

**NEWSLETTER FROM THE DEPARTMENT OF
ANATOMY AND NEUROBIOLOGY**

Boston University School of Medicine · Division of Graduate Medical Sciences



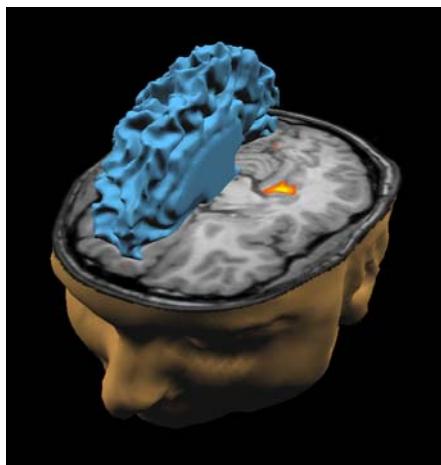
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New Facility for Biomedical Imaging to Open at BUMC

By Dr. Dae-Shik Kim

One of the enduring foundations of modern neuroscience is the concept of "localization." Localization was first hypothesized by the obscure Viennese phrenologist Franz Gall who theorized in the early 1800s that anatomically and cytoarchitectonically distinct parts of the mammalian brain performed different functions. Gall's ideas were espoused and expanded upon by many other pioneers such as Szentagothai, Mountcastle, Hubel, Wiesel, and Sokoloff who used more scientific methods to map the modular architecture of the *cortex cerebri*. Today, neuroscientists use modern variants of these mapping techniques such as functional magnetic resonance imaging (fMRI). fMRI utilizes deoxy/oxyhemoglobin as nature's own contrast agent through a technique called blood oxygenation level dependent (BOLD) contrast. An increase in neuronal activity leads to an increase in brain metabolism which results in an increase in delivery of new oxygen to the active area. Such increase in oxyhemoglobin (and the commensurate decrease in paramagnetic

deoxyhemoglobin) increases the magnetic resonance signals, which can then be detected using modern MR systems. A particularly exciting model of such an MR system is the 3 Tesla Phillips MRI scanner to be installed at the new Facility for Biomedical Imaging (to be located in



fMRI mapping of the activation in the parahippocampal place area (PPA). Unpublished data by M.Kim & D.S. Kim.

the basement of the Evans "X" building). The aim of the new Facility is to advance current NMR/MRI techniques specifically tailored for systems and cognitive neuroscience questions, ranging from visual neurophysiology to brain development and aging. Dr. Itamar Ronen, a MR physicist and a new faculty member of the Department of Anatomy and Neurobiology, will serve as the head of MR physics at the Facility. Dr. Dae-Shik Kim (dskim@bu.edu), an associate professor of anatomy and neurobiology will serve as director of the Facility. Once the 3T system has been properly installed and "debugged" (around Feb/March 2004), investigators will be able to apply for scanner access. Training in basics of MR physics, fMRI and 3T scanner operation will be offered, as well as a certification process for external users and collaborators who wish to operate the 3T scanner.

Dr. Dae-Shik Kim is an associate professor in the Department of Anatomy and Neurobiology and the director of the Biomedical Imaging Facility.

Faculty Focus: Dr. Thomas Kemper



Dr. Kemper works in his neuroscience laboratory in the FGH building.

By Dr. Margaret Bauman

A visit to the first floor of the FGH building at BUMC campus will likely find Dr. Thomas Kemper, professor of neurology, anatomy, and pathology, huddled over a microscope or comfortably settled into his office easy chair pouring over one of the numerous medical journals piled at his feet. This is the neuroscience laboratory and the professional home of one of the most recognized national and international scientists of our time and arguably one of the finest investigators and teachers of developmental brain anatomy.

Dr. Kemper grew up in Winnetka, Illinois. He is the second son of a father who was a dermatologist and a mother who was deeply involved with the

Chicago Symphony; her regular contact with artists were an important part of family life and instilled an enduring passion for music in her children. Dr. Kemper completed his undergraduate studies at Northwestern University where he majored in premedical science and vertebrate zoology. During his undergraduate years he spent summers tramping through the wilds of Montana observing and documenting many aspects of bird life. As a result of this work he published his first scientific paper entitled, "Notes on the Breeding Cycle of the Red Crossbill (*Loxia curvirostra*) in Montana," in *The Auk* in 1959. Dr. Kemper earned a medical degree at the University of Illinois School of Medicine in Chicago, Illinois.

