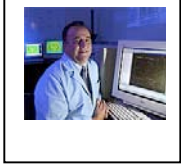


SPINES FACULTY MEMBERS BIOGRAPHY

JOE L. MARTINEZ Jr., Ph.D., Program Director



Joe L. Martinez, Jr. earned a B.A. in Psychology from the University of San Diego in 1966, an M.S. in Psychology from New Mexico Highlands University in 1968 and completed a Ph.D. at the University of Delaware in 1971 with a specialization in Physiological Psychology. He served for 13 years as a Professor in the Department of Psychology at the University of California, Berkeley. Currently, he is the Ewing Halsell Distinguished Chair at the University of Texas at San Antonio, and the director of the Summer Program in Neuroscience, Ethics, and Survival (SPINES) at the Marine Biological Laboratory in Woods Hole, MA. Dr. Martinez is also an Associate Editor for the American Psychologist and serves on the Editorial Board of Behavioral Neuroscience. Dr. Martinez has been recognized by several organizations for his outstanding contribution to student development. He received the Raza Recognition Award in 1986, the American Association for the Advancement of Science Mentor Award for Lifetime Achievement in 1994, the National Hispanic Science Network on Drug Abuse Outstanding Mentorship Award in 2001, and the Association of Neuroscience Departments and Programs Education Award in 2003.

His laboratory's research interests lie in the neurobiology of learning and memory, and the laboratory uses a variety of techniques to examine the mechanisms that underlie these memory processes in the mammalian brain. Currently, he uses DNA microarray technology to investigate candidate genes involved in Long Term Potentiation (LTP), a cellular model of learning and memory, and drug abuse and addiction. In addition, he uses confocal microscopy to determine the degree to which radiation exposure affects hippocampal morphology, and how these structural alterations impact animals' behavior on hippocampus-dependent tasks such as trace fear conditioning and the Morris Water Maze.

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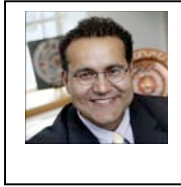
JAMES G. TOWNSEL, Ph.D., Program Director



Studies in my laboratory center on trafficking of the cholinergic choline cotransporter (ChCoT) in *Limulus polyphemus*. The ChCoT is rate limiting in the synthesis of releasable acetylcholine and thus its regulation is critical to the physiology of cholinergic transmission. A major component of this regulation involves the acute redistribution of the ChCoT to the plasma membrane as a result of high frequency impulse activity. Our laboratory used the selective irreversible ligand, hemicholinium-3 mustard (HCM), in providing the first evidence for the constitutive cycling of the ChCoT into the plasma membrane. Upon cloning of the cDNA in *Limulus*, we reported the phylogenetic relationship of the ChCoT's to the sodium dependent glucose transporters. Recent studies derive from observed similarities between the ChCoT and the well-studied insulin responsive glucose transporter (GLUT4). As has been reported in studies with GLUT4, horseradish peroxidase conjugated transferring coupled with diaminobenzidine and H₂O₂ treatment resulted in the ablation of selected endosomal compartments in isolated *Limulus* brain hemi-slice preparation and thus the interruption of the constitutive cycling of the ChCoT. A recruitment paradigm involving exposure of ablated hemi-slices to depolarizing concentrations of elevated potassium in Chao's resulted in the restoration of transport in these slices. Thus, these studies point to the presence of an uncharacterized endosome essential to the regulated trafficking of the ChCoT. On-going studies are aimed at identifying the endosomal compartments involved in both the constitutive and regulated trafficking of the ChCoT with a special emphasis on the role of rab proteins in this trafficking.

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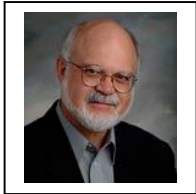
ALFREDO QUINONES-HINOJOSA, MD



