

A N N U A L R E P O R T

Stimulating Science in a Unique Setting

RESEARCH UPDATE IN NEUROSCIENCE FOR NEUROSURGEONS (RUNN)

OCTOBER 20–27, 2007

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,
ROBERT J. DEMPSEY, CHARLES HODGE, JR.,
AND EDWARD OLDFIELD**

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 and 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 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 2007 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 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.

The 2007 Special Lecture, “Mankind 2007: The Scope of Modern Science” was given by Michael Apuzzo, M.D., Professor, Todd-Wells Professorship in Neurosurgery Director of Neurosurgery, USC/Norris Cancer Hospital. This was a very well received lecture outlining progress from nuclear submarines to nano technology. Following this lecture, Dr. Apuzzo waded into the audience posing and asking questions concerning the future of neurosurgery. This personal interaction with the Editor of NEUROSURGERY drew special note in the residents’ course evaluation.



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 Third Edition of Neuroscience, Edited by

Purves, Augustine, Fitzpatrick, Hall, LaMantia, McNamara and Williams. This book is a magnificent reference to 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 (see list), 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 79 attendees (see list) representing programs throughout the United States, Canada, Puerto Rico, Germany, Portugal and South America. This was the largest number of attendees to attend the RUNN 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. 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 Charles Kanaly, M.D. Resident Attendee

Neurosurgical Resident, Duke University Hospital

The RUNN course was once again a huge success this year and has continued its proud tradition of inspiring and educating the upcoming generation of neurosurgical leaders, both from this country and

around the world. As a testament to the increasing prestige of the conference, this year there were multiple attendees from around the world as well. The RUNN course was held at the historic Marine Biological Laboratories, a location with immense scientific importance. It is here where many Nobel laureates have worked and made landmark discoveries using multiple different organisms. As part of the course, we dissected the giant squid axon to see firsthand how some of these early experiments were performed. The ability to keep the axon intact during dissection was more difficult than any of us expected! In the midst of these inspiring surroundings, we received multiple lectures from many of the top neurosurgeons and neuroscientists in the country.

These talks covered a broad range of topics, including everything from recent advances in nerve regeneration, to the genetics of medulloblastoma, to extending lifespan with a component of red wine, to training the spinal cord central pattern generator to bear weight and walk without communication to the brain. Each of these talks presented fascinating information and left the audience stimulated to spread their newfound knowledge back to their residency programs. As a few examples, we learned from Dr. Friedlander that caspase inhibitors like minocycline may prove to be beneficial after stroke, and Dr. Benowitz presented data suggesting that intrathecal inosine infusions after stroke in mice protect the mice from deficits. Dr. Simard described how glibenclamide, a sulfonylurea medication, has been shown to decrease cerebral edema and mortality after stroke. Dr. Sinclair suggested that resveratrol, a component of red wine that activates sirtuins, may actually extend lifespan. Dr. Walters discussed the importance of promoting evidence based medicine in neurosurgery, and Dr. Hochberg showed his current research in brain computer interfaces.

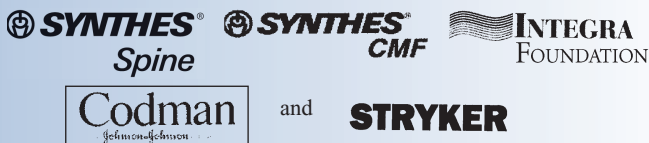
The keynote speech by Dr. Apuzzo encouraged us all to look to the future and imagine advances in the field, especially concerning ongoing developments in the field of nanotechnology. The scope of the lectures covered such a broad range of topics that everyone was sure to learn new discoveries in their particular field of interest in addition to being exposed to multiple other fascinating fields. In addition to the opportunity to learn from many individuals at the forefront of the research community, each lecturer began his presentation with a summary of how his career developed and gave advice on how to both balance research with clinical endeavors and balance work with life outside of medicine. Beyond just explaining the steps necessary to develop careers as academic neurosurgeons, the course offers encouragement to pursue this goal through a grant program to support our research efforts in the coming years. The informal nature of the conference allowed for multiple personal interactions with these professors; frequent interruptions for questions occurred during the lectures and conversations even arose over a drink in the evenings at happy hour.

