Summer Fellowship Placement Sites
2023

Mike Barish, Ph.D.

Department of Neuroscience
Beckman Research Institute
City of Hope
Duarte, CA

Dr. Barish is investigating early electrical activity in the developing hippocampus and cortex and its relationship to neural birth, migration and maturation. In collaboration with Karen Aboody, M.D. , (Hematology/HCT) and Carlotta Glackin, Ph.D. , is also examining the molecular mechanisms of neural progenitor cell migration to glioma and tumors outside the brain, and targeting of these tumors with genetically-modified therapeutics using immortalized neural progenitor cells. For more detailed information on Dr. Barish's research please go to www.cityofhope.org/neurosciences or you may contact Dr. Barish at mbarish@coh.org.

Michele Basso, Ph.D.

Departments of Psychiatry and Neurobiology
Semel Neuropsychiatric Institute
University of California, Los Angeles
Los Angeles, CA

Michele A. Basso is currently the director of the Fuster Laboratory of Cognitive Neuroscience at UCLA's Semel Institute for Neuroscience and Human Behavior. The laboratory runs a research program focusing on basic questions of science that may have direct clinical impact on the treatment of certain diseases, including Parkinson's disease. One of Dr. Basso's current target research projects investigates the role of two parts of the brain, the basal ganglia and the superior colliculus, in saccadic (quick and simultaneous) eye movement decision-making. Saccadic eye movement choices, like many other action selections, are routed through the basal ganglia and superior colliculus within the brain. Further study of the link between these parts of the brain and saccadic eye movement selection may yield a better understanding of how Parkinson's disease may cause decreases in patients' decision-making ability. Professor's Basso's contact information is mbasso@mednet.ucla.edu

Michel Baudry, Ph.D.

Graduate College of Biomedical Sciences
Western University of Health Sciences
Pomona CA

Research Interests:

1.Mechanisms implicated in long-term synaptic potentiation and depression in hippocampus and other brain regions.
2. Regulation of glutamate receptors.
3. Role of oxygen free radicals in central nervous system.
4. Mechanisms underlying selective neuronal degeneration.
5. Computational neuroscience

For more information please visit www.westernu.edu. You may contact Professor Baudry at mbaudry@weaternu.edu

Xiaoning Bi M.D., Ph.D.

Basic Medical Sciences
College of Osteopathic Medicine of the Pacific
Western University of Health Sciences

Research in my laboratory seeks to understand how neurons develop, mature, and function properly and how they die when challenged by natural aging process, by intrinsic genetic defects, or by various insults. We hope that by understanding the basic molecular cellular mechanisms that govern these processes we can develop better kjpreventive and therapeutic strategies for central nervous system disorders in children as well as in elders.

For more information please visit www.westernu.edu. You may contact Professor Bi at xbi@westernu.edu.

Samantha Butler Ph.D.

Department of Neurobiology & The Edythe and Eli Broad Center of Regenerative Medicine and Stem Cell Research
David Geffen School of Medicine
University of California, Los Angeles
Los Angeles, CA

The extraordinarily diverse functions of the nervous system, from cognition to movement, are possible because neurons are assembled into precisely ordered networks that permit them to rapidly and accurately communicate with their synaptic targets. My laboratory seeks to understand the mechanisms that establish these neuronal networks during

development with the long-term goal of determining how this process may be co-opted to regenerate diseased or damaged circuits. Working the developing spinal cord, we have shown that molecules previously identified as morphogens, such as the Bone Morphogenetic Proteins (BMPs) family of growth factors, can also act as axon guidance signals. We are now determining the key intrinsic factors that translate the ability of the BMPs to direct cell fate and axon guidance decisions, two strikingly different processes in the generation of neural circuits. During the course of these studies, we have identified a critical mechanism by which the rate of axon outgrowth is controlled during embryogenesis, thereby permitting neural circuits to develop in synchrony with the rest of the embryo. My laboratory is currently assessing how this mechanism can be harnessed to accelerate axon growth in a regenerative context to stimulate the repair of neural circuits. The successful implementation of this technology could result in significantly improved recovery times for patients with damaged nervous systems. For more information please visit www.faculty.neuroscieuce.ucla.edu or contact Dr. Butler at butlersj@ucla.edu

Arezoo Campbell, Ph.D.