Dr. Alfredo Quiñones-Hinojosa received his medical degree from Harvard, where he graduated with honors. He then completed his residency in neurosurgery at the University of California, San Francisco, where he also completed a postdoctoral fellowship in developmental and stem cell biology. Now an Associate Professor of Neurosurgery and Oncology at Johns Hopkins, Dr. Quiñones serves as the Director of the brain tumor program at the The Johns Hopkins Bayview campus. He focuses on the surgical treatment of primary and metastatic brain tumors, with an emphasis on motor and speech mapping during surgery. He is expert in treating intradural spinal tumors as well as brainstem and eloquent brain tumors in adults with the use of neurophysiological monitoring during surgery. He further specializes in the treatment of patients with pituitary tumors using a transphenoidal endonasal approach with surgical navigation and/or endoscopic techniques. He has a strong interest in treating patients with skull base tumors and the use of radiosurgery as an adjunct to the treatment of these lesions. Dr. Quinones conducts numerous research efforts on elucidating the role of stem cells in the origin of brain tumors and the potential role stem cells can play in fighting brain cancer and regaining neurological function. His most recent accolade was being honored with the American Association of Neurological Surgeons Ronald Bittner Award. He has also received multiple teaching awards. Dr. Quiñones currently sees patients at The Johns Hopkins Bayview Hospital Outpatient Center on Tuesdays.

Weblink: [http://www.hopkinsmedicine.org/neurology_neurosurgery/experts/team_member_profile/36A35BDE9B71CB08318C8F419FD7ACB4/Alfredo_Quinones-Hinojosa]

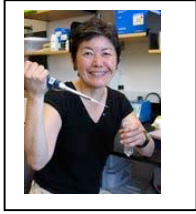
JOHN G HILDEBRAND, Ph.D.



Is Regents Professor and founding Head of the Department of Neuroscience at the University of Arizona in Tucson. He joined the faculty at Arizona in 1985 after teaching at Harvard and Columbia Universities. He and his coworkers study insect nervous systems, with a current focus on the neurobiology and development of the olfactory system and its roles in behavior. This work teaches us about mechanisms that are common to vertebrate and invertebrate nervous systems and at the same time contributes to knowledge that will help alleviate the harm done by insects that are predators of the human food supply or carriers of disease. Hildebrand is past president of several scientific societies and a frequent consultant to federal agencies, private foundations, and industry. Among his strongest interests is education at all levels, and in that connection he serves as chairman of the Board of Neuroscience Schools of the International Brain Research Organization (IBRO) and as a member of the Training Advisory Committee of the APA/ANDP/NIH Diversity Program in Neuroscience and is a past co-director of the Neurobiology Course at the MBL. He is a member of the National Academy of Sciences, the American Academy of Arts and Sciences, and the German Academy of Sciences 'Leopoldina;' a foreign member of the Norwegian Academy of Science and Letters; and a fellow of the AAAS, the Entomological Society of America, and the Royal Entomological Society. He was recently named an Einstein Professor by the Chinese Academy of Sciences. Other honors include a Lifetime Achievement Award, American Psychological Association Diversity Program in Neuroscience; Outstanding Service Award for Contributions to the Biological Sciences, American Institute of Biological Sciences; Silver Medal, International Society for Chemical Ecology; and Founders Memorial Award, Entomological Society of America.

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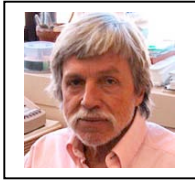
RAE NISHI, Ph.D.



Rae Nishi is presently Professor of Anatomy and Neurobiology and Director of the Neuroscience Graduate Program at the University of Vermont. She received her BS with Honors in Biological Sciences from Stanford University in 1975 and her PhD from UCSD in 1980. Her postdoctoral training was with Dr. David D. Potter in the Neurobiology Department at Harvard Medical School. In 1986 she took a faculty position in the Cell Biology and Anatomy Department at Oregon Health Sciences University, where she rose through the ranks to Professor with tenure. In 2001, she moved to the Anatomy and Neurobiology Department at the University of Vermont. Together with Ed McCleskey, Rae was Co-Director of the Summer Neurobiology Course at MBL from 2004- 2007. She is presently a member of the Training Advisory Committee for the Diversity Program in Neuroscience and President of the Association of Neuroscience Departments and Programs. Her research is focused in two areas: nicotinic receptors and programmed cell death during development and TrkB activation during the genesis of neuroblastoma. She has two teenage daughters (15 and 18 yrs) who love to play soccer.

