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HOW TO COMBINE CLINICAL AND RESEARCH CAREERS IN NEUROSCIENCE

The Association of University Professors of Neurology (AUPN) together with the National Institute of Neurological Disorders and Stroke (NINDS) and the American Neurological Association (ANA) welcome you to the fifth annual clinician-scientist mentoring symposium.

Goals: The goals of this symposium are to: 1) encourage medical students with neuroscience research training to pursue clinical training (with special emphasis on neurology) and choose clinician-scientist careers, 2) describe and discuss strategies for successfully melding clinical and research careers, 3) discuss the satisfactions and power of a combined research and clinical career, 4) describe and discuss sources of and strategies for obtaining training and research support, and 5) provide an opportunity for students to meet academicians who have successfully combined clinical and research careers in neuroscience.

Expectations: We are interested to know the impact of this symposium on the career-development experience of our student attendees. To this end we must collect both immediate and long-term information about our student participants. This information will help us justify federal support for future mentoring symposia and will allow us to modify the program to be maximally responsive to student needs. Please give us your feedback. We are counting on a 100% response rate to the brief questionnaires you will receive.



Bruce R. Ransom, M.D., Ph.D.

Symposium Organizer

Warren and Jermaine Magnuson Professor and Chairman

Department of Neurology, University of Washington

Conference Organizer

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HOW TO COMBINE CLINICAL AND RESEARCH CAREERS IN NEUROSCIENCE SYMPOSIUM

2007 AGENDA

Omni Shoreham Hotel, Washington, DC

**Sponsored by: the Association of University Professors of Neurology (AUPN),
American Neurological Association (ANA),
and the National Institute of Neurological Disorders and Stroke (NINDS)**

Friday, June 22, 2007

6:30 p.m.–7:30 p.m.

REGISTRATION – East Registration Desk

7:30 p.m.–7:45 p.m.

Welcome and Opening Remarks – Hampton Ballroom

*Bruce Ransom, M.D., Ph.D., University of Washington, Seattle, WA
Story C. Landis, Ph.D., NINDS, Bethesda, MD*

7:45 p.m.–8:45 p.m.

DINNER

8:45 p.m.–9:30 p.m.

Combining Clinical and Research Careers: How I Am Doing It

*Craig Powell, M.D., Ph.D., University of Texas Southwestern Medical
Center, Dallas, TX*

Saturday, June 23, 2007

8:30 a.m.–9:15 a.m.

**REGISTRATION AND CONTINENTAL BREAKFAST – East
Registration Desk**

9:15 a.m.–10 a.m.

Overview – Hampton Ballroom

Bruce Ransom, M.D., Ph.D., University of Washington, Seattle, WA

10:00 a.m.–11:30 a.m.

Residency Training and Beyond: Transitions and Career Vulnerability

John W. Griffin, M.D., Johns Hopkins University, Baltimore, MD

11:30 a.m.–12:30 p.m.

Panel Discussion

*Bruce Ransom, M.D., Ph.D., University of Washington, Seattle, WA
John W. Griffin, M.D., Johns Hopkins University, Baltimore, MD*

12:30 p.m.–1:30 p.m.

NETWORKING LUNCH – Palladian Ballroom

1:30 p.m.–2:30 p.m.

Research Training and Career Development

Dennis M. Landis, M.D., Baylor College of Medicine, Houston, TX

2:30 p.m.–3:30 p.m.

Physician-Scientist. Career and Family: Can you have it all?

Eva L. Feldman, M.D., Ph.D., University of Michigan, Ann Arbor, MI

3:30 p.m.–3:45 p.m.

BREAK

3:45 p.m.–5 p.m.

**Small Group Breakouts – Embassy Room, Capitol Room, Chairman's
Room, Hampton Ballroom**

5:30 p.m.–7:15 p.m.

RECEPTION

Sunday, June 24, 2007

Departures

Writing a Grant Application: An Informal Guide

1. Essentials

- a. Significance
- b. Sound, clear hypotheses
- c. Productivity and demonstration of feasibility -- high quality results and figures
- d. Logical development of experimental design – experiments address stated hypotheses
- e. Can you do everything you propose to do in the time requested -- “Overly Ambitious” is one of the most common criticisms of young investigators.

2. Before you start

- a. Is it really time to write this grant application? Is it premature?
- b. Should you write that paper first?
- c. Plan ahead and don't rush -- give yourself 2-3 months to prepare the grant application.
- d. Arrange with colleagues or mentors to review a first draft of your specific aims early (6 weeks or so). You want the harshest critiques before you submit.

