

## Initiatives for FY11 Annual Report and Website for Research and Education

### **RESEARCH INITIATIVES:**

Dr. Robert Coghill initiated collaboration with Dr. David Yarnitsky's group at Technion University, Rambam Medical Center to compare different forms of endogenous pain modulation. He is also spending a month as a Visiting Professor, Translational Neurobiology of the Pain System XV at the Aalborg University in Aalborg, Denmark.

Dr. Dwayne Godwin Hosted the Canadian Defense Department and initiated a new collaboration on imaging and traumatic brain injury with the DRDC and the Salisbury VA.

Drs. Carol Milligan, Ron Oppenheim and members of their labs, as well as Dr. Jim Caress (Neurology) and the ALS Clinic were featured on a Focus Forward Video with Dr. John McConnell to highlight the ALS Center and its translational research program. Drs. Milligan and Caress also presented to the Board of Visitors a description of the current ALS Research programs. The group was also the main feature story in the debut issue of the Development Office's magazine for donors, to keep them informed about and engaged with the medical center. The story described the ALS Center, and its approach to research, patient care and education.

Dr. David Riddle, with collaborator Dr. Mike Robbins (Cancer Biology) submitted a grant proposal to NASA for a new study of the effects of space irradiation on normal brain tissue and cognitive function, using our established rodent model of radiation-induced brain injury. This grant was developed in response to a request for proposals assessing the impact of long-term space travel on cognitive function in astronauts.

Dr. Benjamin Rowland has been extending knowledge gained from physiological studies of multisensory integration in animals to normal and patient populations. Because the brain combines information across the senses to enhance perception, and the benefits associated with this signal fusion are greatest when the component signals themselves are unreliable, he is planning to examine these processes in macular degeneration patients. Given that central vision is unreliable, they may benefit more from compensatory strategies based on the use of other senses. In another initiative he is planning to study a population of children having disorders specific to the processing of sensory information within and across the senses (Sensory Processing Disorder) in order to more rigorously quantify the perceptual deficits and link them to behavior.

Drs. Terrence Stanford and Emilio Salinas have been awarded an R01 grant from NIDA via the highly competitive CRCNS program for collaboration between computational and a bench neuroscientists. Their work on perceptual decision making was featured in a Nature News and Views commentary and has been quoted by several major news organizations, including the NY Times.

Dr. Barry E. Stein has obtained a new T32 Training Grant entitled "Training Program in Multisensory Processes" (Drs. Terrence Stanford and Dwayne Godwin, serve as Co-Directors). This unique training program is the only NIH training program that emphasizes how the brain integrates information from different senses to produce a coherent, integrated percept of the world. It incorporates both postdoctoral and predoctoral training and involves 10 faculty members from the Department of Neurobiology and Anatomy. It is believed that its graduates will contribute to the amelioration of the

perceptual deficits resulting from developmental anomalies (e.g., Autism, ADHD, SPD), trauma, and disease-induced deficits in sensory function. This T32 is one of two administered in the Department of Neurobiology, with Dr. Ron Oppenheim's being the other.

Dr. Michael Tytell, was awarded Travel Funds from the Center for Bioethics, Health, and Society to attend the meeting organized by the NIH Office of Research Integrity titled, Quest for Research Excellence 2011 Conference, Aug 29-30, at Georgetown University in DC. He is also examining how a keratin protein fraction produced by KeraNetics, Inc., is effective in treating radiation-induced skin injury. He is PI on a the subcontract grant proposal titled, Proof of Concept Non-Clinical Study Using KeraHeal for Cutaneous Radiation Injury, under review by the Biomedical Advanced Research and Development Authority, and will work with collaborators Drs. Mark Van Dyke, Daniel Bourland (Radiation Oncology) and Mike Robbins (Radiation Oncology). In addition, his work with the protective effects of extracellular heat shock proteins continues via a cross-campus effort with collaborator Dr. Carole Browne (Biology) and Dr. Jed Macosko (Physics). The long-term objective is to use hsp70 to ameliorate nervous system injury and degenerative diseases.

Dr. Mary Lou Voytko initiated a pilot study of the effects of fractionated whole brain irradiation on cognitive function in older menopausal monkeys treated with hormone therapy in collaboration with Dr. Mike Robbins of Radiation Oncology. They are investigating if hormone therapy prevents the cognitive dysfunction that is a usual consequence of brain irradiation. Studies of brain irradiation effects in old nonhuman primates have not been performed previously.

