McKNIGHT BRAIN RESEARCH FOUNDATION
TENTH INTER-INSTITUTIONAL MEETING

The University of Alabama at Birmingham
Birmingham, Alabama
April 4 – 6, 2018
The Evelyn F. McKnight Brain Institute at the University of Alabama at Birmingham welcomes:

The McKnight Brain Research Foundation
Board of Trustees

The Evelyn F. McKnight Brain Institute
University of Arizona

The Evelyn F. & William L. McKnight Brain Institute
University of Florida

The Evelyn F. McKnight Brain Institute
University of Miami
Special thanks to
The McKnight Brain Research Foundation
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Mission Statement
The McKnight Brain Research Foundation strives to:

- Lead in generating interest and support of scientific research in the understanding and alleviation of age-related memory loss
- Inspire commitment and shared vision in the understanding and alleviation of age-related memory loss
- Partner with research scientists, institutions, and organizations to promote research to understand and alleviate age-related memory loss
- Promote collaboration and communication among research scientists, institutions, and organizations engaged in research in age-related memory loss
- Nurture scientists dedicated to the exploration and innovative research in the understanding and alleviation of age-related memory loss
- Recognize and Reward achievement in discoveries leading to the understanding and alleviation of age-related memory loss
AGENDA

Wednesday, April 4, 2018

1:00 – 6:00 p.m.  Registration: DoubleTree by Hilton – Lower Level - Foyer

6:00 - 6:30 p.m.  Reception: Doubletree Hilton Hotel - Lower Level - Heritage 1

6:30 - 8:00 p.m.  Dinner: Doubletree Hilton Hotel – Lower Level – Heritage 1

Welcome

Ronald M. Lazar, PhD, FAAN, FAHA
Evelyn F. McKnight Endowed Chair
Professor of Neurology
Director, Evelyn F. McKnight Brain Institute at UAB
Director, Division of Neuropsychology
University of Alabama at Birmingham

J. Lee Dockery, MD
Chair, Board of Trustees
McKnight Brain Research Foundation

Thursday, April 5, 2018

7:30 – 8:40 a.m.  Breakfast: Doubletree Hilton Hotel – Heritage 2

8:45 - 9:00 a.m.  Opening Remarks – Heritage 1

Ronald M. Lazar, PhD, FAAN, FAHA
Evelyn F. McKnight Endowed Chair
Director, Evelyn F. McKnight Brain Institute at UAB
University of Alabama at Birmingham

Christopher S. Brown, PhD
Vice President for Research
University of Alabama at Birmingham

J. Lee Dockery, MD
Chair, Board of Trustees
McKnight Brain Research Foundation
SESSION I  Intervention
Location: Heritage 1  Moderator: Carol Barnes, PhD

9:00 – 9:15 a.m.  “Intervention Opportunities for Cognitive Decline:
Report from the National Academy of Medicine”  Ralph Sacco, MD, MS, FAHA, FAAN
Professor and Olefemberg Chair of Neurology
Executive Director McKnight Brain Institute
Chief of Neurology Jackson memorial Hospital
Director, UM Clinical & Translational Science Institute
Senior Associate Dean for Clinical & Translational Science
Miller School of Medicine, University of Miami
President, American Academy of Neurology

9:20 – 9:45 a.m.  “Exercise is Regenerative Medicine: Impact on Aging”
Marcas M. Bamman, PhD, FACMS
Professor and Center Director
Center for Exercise Medicine
University of Alabama at Birmingham

9:50 – 10:15 a.m.  “The ACT Intervention Trial”
Ronald Cohen, PhD, ABPP, ABCN
Evelyn McKnight Chair of Clinical Translation in Cognitive Aging
Professor, Clinical and Health Psychology, Neurology and Psychiatry
Director, Center for Cognitive Aging and Memory University of Florida
Woods, PhD
Assistant Professor, Clinical and Health Psychology, Neuroscience
Assistant Director, Ctr for Cognitive Aging and Memory Clinical Trans Res
University of Florida

10:20 – 10:25 a.m.  Additional Q & A

10:30 – 10:40 a.m.  Break

10:40 – 11:00 a.m.  “Modifiable Risk Factors in Cognitive Aging:
Influence of Vascular Health and Physical Activity”
Gene Alexander, PhD
Professor
Departments of Psychology and Psychiatry
University of Arizona

11:05 - 11:25 a.m.  “Cognitive Resilience: Mechanisms and Therapeutic
Windows for Memory Loss”
Jeremy Herskowitz, PhD
Assistant Professor
Department of Neurology
University of Alabama at Birmingham

11:25 – 11:30 a.m.  Additional Q &

11:30 – 12:30 p.m.  Lunch – Heritage 2
KEYNOTE ADDRESS
12:30 -1:45 p.m.  “Epigenetic Clock Analysis of Cognitive Aging”
Steve Horvath, PhD
Professor, Human Genetics and Biostatistics
David Geffen School of Medicine
University of California