3. Specific aims

- a. Do the aims address interesting and significant issues?
- b. Are they hypothesis-based?
- c. Are they "win-win" – i.e., will an outcome consistent with the null hypothesis still be a contribution to the field?

4. Background

- a. Clear, well organized -- use subheadings. Make sure the significance of the topic is explicitly stated.
- b. State clearly where the gaps in knowledge exist in the field that your results will address.
- c. Make sure your references reflect an updated knowledge of the field.

5. Preliminary results

- a. Draw as much as possible on your past productivity; emphasize how your previous work leads up to the present proposal or at least demonstrates feasibility of methods to be used.
- b. Do not show preliminary results that are not of high quality -- this is your chance to represent yourself.
- c. Make sure that the major methods to be used in the proposed work are reflected by preliminary results. If you do not have expertise or preliminary results with a technique, make sure you list a solid, experienced consultant or collaborator and include a letter agreeing to the collaboration, and a specific statement about what the collaborator will contribute.

- d. Show detailed numbers and representative raw data where necessary, especially if this is work that is unpublished.
- e. Put time and effort into preparing meticulous figures, graphs, or tables; this is your chance to demonstrate rigor and organization that will increase the reviewer's confidence that you can carry out the project. This cannot be overemphasized: a high quality application reflects high quality work (and vice-versa).

6. Experimental design

- a. This is one of the most common places where the text is insufficient. This is not just a place to tediously list group sizes, detailed methods, etc. This is the place to demonstrate your ability to think knowledgeably and logically.
- b. Develop your aims; of all the sections this may well be the part of the grant application upon which you spend the most time.
- c. What happens if your first specific aim doesn't work out as you have predicted? Will aims 2, 3 and 4 then be rendered useless? Where do you go if the first step fails? Have multiple working hypotheses.
- d. One method that often works is to divide this section into subheadings after *each* specific aim is restated, as follows:

Specific Aim #

- i. **Rationale:** How does this design relate to your hypotheses? What is your reasoning (in detail)?
- ii. **Methods:** List general approaches first, explaining why the methods you propose are the best available for your questions. (*caveat:* if you realize that you do not have the best, most direct methods for your questions, you need to rethink your aims or incorporate collaborators or new preliminary data showing feasibility with the necessary techniques.)
**Don't forget to address statistical analysis.
- iii. **Anticipated results:** You need to devote a great deal of thought, and text, to potential outcomes and their likelihood of realization. Explain how you will interpret the different outcome scenarios and how these results relate back to your hypotheses. This is an opportunity to demonstrate creativity and enthusiasm for the data to be obtained, and show that you have considered the interpretation of alternative outcomes.
- iv. **Problems and pitfalls:** Be honest with yourself. If this section feels horribly uncomfortable, it is because you are probably trying an experiment that is not feasible. All experiments have pitfalls, but extraordinarily large pitfalls are likely to be unreasonable; hence, this section should serve as a reality test. Explain the pitfalls, and how alternate approaches will be used to overcome them if they occur. Do not think that avoiding mentioning a pitfall is a good strategy - it usually doesn't work. The reviewer will very likely notice the pitfall and believe that you are not aware of it, decreasing confidence in your ability to manage the data.

7. Timetable

This is a worthwhile exercise, but does not need to take up an inordinate amount of space. The idea is to take a serious look at the amount of work you've proposed and demonstrate to reviewers that this amount is appropriate.

Common Mistakes in NIH Grant Applications

The five review criteria for most NIH grant applications are Significance, Approach, Innovation (not necessary, but the results should have compelling significance), Investigator and Environment:

Problems with Significance:

Not significant, exciting, or new research
Lack of compelling rationale
Incremental and low impact research

Problems with Approach:

Too ambitious, too much work proposed
Unfocused aims, unclear goals
Limited aims and uncertain future directions

Problems with Experimental Approach:

Too much unnecessary experimental detail
Not enough detail on approaches, especially untested ones
Not enough preliminary data to establish feasibility
Feasibility of each aim not shown
Little or no expertise with approach
Lack of appropriate controls
Not directly testing hypothesis
Correlative or descriptive data
Experiments not directed towards mechanisms
No discussion of alternative models or hypotheses
No discussion of potential pitfalls
No discussion of interpretation of data

Problems with Investigator:

No demonstration of expertise or publications in approaches
Low productivity, few recent papers
No collaborators recruited or no letters from collaborators

Problems with Environment:

Little demonstration of institutional support
Little or no start up package or necessary equipment

NIH Websites

THE FUNDING COMPONENTS OF NIH

The NIH Homepage:

