



# *Stimulating Science in a Unique Setting*

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

**OCTOBER 23-30, 2010**

**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**

**Robert J. Dempsey  
Charles Hodge, Jr.  
Edward Oldfield**



## 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 he predicted in the early 1980's. The course was to combat what he

perceived as potential 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 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 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) so 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 and nearby islands. With miles of bicycle 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 (Harvard) as the new Directors of the Course. The Co-Directors of the Course are Issam A. Awad (Northwestern), Bruce Andersen (Idaho Neurological Institute), Henry Brem (Johns Hopkins), Robert J. Dempsey (University of Wisconsin) and Charles Hodge, Jr. (SUNY at Syracuse). Dr. Andersen works closely with Jim Gailbraith and Paul Gallant (both of



the National Institutes of Health) on the squid lab and microscopy workshop. Course Coordinator, Karen Koenig, works throughout the year to insure RUNN is executed flawlessly, managing the organization, administration and accounting of the Course.



## The 2010 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. Stock No. WEST43000 Many of the lectures were given by practicing neurosurgeons with active funded laboratories. There were tours of the MBL laboratories and the very popular microscopy seminar. 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 Clambake and certificate ceremony.

### New Lectures Presented at the 2010 Course:

- C. Edward Dixon, Ph.D., Lecture Title: “Traumatic Brain Injury: Lessons Learned from the Bench”
- Sean Lawler, Ph.D., Lecture Title: “MicroRNAs – Key Players in CNS Biology and Tumorigenesis”



- Eng H. Lo, Ph.D., Lecture Title: “Neurovascular Mechanisms of Injury and Repair after Stroke”
- Professor Richard I. Morimoto, Ph.D., Lecture Title: “The Stress of Misfolded Proteins in Aging and Neurodegenerative Disease”
- W. Mark Saltzman, Ph.D., Lecture Title: “Polymer Nanoparticles for Controlled and Targeted Delivery of Agents to the Brain”
- Peter L. Strick, Ph.D., Lecture Title: “Basal Ganglia and Cerebellar ‘Loops’ with the Cerebral Cortex: Circuits for Movement, Cognition and Affect”
- Leslie M. Thompson, Ph.D., Lecture Title: “Epigenetics in Huntington’s Disease: Implication for Therapeutics”
- And Keynote: Junying Yuan, Ph.D., Keynote Speaker Lecture Title: “Regulation of Cell Death: From Apoptosis to Necroptosis”



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 complimentary copy of the Fundamental Neuroscience, Edited by Squire, Berg, Bloom, du Lac and Ghosh. This book is a magnificent reference to the topics covered in the lectures, and it is an outstanding resource for future study. The books were funded by a grant from Synthes Spine Corporation.

## A 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 8 directors, representing an extraordinary student/faculty ratio of 2/1. 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

There were 75 attendees (see list) representing programs throughout the United States, Canada, and Puerto Rico. 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. We will work hard until we achieve representation of at least one participant from each North American Program.

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 Jonathan Choi

Neurosurgical Resident, Duke University Hospital

The RUNN course is a unique, stimulating course for young neurosurgeons to learn about the latest advances in basic science and translational research and hear first hand from the giants in the field about pursuing a career in academic neurosurgery. Chairmen and researchers from across the U.S. and Canada come to the harbor at Woods Hole to share their knowledge and experience with the seventy some neurosurgical residents who attend the course. The broad scope of the course included lectures on DBS and brain machine interfaces, spine biomechanics, targeted polymer nanoparticle drug delivery to the brain, regeneration in the CNS, tumor genetics, and the latest in traumatic brain injury research. Prior to each lecture, according to the tradition of the RUNN course, each lecturer shared how he or she became interested in their field of research and how they got started. Each night beer, wine, and snacks were provided for time to relax and get to know the



other residents from around the country. Faculty and guest lectures often came as well to socialize and share their experiences in this informal setting. One of the perks of coming to Woods Hole at this time of the year is the beautiful New England fall foliage and the seaside location on Cape Cod.

Many of the applicants, including myself, took daily runs along the coastline to the lighthouse where Martha's Vineyard can be seen across the Vineyard Sound. Another perk is the up to date electronic library in the Woods Hole marine biological laboratory available at all times of the day and night. The RUNN course and the Woods Hole setting provide an excellent setting to recharge, learn about the latest in neuroscience research, and form friendships that will last a lifetime.

We acknowledge generous grants, from



Spine



These grants paid for the purchase of textbooks for each participant and subsidized faculty travel and honoraria costs.