SESSION II  MBAR
Location: Heritage 1  Moderator:  Tatjana Rundek, MD, PhD, FANA
2:00 - 2:20 p.m.  “MBAR I: Clinical Update”
Bonnie Levin, PhD
Bernard and Alexandria Schoninger Professor of Neurology
Director, Division of Neuropsychology
University of Miami, Miller School of medicine

2:20 - 2:40 p.m.  “MBAR II: Imaging Update” Kristina Visscher, PhD
Associate Professor
Department of Neurobiology
University of Alabama at Birmingham

2:40 – 2:45 p.m.  Additional Q & A

2:45 – 3:00 p.m.  Break

SESSION III  New MBI Faculty
Location: Heritage 1  Moderator:  Ron Cohen, PhD
3:00 – 3:12 p.m.  “Cardiac Reperfusion, Neuro-inflammation and Human Cognition”
Ronald M. Lazar, PhD, FAAN, FAHA
Evelyn F. McKnight Endowed Chair
Director, Evelyn F. McKnight Brain Institute at UAB
University of Alabama at Birmingham

3:15 – 3:27 p.m.  “Novel Peptide Therapy to Treat Cognitive Impairment in Heart Disease Patients at Risk for Alzheimer’s Disease”
Meredith Hay, PhD
Professor, Physiology, Psychology
Evelyn F. McKnight Brain Institute
Arizona Health Sciences Center

3:30 – 3:42 p.m.  “Cognitive, Cultural and Affective Dimensions of Frailty”
Katalina McInerney, PhD
Assistant Professor – Clinical
Department of Neurology
University of Miami

Sarah Getz, PhD
Neuropsychology Postdoctoral Fellow Department of Neurology
University of Miami
3:45 – 3:57 p.m. “Exosomes: Biomarkers of Aging and Potential Mediators of Therapeutic Interventions”
Brittney Yegla, PhD
Post-doctoral Researcher
University of Florida

4:00 – 4:12 p.m. “The Gut Microbiome: A Target for Improving Late Life Cognition?”
Tom Buford, PhD
Associate Professor
Med – Gerontology, Geriatrics, and Palliative Care
University of Alabama at Birmingham

4:15 – 4:27 p.m. “Encoding and Retrieval of Complex Events: A Shift towards Knowledge-Based Processing with Normal Aging”
Matthew Grilli, PhD
Assistant Professor
Department of Psychology
Evelyn F. McKnight Brain Institute
University of Arizona

4:30 – 4:42 p.m. “Sleep and Neurocognitive Aging in Population Based Studies”
Alberto Ramos, MD, MSPH, FAASM
Associate Professor
Research Director, Sleep Disorders Program
University of Miami, Miller School of Medicine

4:45 – 4:57 p.m. “Frontal Gamma-Aminobutyric Acid Concentrations are Associated with Cognitive Performance in Older Adults” Eric Porges, PhD
Assistant Professor
University of Florida

5:00 – 5:05 p.m. Additional Q & A

5:45 p.m. Start loading busses

6:00 p.m. Travel to Vulcan

6:15 p.m. Vulcan Park & Museum
Introduction
David Standaert, MD, PhD
John N. Whitaker Professor and Chair, Department of Neurology, UAB

KEYNOTE ADDRESS
“Bears, Bile and the Brain: Towards New Cures for Alzheimer’s Disease”
Madhav Thambisetty, MD, PhD
Investigator and Chief
Unit of Clinical and Translational Neuroscience, National Institute on Aging

8:45 & 9:15 p.m. Buses return to hotel
**Friday, April 6, 2018**

7:30 - 9:00 a.m.  
Breakfast Buffet and Hotel Check-out  
Location: Heritage 2

7:30 – 9:00 a.m.  
Board of Directors Breakfast with MBI Directors  
Breakfast Buffet: Location: Heritage 2  
Meeting: Hotel Boardroom – Lower Level

**SESSION IV**  
**Data Blitz: Trends in Neuroscience**

**Location:** Heritage 1  
**MODERATOR – Erik Roberson, MD, PhD**

9:00 – 9:08 a.m.  
“Neurobiological Mechanisms of Age-Associated Changes in Decision-Making”  
**Jennifer Bizon, PhD**  
Professor  
College of Medicine  
Department of Neuroscience and Psychiatry  
Evelyn F. and William L. McKnight Brain Institute University of Florida

9:10 – 9:18 a.m.  
“Contributions of Perirhinal and Postrhinal Cortex to Memory: Implications for Aging”  
**Lee Ryan, PhD**  
Professor and Department Head  
Associate Director, Evelyn F. McKnight Brain Institute  
Director, Cognition and Neuroimaging Laboratory  
University of Arizona

