	Johns Hopkins
Farokhi, Frank. . . . .	LSU Health Sciences Center-Shreveport
Fernandez-Abinader, Jose. . . . .	University of Puerto Rico
Gamble, Alexander . . . . .	Hofstra North Shore Long Island
Garces, Juanita . . . . .	Tulane University
Gesheva, Silvia . . . . .	LSUHSC – New Orleans
Ghinda, Diana . . . . .	Ottawa University
Goldstein, Hannah . . . . .	Columbia University – New York Presbyterian Hospital
Goodwin, C. Rory. . . . .	Johns Hopkins University
Guha, Daipayan . . . . .	University of Toronto
Gupta, Kunal. . . . .	Oregon Health & Science University
Ha, Sung . . . . .	University of Wisconsin
Hawksworth, Shane . . . . .	University of Texas HSC San Antonio
Hayman, Erik . . . . .	University of Maryland
Hilliard, Justin. . . . .	University of Florida
Hobbs, Jonathan . . . . .	University of Chicago
Hong, Jennifer. . . . .	Dartmouth-Hitchcock Medical Center
Huang, Meng . . . . .	Houston Methodist Hospital

## **RUNN Course 2014 Attendees: continues**

Hubbard, Molly . . . . .	University of Minnesota
Huntoon, Kristin . . . . .	Ohio State University
Jermakowicz, Walter . . . . .	University of Miami – Jackson Health System
Johnson, Stephen . . . . .	University of Pittsburgh Medical Center
Jones, Salazar . . . . .	University of Maryland
Jones, Wesley . . . . .	University of Texas Medical School at Houston
Joseph, Jacob . . . . .	University of Michigan
Kellogg, Ryan . . . . .	Medical University of South Carolina
Kicielinski, Kimberly . . . . .	University of Alabama
Kilburg, Craig . . . . .	University of Utah
Knudson, Kathleen . . . . .	The George Washington University
Konakondla, Sanjay . . . . .	University of Missouri
Kosztowski, Thomas . . . . .	Johns Hopkins
Krause, Katie . . . . .	Oregon Health & Science University
Kumar, Ramesh . . . . .	University of Colorado School of Medicine
Lan, Zheng . . . . .	Baylor College of Medicine
Lim, Joshua . . . . .	University of Minnesota
Maknojia, Asif . . . . .	University of Texas, San Antonio
Mathew, Jesna . . . . .	Geisinger Health System, PA (New Program 2013)
McGinity, Michael . . . . .	University of Texas, San Antonio
Mehan, Neal . . . . .	Hofstra North Shore University, New York
Menendez, Josh . . . . .	University of Alabama at Birmingham
Mirza, Farhan . . . . .	University of Kentucky
Moraff, Adrienne . . . . .	Stanford University Hospitals & Clinics
Morgenstern, Peter . . . . .	NYP – Weill Cornell Medical College
Morris, Saint-Aaron . . . . .	University of Texas Medical School at Houston
Moses, Ziev . . . . .	Brigham and Women’s Children Hospital
Nagasawa, Daniel . . . . .	University of California Los Angeles
Newman, W. Christopher . . . . .	University of Pittsburgh Medical Center
Nguyen, Ha . . . . .	Medical College of Wisconsin
Noh, Thomas . . . . .	Henry Ford Hospital
Olasunkanmi, Ade . . . . .	UNC Department of Neurosurgery
Ondoma, Solomon . . . . .	University of Wisconsin
Paff, Michelle . . . . .	University of California, Irvine
Pain, Margaret . . . . .	Mount Sinai New York
Peterson, Jeremy . . . . .	University of Kansas School of Medicine
Petrov, Dmitriy . . . . .	University of Pennsylvania
Pisapia, Jared . . . . .	University of Pennsylvania
Pucci, Francesco . . . . .	Brown University