(story continued on page 6)

Let's Welcome New Members to the Department



Photo by Claire Folger

DR. DAE-SHIK KIM is a new associate professor in the Department of Anatomy and Neurobiology and the director of the new Biomedical Imaging Facility at the Medical School. Originally trained in cognitive psychology and computer science, Dr. Kim received his Ph.D. in neuroscience at the Max-Planck-Institute for Brain Research in Frankfurt, Germany, conducting anatomical, electrophysiological, and optical imaging studies in kitten visual cortex during their critical period. Since 1998 he has been a member of the faculty at the Center for Magnetic Resonance Research of the University of Minnesota Medical School. His main research interests are functional and diffusion tensor magnetic resonance imaging of the cortical architecture in both mature and developing brains. In this photo Dr. Kim stands before the new 3T MRI scanner at the Facility for Biomedical Imaging.

DR. IVELISSE SANCHEZ joined the faculty at Boston University School of Medicine, Department of Anatomy and Neurobiology as an assistant professor in the spring of 2003. Dr. Sanchez earned her B.A and M.A from Hunter College, New York, and her Ph.D. from Graduate Center of the City University of New York in 1993. Her postdoctoral research at the Department of Psychiatry, McLean Hospital and Harvard Medical School was followed by an appointment as instructor at the Department of Cell Biology, Harvard Medical School in 1998. The Sanchez lab uses molecular and chemical approaches to investigate how survival and differentiation signaling pathways modulate neuronal function during development and disease, particularly neurodegenerative disorders.



DR. ITAMAR RONEN hails from Tel Aviv, Israel. He received his Ph.D. degree from the School of Chemistry at Tel Aviv University in 1998, where he developed a sensitive MRI method intended for metabolic functional imaging. In 1998, Dr. Ronen joined the Center for Magnetic Resonance Research at the University of Minnesota, where he continued to pursue his interest in developing MR methods with application to neuroscience. At Boston University Dr. Ronen will continue to work on MR methodologies that will help answer basic neuroscience questions related to brain function, physiology, and structure, both in animal models and in humans.

DR. JOSEPH MARCUS is a new post-doc in the Laboratory for Cognitive Neurobiology. Dr. Marcus comes from the Biological Anthropology Program at Harvard, where his Ph.D. thesis compared numbers of neurons in the cortical columns of mammals ranging from humans to hippos [Marcus, J. A., Lin, J. Z., Rosene, D. L., and Deacon, T. W. 1999. "Non-uniformity of neocortical structure in mammals: Variation in radial neuron number." Society for Neuroscience Abstracts 25:105]. Originally trained in human behavioral biology and evolutionary neuroanatomy by Dr. Terrence Deacon, Dr. Marcus hopes to apply insights from evolutionary theory to problems of primate brain aging. His current and projected research will investigate the extent of age-dependent commissurally projecting and deep-layer inhibitory cortical neuron loss.



Student Updates

KIRSTEN NIELSEN has been hired as assistant professor to teach Advanced Gross Anatomy in the Department of Physical Therapy at Daemen College, Amherst, NY. She plans to return to Boston University in the coming months to defend her Ph.D. dissertation.

JASON KASS and **NATALIE ZAHR** have both recently relocated to Northwestern University, Chicago, Illinois, with their principle investigator, Dr. Isabelle Mintz. Natalie is currently studying the basic pharmacology of dopamine (DA) cells in the substantia nigra pars compacta (SNc) to distinguish specific and selective agents for the metabotropic GABA receptor system and the D2 DA system. Jason uses pharmacological antagonists and ionic substitution experiments to augment electrophysiological studies of cells in the subthalamic nucleus (STN).