9:20 – 9:28 a.m.  
“Processing Speed Training to Preserve Driving and Functional Competencies in Persons with Mild Cognitive Impairment”  
**Virginia Bradley, PhD**  
Professor  
Med-Gerontology/Geriatics/Palliative Care  
University of Alabama at Birmingham

9:30 – 9:38 a.m.  
“Retinal Microvascular and Microstructural Changes in Normal Aging and Alzheimer’s Disease”  
**Hong Jiang, MD, PhD**  
Assistant Professor of Clinical Neuro-ophthalmology & Neurology  
Bascom Palmer Eye Institute  
Department of Neurology  
University of Miami

9:40 – 9:48 a.m.  
“Perforant Path Fiber Loss Impairs Mnemonic Similarity Task Performance in Rats”  
**Sara Burke, PhD**  
Assistant Professor  
Department of Neuroscience  
University of Florida
9:50 – 9:58 a.m.  
"Neat1 Mediated Histone Methylation and c-Fos Gene Expression in Memory and Age-Related Memory Deficits"  
**Farah Lubin, PhD**  
Associate Professor  
Department of Neurobiology  
University of Alabama at Birmingham

10:00 – 10:08 a.m.  
“Post-Stroke Physical Exercise Improves Cognitive Outcomes in Young and Elderly Animals”  
**Kunjan Dave, PhD**  
Research Associate Professor  
Department of Neurology  
University of Miami

10:10 – 10:18 a.m.  
“Use of Internet-Based Testing to Identify Factors Associated with Successful Cognitive Aging”  
**Matthew Huentelman, PhD**  
Professor, Neurogenomics Division  
Scientific Director, Center for Rare Childhood Disorders  
The Translational Genomics Research Institute  
University of Arizona

10:20 - 11:20 a.m.  
Pre-Meeting Reports

11:20 a.m.  
Closing Remarks  
**Ronald M. Lazar, PhD**  
**J. Lee Dockery, MD**

11:30 a.m.  
Travelers pick up box lunches  
Foyer – Lower Level

11:30 a.m.  
Shuttle service to airport begins
KEYNOTE SPEAKERS

Steve Horvath, PhD
Professor, Human Genetics and Biostatistics
David Geffen School of Medicine
University of California, Los Angeles

Dr. Horvath’s research lies at the intersection of aging research, epidemiology, chronic diseases, epigenetics, genetics, and systems biology. He works on all aspects of biomarker development with a particular focus on genomic biomarkers of aging. He developed a highly accurate multi-tissue biomarker of aging known as the epigenetic clock. Dr. Horvath developed systems biologic approaches such as weighted gene co-expression network analysis which lend themselves for integrating gene genomic data sets. These methods have been used for a broad spectrum of age related diseases including neurodegenerative diseases, cancer, and cardiovascular disease. Dr. Horvath received a PhD in Mathematics from the University of North Carolina, Chapel Hill in 1995 and a Doctorate of Science in Biostatistics from the Harvard School of Public Health in 2000.

Madhav Thambisetty, MD, PhD
Investigator and Chief
Unit of Clinical and Translational Neuroscience
Laboratory of Behavioral Neuroscience
National Institute on Aging
National Institutes of Health

Dr. Madhav Thambisetty is a Board-certified neurologist with sub-specialty training in cognitive/behavioral neurology and sleep disorders. He completed both residency and fellowship training in the Department of Neurology at Emory University School of Medicine in Atlanta. Prior to training in Neurology, he was awarded a PhD (DPhil) in Clinical Pharmacology from the University of Oxford where he pursued doctoral studies on a Felix scholarship. His PhD thesis examined the role of synaptic remodeling in the actions of antidepressant treatments. In 2004, he was awarded a research fellowship by the Alzheimer’s Society of the United Kingdom to pursue research into ‘Blood biomarkers of Alzheimer’s Disease’ at the Institute of Psychiatry, King’s College, London. He was elected to the Emanuel Lee medical research fellowship at St. Cross College, Oxford in 2004. In 2016, he was awarded the Norman Geschwind prize in Behavioral Neurology by the American Academy of Neurology (AAN). He is currently also an Adjunct Associate Professor of Neurology at the Johns Hopkins University School of Medicine.
Amy Amara, MD
Associate Professor
Department of Neurology
Investigator, Evelyn F. McKnight Brain Ins

Steven N. Austad, PhD
Distinguished Professor & Chair
Department of Biology
Investigator, Evelyn F. McKnight Brain Ins

Karlene Ball, PhD
University Professor
Department of Psychology
Investigator, Evelyn F. McKnight Brain Ins