## **RUNN Course 2014 Attendees: continues**

Ravindra, Vijay . . . . .	University of Utah
Ricks, Christian . . . . .	University of Pittsburgh Medical Center
Robinson, Leslie . . . . .	University of Colorado School of Medicine
Rohatagi, Pratik . . . . .	Penn State Hershey
Sanchez, Carlos . . . . .	University of New Mexico
Sandler, Adam . . . . .	Albert Einstein College of Medicine/Montefiore
Savastano, Luis . . . . .	University of Michigan
Schunemann, Victoria . . . . .	Ohio State University Medical Center
Shaikh, Kashif . . . . .	Indiana University School of Medicine
Singh, Rahul . . . . .	West Virginia University Department of Neurosurgery
Smith, Kyle . . . . .	University of Kansas School of Medicine
Stani, Tristan . . . . .	Oregon Health Sciences University
Synkowski, Jordan . . . . .	Carilion Clinic Osteopathic Neurosurgery
Toshkezi, Gentian . . . . .	SUNY Upstate Medical University
Tsvankin, Vadim . . . . .	Duke University Medical Center
Tucker, Alexander . . . . .	University of California Los Angeles
Vasudeva, Viren . . . . .	Brigham and Women's Hospital/Harvard Medical School
Vicenty-Padilla, Juan . . . . .	University of Puerto Rico
Vivas, Andrew . . . . .	University of South Florida
Wang, Arthur . . . . .	New York Medical College
White, Ian . . . . .	Indiana University School of Medicine
Wild, Elizabeth . . . . .	LSU Health Sciences Center-Shreveport
Wilkinson, David . . . . .	University of Michigan
Yoon, Jang . . . . .	Mayo Clinic in Florida
Zohny, Zohny . . . . .	Washington University in St. Louis

## 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: “The Scientific Method in Neurosurgery” and “Developing and Accrediting New Treatments for Hemorrhagic Stroke: The MISTIE and CLEAR Odyssey”*

### **Larry Benowitz, Ph.D.**

Harvard University  
*Lecture Title: “Rewiring the Injured CNS”*

### **Edward Benzel, M.D.**

Cleveland Clinic  
*Lecture Title: “Spine, Biomechanics, Clinical Practice, and the Quest of Academic Excellence”*

### **Kerry Bernstein, Ph.D.**

*Lecture Title: “A Matter of TRUST”*

### **John Bookvar, M.D.**

Cornell University  
*Lecture Title: “Intra-arterial Chemotherapy to Target the Glioma Stem Cell Niche in Malignant Brain Tumors”*

### **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?”*

### **Steve Goldman, M.D., Ph.D**

University of Rochester Medical Center  
*Lecture Title: “Progenitor Cell-based Treatment of CNS Disorders: Making Neurological Disease Neurosurgical”*

### **Murat Günel, MD**

Yale University  
*Lecture Title: “Next Generation Genomics”*

## Faculty and Topics continues

**Michael M. Haglund, M.D., Ph.D., FAANS, FCS (ECSA)**

Duke University Medical Center  
*Lecture Title: "Optical Imaging of Epileptiform Activity: from Brain Slices to the Operating Room"*

**Robert E. Harbaugh, MD, FACS, FAHA**

Penn State University  
*Lecture Title: "Issues in Neurosurgical Clinical Research"*

**Takeo Hensch, Ph.D.**

Center for Brain Science, Harvard University  
*Lecture Title: "Balancing Plasticity/ Stability in the Brain"*

**Jeff W. Lichtman, M.D., Ph.D.**

Harvard University  
*Lecture Title: "Connectomics"*

**Margaret Livingstone, Ph.D.**

Harvard Medical School  
*Keynote Lecture Title: "What Art Can Tell Us About the Brain"*

**David Reardon, M.D**

Harvard Medical School, Dana-Farber Cancer Institute  
*Lecture Title: "Clinical Trial Design and Conduct in Neuro-Oncology"*

**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" Prosthetics"*

**Marc Simard, M.D., Ph.D.**

University of Maryland  
*Lecture Title: "The SUR1-Regulated NC(Ca-ATP) Channel – a New Player in CNS Ischemia and Trauma"*

**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"*

**Klaus van Leyen, Ph.D.**

Massachusetts General Hospital Radiology  
*Lecture Title: "Targeting Mechanisms of Injury and Repair in Stroke"*