#### **Cross Departmental Efforts:**

The following Neurobiology and Anatomy faculty members continue their roles in Cross Departmental Efforts: Dr. Dwayne Godwin, Associate Dean for Graduate Studies and Director of the MBA/PhD Program. Dr. Mary Lou Voytko, Director of the Women's Health Center of Excellence and as Associate Dean of Faculty Services; Dr. Ronald Oppenheim continues in his role as Director of the Neuroscience Program and Director of Track 6 (Neuroscience) of the Graduate Program in Neuroscience; Dr. James E. Johnson, Director of the Center for Applied Learning (CAL); Dr. Craig Henkel, Director of the ARCTC (Anatomical Resource Clinical Training Center); Dr. Terrence Stanford, Chair of the Non-human Primate Environmental Enrichment Committee, and in this role continues to lead a Neuroscience Strategic Planning Workgroup.

#### **Research Awards:**

This year, Dr. Ashok N. Hegde was the recipient of the Medical School Research "Mid-Career Investigator in Basic Sciences" Award.

#### **Student Research/Travel Awards:**

The following graduate students won the research travel awards: Svitlana Bach, Graduate Student in Dr. Ashok Hegde's lab, and Gaby Costello, a Graduate Student in Dr. Terry Stanford's lab, were co-recipients of the 2011 Fine Science Tools Travel Award. Gaby also was the winner of the 2010-2011 Bell Award for best poster in the "System" Category at the WFSM Fall Research Day, December 2, 2010.

Fumi Katsuki, Graduate Student in the laboratory of Dr. Christos Constantinidis, received an Elsevier/Vision Research Awards to be presented at the 2011 Annual Sciences Society Meeting. This is a highly competitive award, with nearly 150 senior graduate students and postdoc applicants in 2011.

Dr. David Gifondorwa, Postdoctoral Research Fellow in Dr. Carol Milligan's lab was the winner of the 2010-2011 Bell Award for best poster in the "Postdoctoral" category awarded by WFSM at the Fall Research Day, December 2, 2010.

Dr. Xuelian Qi, Postdoctoral Fellow with Dr. Christos Constantinidis won the WNCsfN Travel Award (May 2011). Dr. Qi studies the functional Organization of Prefrontal Cortex during working memory.

Dr. Liping Yu, Postdoctoral Fellow with Dr. Barry E. Stein, was the recipient of the WNCsfN Postdoctoral Trainee Travel Award, September, 2011.

### **MD/PhD Program Student Awards:**

We continue our high involvement with MD/PhD students having had 4 MD/PhD Student out of 8 students enrolled during FY11 (Wiggins, Hudgins, Starr, and Yelle).

Two of these students, Christopher Starr and Marc Yelle, recently graduated and were highly competitive in their residency match. They matched respectively at Massachusetts General Hospital and at UCSF. Dr. Robert Coghill, served as mentor to both students.

### **EDUCATIONAL INITIATIVES:**

#### **Institutional Initiatives:**

##### **The PhD/MBA Program, Dr. Dwayne Godwin, Director**

In addition to intensive doctoral training, the PhD/MBA program incorporates core knowledge of business and managerial skills to provide the student with a marketable, competitive advantage, whether the student finds employment in industry or academia. Graduates choosing to pursue a traditional tenure-track faculty position will have the managerial and business training to initiate and operate their own research laboratories and to collaborate more effectively with the private sector. Graduates choosing a non-traditional career path will be prepared to exercise their research training in management positions in the pharmaceutical industry, private foundations, government agencies, or university research and technology transfer offices.

##### **Combined Science and Management Training at Wake Forest**

There is a growing realization that graduate education must adapt to new economic and societal realities. A significant proportion (by some estimates, over half) of new PhDs are going to work in the private sector. Leading foundations and scientific agencies are calling for models for graduate education that impart a broader range of skills to prepare students for a changing employment climate. At the same time, the PhD should retain the rigor of an original research experience that makes it a world model. Two such innovative solutions were originated by the Department of Neurobiology and Anatomy faculty, in collaboration with the Wake Forest University Schools of Business: the PhD/MBA program, and the Certificate in Science Management program.

### **The Certificate in Science Management Program, Dr. Dwayne Godwin**

The Certificate in Science Management is a unique program that allows graduate students, postdoctoral fellows and interested faculty to access business courses through the Wake Forest University Schools of Business. The certificate is granted after completing 15 hours of coursework. The certificate can stand alone, or the hours taken through the Schools of Business can be transferred to a formal Wake Forest University MBA course of study.