College of Pharmacy
Western University of Health Sciences
Pomona CA

The main focus of the laboratory is to determine how induction of aberrant innate immune responses and oxidative stress by environmental exposures may accelerate the pathogenesis of neurodegenerative disorders.

The neurohormone melatonin not only modulates the circadian rhythm, but also has the ability to delay the onset of several changes associated with aging. Another focus of the laboratory is to use a simplified, but biologically relevant, in vitro system to decipher the possible mechanisms underlying the ability of melatonin to reverse age-related changes in the brain. Professor Campbell's contact information is acampbell@westernu.edu

Giorgio Coricelli, Ph.D.

Department of Economics (Neuroeconomics)
University of Southern California
3620 S. Vermont Ave.
Los Angeles, CA 90089-0253

Neuroeconomics, experimental economics, game theory

We study human behaviors emerging from the interplay of cognitive and emotional systems. Our research agenda includes two main projects. The first one concerns the role of emotions in decision making, and the second is aimed at investigating the relational complexity in social interaction. Our objective is to apply robust methods and findings from behavioral decision theory to study the brain structures that contribute to forming judgments and decisions, both in an individual and a social context.

We study (1) the role of counterfactual emotions, such as regret and envy, in decision making (fMRI, Orbitofrontal patients, and developmental studies); (2) the neural basis of bounded rational behavior: limit in depth of strategic reasoning (fMRI and eye-tracking studies on attention in games); (3) the neural correlates of individual and social uncertainty: disposition effect, aspiration level, strategic uncertainty; (4) how the brain encodes learning signals: regret/fictive learning, reputation building, transfer learning; (5) impaired decision making in schizophrenia and autism; (6) eating disorders.

We conduct our research using a fundamentally multidisciplinary approach (Neuroeconomics), drawing from behavioral and experimental economics, game theory, neuroimaging (fMRI), neuropsychology (patients studies), and cognitive neurosciences.

Contact Information: http://dornsife.usc.edu/coricelli; Email: giorgio.coricelli@usc.edu

Chris Dulla, Ph.D.
Department of Neuroscience
Tufts University School of Medicine
Boston MA

The principal goal of my research is to understand how neurotransmission contributes to the function of neuronal networks. Neurotransmission is the most basic unit of neuronal communication. Disruption of the basic features of neurotransmission is associated with many neurological diseases. My lab aims to understand how specific properties of synaptic function contribute to network activity, and how changes in neurotransmission are involved in the pathology of disease states such as epilepsy and traumatic brain injury. We are specifically interested in astrocyte glutamate uptake, astrocyte/neuron interactions, GABAergic interneuron development, and metabolic control of neuronal activity. Using advanced neurotransmitter imaging, electrophysiological techniques, and more, my lab aims to answer questions about how neuronal network function is shaped by some of the most basic parameters of neurotransmission. We hope to contribute new understanding and novel therapies to treat epilepsy, traumatic brain injury, and other devastating neurological diseases.

Email: Chris.Dulla@tufts.edu

Jun-Hyeong Cho, Ph.D.
Department of Cell, Systems and Molecular Biology
University of California, Riverside
Riverside, CA

In order to survive in a dynamic environment, animals develop fear responses to dangerous situations. The neural mechanism of learned fear has great survival value for animals, who must predict biologically relevant events from seemingly neutral cues. In order to develop adaptive fear responses, the brain must discriminate between different sensory cues or contexts and associates only relevant stimuli with aversive events. Dysregulation of this process leads to maladaptive overgeneralized fear in PTSD. Our

long-term research goal is to discover the neural mechanisms of adaptive fear and anxiety, so that improved strategies can be developed to suppress maladaptive fear.