PASSED QUALIFYING EXAMS

YU-MING CHANG

ELIZABETH JONAK

SANDY THEVARUNKUNNEL

JENNIFER TOBIN

A Tribute to Salvatore Lunetta

By Dr. Alan Peters

Prior to the Second World War, both in Europe and America there were no research grants as we know them today. Consequently technicians were employed not by individual faculty members, but by the Professor of the Department. In large Anatomy Departments there was a Chief Technician, who was answerable to the Professor, and under the Chief Technician would be several other technicians with specific jobs, such as embalming, preparing histology slides, and photography. To get anything done, one had to go through the Chief Technician who would allocate technicians to help faculty members with specific tasks. Since each technician had his own territory, you certainly would not yourself be allowed to use the equipment under his charge, and so you either had to work alongside the technician, or tell the technician what you wanted to be done.

Having come from a large Department in Edinburgh in which there were about 10 technicians, I was surprised when I arrived in Boston in 1966 to find that there was only one technician in this Department, with some seven full-time faculty members who taught 70 medical students. The technician's name was Salvatore Lunetta. He was a small man with a ready smile and polite manner, and a person who exuded an air of confidence. "Tory", as he was known to everyone, was a man-of-all-trades. He did the embalming, as



well as taking care of and preparing microscopic slides for histology and neuroanatomy; he did photography and was in charge of the audio-visual equipment for the medical school. Tory produced many of the histology slides of human tissue that are in the slide boxes used to teach microscopic anatomy. He also prepared the two complete sets of Nissl stained sections of the human brain stem and these are the source the projection slides that are used to teach neuroanatomy.

Tory, started out as a technician in about 1927, and he worked closely with Dr.

Leroy Conel, who served as the Head of this Department from 1944 to 1948. Tory prepared most of the Golgi-Cox stained slides that were the basis for the series of books that Conel produced on the development of the human cerebral cortex. You will find copies of some of these volumes in the Departmental library and inside them you will find acknowledgements to Salvatore Lunetta for preparing the Golgi material and for taking the photographs. These books are still an important source of information for those interested in cortical development and they are frequently referenced. Unfortunately, Conel did not complete the series, but published only eight volumes.

Everyone in the Medical School, from the Dean downwards, knew Tory. He was beloved by many generations of medical students and one of the first Departmental get-togethers that I attended in 1967 was a party to celebrate Tory's 40th year at the Medical School. Tory eventually retired in 1979, after spending over 52 years in this Department. He enjoyed his retirement for 10 years before his death in 1989 and you will find a photograph of him hanging in the Departmental Library.

Dr. Alan Peters is a professor of anatomy and neurobiology and the former chairman of the department. He has been teaching and conducting research since 1966.

Announcing McNary "Living Memory" Fund

By Dr. Mark Moss

The Department of Anatomy and Neurobiology together with the support of the Alumni Association has established a fund to create a "living" memorial honoring Dr. William McNary, former professor of anatomy and associate dean of students at Boston University School of Medicine. The purpose of the memorial is to honor Dr. McNary and to help keep his legacy alive. All contributions to the memorial fund will go directly towards establishing an annual event at BUMC. The event will include a luncheon in Dr. McNary's name for students, faculty, alumni and family. The luncheon will be followed by a seminar by a notable

individual who embodies Dr. McNary's remarkable attributes as teacher, mentor, and scholar. The Department also hopes to build an endowment over time to help fund a teaching scholarship in Dr. McNary's name. All individuals wishing to donate to the McNary "Living Memory" Fund should contact the Department office at (617) 638-4200 or email markmoss@bu.edu.

Dr. Mark Moss has been the chairman of the Department of Anatomy and Neurobiology since 1998. He is also a co-director for the Laboratory of Cognitive Neurobiology.

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EDITORS

Maureen Estevez
Juliana Mariani

For comments, questions, or information please email:

AnatNeuroNews@hotmail.com

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(Kemper, continued from cover)

After completing his internship and residency in medicine at the Presbyterian St. Luke's Hospital in Chicago, he moved to Boston, where he trained in neurology at the New England Medical Center under the chairmanship of Dr. John Sullivan. In 1967 he met and began to work with Dr. Paul Yakovlev at the Harvard Medical School; this relationship proved to be an association and friendship that framed the future of his research career. In 1973 Dr. Kemper was recruited by the late Dr. Norman Geschwind and became the director of neuropathology at Boston City Hospital. Currently, he holds academic positions as professor of neurology and anatomy, and professor of pathology at the Boston University School of Medicine.