<http://www.nih.gov>

Homepages of the NIH Institutes, Centers & Offices:

<http://www.nih.gov/icd/>

THE NIH GUIDE FOR GRANTS AND CONTRACTS:

Program Announcements (PAs) and

Request for Applications (RFAs):

<http://www.nih.gov/grants/guide/index.html>

Research Areas of Interest to the Extramural
Programs at NIH Institutes

<http://www.nih.gov/grants/policy/emprograms/index.html>

NIH Grants Policy Statement

<http://grants.nih.gov/grants/policy/nihgps/>

THE APPLICATION PROCESS

NCI's Quick Guide to the Preparation of

NIH Grant Applications:

<http://deainfo.nci.nih.gov/EXTRA/EXTDOCS/gntapp.htm>

Application Receipt, Referral and Review,

Center for Scientific Review:

<http://www.nih.gov/grants/funding/submissionschedule.htm>

and

<http://www.csr.nih.gov/>

NIH Grant Application Instructions, Guidelines and Forms:

<http://www.nih.gov/grants/forms.htm>

NIH Modular Grant Information, Q&A,

Sample Budget and Biosketch:

<http://www.nih.gov/grants/funding/modular/modular.htm>

NIAID "How To" website for developing a grant
application:

<http://www.niaid.nih.gov/ncn/grants/default.htm>

THE REVIEW PROCESS

The Five Review Criteria for Most NIH applications:

<http://grants.nih.gov/grants/guide/notice-files/NOT-OD-05-002.html>

Descriptions of Initial Review Groups at the
Center for Scientific Review:

<http://www.csr.nih.gov/review/irgdesc.htm>

NIH Center for Scientific Review Study Section Rosters:

<http://www.csr.nih.gov/committees/rosterindex.asp>

DATA ON ACTIVE GRANTS

CRISP and NIH Award Data and Trends:

<http://www.nih.gov/grants/award/award.htm>

NIH eRA commons:

<https://commons.era.nih.gov/commons/>

THE SPECIAL PROGRAMS AT NIH

The K Awards:

<http://www.nih.gov/training/careerdevelopmentawards.htm>

Application Guidelines for the K Awards:

<http://grants.nih.gov/grants/funding/phs398/phs398.html>

Frequently Asked Questions: NRSA Fellowships

http://grants2.nih.gov/training/faq_fellowships.htm

Frequently Asked Questions: NRSA Training Grants

http://grants2.nih.gov/training/faq_training.htm

R03/Small Grant Program

<http://www.nih.gov/grants/funding/r03.htm>

AREA or R15 for Non-Research-Intensive
Colleges and Universities:

<http://www.nih.gov/grants/funding/area.htm>

SBIR/STTR Homepage:

<http://www.nih.gov/grants/funding/sbir.htm>

Jan Claassen, M.D.

Dr. Claassen received his Ph.D., magna cum laude, from the University of Hamburg, Germany, studying the ability of somatosensory-evoked potentials to predict outcome after diffuse axonal brain injury. He received his M.D. and training in neurological intensive care from the same institution. Between 1999 and 2003, he worked as a postdoctoral research fellow in the Divisions of Critical Care Neurology and Epilepsy and Clinical Neurophysiology at Columbia University, New York. After a year of internship in the Department of Medicine, he completed residency training at the Neurological Institute, both at New York Presbyterian Hospital, in New York. Between 2006 and 2007, he served as Chief Resident of the Department of Neurology. He will start a fellowship in critical care neurology at Columbia University in July 2007.

Dr. Claassen's research has primarily focused on improving treatment and outcomes of patients with neurological emergencies, specifically status epilepticus, subarachnoid hemorrhage (SAH), intracerebral hemorrhage, and traumatic brain injury.

The first part of Dr Claassen's research involved innovative applications of electrophysiological and neuroradiological monitoring techniques. He demonstrated the potential of electrophysiological monitoring tools to predict the potential for recovery after diffuse axonal head injury, using somatosensory-evoked potentials (Critical Care Medicine, 2001; 29:494–502). By means of quantitative EEG analysis (Fast Fourier Transformation), he developed parameters that detect cerebral ischemia from vasospasm after SAH (Clin. Neurophysiol, 2004; 115:2699–710). The use of this technique may indicate ischemia up to 2 days before clinical findings change, a time when neuroradiological and medical interventions may still prevent the development of infarction. If confirmed, this technique may lead to a decrease in morbidity and mortality of patients with SAH. Silent infarction after SAH may go undetected in comatose patients (Stroke 2001; 32; 356).