One of the best parts of the conference was the social time between lectures and in the evenings, when everyone had an opportunity to both meet their future colleagues and catch up with friends they had made back when they were interviewing for residency positions. There were countless opportunities to make many good memories and friends during the conference including: over a pitcher at Captain Kidd's (the only bar open in the Wood's Hole off-season), over a

game of pool with Dr. Friedlander, while watching the Red Sox sweep the Rockies in the World Series, or even on a cruise around the Wood's Hole harbor. The tools I learned for how to begin a successful career in academic neurosurgery, making connections with the leading professors in the field today, and building lasting friendships with peers are all reasons why the RUNN course will remain one of the highlights of my neurosurgical residency.

Generous Educational Grants

We acknowledge generous grants, from



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

Toward RUNN 2008 and Beyond!

We have finalized space contract with the MBL for the years 2004 through 2015. RUNN 2008 will take place from October 18-25, 2008. 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>

Future Course Dates

**Marine Biology Laboratory
Woods Hole, MA**

October 18-25, 2008
October 17-24, 2009
Oct. 31 - Nov. 7, 2010
Oct. 30 - Nov. 6, 2011
Oct. 28 - Nov. 4, 2012
Oct. 27 - Nov. 3, 2013
Oct. 26 - Nov. 2, 2014
Oct. 35 - Nov. 1, 2015



RUNN Course Attendees October 20–27, 2007

Participant

Adedipe	Alusola
Alfasi	Abdulghader
Alkherayf	Fahad
Anderson	Josh
Antonucci	Michael
Baez	Frankie
Bastos	Lourenco Jose Artur
Berk	Mehmet

Bhatia	Sanjay
--------	--------

Bidros	Dani
Binello	Emanuela
Boev	Angel
Broadway	Jared

Cadotte	David
Chamczuk	Andrea
Chan	Michael
Chen	Julie
Cherqui	Alice

Crupain	Michael
Dewan	Sheri
Diering	Scott
Duhon	Bradley
Dumont	Travis
Eickman	John
Etamex	Arnold
Everett	Robert

Fedor	Mark
Fontana	Elizabeth
Forshaw	David
Fox	Benjamin
Gupta	Gaurav

Gutierrez	Elena
Hammers	Ronald
Helbig	Gregory
Iannotti	Christopher
Ibrahimi	David
Ishizuka	Kelly
Jernigan	Sarah
Kalhorn	Stephen

Institution

South Africa
Ottawa University
Ottawa University
University of Kansas
University of Florida
University of Puerto Rico
Lisboa, Portugal
Oregon Health Sciences University
Allegheny General Hospital, Pittsburgh
Cleveland Clinic
Mt. Sinai University
University of Rochester
University of Tennessee at Memphis
University of Toronto
SUNY Buffalo
University of Chicago, Illinois
Cleveland Clinic
Louisiana State University, New Orleans
New York Medical College
Brown University
University of Missouri
University of Utah
University of Vermont
Wake Forest University
University of Michigan
Louisiana State University, New Orleans
UC Davis
Columbia
New York University
Baylor College
University of Medicine & Denistry (UMDNJ)
Ohio State University
Loyola University, Maywood, IL
Indiana University
Cleveland Clinic
University of Maryland
University of Minnesota
University of Louisville
New York University

Kanaly	Charles	Duke University
Kasoff	Willard	Yale University
Kenning	Tyler	Albany Medical Center
Knerlich	Friederike	University Hospital
		Schleswig-Holstein
Koltz	Michael	University of Maryland
Lenart	Christopher	Albert Einstein University
Lo	Benjamin	McMaster University, Canada
Madera	Marella	University of Cincinnati
Makonnen	Girma	Ohio State University
Maserati	Matthew	University of Pittsburgh
Mesfin	Fassil	Albany Medical Center
Meyer	Scott	Mount Sinai
Mitchel	Lana	University of Medicine & Dentistry (UMDNJ)
		Methodist - Houston
Moisi	Marc	Yale University
Moliterno	Jennifer	Medical College of
Morgan	Steven	South Carolina
		University of Utah
Niazi	Toba	University of Pittsburgh
Ochalski	Pawel	Columbia
Otten	Marc	South Africa
Ouma	John	Mayo, Rochester MN
Park	Paul	University of Wisconsin
Patel	Nirav	LSUHSC Shreveport
Patil	Shashikant	Northwestern University
Pollock	Glen	University of Florida
Rahman	Maryam	TUFTS
Ramachandran	Pranarthi	University of Illinois, Peoria
Rammos	Stylian	Oregon Health Sciences
Raslan	Ahmed	University
		University of New Mexico
Rehman	Tausif-Ur	Mayo
Schultz	Caleb	Columbia Presbyterian
Seyed	Omar	Medical College of GA
Shakir	Ahmed	Dartmouth-Hitchcock Medical
Spire	William (BJ)	Center
		Wake Forest University
Stevens	Andy	Thomas Jefferson
Tjoumakaris	Stavropoul	University of Pittsburgh
Tomycz	Nostov	University of Toronto
Vachhrajani	Shobhan	Loma Linda University
Westra	David	SUNY Upstate New York
Yusupov	Igor R.	University of Michigan
Ziewacz	John	