In classical fear conditioning—an experimental model of fear learning—experimental subjects learn to associate an emotionally-neutral conditioned stimulus (CS, sensory cue or context) with an aversive unconditioned stimulus (US). A specific CS activates only a subset of neurons in the sensory cortex/thalamus and hippocampus, which convey CS information to the amygdala, integrating the information of the CS and US for fear memory formation. Our central hypothesis is that specific fear memory is encoded by selective long-term potentiation (LTP) in pathways conveying specific CS information to the amygdala. If such input-specific LTP underlies fear memory specificity, fear memory for the CS could be erased selectively by depotentiation, reversing the input-specific LTP. We are testing the hypothesis, using a combination of neural activity-dependent behavioral labeling, electrophysiological and optogenetic approaches in mouse models of fear conditioning. Our studies will elucidate fundamental principles of adaptive fear to the relevant stimulus and provide new insights into developing strategies to attenuate pathological fear memory without affecting adaptive fear memories in PTSD.

https://profiles.ucr.edu/app/home/profile/juncho; Email: juncho@ucr.edu

Christine Fowler, Ph.D.

Department of Neurobiology and Behavior
University of California, Irvine
Irvine, CA

Our group's overall research goals are centered on elucidating the neurobiological mechanisms underlying motivated behaviors and behavioral deficits associated with neuropsychiatric disorders, such as depression. At present, we are focused on determining how drugs of abuse modulate brain circuitries involved in the emergence and maintenance of drug seeking behaviors that characterize addiction. While the vast majority of research in the field has focused on the mesocorticolimbic dopamine 'reward' pathway, much less is known about the involvement of other motivation-related circuits in addiction. Further, given the high comorbidity between depression and substance abuse, it has been proposed that similar mechanisms may mediate both disease states, and/or individuals with depression may consume drugs of abuse to modulate symptoms associated with the disorder.

Recently, we established a key role for the medial habenula (MHb) and its major afferent target, the interpeduncular nucleus (IPN), in controlling the addictive properties of nicotine. Specifically, we found that nicotinic acetylcholine receptors (nAChRs) in the MHb-IPN, particularly those containing α5 subunits, control the aversive effects of nicotine and thereby limit consumption of the drug. This finding likely explains why human allelic variation in the gene encoding the α5 subunit gene (CHRNA5) dramatically increases vulnerability to tobacco dependence and smoking related diseases in humans, such as lung cancer. Moreover, these data have promoted the pharmaceutical

development of novel small molecule α5 nAChR ligands that will potentially be used as smoking cessation agents.

For more information please contact cdfowler@uci.edu or visit her website at http://faculty.sites.uci.edu/fowlerlab/research/

Timothy Gentner, Ph.D.

Department of Psychology
University of California, San Diego
La Jolla, CA

Our research takes an integrative, systems-level approach to study the neural mechanisms that govern the sensory, perceptual, and cognitive processing of real-world acoustic signals. We want to know how the brain represents behaviorally important, complex, natural stimuli; what spatial and temporal forms these functional representations assume; how they are learned and remembered; how perceptual representations function in higher-level decision processes; and how the outputs of such processes guide natural behaviors. Our primary focus is on the elaborate vocal communication system in songbirds. For more information please contact Dr. Gentner at tgentner@ucsd.edu or visit the lab website at http://gentnerlab.ucsd.edu.

David Glanzman, Ph.D.

Department of Integrative Biology and Physiology
University of California, Los Angeles
Los Angeles, CA

My laboratory is interested in the cell biology of learning and memory in simple organisms. The marine invertebrate *Aplysia californica* has a comparatively simple nervous system (~ 20,000 neurons) that provides a valuable experimental model for understanding the cellular mechanisms that underlie simple forms of learning, such as habituation, sensitization, and classical conditioning. Another experimental advantage of *Aplysia* is that sensory and motor neurons that mediate specific reflexes of the animal can be placed into dissociated cell culture where they will reform their synaptic connections. These *in vitro* sensorimotor synapses are extremely useful for cellular and molecular studies of short- and long-term learning-related synaptic plasticity. Currently, my laboratory is investigating the modulation of AMPA-type glutamate receptors during learning in *Aplysia*. We have found that serotonin, an endogenous monoamine that plays a central role in learning, modulates the efficacy of AMPA receptors in the motor neurons. Our current evidence indicates that serotonin modulates the trafficking of AMPA receptors in the motor neurons, causing additional receptors to be delivered to postsynaptic sites via exocytosis. We also wish to know whether long-term learning in *Aplysia* involves changes in the expression of glutamate receptors. We have cloned and sequenced ten AMPA-type and one NMDA-type glutamate receptor from the CNS of *Aplysia*. Currently, we are using the techniques of in situ hybridization and quantitative

RT-PCR to examine whether long-term sensitization and long-term habituation are accompanied by changes in glutamate receptor expression. For more information please visit www.ibp.ucla.edu or contact Professor Glanzman at dglanzman@physci.ucla.edu.