Dr. Claassen proposed a new scale to better predict the risk of delayed cerebral ischemia based on computed tomography scans (Stroke 2001; 32:2012–20; and Neurosurgery 2006; 59:21–7). Comparing acetazolamide-activated 99m-Tc-HMPAO single-photon emission computed tomography and transcranial Doppler sonography, he found both techniques inadequate to reliably identify patients at high risk for developing delayed cerebral ischemia after SAH (Neurocrit Care, in press). He found a better relationship between impaired autoregulation and delayed cerebral ischemia in a pilot study using carbon dioxide reactivity testing (Neurology 2006; 66:727–9). He compiled a database of all critically ill patients monitored with continuous EEG at Columbia University since this technique was first introduced in 1996. Using this database, Dr. Claassen was able to confirm the high frequency of nonconvulsive seizures in severely ill patients with SAH (Neurosurgery 2002; 51:1136–43) and demonstrate the impact that nonconvulsive seizures may have on outcome (Neurocrit Care 2006; 4:103–12). He established predictors and the minimum time of cEEG monitoring needed to detect nonconvulsive seizures and demonstrated that most seizures in ICU patients are nonconvulsive and can only be recognized with EEG monitoring. (Neurology 2004; 62:1743–9).

The second part of Dr. Claassen's research investigates epidemiological aspects and predictors of outcome in patients with acute life-threatening neurological diseases. The optimal treatment of refractory status epilepticus is presently controversial, and Dr. Claassen published the largest series of these patients treated with continuous midazolam infusions (Neurology 2001; 57:1036–42). Among other findings, his study demonstrated frequent breakthrough seizures that were only detected using continuous EEG monitoring. Furthermore, he analyzed the world's literature comparing the treatment of this rare but life threatening disease by means of a metaanalysis (Epilepsia 2002; 43:146–53). He also conducted a survey to sample

treatment strategies of status epilepticus among U.S. neurologists (J Neurol Sci 2003; 2003; 211:37–41). He found agreement for first and second line therapy, but a lack of consensus for third or fourth line treatment of status epilepticus. He identified predictors of morbidity and mortality (Neurology 2002; 58:139–42) and refractoriness to initial treatment of status epilepticus (Archives of Neurology 2002; 59:205–10). Analyzing the nationwide inpatient sample, a database of admissions to non-Federal hospitals in the United States, he found convulsive status epilepticus to be a rare but potentially devastating complication among 29,998 patients with nontraumatic SAH, ischemic stroke, and intracerebral hemorrhage (Neurosurgery, in press; Neurocritical Care, in press).

Investigating epidemiological aspects of patients with SAH, Dr. Claassen identified global edema as a previously underrecognized factor impacting on outcome (Stroke 2002; 33:1225–32). Among SAH patients, he investigated the impact on outcome of physiological derangements (Critical Care Medicine 2004; 32:832–8), the impact of hyperglycemia (Stroke 2006; 37:199–203), medical complications (Critical Care Medicine 2006; 34:617–23), misdiagnosis (JAMA 2004; 291:866–9), and fever (Neurology 2007; 8:1013–9). He also studied the relationship between SAH and the development of epilepsy and found that epilepsy significantly impacts different levels of outcome at 1 year after hemorrhage (Neurology 2003; 60:208–14). These results warrant further investigations into the benefits of treatment in these patients and options to prevent the development of epilepsy.

In 2007, Dr. Claassen received the Founders Award from the American Academy of Neurology, given in recognition of outstanding achievements in clinical and translational research in neuroscience. He received the first and third prize from the Greater New York Critical Care Quarterly at the New York Academy of Sciences 2001. He is a peer reviewer for Neurology since 2003, Stroke since 2003, Arch Neurology since 2004, CNS Drugs since 2004, Epilepsia since 2005, Brain since 2005, Clinical Neurophysiology since 2005, Hospital Physician since 2006, and Neurocritical Care since 2007. He has given many invited lectures including the New York Symposium on Neurological Emergencies and Neurocritical Care (2007); Neurology Grand Rounds at the University of Witten Herdecke, Germany (2004); and the European Congress on Epileptology, Madrid, Spain (2002). He has given platform presentations at scientific meetings at the American Academy of Neurology in 2002 and 2007, the American Epilepsy Society in 2001, the American Clinical Neurophysiology Society in 2000, and the Working Group of Neurological Intensive Care Medicine in 1998. He has written six book chapters and three review articles.

Phillip De Jager, M.D.

Eva L. Feldman, M.D., Ph.D.