For more than 25 years Dr. Kemper served as the evaluation team neurologist at the Community Evaluation and Rehabilitation Center (CERC) of the Eunice Kennedy Shriver Center in Waltham, Massachusetts. In this capacity he was instrumental in setting a pattern of excellence in the evaluation of children and adults with a variety of developmental disabilities.

Dr. Kemper is a careful and thoughtful observer, and his strong scientific background has contributed substantially to our understanding of the relationships between abnormalities in the brain and associated clinical features. In addition, Dr. Kemper is an exceptionally talented teacher whether to graduate students, medical students, residents, or peers. He is extremely generous with his time and knowledge and extremely patient when conveying complex information to others.

Although an outstanding clinician, Dr. Kemper's major contributions to the field of neuroscience have come from his anatomical studies of the brain. His early work detailed descriptions of the brain abnormalities in Rubenstein-Taybi syndrome, congenital rubella syndrome, birth injury, seizures, and phenylketonuria – work which remains the benchmark from which our

present knowledge of these disorders has evolved. In addition, Dr. Kemper along with Dr. Albert Galaburda, was the first to describe the brain abnormalities related to dyslexia. Additional scientific contributions have included pioneering research on radiation effects in the brain, as well as Down's syndrome, fetal alcohol syndrome, and more recently Alzheimer's disease, aging, and the effect of prenatal malnutrition on the developing nervous system.

Of particular interest to the Boston University Medical community is Dr. Kemper's substantial contribution to the field of autism and related disorders. In association with his research colleague, Dr. Margaret Bauman, he was the first to describe abnormalities in selected regions of the autistic brain. This seminal work demonstrated for the first time that autism was a disorder of prenatal onset and not caused by abnormal maternal-child interactions, as was once believed. This study has served as the framework upon which current neuroimaging, cognitive and language observations, as well as genetics, neuroimmunology, and biochemical investigations have been based and against which studies continue to be compared.

Outside of his professional life Dr. Kemper has numerous hobbies and interests. Every summer he eagerly departs to the family

camp on the coast of Maine where he enjoys spending time with his wife, Mary Jane, who is a nurse practitioner working within the Boston public schools, and their four children, in-laws, three grandsons, and numerous close friends and relatives. In addition, Dr. Kemper still finds time to trap lobsters with his friend Herbie, to host an annual fall October Fest which features his own homemade brews, to create stained glass lamp shades, to carefully carve personally designed totem poles, to nurture multiple plants from seedlings into glorious gardens, and to watch eagles nesting in nearby trees and soaring over the bay. This is a man who will never be bored.

Although he frequently talks about retiring to his hideaway in Maine, most of us who have had the pleasure and privilege of working with him and who are lucky enough to have him as a friend and mentor selfishly hope that that time is still a long way off.

Dr. Bauman is an adjunct associate professor of the Department of Anatomy and Neurobiology, an associate professor of neurology at the Massachusetts General Hospital and the director of the LADDERS (Learning and Developmental Disabilities Evaluation and Rehabilitation Services) program. She has been a research colleague of Dr. Kemper for nearly 20 years.

Recent Grant Receipts

Dr. Helen Tager-Flusberg

"Social and Affective Processes in Autism"
(STAART Program) NIH/NIMH - 5 years

Dr. Mark Moss

"Memory and Executive Systems in Prefrontal and Temporal Cortex"
NIH/NIMH - 5 years

Dr. Bertram Payne

"Rehabilitation of Neural Spacial Neglect"
NIH/NINDS - 5 years

Boston University School of Medicine
Department of Anatomy and Neurobiology

715 Albany Street L-1004
Boston, Massachusetts 02118-2526

Phone: (617) 638-4200
Fax: (617) 638-4216
Email: AnatNeuroNews@hotmail.com

www.bu.edu/anatneuro/