Marcus Bamman, PhD, FACSM
Professor
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Investigator, Evelyn F. McKnight Brain Ins

Tika Benveniste, PhD
Professor/Sr Asso Dean
Department of Cell, Developmental & Integrative Biology
Investigator, Evelyn F. McKnight Brain Ins

Mark Bolding, PhD
Associate Professor
Department of Radiology
Director, Civitan International Neuroimaging Laboratory
Investigator, Evelyn F. McKnight Brain Ins

Virginia G. Wadley Bradley, PhD
Professor of Medicine
Division of Gerontology, Geriatrics and Palliative Care
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Michael Brenner, PhD
Emeritus Professor
Department of Neurobiology

Cynthia J. Brown, MD, MSPH
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Thomas Buford, PhD, FACSM, FAHA
Associate Professor and Endowed Scholar
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Jeremy Day, PhD
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Lynn Dobrunz, PhD
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Lloyd Edwards, PhD
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Paul Gamlin, PhD
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Professor of Neurology
Director, Division of Memory Disorders and Behavioral Neurology
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Seth Landefeld, MD
Professor and Chair
Dept of Medicine Chair Office

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Lucas Pozzo-Miller, PhD
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Interim Scientific Co-Director, Civitan International Research Center
Co-Director, Neuroscience Graduate Theme, Graduate Biomedical Science Investigator, Evelyn F. McKnight Brain Ins

Sumanth D. Prabhu, MD
Professor of Medicine, and Cell, Developmental & Int Biology
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Erik Roberson, MD, PhD
Patsy W. and Charles A. Collat Professor of Neuroscience Director, Alzheimer’s Disease Center Co-Director, Ctr for Neurodegenerations and Experimental Therapeutics Co-Director, Evelyn F. McKnight Brain Ins
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Rosalinda Roberts, PhD
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Michael S. Saag, MD
Associate Dean for Global Health
Director, UAB Center for AIDS Research
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RESEARCH INTERESTS
Dr. Amara studies sleep disorders in patients with Parkinson's disease (PD) and other neurodegenerative disorders. Specifically, she investigates the impact of deep brain stimulation on sleep in PD and studies the influence of daytime sleepiness on safety in these patients. Additional research interests include the effect of exercise on sleep in patients with Parkinson's disease.

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RESEARCH INTERESTS
Dr. Austad’s scientific interests concern many aspects of the biology of aging and the evolution of life histories, from molecular processes to evolutionary demography. He investigates aging in a number of species. He is interested in aging, all aspects, including age-related cognitive decline, mouse models, protein aggregation, and techniques for defining mouse healthspan.

Aging is a major puzzle in biology. It is also arguably the most important health problem facing humans today, underlying all major causes of death and disability in the developed world. Why do animals age at all? Why do some species live short lives, physically decaying rapidly and others live exceptionally long and healthy lives? Attempting to identify the underlying cellular and molecular mechanisms that account for such species differences is the basis of Dr. Austad's research in comparative biogerontology. A second interest of his laboratory is in development methods for the assessment of animal healthspan, so that the impact on health (as well as longevity) of potential senescence-retarding therapies can be investigated.

Karlene Ball, PhD
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RESEARCH INTERESTS

Dr. Ball is widely published, and recognized internationally as an expert in the field of vision, aging, and cognitive function. She is particularly known for her work with older drivers and cognitive interventions to improve cognition, driving and other functional abilities in older adults. Her research is funded primarily through the NIH, and she collaborates widely with automobile insurance companies, Departments of Motor Vehicles, industry partners, and other organizations with interests in driving assessment and/or cognitive training to maintain driving competence. She has served on numerous committees for the National Academy of Sciences and the National Research Council and recently chaired the Committee for the Safe Mobility of Older Persons.

Marcas M. Bamman, PhD, FACSM
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RESEARCH INTERESTS

Dr. Bamman’s research is designed to foster and increase the scientific rigor and impact of clinical trials to address major knowledge gaps such as disease-specific dose-response effectiveness, exercise-drug/device interactions, genetic and phenotypic determinants of response heterogeneity, etc. He is currently the overall PI or site PI of four, multi-site randomized exercise trials focused on: (i) molecular transducers of exercise-induced health benefits, total joint arthroplasty rehabilitation, aging with mobility impairment, Parkinson’s disease and epigenetic determinants of exercise responsiveness. All of his human studies are biologically driven.