Dr. Eva L. Feldman joined the faculty at the University of Michigan in 1988 at the level of Assistant Professor in the Department of Neurology. She was promoted to Associate Professor of Neurology in 1994 and Professor of Neurology in 2000. In 2006, she was named the Russell N. DeJong Professor of Neurology. Dr. Feldman is an outstanding clinician, teacher, and neuroscientist who has received national and international recognition for her work. She has made major service contributions to the Department of Neurology, the University of Michigan Medical Center, and nationally, serving on major committees at all levels. Dr. Feldman is an international authority on two disorders: the complications of diabetes, particularly diabetic neuropathy; and amyotrophic lateral sclerosis (ALS). She serves as the Director of the Juvenile Diabetes Research Foundation International Center for the Study of Complications in Diabetes. Dr. Feldman also serves as Director of another multidisciplinary research effort, the Program for Understanding Neurological Diseases and of the ALS Clinic. She has given several prestigious lectures in the neurology and endocrinology communities. She also serves on numerous editorial boards, is the Vice President of the American Neurological Association, President-Elect of the Peripheral Nerve Society, and is listed annually in Best Doctors in America.

Dr. Feldman is an experimental cell biologist who has made seminal contributions in several areas, including the molecular mechanisms underlying glucose-mediated cell death in the nervous system, the role of oxidative stress in the development of diabetic microvascular complications, and the intracellular signaling mechanisms of growth factors, with particular attention to insulin-like growth factor-I. She is the author of more than 150 articles and book chapters and has substantial funding from the National Institutes of Health and private foundations.

Among her greatest accomplishments is her training of both scientists and neurologists. She has trained 6 doctoral students and 28 postdoctoral fellows in her laboratory to become neuroscientists, and 26 neurologists have trained with her to specialize in the understanding and treatment of neuromuscular diseases with a focus on the complications of diabetes and ALS.

John W. Griffin, M.D.

Dr. John Griffin is Professor of the Departments of Neurology, Neuroscience, and Pathology at Johns Hopkins University School of Medicine. His research career has been devoted to the neurobiology and neuropathology of the peripheral nervous system, and to studies of peripheral neuropathies. Dr. Griffin is the Director of the Brain Science Institute at Johns Hopkins Medicine, which brings together neuroscientists to solve fundamental questions about brain development and function, to understand the mechanisms of brain diseases, to develop effective treatments, and to take these therapies to patients.

Dr. Griffin was brought up in Nebraska and attended Grinnell College, Grinnell, Iowa, and Stanford University School of Medicine. He was a medical intern and resident at Stanford and did his neurology residency at Johns Hopkins, before going to NIH as a clinical associate. He has been on the faculty at Johns Hopkins since 1976 and has been Professor of Neurology and Neuroscience since 1986. In 1998, he was named Director of the Department of Neurology and Neurologist-in-Chief at Johns Hopkins.

Dr. Griffin's honors include the Jacob Javits Award from the NIH and multiple teaching awards, including the Professor's Award of the Johns Hopkins University School of Medicine. He has given many named lectures, including the Robert Wartenberg Lecture of the American Academy of Neurology and the Soriano Lecture of the American Neurological Association. He is a former member of the National Advisory Council to the National Institute of Neurologic Disease and Stroke; Chair of the Burroughs Wellcome Fund Program in Translational Research; and past-President of the Peripheral Nerve Society, the Society for Experimental Neuropathology, and the American Neurological Association. Dr. Griffin is Editor of the journal, *Nature Neurology*; and a member of the National Academy of Science. This year, he was awarded the prestigious Johns Hopkins Heritage Award for his outstanding service to the University.

The current focus of the laboratory is in three areas: mechanisms of degeneration and of axonal protection in nerve disease, mechanisms underlying painful nerve diseases, and the acquired demyelinating neuropathies. With regard to the last, Dr. Griffin's clinical and research career has been devoted to the neurobiology and neuropathology of the peripheral nervous system and to studies of peripheral neuropathies. He has published over 300 papers in this area and edited major textbooks on peripheral neuropathies. Dr. Griffin was an organizer of the North American trial of plasmapheresis for treatment of the Guillain-Barré syndrome, the first demonstration of an effective therapy in this disease. He led a team of investigators from Johns Hopkins, the University of Pennsylvania, Beijing Children's Hospital, and Second Teaching Hospital in Hebei Province, China, in investigating Guillain-Barré syndrome in Northern China. These studies defined an important variant of Guillain-Barré syndrome, acute motor axonal neuropathy (AMAN). Subsequent studies have identified the role of *Campylobacter jejuni* enteritis as an antecedent to the AMAN syndrome and have dissected the pathology and immunopathology of the disease. It has proved to be a disorder mediated by IgG antibodies against specific nerve gangliosides. The axonal form of GBS is currently one of the best understood examples of "molecular mimicry," in which the immune response to an infectious organism leads to an immune attack on similar antigens in the nervous system.