## Toward RUNN 2011 and Beyond!

We have finalized space contract with the MBL for the years 2011 through 2015. RUNN 2011 will take place from October 30, 2011–November 6, 2011. 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!

## Future Course Dates

Marine Biology Laboratory  
Woods Hole, MA

Oct. 30 – Nov. 6, 2011  
Oct. 28 – Nov. 4, 2012  
Oct. 27 – Nov. 3, 2013  
Oct. 26 – Nov. 2, 2014  
Oct. 25 – Nov. 1, 2015

## RUNN Web Site

<http://www.societyofneurosurgeons.org>



## RUNN Course Attendees October 23-30, 2010

### ATTENDEES

Abla, Adib. ....	Barrow Neurological Institute
Aghion, Daniel ....	Brown University
Barrese, James ....	UMDNJ -NJ Medical School
Bate, Berkeley. ....	University of TN
Belayev, Andrey ....	University of Texas, San Antonio
Ben-Haim, Sharona. ....	Mount Sinai, NY
Betgegowda, Chetan ....	Johns Hopkins
Bower, Regina ....	Mayo
Brantyl, Rylan. ....	University of Missouri-Columbia
Brown, Barrett ....	University of Kentucky
Chang, Wendy ....	Mayo
Chen, Selby. ....	Mayo
Choi, Jonathan ....	Duke University
Daniels, Lawrence ....	Albert Einstein College of Medicine
Dey, Mahua. ....	University of Chicago
DiNapoli, Vincent. ....	University of Cincinnati
Ellis, Jason ....	Columbia University
Farrell, Brian. ....	Oregon Health Sciences University
Foster, Kimberly. ....	University of Pittsburgh
Gallati, Christopher, ....	University of Rochester
Gist, Taylor, ....	Methodist, Houston
Gonda, David, ....	University of California San Diego
Hauptman, Jason, ....	UCLA
Haydel, Justin ....	LSUHSC-Shreveport
Hdeib, Alia ....	University Hospitals Case Medical
Hebert, Ryan. ....	Yale University
Hintz, Eric. ....	University of Rochester
Hong, David ....	Wayne State University
Ikeda, Daniel. ....	Ohio State University
Jacobsen, Walter ....	SUNY Upstate New York
Kainth, Daraspreet ....	University of Minnesota
Kakoulides, George ....	Dartmouth-Hitchcock Neurosurgery
Kalanithi, Paul ....	Stanford University
Kelley, Brian. ....	Yale University
Kennedy, Benjamin ....	Columbia University
Khan, Osaama. ....	University of Toronto
Kim, Daniel. ....	University of Indiana



Kim, Richard. ....	Temple University Hospital
Krishna, P. Hari ....	University of Illinois Chicago
Lake, Wendell. ....	University of Wisconsin
Lee, Sun IK. ....	Tulane University
Lee, William ....	University of Illinois, Peoria
Lena, Jonathan ....	Medical College of South Carolina
Loganathan, Amritraj (Raj) ....	Wake Forest University
Lozada, David ....	University of Puerto Rico
Muhs, Amanda ....	Georgetown University
Nalbach, Stephen ....	Brigham and Womens/Childrens, Harvard
Neil, Jayson. ....	New York Medical College
Nickele, Christopher. ....	University of Wisconsin
Parry, Phillip. ....	University of Pittsburgh
Pinakin, Jethwa. ....	UMDNJ – New Jersey Medical School
Qaiser, Rabia. ....	University of Minnesota
Rahal, Jason, ....	Tufts Medical Center
Richard, Paul, ....	University of Pittsburgh
Rubin, Benjamin, ....	New York University
Sanders Taylor, Christopher. ....	University of Cincinnati
Seecharan, Dave ....	University of Kansas
Shafer, David ....	University of Colorado
Shaw, Andrew. ....	Ohio State University
Singla, Amit ....	SUNY Upstate University
Sorkin, Grant. ....	SUNY Buffalo
Stockwell, David. ....	University of Vermont
Strahle, Jennifer ....	University of Michigan
Su, David ....	University of Washington
Terzic, Dino ....	University of Minnesota
Trahan, Jayme. ....	Louisiana State University, New Orleans
Upchurch, Kristen. ....	University of New Mexico
Vanaman, Monique. ....	University of Michigan
Vasan, Rohit ....	University of South Florida
Wang, David. ....	Medical College of Georgia
Whitney, Nathaniel. ....	Oregon Health Sciences University
Whittemore, Brett ....	UT Southwestern University
Wilson, Jonathan. ....	Wake Forest University
Zalatimo, Omar. ....	Penn State Hershey
Zhang, Shihao, ....	LSUHSC-Shreveport