Etty (Tika) Benveniste, PhD
Senior Associate Dean for Research Administration, SOM
Associate Vice President for Medicine and Basic Sciences
Charlene A. Jones Endowed Chair in Neuroimmunology
Professor, Department of Cell, Developmental and Integrative Biology (CDIB)
Co-Director, UAB Multiple Sclerosis Center
Associate Director, Basic Science Research Comprehensive Cancer Center
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RESEARCH INTERESTS

My research focus is in the field of neuroimmunology, which is the study of how the immune system and central nervous system communicate with one another. Disruption in this process leads to diseases such as Multiple Sclerosis (MS), which is characterized by profound inflammatory responses in the brain. Ten thousand new cases are reported each year in the US, and MS affects females more frequently than males. Another disease with pronounced
neuroinflammation is Parkinson’s Disease (PD), which affects 1% of the general population over the age of 60. Our research is directed towards understanding aspects of neuroinflammation in the brains of patients with MS and PD, and more importantly, how to suppress this response.

Mark Bolding, PhD
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RESEARCH INTERESTS
Dr. Bolding’s research focuses on eye movements and gaze from both a basic vision science perspective and in the context of neuropathology. To facilitate this basic oculomotor and neuroscience research, Dr. Bolding is applying magnetic resonance imaging, materials engineering, and ultrasound in novel ways. Currently, he is collaborating with several other labs to develop a new MRI-guided non-invasive drug delivery system that will allow localized modulation of brain activity. The ultimate goal is the investigation of oculomotor control using dynamic eye imaging and high resolution functional and anatomical eye imaging in vivo in concert with targeted non-invasive, pharmacological manipulations.

In addition to pursuing his own research, Dr. Bolding’s lab maintains several shared resources. He is director of the new Civitan International Neuroimaging Laboratory and the small animal MRI in the Small Animal Imaging Shared Facility at UAB. Dr. Bolding is also working to build a shared transcranial ultrasound core facility at UAB.

Virginia G. Wadley Bradley, PhD
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RESEARCH INTERESTS
Dr. Bradley’s research is focused on the relationship of cognitive function to everyday function in normal aging, vascular disease, stroke, Alzheimer’s disease, and preclinical dementia syndromes. She designs and oversees cognitive assessments within multiple epidemiological, observational, clinical, and experimental research protocols. She also contributes to development of computer-based cognitive training paradigms and is conducting randomized controlled trials of these interventions.
**Michael Brenner, PhD**  
Emeritus Professor  
Department of Neurobiology  
Evelyn F. McKnight Brain Institute  
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**RESEARCH INTERESTS**

Dr. Brenner's interests focus on the molecular biology of astrocytes, the most common cell type in the central nervous system (CNS). Astrocytes are responsible for many of the homeostatic controls in the CNS, such as maintaining the blood-brain barrier and proper neurotransmitter levels. Astrocytes serve as precursors for neurons and oligodendrocytes during development, and also serve as stem cells for the production of these cell types in the adult. CNS injury stimulates astrocytes to undergo a reactive response, which contributes to healing but can also lead to further damage. His work focuses on the transcriptional regulation of a gene encoding intermediate filament protein specific to astrocytes, glial fibrillary acidic protein (GFAP), and on the biological role of this protein. The GFAP gene is of interest because it is tuned on as astrocytes mature, and its activity increased dramatically during the reactive response.

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**Cynthia J. Brown, MD, MSPH**  
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Investigator, Evelyn F. McKnight Brain Institute  
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**RESEARCH INTERESTS**

Dr. Brown’s clinical interests center on mobility-related issues. Her current research focuses on low mobility and falls in hospitalized older patients.

Dr. Brown graduated with a BS degree in physical therapy from East Carolina University in Greenville, North Carolina, and completed her MD degree at the University of North Carolina at Chapel Hill. She served an internship and residency, including a year as chief resident, in the Primary Care Internal Medicine Program at Yale University School of Medicine in New Haven, Connecticut. Prior to joining UAB, she completed a fellowship in geriatrics and clinical epidemiology at Yale. She obtained a Masters of Science in Public Health from UAB in 2006. Dr. Brown is a diplomate of the American Board of Internal Medicine with a certification in geriatrics.
Thomas Buford, PhD, FACSM, FAHA
Associate Professor and Endowed Scholar
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RESEARCH INTERESTS
Dr. Buford’s research focus is in preserving the health and independence of older adults through interdisciplinary research broadly related to the prevention of age-related physical disability. He serves as Principle Investigator or co-PI for numerous clinical research studies funded by the National Institutes of Health, including the LIFE study, a Phase 3, randomized clinical trial which revealed that long-term, structured physical activity can reduce the incidence of mobility disability among mobility-limited older adults. He also has a burgeoning interest in understanding how late-life cognitive changes contribute to physical decline and disability.

Jeremy Day, PhD
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RESEARCH INTERESTS
Our goal is to understand how experience alters the brain, and how those changes drive future behaviors. We approach this broad topic at diverse levels of analysis that integrate molecular, genetic, and epigenetic tools with techniques that probe the function of single neurons and entire neuronal circuits. A major focus of the Day lab is to investigate the neural mechanisms that regulate addiction-related behaviors. Specifically, we are interested in identifying the neural circuits that signal information about rewards, and dissecting how dynamic transcriptional and epigenetic mechanisms within those circuits contribute to motivated behavior.