In the painful neuropathies, he teamed with Dr. Justin McArthur in the early development of skin biopsies to assess epidermal nerve fibers, showing that these fibers are lost in many painful neuropathies. In collaboration with Dr. Richard Meyer and Beth Murinson, he has examined the contribution of C-fiber nociceptors to experimental neuropathic pain and the responses of Remak Schwann cells in nerve disease.

Dennis Landis, M.D.

Dr. Dennis Landis is Chair of the Department of Neurology at Baylor College of Medicine. He has conducted basic neurobiological research in the past, and more recently has been working on national policies to support the education of physician-scientists.

Dr. Landis received his B.A. from Harvard College and his M.D. from Harvard Medical School. After a year of internship at the University of California at San Diego, he pursued 2 years of research at the National Institutes of Health, in the laboratory of Dr. T.S. Reese. There he learned the techniques of freeze fracture and developed interests in synaptic structure and membrane organization of astrocytes in the central nervous system. He returned for a second year of residency training in internal medicine at the Peter Bent Brigham Hospital in 1974, and in 1975–78 completed residency training in neurology at the Massachusetts General Hospital. He joined the faculties of Massachusetts General Hospital and Harvard Medical School and from that time benefited from continuous NIH funding until becoming chair of his own department.

His initial studies on the structure and function of synapses in the mammalian brain utilized innovative rapid freezing and freeze fracture techniques. In parallel, he studied astrocytic structure and later developed a panel of monoclonal bodies to examine the differentiation of that class of cell during development. He studied the response of astrocytes to brain injury by identifying cells that divide in response to injury, utilizing BrdU uptake and retrovirus labeling techniques.

In 1993, Dr. Landis organized and initiated a Brain Attack Program at University Hospitals of Cleveland. In collaboration with his colleagues in the Departments of Radiology and Neurological Surgery, the program has grown into one of the largest in the country and has exceptional experience in utilizing intra-arterial techniques for care of acute ischemic stroke.

Dr. Landis has had a long-standing interest in the education of scientists and physicians. In 1976, he was one of the co-organizers of the Neurobiology of Disease Workshop at the Society for Neuroscience, a course that continues to the present. In 2000, he worked as a special consultant to the NINDS, organizing and implementing a broad range of programs designed to foster and expand the training of physician-neuroscientists across the United States. In association with the American Neurological Association, he organized a course designed to encourage young physician-scientist investigators in the early portions of their career development. In 2003, he worked with the Association of University Professors of Neurology and with the NINDS to devise a second course to encourage medical students who obtain research experience to continue on with clinical neuroscience training.

Dr. Landis was Chair of the Department of Neurology at Case Western Reserve University from 1995 through 2006. The focus of his clinical activities has remained in the emergency treatment of acute ischemic stroke, utilizing thrombolytic methods. In 2007, he joined the Department of Neurology at Baylor College of Medicine as Professor and Chair.

Story C. Landis, Ph.D.

Dr. Story Landis has been Director of the National Institute for Neurological Disorders and Stroke (NINDS) since September 1, 2003. As the Director of the NINDS, Dr. Landis oversees an annual budget of \$1.5 billion and a staff of more than 900 scientists, physician-scientists, and administrators.

The Institute supports research by investigators in public and private institutions across the country, as well as by scientists working in its intramural laboratories and branches in Bethesda, Maryland. Since 1950, the Institute has been at the forefront of U.S. efforts in brain research.

Dr. Landis joined the NINDS in 1995 as Scientific Director and worked with then-Institute Director Zach W. Hall, Ph.D., to coordinate and re-engineer the Institute's intramural research programs. Between 1999 and 2000, under the leadership of NINDS Director Gerald D. Fischbach, M.D., she led the movement, together with NIMH Scientific Director Robert Desimone, Ph.D., to bring some sense of unity and common purpose to 200 laboratories from 11 different NIH Institutes, all of which conduct leading-edge clinical and basic neuroscience research.

A native of New England, Dr. Landis received her undergraduate degree in biology from Wellesley College in 1967 and her master's degree (1970) and Ph.D. (1973) from Harvard University, where she conducted research on cerebellar development in mice. After postdoctoral work at Harvard University studying transmitter plasticity in sympathetic neurons, she served on the faculty of the Harvard Medical School Department of Neurobiology.