## FACULTY AND TOPICS

### **Andersen, Bruce**

Idaho Neurological Institute  
Squid Lab

### **Awad, Issam**

Northwestern University  
*“Philosophy of Science and Neurosurgery”*  
and *“Translational and Integrational  
Research: Cavernous Angioma  
as a Paradigm”*

### **Benowitz, Larry**

Harvard University  
*“Rewinding the Injured CNS”*

### **Benzel, Edward**

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

### **Bernstein, Kerry**

Vermont State Guard  
*“On The Evolution  
of an Electronic Species”*

### **Brem, Henry**

Johns Hopkins University  
*“Brain Tumor Therapy”*

### **Burns, Mark**

Georgetown University  
*“Acute CNS Injury and Chronic  
Neurodegenerative Disease: Common  
Pathways and Therapeutic Targets”*

### **Chiocca, E. Antonio**

Ohio State University  
*“Translational Therapeutics  
for Brain Tumors: From the Lab  
to the Clinic and Back”*

### **Dempsey, Robert**

University of Wisconsin  
*“Research and Balance in an Academic  
Neurosurgery Career. Getting started:  
How do I Write a Grant or paper?”*

### **C. Edward Dixon, Ph.D.**

University of Pittsburgh  
*Lecture Title: “Traumatic Brain Injury:  
Lessons Learned from the Bench”*

### **Edgerton, V. Reggie**

UCLA Medical Center  
*“Activity Dependent Mechanisms that  
Enhance Sensorimotor Function Following  
Spinal Cord Injury”*

### **James Galbraith, Ph.D.**

National Institutes of Health  
*Laboratory Experience: “Squid Lab”*

### **Friedlander, Robert**

Harvard Medical School  
*“Mechanisms of Cell Death  
in Neurologic Diseases”*

### **Haglund, Michael**

Duke University  
*“Optical Imaging of Epileptiform Activity:  
From Brain Slices to the Operating Room”*

### **Harbaugh, Robert**

Penn State University  
*“Biostatistics and Clinical Trial Design”*

### **Hochberg, Leigh**

Harvard Medical School  
*“Intracortically-based Brain-Computer  
Interfaces”*



**Sean Lawler, Ph.D.**

Ohio State University Medical Center

*Lecture Title: "MicroRNAs – Key Players in CNS Biology and Tumorigenesis"*

**Lichtman, Jeff**

Harvard Medical School

*"Connectomics"*

**Eng H. Lo, Ph.D.**

Neuroscience Center

at Massachusetts General Hospital

*Lecture Title: "Neurovascular Mechanisms of Injury and Repair after Stroke"*

**Lozano, Andres**

University of Toronto

*"Adjusting the Activity in Human Brain Circuits"*

**Joseph R. Madsen, M.D.**

Harvard University

*Lecture Title: "Signals and Systems in the Human Brain: Water and Electricity"*

**Professor Richard I. Morimoto, Ph.D.**

Northwestern University

*Lecture Title: "The Stress of Misfolded Proteins in Aging and Neurodegenerative Disease"*

**Edward H. Oldfield, M.D.**

University of Virginia

*Lecture Title: "Von Hippel-Lindau Disease: Studies on Biology, Natural History, Patient Management in a Familial Tumor Suppressor Syndrome"*

**James T. Rutka, MD, PhD,**

**FRCSC, FACS, FAAP,**

University of Toronto

*Lecture Title: "Medulloblastoma — from a Difficult Past to a Promising Future"*



**W. Mark Saltzman, Ph.D.**

Yale University

*Lecture Title: "Polymer Nanoparticles for Controlled and Targeted Delivery of Agents to the Brain"*

**Jerry Silver, Ph.D.**

School of Medicine E653

*Lecture Title: "Functional Regeneration Beyond the Glial Scar"*

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

University of Maryland

*Lecture Title: "The SUR1-Regulated NC(Ca-ATP) Channel – a New Player in CNS Ischemia?"*

**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"*

**Leslie M. Thompson, Ph.D.**

University of California Irvine

*Lecture Title: "Epigenetics in Huntington's Disease: Implication for Therapeutics"*

**Junying Yuan, Ph.D.**

240 Longwood Avenue

Boston, MA 02115

*Keynote Speaker Lecture Title:*

*"Regulation of Cell Death: From Apoptosis to Necroptosis"*