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MICHAEL VANDER LAAN BENNETT, D.PHIL



Distinguished Professor, Dominick P. Purpura Department of Neuroscience

Sylvia and Robert S. Olnick Professor of Neuroscience.
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content. Faculty: Update your Profile Professional

Interests Overview of Professional Interests. Areas of investigation include: molecular and cellular physiology of glutamatergic transmission and gap junction mediated intercellular communication; mechanisms of delayed neurodegeneration induced by global ischemia; and neuroprotection after ischemia or other insult. Glutamatergic transmission is the primary mode of excitation in the nervous system. Modifications of synaptic efficacy underlie development and learning and also play important roles in disease processes. NMDA receptors, one class responding to glutamate, mediate some types of long term potentiation, which underlie at least one form of memory. Protein kinases and phosphatases modify single channel properties and trafficking, i.e., movement out from the cell body, insertion into the surface membrane, removal, and recycling or degradation. Regulation involves protein synthesis in dendrites as well as cell bodies. Change in glutamate receptor expression appears to mediate delayed neuronal death in the hippocampal CA1 following global ischemia and in CA3 following kainate induced status epilepticus. In situ hybridization and immunocytochemistry indicate down regulation of GluR2, the AMPA receptor subunit that limits calcium permeability of these receptors, and measurements with Ca²⁺ indicators demonstrate increased Ca²⁺ permeability. Increased Ca²⁺ influx in response to endogenous glutamate may then trigger cell death by apoptosis. REST, an RE-1 silencing transcription factor, is upregulated after ischemia and is known to suppress GluR2 expression. In ischemic preconditioning a brief period of ischemia leads to tolerance of a longer lasting and otherwise injurious ischemic episode. We have now shown several changes in gene expression that are responsible for the ischemic tolerance after preconditioning.

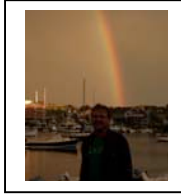
Electrical synapses formed by gap junctions are known to synchronize a number of types of inhibitory interneurons widely distributed in the mammalian brain. A nearly specific neuronal connexin expressed by these cells is upregulated after global ischemia at the mRNA and protein level and we are evaluating changes in coupling of the inhibitory interneurons. Gap junction channels are formed by a hemichannel provided by each of the coupled cells; because of their high conductance and permeability, it was thought that hemichannels were closed until docking with another hemichannel. Now there is evidence that hemichannels not apposed to another hemichannel can open under physiological as well as pathological conditions. We are investigating the controlling mechanisms at the level of single (hemi)channels. Hemichannels mediate intercellular signaling by secreted molecules, such as ATP, and may be involved in propagation of damage (or protection) at boundaries between normal and injured tissue.

Several human genetic diseases are caused by connexin mutations, including X-linked Charcot-Marie-Tooth disease and one type of non-syndromic deafness. We are therefore analyzing how the altered biophysics of the mutations leads to the pathology.

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[<http://www.aecom.yu.edu/home/faculty/profile.asp?id=8219&k=&O=1>]

KEITH TRUJILLO, Ph.D.



Dr. Keith Trujillo, is Professor of Psychology and Associate Director of the Office for Biomedical Research and Training at California State University, San Marcos. He received an Associates degree in Biological Sciences from Shasta College; Bachelors degrees in Biological Sciences, Psychology, and Chemistry from California State University, Chico; and a Ph.D. in Pharmacology and Toxicology from the University of California, Irvine. Following completion of his doctorate, Dr. Trujillo worked as a Postdoctoral Fellow and a Research Investigator at The University of Michigan. He is a neuroscientist and psychopharmacologist with a longstanding interest in the neural basis of drug abuse and addiction. Dr. Trujillo has performed laboratory research on drug reward, tolerance, sensitization, and physical dependence, among other areas, and has been funded by the National Institute on Drug Abuse, the National Institute of General Medical Sciences, and the National Alliance for Research on Schizophrenia and Depression. In addition to his laboratory research, he has strong interests in increasing diversity in science and academia, and training the next generation of scientists. Among his awards and honors is the National Award of Excellence in Mentorship from the National Hispanic Science Network.

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STEVE ZOTTOLI, Ph.D.,



My name is Steve Zottoli, and I am a full professor at Williams College in Williamstown, MA. Williams College is a small liberal arts institution of about 2,000 students.

I am currently Chair of the Biology Department at Williams where I teach animal physiology and neurobiology courses.