In 1985, Dr. Landis joined the faculty of Case Western Reserve University School of Medicine in Cleveland, Ohio, where she held many academic positions, including Associate Professor of Pharmacology; Professor and Director of the Center on Neurosciences; and Chair of the Department of Neurosciences, a department she was instrumental in establishing. Under her leadership, Case Western's neuroscience department achieved worldwide acclaim and a reputation for excellence.

Throughout her research career, Dr. Landis has made many fundamental contributions to the understanding of developmental interactions required for synapse formation. She has garnered many honors and awards and is an elected fellow of the Academy of Arts and Sciences, the American Association for the Advancement of Science, and the American Neurological Association. In 2002, she was named the President-Elect of the Society for Neuroscience.

Michelle Monje, M.D., Ph.D.

Dr. Monje received her B.A. in biology from Vassar College in 1998 and her M.D. and Ph.D. from Stanford University in 2004. At Vassar, she spent the majority of her undergraduate years in the laboratory of Kathleen Raley-Susman, studying the role of free radical generation in excitotoxic neuronal death. She then attended Stanford University Medical School. During her M.D. training, Dr. Monje's interest in neuroscience deepened and she entered the neuroscience Ph.D. program with an NINDS National Research Service Award. During graduate school, she was mentored in the laboratory of Dr. Theo D. Palmer, where she investigated microenvironmental determinants of postnatal hippocampal neurogenesis. After completing an internship in internal medicine at Stanford University in 2005, Dr. Monje moved to Boston to pursue residency in the Partners Neurology program, training at the Massachusetts General Hospital and the Brigham and Women's Hospital.

In medical school, Dr. Monje became particularly interested in the cognitive complications of cancer therapy, particularly cranial radiotherapy. Her graduate studies in rodents focused specifically on the effects of radiation exposure on stem cell fate choice in the hippocampus, microenvironmental perturbations that disrupt neurogenesis, and targeted therapy to restore neurogenesis after cranial radiotherapy. In lead author publications in *Science* and *Nature Medicine*, she demonstrated for the first time that microglial inflammation and subsequent pro-inflammatory cytokine production, caused in this case by radiation exposure, specifically and profoundly inhibit neurogenesis. Moreover, this pathology can be blocked with anti-inflammatory strategies. Her findings have led to ongoing clinical trials of anti-inflammatory therapy during and after cranial radiotherapy to improve long-term cognitive outcomes. During her residency, she was awarded the prestigious Hagerty Foundation Award for Young Investigators in Neuro-Oncology to study the effects of brain tumor therapies on human neurogenesis and to develop a functional MRI (fMRI) paradigm to evaluate hippocampal function in patients treated for CNS malignancies. She will soon begin a neuro-oncology fellowship and plans to continue her clinical and basic science work focused on the effects of cancer therapies on dynamic neural cell populations in the pediatric and adult brain.

Craig M. Powell, M.D., Ph.D.

Dr. Powell is a recent tenure-track Assistant Professor in the Departments of Neurology and Psychiatry and an active member of the Neuroscience Graduate Program at the University of Texas Southwestern Medical Center at Dallas. A native of Lake Charles, Louisiana, Dr. Powell attended Louisiana State University, Baton Rouge, as an undergraduate major in zoology with a minor in psychology. He then entered the Medical Scientist Training Program at Baylor College of Medicine in 1988. He trained in the laboratories of Drs. David Sweatt and Dan Johnston, basic scientists in the Division of Neuroscience. He obtained his Ph.D. in neuroscience in 1994 and his M.D. with honors in 1997, including a 1-year personal leave of absence to raise his firstborn son, Christopher. After a year of internship at Baylor College of Medicine, Dr. Powell did his neurology residency at the University of California, San Francisco (UCSF), serving as Chief Resident in his final year. He then did a brief postdoctoral fellowship with Dr. Eric Nestler, obtained a K08 award from NIMH, and then became a non-tenure-track faculty at UTSW for 2 years. He then took a tenure-track faculty position in the Department of Neurology at UTSW Medical Center, where he is studying the molecular mechanisms of cognitive function including genetic models of autism, mental retardation, and post-traumatic stress disorder.

Bruce R. Ransom, M.D., Ph.D.

Bruce R. Ransom, M.D., Ph.D., is Professor and Chair of the Department of Neurology at the University of Washington School of Medicine. He is Adjunct Professor in the department of Physiology and Biophysics and also holds the Warren and Jermaine Magnuson Chair in Medicine for Neurosciences.