Mike Harrington

Department of Molecular Neurology
Huntington Medical Research Institute.
99 North El Molino Ave, Pasadena CA

In 1997, HMRI developed a new diagnostic tool – magnetic resonance spectroscopy (MRS) – that led to the discovery and patent of the first AD biomarkers, a revolutionary concept of the time.

Now MRS is being employed again, this time in tandem with molecular neurology in a two-year study to find AD biomarkers long before onset of symptoms.

For more information go to www.hmri.org or contact Dr. Harrington at mghworks@hmri.org.

Alicia Izquierdo-Edler, Ph.D.

Department of Psychology
University of California, Los Angeles
Los Angeles, CA

Research Interests

My main interests include: Uncovering the neural mechanisms important for flexible cognition and behavior, exploring the factors contributing to reward-related decision-making, and studying the neuropharmacology of [and effects of psychostimulants on] executive function. At best, addressing these research questions could contribute to a better understanding (and treatment) of diseases such as OCD, PTSD, addiction/relapse, and Impulse Control Disorder.

Contact: aizquie@calstatela.edu

Albert Laspada, M.D., Ph.D.

Department of Neurobiology and Behavior
UCI School of Medicine
Irvine CA

My research is focused upon neurodegenerative disease, as my lab is seeking the molecular events that underlie neurodegeneration and neuron cell death in spinocerebellar

ataxia type 7, spinal & bulbar muscular atrophy, Huntington's Disease, ALS, Parkinson's disease, and Alzheimer's disease. My team has uncovered evidence for transcription dysregulation, perturbed bioenergetics, and altered protein quality control as contributing factors to neuron dysfunction. By reproducing molecular pathology in mice and in neurons, astrocytes, microglia, and skeletal muscle cells derived from human patient stem cells, we have begun to develop therapies to treat these disorders.

Contact: alaspada@uci.edu
Website: https://neurobiology.uci.edu/research/

Edythe London, Ph.D.

Departments of Psychiatry and Biobehavioral Sciences, and Molecular and Medical Pharmacology, at the David Geffen School of Medicine, UCLA
University of California, Los Angeles
Los Angeles, CA

Dr. London's research has advanced the study of substance abuse and the development of new approaches and probes for studies of brain function. She has edited several books and authored over 200 original research articles and over 60 reviews. Her most recognized accomplishments involve PET scanning of human subjects who suffer from addictions. Dr. London's group was the first to show a relationship between drug craving and activity of brain regions that link memory with emotion. She also showed that drug abusers have structural abnormalities in prefrontal cortex and deficits in decision-making tasks that depend on prefrontal cortex function. Her work influenced other researchers to look toward the frontal lobe for an understanding of the compulsive self-administration of drugs despite detrimental effects, which characterizes drug addiction. Most recently, she and her colleagues have developed new probes for external imaging of those receptors in the brain where nicotine binds to produce its behavioral actions.

For more information you may contact Dr. London at elondon@mednet.ucla.edu or visit her faculty page at http://www.pharmacology.ucla.edu

Stephen Mahler, Ph.D.

Department of Neurobiology and Behavior
University of California, Irvine
Irvine, CA

Brain circuits of "reward" are evolutionarily ancient, and likely function in a qualitatively similar way in humans and model organisms such as rodents. Such homology should not be surprising considering the strong adaptive pressure on organisms to efficiently exploit environmental opportunities when they are available. In order to attain a natural reward like food, water, or sex, animals must know what and where rewards are, and how to get them. This is accomplished in part via the brain's "reward circuitry," aspects of which allow animals to recognize rewards when they are attained, learn about the circumstances

in which they were attained, remember these circumstances when they are encountered in future, and generate appropriate motivated behavior at those times. We investigate the neural circuits underlying these psychological processes, including learning, motivation, and pleasure. We employ anatomical, pharmacological, and virus-based strategies to examine and control neuronal populations and circuits in rodents, with the aim of understanding how these circuits control behavior.
Email: mahlers@uci.edu

Katherine Narr, Ph.D.