### **A New Neuroscience Track**

Within the past year our faculty played key roles in a major institutional effort for the reorganization of the graduate programs in the biomedical sciences. As a result, prospective students now apply to a small number of tracks that have broader scopes, both in terms of educational and research objectives. Dr. Terrence Stanford represented the Neurosciences on the institutional task force responsible for developing the new graduate school platform. Subsequently, Drs. Stanford, Salinas, Milligan, Godwin, and Oppenheim were members of the committee responsible for implementing the task force recommendations to form a new Neuroscience Track that consolidates three pre-existing programs with intersecting interests; the Interdisciplinary Neuroscience Program, the departmental Neurobiology and Anatomy Program, and part of the Physiology and Pharmacology program. Dr. Oppenheim currently serves as the Track Director, while Drs. Stanford, Salinas, Milligan, and Godwin sit on the Neuroscience Track Executive Committee. The new Neuroscience Track encompasses virtually all areas of modern neuroscience, and will provide prospective graduate students with a wider range of laboratories to work in, a streamlined set of first-year core courses, and a broader selection of electives to choose from during their senior years. These electives are organized thematically, so that students can focus their training on specific areas of interest, such as drug addiction, developmental neuroscience, or sensory systems, to mention just a few. The goal of this reorganization was to showcase the diversity of research techniques and interests as well as the excellence of our community of neuroscientists, and ultimately to attract more applicants of higher quality. A consolidated network of students and laboratories should also serve to catalyze further collaborations. The first group of matriculants will enter this fall. They were selected from a high-quality pool of applicants, in spite of the fact that our recruitment tools last year were not yet fully developed. Having completed most of the reorganization, and now with a stronger world-wide-web presence, we expect future student generations to be even more competitive.

Drs. Dwayne Godwin (Chair) and Michael Tytell and others are working through the RCR Education Committee to add and refine the education of graduate students and postdoctoral trainees as required by federal mandate for all trainees supported by federal grants. Dr. Tytell will also be attending the national meeting hosted by the Office of Research Integrity (Quest for Research Excellence). He is also working to upgrade our virtual microscopy software to enhance its educational impact.

### **PA Program**

Drs. Craig Henkel, Thomas Perrault and James E. Johnson have produced a summer anatomy course for the entering class of the Physician Assistant Program. Bob Bowden and Chris York have been involved in this new program by providing prosected material for the course and helping with the multiple lectures and labs in this new curriculum. In addition, Drs. Johnson and Henkel have produced new review materials covering the cardiovascular system and pulmonary system for the 2<sup>nd</sup> year medical class.

### **Human Structure**

Dr. David Riddle began revisions of microanatomy laboratory sessions in the Human Structure and Development course to include stronger clinical links and guided pre-laboratory learning exercises. The

goal is to increase engagement of students in the material and reduce the problems and student complaints related to limitations of the NeuroInformatica virtual microscopy system. In graduate education, Dr. Riddle's in his role as Chair of the Society for Neuroscience (SfN) Committee on Neuroscience Departments and Programs (CNDP) began pursuing greater international contact and collaboration among neuroscience training programs by participating as a panelist at the meeting of the Network of European Neuroscience Schools meeting in Lausanne. This effort will continue in 2011/2012 with my participation in a joint symposium on graduate neuroscience education at the annual meeting of the Japan Neuroscience Society in Yokohama.

### **International Initiatives:**

The department continues its unique International *Ph.D. Program (Dr. Barry E. Stein, Director) "A Joint International Cognitive Neuroscience (ICN) Ph.D. Program"* with the University of Bologna, for which we are the only host U.S. department/institution.

There is also a formal agreement to explore creating a similar program with the *Autonomous University of Mexico*.

### **Teaching Awards:**

Our long time history continues with Neurobiology and Anatomy faculty receiving multiple awards per year. Since year 2000 to present, 4 of our faculty members have won the most prestigious *Medical School Basic Science Teaching Excellence Award* (36.4%). Additionally, since 1998 to present, 20 of faculty have won 20 of the 40 *Medical School Basic Science Teaching Awards* (50%).

In 2009, the Neuroscience Program initiated an award for outstanding Graduate Faculty Teaching. Two of the three awards given since inception went Neurobiology and Anatomy faculty members, Dr. Terrence Stanford and Dr. Mary Lou Voytko.

The first recipient of the *Graduate Student Association Faculty Excellence Award* was awarded to Dr. Dwayne Godwin FY2000 and Dr. Mark Wallace was the recipient in FY 2003. Two of Dr. Godwin's graduate Students, Anita McCauley and Georgia Meyer were recipients of the Gordon A. Melson Outstanding Doctoral Student Award, Anita McCauley in FY 2003 and Georgia Meyer Alexander, FY 2006.