Dr. Ransom obtained his M.D. and Ph.D. (Neurophysiology) degrees at Washington University in St. Louis. After his internship, he spent 3 years as a postdoctoral research fellow at the NIH and then completed his Neurology residency at Stanford, where he stayed on as a faculty member. He moved to Yale University in 1987, where he was Professor of Neurology and Cellular and Molecular Physiology, and Director of the Outpatient Neurology Clinic. He took his current positions at the University of Washington in Seattle in 1995 and became the founding chair of the new Department of Neurology. The department has grown rapidly under his leadership and now consists of about 60 faculty engaged in research, clinical work, and teaching.

Dr. Ransom is an authority on the physiology and function of glial cells and on the pathophysiology of neural injury, especially ischemic injury of CNS white matter. He has served on scientific advisory boards for the NIH, the Howard Hughes Medical Institute, and the Paralyzed Veterans of America Spinal Cord Research Foundation. He received the Javits Neuroscience Investigator Award from the NIH (1991 to 1998), the Alexander von Humboldt Research Award (2005), teaching awards from Stanford and Yale, and has delivered several named lectureships. He is the founder and Editor-in-Chief of the journal *GLIA*, now in its 20th year, and serves on the editorial boards of several neuroscience journals. He was a Decade of the Brain lecturer for the American Academy of Neurology.

Dr. Ransom has three children. His oldest son is an MSTP graduate who is just finishing his neurology training. Personal interests include running, downhill skiing, and travel. He is an avid collector and has an extensive collection of petrified wood; in fact, several pieces of his furniture are made from petrified wood.

David A. Rempe, M.D., Ph.D.

Dr. Rempe received his undergraduate degree from Texas Tech University in physics in 1989. He then matriculated in the Medical Scientist Training Program (M.D., Ph.D.) at the University of Virginia, graduating in 1997. Following his internship, he completed a neurology residency at the University of Rochester, followed by a postdoctoral and clinical stroke fellowship. Beginning in October 2004, Dr. Rempe joined the Department of Neurology faculty as an Assistant Professor and is board certified in vascular neurology.

In addition to his clinical interests in treatment of neurological disease, Dr. Rempe has pursued training in basic research to define the basic pathophysiological mechanisms of neurological disease. As such, in graduate school he examined the balance between excitatory and inhibitory neurotransmission in the hippocampus in a model of chronic temporal lobe epilepsy. Following his residency, Dr. Rempe changed his research interests to another neurological disease, stroke. Gene expression changes induced by hypoxia and how these alter neuronal and astrocyte viability during brain ischemia are a particular interest. Furthermore, the role of astrocytes during stroke and how their function during hypoxia/ischemia alters neuronal viability is also a focus of research. Dr. Rempe recently opened an independent research laboratory and is currently mentoring two graduate students.

During his postdoctoral training, Dr. Rempe was named a Nathan Shock Scholar in the Center for Aging and Developmental Biology at the University of Rochester. He was awarded a postdoctoral fellowship and Fellow to Faculty Transition Award from the American Heart Association (AHA). In addition, he was recently awarded the Excellence in Basic or Clinical Cardiovascular Science Award from the AHA. Dr. Rempe is a member of several organizations including the American Academy of Neurology, the Society for Neuroscience, and the AHA. In addition to clinical and basic research responsibilities, he also organizes the Neuroscience Pathways course for interested medical students at the University of Rochester. Neuroscience Pathways incorporates the understanding of the basic mechanisms of neurological disease and their application to the treatment of neurological disease.

Heidi M. Schambra, M.D.

Dr. Schambra is a recent graduate of the Partners Residency Program in Neurology at Harvard Medical School. A native of Chapel Hill, North Carolina, she attended Brown University, graduating in 1997 with honors in neuroscience. Her undergraduate thesis was conducted with Dr. Mark Bear and involved the study of long-term potentiation in rat hippocampus. Dr. Schambra then spent a year assisting in clinical research at Washington University, St. Louis, with Drs. Maurizio Corbetta and Carolyn Baum. She was involved in the investigation of cognitive and functional imaging markers of visuospatial neglect. In 1998, Dr. Schambra began medical school at Emory University in Atlanta, but took 1 year to enter the Clinical Research Training Program at the NIH. With Dr. Leonardo Cohen at the NINDS, she studied the modulation of cortical plasticity using transcranial magnetic stimulation. Dr. Schambra obtained her M.D. in 2003. After a year of internship at Brigham and Women's Hospital, she completed the Partners Residency Program in Neurology at Harvard in June. In July, she will return to the laboratory of Dr. Cohen, where she will engage in the study of cortical plasticity and functional recovery following stroke. Ultimately, she hopes to contribute significantly to the emerging field of neurorehabilitation.