Brain Research Institute
UCLA Brain Mapping Center
University of California, Los Angeles
Los Angeles, CA

Dr. Katherine Narr is an Associate Professor of Neurology at UCLA. She received her Ph.D. in Neuroscience, and completed her postdoctoral fellowship co-jointly in the Departments of Neurology and Psychiatry at the University of California, Los Angeles. Dr Narr's program of research is focused on using imaging data from multiple modalities, including structural (sMRI), functional (fMRI) and diffusion tensor imaging (DTI), to facilitate a deeper understanding of the pathophysiological mechanisms and genetic contributions associated with schizophrenia and other psychiatric disorders. Though her work includes examining the regional specificity of structural brain abnormalities and functional impairments across several different brain systems, she is focused on using advanced imaging methodologies to determine whether aspects of a specific cortical network, the medial temporal lobe memory system, are selectively disturbed in schizophrenia. These experiments aim to establish the presence of structure-function relationships, and to identify system components indexing genetic vulnerability effects.

For more information go to http:// narr.bmap.ucla.edu/. You may contact Dr. Narr at narr@ucla.edu.

Arbi Nazarian, Ph.D.

Pharmaceutical Sciences Division
College of Pharmacy
Western University of Health Sciences
Pomona CA

The use of drugs of abuse during development can lead to a greater propensity to drug addiction in adulthood. Therefore, in order to understand the changes that occur in the developing brain, my research investigates animal models of opiate and psychostimulant addiction across different developmental stages (neonatal, adolescence and adulthood) by using behavioral, pharmacological and cell biological approaches.

A second research theme in my laboratory is to study nociceptive processing as it pertains to the underlying mechanisms of opiate tolerance at the level of the brain and the spinal cord.

For more information please contact Professor Nazarian at anazarian@westernu.edu

Andy Obenaus, Ph.D.

Department of Pediatrics
Preclinical and Translational Imaging Center
University of California, Irvine School of Medicine
Irvine, CA

Dr. Obenaus serves as the Director of the Non-Invasive Imaging Laboratory in the Radiation Biology Program at Loma Linda University. His laboratory is well known for its state-of-the-art equipment. His expertise is in the area of neuroimaging of disease, and the Noninvasive Imaging Laboratory has experience with a broad range of topics and models of disease including Alzheimer's and neuro-repair using stem cells. He has been involved in teaching Biomedical Imaging and Radiation Biology, and he has supervised a number of undergraduate and graduate students.

For more information: http://www.faculty.uci.edu/profile.cfm?faculty_id=6327 or you may contact Dr. Obenaus at obenausa@uci.edu

Kathleen Page M.D.

Keck School of Medicine
Division of Endrocrinlogy
University of Southern California

We aim to understand the causes of obesity and diabetes so that more effective strategies can be developed for reducing the number of people affected by these health conditions. Diabetes and obesity are critical health topics to study as in the United States, more than 35% of adults and 17% of children are obese. Additionally, 25.8 million children and adults have diabetes — this is a staggering 8.3% of the population.

Our work combines a number of fields (including neuroscience, physiology, nutrition and psychology) and applies novel techniques to tackle the roots of obesity and diabetes.

For more information please contact Dr. Kathleen Page at drkatieapage@gmail.com or visit her website at https://www.drkatiepage.com

Robert Pechnick, PhD

Neuropharmacology
College of Osteopathic Medicine of the Pacific
Western University Health Sciences

The research in my laboratory is focused on three aspects of neuropsychopharmacology: using animals models to understand the causes of and to develop new potential treatments for various forms of mental illness; utilizing both in vivo and in vitro approaches to study the neuropharmacology of drugs of abuse; and defining the role of hippocampal neurogenesis in health and disease states. Primary goals include: characterizing the role of developmental insults (prenatal, neonatal and adolescent) in producing neuropsychiatric disorders; defining the involvement of cytokines and stress in neurogenesis and depression; understanding the role of neurogenesis in post-chemotherapy-induced cognitive function, and determining the neurochemical mechanisms underlying the effects of nicotine, cocaine and phencyclidine (PCP), and the pathophysiological and neurochemical consequences of the repeated administration of these drugs. Experimental approaches involve studying the effects of the systemic and central administration of selective agonists, antagonists and antisense oligonucleotides, using transgenic animal models, utilizing viral-mediated gene delivery, and characterizing functional responses as well as changes in receptor subunit gene expression, neurotransmitter levels and neurotransmitter receptors after acute and chronic drug administration.