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RESEARCH INTERESTS
My lab’s research focuses on understanding the role of inhibitory interneurons in regulating synaptic plasticity and circuit function in hippocampus, both in normal brain and in rodent models of neuropsychiatric disorders. We currently have three major areas of investigation. First, we are investigating the role of short-term plasticity in regulating the balance between excitation and inhibition in hippocampus. In a second (related) project, we are investigating the effects of interneuron transcriptional dysregulation on hippocampal circuit function. In a third project, we are investigating the effects of Neuropeptide Y (NPY) on hippocampal circuit function and behavior. NPY is an endogenous neuropeptide with robust anxiolytic (anti-anxiety) properties that has been implicated in a wide variety of anxiety disorders, including posttraumatic stress disorder (PTSD). It is released by a subset of inhibitory interneurons that also release GABA. We are studying the mechanisms that regulate the firing of NPY interneurons in hippocampus, the release of NPY, and the effects of NPY on the E/I ratio and on hippocampal circuit function.

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RESEARCH INTERESTS
My statistical research includes developing model selection and model choice techniques in linear and generalized linear mixed models with a concentration on longitudinal data analysis, derivation of techniques for computation of power and control of Type I error, and design and analysis of clinical trials. I have an extensive background in collaborating with subject-specific researchers in a broad range of areas in biomedical research, including cardiovascular disease, cystic fibrosis, cancer, aging, pediatrics, minority health, and an increasing role in statistical neuroscience.

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RESEARCH INTERESTS
Dr. Gamlin is interested in vision and the neural control of eye movements. Our studies of vision are currently focused on using AAV vectors to express light-sensitive proteins in inner retinal neurons in those individuals who are blind due to photoreceptor loss. This approach holds the promise of restoring vision to blind individuals. Another goal of my laboratory is to characterize the role that melanopsin-containing, intrinsically-photoreceptive retinal ganglion cells play in mediating the pupillary light reflex and entraining circadian rhythms. Our interest in eye movement control is concentrated on determining how the brain controls those eye movements that are required to look at objects at different distances i.e. vergence, ocular accommodation, and pupillary responses. To investigate these questions, we use electrophysiological, behavioral, fMRI, and neuroanatomical techniques.
**Cristin Gavin, PhD**  
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Co-Director, Postbaccalaureate Research Education Program  
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**RESEARCH INTERESTS**  
Dr. Gavin’s interests include structural and functional plasticity of dendritic spines and the molecular mechanisms of memory formation.

As an Assistant Professor of Neurobiology, Dr. Gavin serves as Co-Director of the Undergraduate Neuroscience Program (UNP). Established in 2008 in response to the growing interest in Neuroscience among undergraduates and the consequent need to coordinate coursework and research opportunities, the UAB Undergraduate Neuroscience Program is an interdisciplinary program between the Department of Neurobiology in the School of Medicine and the Department of Psychology in the College of Arts and Sciences.

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**David S. Geldmacher, MD, FACP**  
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**RESEARCH INTERESTS**  
His research has centered on developing new dementia treatments, and ways of measuring the success of treatments. His other research interests include complex visual processing in aging and neurological conditions.  
He has been awarded NIH and pharmaceutical industry funding for investigator-initiated clinical trials in Alzheimer’s disease. Previously his research focused on disorders of complex visual processing associated with aging, brain trauma, stroke, and neurodegenerative disease.

Dr. Geldmacher is the author of *Contemporary Diagnosis and Management of Alzheimer’s Dementia*, and has published over 100 research articles, chapters, abstracts and reviews.
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RESEARCH INTERESTS
In terms of research, Dr. Gerstenecker’s past endeavors involve areas of neuropsychology and geropsychology, with particular interest in the intersection of neurodegenerative disease and vascular risk factors. In regards to scholarship, he has published numerous articles outlining the cognitive, behavioral, and functional aspects of neurodegenerative disorders and their associated risk factors, many in top-tier journals (e.g., Neurology, Movement Disorders).

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RESEARCH INTERESTS
Our research is focused on identifying the mechanisms of neuronal degeneration in Parkinson’s disease. There are currently no therapies proven to slow down the age-dependent loss of dopamine producing neurons in the substantia nigra, which is the cause of the primary clinical symptoms of Parkinson’s disease. We use animal models and cultured cells to study how genetic mutations cause inherited forms of Parkinson’s disease. Our goal is to gain sufficient understanding of the pathogenic mechanisms to develop therapies that can slow down or halt disease progression. Ongoing and previous grants from the National Institutes of Health, the Michael J. Fox Foundation for Parkinson’s Research, the Parkinson’s Disease Foundation, and the American Parkinson Disease Association support our studies of mitochondrial dysfunction and oxidative stress as the underlying cause of neurodegeneration in idiopathic Parkinson’s disease as well as familial Parkinson’s disease linked to mutations in alpha-synuclein, LRRK2, Parkin, DJ-1 and PINK1.