My main research interest is the functional recovery of startle behavior after spinal cord injury. After damage to their spinal cords, non-mammalian vertebrates can regain function caudal to the wound. In order to understand the cellular basis for this return of behavior, we are studying the Mauthner cells ("model system") of fish, which are known to initiate a C-type startle response (C-starts) to an abrupt stimulus. This response is thought to be involved in escape from predation. Spinal cord crushes at the spinomedullary junction result in the loss of function caudal to the wound in goldfish. Over a period of months swimming, equilibrium and the ability to maneuver and feed from the surface return in about 50% of the fish studied.

In addition, the C-start returns. Preliminary results indicate that this recovered behavior is quite different from sham-operated control fish. The behavioral recovery of the C-start is not the result of Mauthner cell regeneration in many cases. Rather regeneration of other reticulospinal neurons results in the recovery. Thus, there is a differential ability of subsets of reticulospinal neurons to contribute to the recovery of a specific behavior. Our long term goal is to understand the basic mechanisms which limit the ability of a nerve cell to regenerate and contribute to behavioral recovery.

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[http://www.williams.edu/Biology/Faculty_Staff/szottoli/szottoli.shtml]

ANN STUART, Ph.D.



Ann Stuart, Brief Bio: I have been coming to the MBL since 1973. For decades I moved my lab of electrophysiology setups into Rowe for the summer. Here my students and I studied synaptic transmission and integration in the visual system of giant barnacles, where neural mechanisms are amazingly similar to those in the vertebrate retina. More recently I and my husband John Moore have focused on the Neurons in Action project and, currently in development, Calcium in Action. My academic path was from Swarthmore College to Physiology and Neurobiology Departments at Yale (PhD), UCLA (postdoc), Harvard (associate prof), and UNC Chapel Hill (prof; husband John is at Duke). The co-authors of NIA met in Woods Hole over a voltage clamp! Here is a photo of me and my coauthor.

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ANNE ETGEN, Ph.D.



Dr. Etgen received the B.S. from the College of William and Mary (Virginia) in 1975 and the Ph.D. from the University of California, Irvine in 1979, then accepted a faculty position in Biological Sciences at Rutgers University. In 1985, she moved to Albert Einstein College of Medicine where she is currently Professor of Neuroscience, Psychiatry and Behavioral Sciences, Pediatrics, and Obstetrics & Gynecology and a member of the Center for Reproductive Biology and Women's Health. She is a two-time MERIT awardee from NIMH and served as Editor-in-Chief of the journal *Hormones and Behavior* from 2004-2008. Dr. Etgen has been a member of the NINDS Neuroscience Training study section since 2000, and has been on numerous other grant and fellowship review panels for NSF and NIH. She served as Director of the Graduate Division of Biomedical Sciences at Einstein from 1997-2001 and has coordinated efforts to recruit and retain underrepresented minorities (URMs) in Einstein's biomedical training programs since 1988. These programs are featured on the NIGMS web site as model programs for recruitment and retention of URMs in the biomedical sciences. She has been a member of the Training Advisory Committee for the Diversity Program in Neuroscience of the American Psychological Association since 1999 and has chaired the postdoctoral training component since 2004. She has also been one of the core teaching faculty for the SPINES course at the Marine Biological Laboratories since 2000 and a member of the SPINES admissions committee since 2002. She has been a member the External Scientific Advisory Committee for the SCORE program at the University of Puerto Rico Medical Science Campus since 1999. Dr. Etgen joined the External Advisory Board of the RCMI at Meharry Medical College in 2006. She was appointed to the Society for Neuroscience Committee on Diversity in Neuroscience in 2007 and is chairing that committee from 2008-2011.

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[<http://www.aecom.yu.edu/home/faculty/profile.asp?id=6977>]

JOHN DOWLING, Ph.D.