For more information: www.westeru.edu. You may contact Professor Penchnick atrpechnick@westernu.edu

Ephron Rosenzweig, Ph.D.

Assistant Project Scientist
Center of Neural Repair
Department of Neurosciences
University of California, San Diego

My research addresses two different approaches to spinal cord repair: regeneration of cut axons and sprouting of intact axons. Although regeneration of cut axons is the ultimate goal of spinal cord repair research, data from our lab and others suggests that a more practical approach may be to stimulate the compensatory sprouting of axons spared by the initial injury. These axons could form new circuitry beyond the lesion, potentially restoring function. Because even severe human spinal cord injuries (SCIs) generally leave some axons intact, many people currently living with SCI could benefit from such a treatment.

For more information please contact Dr. Rosenzweig at ephronr@gmail.com. You may alos contact the the Director of the Center for Neural Repair at UCSD Dr. Mark Tuszynski at mtuszyns@ucsd.edu.

Amelia Russo-Neustadt M.D., Ph.D.

Biological Sciences Department
California State University, Los Angeles
5151 State University Drive, Los Angeles

Effects of physical activity and antidepressants on induction of BDNF in the brain.
My current research focus involves the study of physical activity and antidepressant treatment interactions in the brain. Our studies seek to reveal the mechanisms of growth factor regulation and behavioral/functional recovery resulting from these interactions.

For more information go to www.calstatela.edu. You may contact Professor Russo-Neustadt at arusson@calstatela.edu.

Erin Schuman, Ph.D.

Department of Synaptic Plasticity
Max Planck Institute for Brain Research
Frankfurt Am Main, Germany

Erin Schuman lab's long-standing research interest is the study of cellular mechanisms and neural circuits that underlie information processing and storage. The lab focuses on the molecular and cell biological processes that control protein synthesis and degradation in neurons and their synapses. The complex morphology of neurons, with most synapses located hundreds of microns from the cell body, presents a logistical challenge for the establishment, maintenance and modification of local synaptic proteomes. Neurons have solved this problem by localizing important cell biological machines, including ribosomes and proteasomes, within dendrites and axons.

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Amanda Saratsis, M.D.

Indiana University/Riley's Children Hospital
Bloomington IN

Diffuse Intrinsic Pontine Glioma (DIPG) is a World Health Organization Grade IV, inoperable, universally lethal pediatric brainstem tumor characterized by invasive growth

of midline structures, unresponsiveness to traditional glioblastoma multiforme chemotherapeutics, and acquired resistance to radiation. The aggressivity of DIPG results from its large and pervasive cell type of origin, the oligodendrocyte precursor cell (OPC). Differentiation arrest of the OPC lineage occurs in part from the overexpression of highly conserved RNA binding proteins (RBPs) which mediate pluripotency during normal fetal development and neonatal hyperplasia. Our work in the Saratsis Lab is focused on understanding the epigenetic background and molecular mechanisms of these RBPs. Specifically, we use techniques such as chromatin immunoprecipitation, genomic editing, tumor suppressor microRNA screens, and pharmaceutical inhibition to assess their targetability and translate novel therapeutic strategies into our advanced murine models.

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Felix Schweizer, Ph.D.

Department of Neurobiology
David Geffen School of Medicine
UCLA
Los Angeles CA

We are interested in molecular and cellular aspects of synaptic transmission. in the regulation of synaptic transmission and how this regulation affects neural systems. We are using acutely isolate neurons, brains slices and cultured cells in order to investigate these issues. We are using electrophysiology (incl. capacitance measurements), imaging and biochemical methods.
For more information please contact Professor Schweizer at felixs@ucla.edu or visit the lab website at http://schweizerlab.org

Neil Segil, Ph.D.

House Ear Institute (USC)
Section on Cell Growth and Differentiation
Laboratory of Developmental Biology
Department of Cell and Molecular Biology

1. Cell cycle regulation during the development and regeneration of the inner ear.
Coordinating cell proliferation, growth and differentiation is crucial for the development of animal form. This project investigates the biochemical machinery responsible for this coordination. Including:
• Regulation of cyclin-dependent kinases and their inhibitors in development.
• Role of proneural and neurogenic genes in cell patterning, differentiation, and cell cycle control.