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RESEARCH INTERESTS
My work is focused broadly on uncovering the mechanisms that contribute to Huntington’s Disease (HD) pathogenesis. Huntington’s Disease is an autosomal dominant neurodegenerative
disorder characterized by motor, psychiatric and cognitive deficits. The disease is caused by a repeat expansion in the ubiquitously expressed huntingtin protein. Although the protein is widely expressed, only a subset of neurons is affected in disease. My current work is focused on understanding the overall contribution of glial cells (which constitute about 50% of cells in the brain) to HD pathology. This includes understanding the normal function of the huntingtin protein in glial cells and determining how the mutant protein in glial cells contributes to neuronal dysfunction in HD. We use conditional mouse genetic models to dissect cell type contribution to disease. We employ BAC transgenesis technology to generate animal models that are then characterized using molecular, cellular, biochemical and neuropathological techniques.

**Alecia Gross, PhD**
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**RESEARCH INTERESTS**
The research interests of the Gross Lab are mainly focused on rhodopsin-mediated retinal degenerations and molecular mechanisms of photoreceptor membrane biogenesis; in particular, the molecular interactions necessary for formation of healthy photoreceptor disk membranes. Studies are currently focused on understanding those interactions that are defective when rhodopsin lacks the proper structure at its carboxy-terminus, as is the case in several of most forms of the blinding disease autosomal dominant retinitis pigmentosa. Knock-in mice bearing rhodopsin carboxy-terminal mutations will be used and new ones constructed to aid in the detection of binding partners to the C-terminus of rhodopsin implicated in rhodopsin trafficking.

**John J. Hablitz, PhD**
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**RESEARCH INTERESTS**
Dr. Hablitz’s research is centered on understanding control of activity in local cortical circuits. He is using studies on synaptic transmission to further understand basic biophysical properties of mammalian central neurons, as well as to explore the pathophysiology of experimental epilepsy. Whole-cell voltage-clamp recordings from visually identified neurons are used in *in vitro* brain slice preparations. The goal of these studies is to determine the types of synaptic interactions present among pyramidal cells and interneurons in neocortex and how these patterns change over the lifespan. A particular goal is to understand how hyperpolarization-activated non-specific cation (HCN) channels control neocortical excitability. HCN channels and I_h, the membrane current generated by their activation, have been implicated in a variety of processes including memory, behavior and neurological diseases. HCN channels regulate dendritic integration and
affect excitability of individual neurons in prefrontal cortex. Alterations in these processes are potentially important in aging since dendritic integration is altered in spatial learning-impaired aged rats.

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RESEARCH INTERESTS
Exciting advances in neuroimaging and other biomarker assays provide the means to detect Alzheimer’s disease (AD) pathology in vivo and yield crucial evidence that the pathological processes of AD initiate years to decades prior to clinical dementia onset. Yet, approximately 30%-50% of individuals who come to autopsy without dementia have high levels of AD pathology. It is hypothesized that such individuals exhibit cognitive resilience that protects against dementia. How cognitively normal older individuals with AD pathology withstand the development of dementia has remained one of the most pivotal, unanswered questions in the field. Our research aims to understand cellular mechanisms of cognitive resilience and how these mechanisms can be exploited for therapeutics to delay or prevent dementia in AD patients.

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RESEARCH INTERESTS
Our lab is broadly interested in understanding proteins involved in brain aging. Only 4% of genes are age-regulated in brain. Among them is the age-regulating protein klotho that is downregulated across species at times when age-related disorders are prone to develop. We are focused on understanding the role of klotho in brain. Klotho protein shortens mouse lifespan when knocked out, and extends lifespan when overexpressed. It is expressed in only a few organs, including brain, but affects organ function throughout the body through functions as both a transmembrane protein regulating ion homeostasis and as a shed protein regulating numerous signaling pathways critical to healthy aging. Although the brains of knockout mice bear the protein hallmarks of premature aging and are cognitively impaired, very little is known about the function of klotho in brain. We are seeking to determine whether klotho’s effects are cell autonomous or the result of circulating klotho produced by choroid plexus. Data from our lab implicates a role for klotho in the basic synaptic function of the brain and in adult neurogenesis.
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RESEARCH INTERESTS
Dr. Knight's laboratory is focused on better understanding the neural substrates of human learning, memory, and emotion using magnetic resonance imaging (MRI) techniques that include functional MRI, diffusion tensor imaging, and magnetic resonance spectroscopy. Behavioral and MRI studies from the lab investigate questions that are important for understanding healthy, as well as dysfunctional, emotion processes.