FACULTY AND TOPICS

Andersen, Bruce / Galbraith, Jim

Idaho Neurological Institute / NIH

Squid Lab

Apuzzo, Michael —Keynote Speaker

University of Southern California

Keynote Speaker: "Mankind 2007: The Scope of Modern Science"

Awad, Issam

Northwestern University

"Scientific Method: History and Philosophy" and "Translational and Integrational Research: Cerebrovascular Malformations as a Disease Model"

Benowitz, Larry

Harvard University

"Axonal Guidance and Regeneration"

Benzel, Edward

Cleveland Clinic

"Science, Clinical Practice, and the Quest of Academic Excellence"

Bernstein, Kerry

IBM Corporation

"On The Evolution of an Electronic Species"

Born, Richard

Harvard Medical School

"Modularity and Integration in the Primate Visual Cortex"

Brem, Henry

Johns Hopkins University

"Brain Tumor Therapy"

Chiocca, Nino

Ohio State University

"Translational Therapeutics for Brain Tumors: from the Lab to the Clinic and Back"

Connolly, E. Sander

Columbia University

"Neuroinflammation/Adhesion Molecules"

D'Armore, Patricia

Schepens Eye Institute

"Angiogenesis and Neoplasia"

Dempsey, Robert

University of Wisconsin

"Putting Scientific Thoughts Together: What a Reviewer looks for in a Grant or Manuscript"

Edgerton, V. Reggie

UCLA Medical Center

"Activity Dependent Mechanisms that Enhance Sensorimotor Function Following Spinal Cord Injury"

Friedlander, Robert

Harvard Medical School

"Mechanisms of Cell Death in Neurologic Disease"

Gunel, Murat

Yale University

"Signaling Pathways and Neural Cell Fate"

Haglund, Michael

Duke University

"Optical Imaging of Epileptiform Activity: From Brain Slices to the Operating Room"

Hochberg, Leigh

Harvard Medical School

"Intracortically-based Brain-Computer Interfaces"

Macklis, Jeffrey

Harvard University Medical School

"Building or Repairing a Brain is Complex, Assembly Instructions Required, Neural Precursors, "Stem Cells," and Molecular Development of Corticospinal Motor Neuron Circuitry"

Madsen, Joseph

Harvard Medical School

"Neuroengineering: Pulses and Waves"

Pomeroy, Scott

Harvard University Medical School

"Genomics and Proteomics in Clinical Neuroscience"

Purves, Dale

Duke University

"Why We See What We Do"

Reese, Thomas

National Institutes of Health

"History of the Marine Biological Laboratory"

Rutka, James

University of Toronto

"Medulloblastoma - From a Difficult Past to a Promising Future"

Schwob, Jim

Tufts University

"Neural Regeneration and the Olfactory System"

Silver, Jerry

Case Western Reserve University

"Functional Regeneration Beyond the Glial Scar"

Simard, Marc

University of Maryland

"The SUR1-regulated NC(Ca-ATP) Channel – a New Player in CNS Ischemia"

Sinclair, David

Harvard Medical School

"Genes and Small Molecules that Extend Lifespan"

Spencer, Dennis

Yale University

"The Contribution of Human Investigation to Epilepsy Research"

Walters, Beverly

Brown University

"An Introduction to Evidence-Based Neurosurgery"