2. Stem cells and progenitors in the developing inner ear.
The goal of this project is the identification and molecular characterization of progenitor

cells (stem cells) that are able to differentiate into the sensory and non-sensory cells of the auditory and vestibular epithelium. This project involves the prospective identification, purification and growth in vitro of hair cell precursors. In the future, manipulation of these cells may offer an alternative to hearing aids and cochlear implants for the treatment of hearing loss.

3. Establishment and maintenance of the postmitotic state. We have shown that maintenance of the postmitotic state of inner ear sensory hair cells is an active process involving the cell type specific regulation of cyclin-dependent kinase inhibitors. Loss of the ability to maintain the postmitotic state leads to cell death. The focus of this project is on the molecular mechanisms that underlie the permanently postmitotic state of terminally differentiated cells and the signaling pathways leading from cellular stress to the cell cycle machinery.

For more information: http://www.hei.org/research/scientists/segil.html. You may contact Dr. Segil at nsegil@hei.org.

Richard Staba, Ph.D.

Department of Neurology
David Geffen School of Medicine
UCLA
Los Angeles CA

Our laboratory focuses on epilepsy and seizures in patients and experimental models. Our current human project focuses on defining the epileptogenic network and identifying which portions of the network need to be removed to achieve seizure freedom. These patient studies involve MRI and DTI to quantify anatomical abnormalities and clinical depth electrode and microelectrode recordings to identify electrophysiological disturbances like high-frequency oscillations and gamma event coupling. We also have collaborative studies that will identify EEG, brain imaging, and plasma biomarkers of the post-traumatic epilepsy. This work is carried out in lateral fluid percussion injury model of human TBI.

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rstaba@mednet.ucla.edu

Joshua Trachtenberg, Ph.D.

Department of Neurobiology
Brain Research Institute
University of California, Los Angeles

The goal of the research in my lab is to understand, on the level of single neurons and synaptic connections, how sensory information changes the "neural ciruit" - the connections between neurons in the brain. It is quite clear that connections between brain cells are extremely labile when we are young (and wild and free), but progressively less so as we age out of adolescence, into adulthood, and old age. Yet it remains something of a mystery why. How is the young brain different than the adult brain? Why is it so trivial for children to learn new languages, symbolic representation, new motor movements, and so on?

To answer these questions, research in my lab employs imaging, genetic, optogenetic, pharmacogenetic, and electrophysiological tools to probe neural circuitry in the brains of adolescent and adult mice. A main technique in the lab is resonant scanning 2-photon calcium imaging, which allows us to visualize the activity of hundereds of neurons in the living brain with high spatial and temporal resolution. With this technique, we follow the activity of neuronal networks over hours, or days, or weeks and define exactly how the network changes before and after learning. We are also mapping neural circuit connectivity both in vivo, by modeling connectivity probabilities based on the calcium imaging data we acquire, and in brain slices using glutamate uncaging or channel-rhodopsin stimulation.

For more information on Dr. Trachtenberg's research please visit www.neurobio.ucla.edu.

Christopher Wilson, Ph.D.

Basic Sciences
Division of Physiology
School of Medicine
Loma Linda University School of Medicine
Loma Linda, CA 92350

My laboratory is primarily interested in the generation and modulation of respiratory rhythm in the mammalian central nervous system. In the past decade, we have focused on apnea of prematurity and other breathing problems that premature infants suffer. The questions we seek to answer are: How does the brain generate the drive for breathing? How is breathing pattern modulated by reflexes and chemosensation? How can we improve breathing regularity in premature infants?

We use electrophysiology techniques (extracellular single-unit recording, whole cell patch-clamp, electrochemistry) and fluorescence imaging (calcium indicators, pH sensitive dyes, cell specific markers) to explore the dynamic relationship between cells that are phasically active during breathing. Our chief animal model is the developing rat but we also use mice to explore genetic variability in the respiratory neural substrate. For me information please visit http:// www.llu.edu/medicine/basic-sciences/faculty/physiology/. Email: cgwilson.llu.edu