John E. Dowling received his A.B. and Ph.D. from Harvard University. He taught in the Biology Department at Harvard from 1961 to 1964, first as an Instructor, then as Assistant Professor. In 1964 he moved to Johns Hopkins University, where he held an appointment as Associate Professor of Ophthalmology and Biophysics. He returned to Harvard as Professor of Biology in 1971, was the Maria Moors Cabot Professor of Natural Sciences from 1971-2001, Harvard College Professor from 1999-2004 and is presently the Gordon and Llura Gund Professor of Neurosciences. He was Chairman of the Biology Department at Harvard from 1975 to 1978 and served as Associate Dean of the Faculty of Arts and Sciences from 1980 to 1984. He was Master of Leverett House at Harvard from 1981-1998 and served as President of the Corporation of The Marine Biological Laboratory in Woods Hole from 1998-2008. He is a Fellow of the American Academy of Arts and Sciences, a member of the National Academy of Sciences and a member of the American Philosophical Society. He received the Friedenwald Medal from the Association of Research in Ophthalmology and Vision in 1970, the Annual Award of the New England Ophthalmological Society in 1979, the Retinal Research Foundation Award for Retinal Research in 1981, an Alcon Vision Research Recognition Award in 1986, a National Eye Institute's MERIT award in 1987, the Von Sallman Prize in 1992, The Helen Keller Prize for Vision Research in 2000, the Llura Ligget Gund Award for Lifetime Achievement and Recognition of Contribution to the Foundation Fighting Blindness in 2001 and the Paul Kayser International Award in Retina Research in 2008. He was granted an honorary M.D. degree by the University of Lund (Sweden) in 1982. His research interests have focused on the vertebrate retina as a model piece of the brain. He and his collaborators have long been interested in the functional organization of the retina, studying its synaptic organization, the electrical responses of the retinal neurons, and the mechanisms underlying neurotransmission and neuromodulation in the retina. He became interested in zebrafish as a system in which one could explore the development and genetics of the vertebrate retina about 15 years ago. Part of his research team has focused on retinal development in zebrafish and the role of retinoic acid in early eye and photoreceptor development. A second group has developed behavioral tests

to isolate mutations, both recessive and dominant, specific to the visual system.

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[<http://www.hms.harvard.edu/dms/neuroscience/fac/dowling.html>]

DANIEL JOHNSTON, Ph.D.



Research in the Cellular Neurophysiology Laboratory is primarily directed towards understanding the cellular and molecular mechanisms of synaptic integration and long-term synaptic plasticity. We have focused our attention on neurons and synapses in the hippocampus, an area of the brain that plays an important role in learning and memory. The hippocampus is also of interest because it has a low seizure threshold and plays an important function in human epilepsy. Our research uses quantitative electrophysiological, optical imaging, and computer modeling techniques. We are investigating the properties and mechanisms of long-term potentiation (LTP), a synaptic substrate for aspects of memory. This interest has led us to investigate not only the basic mechanisms of synaptic transmission but also the basic mechanisms of synaptic integration in the dendrites of the postsynaptic neuron. For example, we have recently used fluorescence imaging techniques and dendritic patch-clamp recordings to identify the types and location of voltage-gated Na⁺ and Ca²⁺ channels in dendrites of hippocampal pyramidal neurons. This work is complemented by our computer modeling studies in which we attempt to reconstruct the biophysical properties of hippocampal neurons based on our experimental data. Our studies of LTP have included investigations of the pre- and/or postsynaptic locus of change during LTP and the cellular mechanisms of induction. We hope that these investigations will enhance our understanding of the synaptic mechanisms of learning and memory and provide insight into the function of the hippocampus in the behaving animal.

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[<http://www.utexas.edu/neuroscience/Neurobiology/DanJohnston/>]

HEATHER EISTHEN, Ph.D.



Affiliation: Michigan State University

The goal of my research is to understand the mechanisms and functional consequences of evolutionary changes in the nervous system. For most of my career, I have focused on examining changes in vertebrate olfactory systems over evolutionary time and the impact of these changes on behavior and physiology. For this research, I have worked extensively with salamanders, but have also conducted studies with lampreys and teleosts. Recently, I have also begun to study the nervous system in hemichordates as a way of understanding the effects of large-scale changes in neural organization.

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Luis Cubano, Ph.D.



Dr. Cubano obtained his BS in Cell and Molecular Biology from Tulane University, his MS in Microbiology and Immunology from the University of Alabama in Huntsville and his PhD in Biology from Kansas State University where he studied the effects of gravity on the immune system. Dr. Cubano performed his postdoctoral work at the Tulane University Medical School. He currently serves as Associate Dean for Research and Graduate Studies and Associate Professor of Cell Biology at the Universidad Central del Caribe (UCC) School of Medicine. Dr. Cubano is the Program Director of the UCC NIH/NIGMS/MBRS-SCORE program, PI of the UCC NIH/NICHD/EARDA and Administrative Program Director of the UCC NIH/NINDS/SNRP. His research interest is the effect of the cell environment on the cytoskeleton.

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[http://web.mac.com/ucresearch/UCCRESEARCH/Luis_Cubano.html]