Recent work from the Knight lab has investigated the neural circuitry that supports emotion regulation processes. Disruption of these processes appears to play an important role in the emotional dysfunction associated with mood and anxiety disorders. Studies from the Knight lab will help determine neural mechanisms that mediate susceptibility/resilience to stress, and offer insights into the development of emotion-related disorders.

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RESEARCH INTERESTS
Use of multimodal brain imaging techniques (PET, fMRI, DTI and MR Spectroscopy) to study the neuropathology of schizophrenia and other mental illnesses and to evaluate the effects of psychototropic drugs on brain function and biochemistry. Contribution of glutamate and GABA to the pathophysiology of schizophrenia and other mental illnesses. Brain imaging biomarkers of abnormal patterns of brain function during cognitive processing.

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RESEARCH INTERESTS

I have made fundamental advances to improve outcomes of older persons with serious illness. My first series of studies focused on anticoagulant therapy as a model for high-risk/high-benefit drug therapies. I first developed the Bleeding Severity Index as a valid and highly reliable measure of hemorrhagic complications. I next designed and validated a risk prediction index for estimating the probability of anticoagulant-related bleeding in hospitalized patients. Using this risk prediction index to identify high-risk patients, I developed a guideline-based intervention to prevent major bleeding and demonstrated its efficacy in a clinical trial. I extended this method to outpatients treated with warfarin, developing and validating a risk prediction index, then designing a multicomponent intervention to prevent major bleeding and testing its efficacy in a second clinical trial.

Ronald M. Lazar, PhD, FAHA, FANA
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RESEARCH INTERESTS

Dr. Lazar is a neuropsychologist with broad interests in aging and vascular disease, with emphases on reversible causes of cognitive decline, risk-factor modification to promote cognitive resiliency, and recovery after stroke. Dr. Lazar is Principal or Co-Principal (MPI) of Cerebral Hemodynamics and Neurocognition in Aortic Valve Disease (NINDS/NIA), the NINDS-funded Blood Flow and Cognition in Asymptomatic Carotid Artery Disease, the NINDS-funded Carotid Revascularization for Primary Prevention of Stroke – Hemodynamics (CREST-H), and the NINDS-funded Co-Investigator and Cognitive Core Leader for the Carotid Revascularization for Primary Prevention of Stroke (CREST-2) trial. His other NIH grants have been funded by NHLBI, NICHD, NIDDK, NCI, and NIAID. His publications have appeared in the New England Journal of Medicine, Nature, Circulation, Brain, Neurology, Lancet Neurology, JAMA Neurology, Annals of Neurology, Brain, Cerebral Cortex, Stroke, JAMA Internal Medicine, the Journal of the American College of Cardiology, among many others. He has served as a permanent member of NIH study section and FDA advisory panel. He was Editor-in-Chief of Neuropsychology Review.

Robin Lester, PhD
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RESEARCH INTERESTS

Dr. Lester’s lab has been researching the role of CNS nicotinic acetylcholine receptors (nAChRs) in tobacco addiction and central synaptic transmission. nAChRs are ligand-gated ion channels
composed of five individual protein subunits that cause neuronal excitation when bound and activated by synaptically released neurotransmitter, acetylcholine, or exogenous drugs like nicotine. In respect to drug addiction, they have been studying how exposure of these receptors to nicotine in vivo leads to persistent changes in hippocampal neuronal network activity following long-term withdrawal of the drug. In addition they have uncovered a unconventional form of diffuse synaptic signaling through nAChRs in the brain implying that this transmitter system may participate in volume transmission. Molecular biological studies have characterized at least ten receptor subunits that can be assembled together in numerous combinations giving rise to a wide variety of nAChRs with distinct functional roles.

Farah D. Lubin, PhD
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RESEARCH INTERESTS
Dr. Lubin is focused on studying the Molecular and Cellular basis for transcriptional regulation of genes in neurons that integrate and encode information in the brain. Epigenetics is the study of both heritable and non-heritable regulation of gene expression that occurs without any alteration in the DNA sequence; it has been newly implicated as a mediator of experience- and environment induced persisting behavioral change. She and others have observed that neurons have “hijacked” epigenetic processes such as DNA methylation and posttranslational histone modifications to coordinate gene transcription changes in the hippocampus, thus revealing an unexpected role for chromatin structure regulation in mature, non-dividing neurons during memory formation. Her work has provided insights into epigenetic mechanisms that participate in the regulation of gene expression during memory encoding, allocation, storage and recall in hopes of unraveling the causes of cognitive deficits and to develop treatment options. Results from these studies will provide fundamental information concerning epigenetics in mature neurons with clear relevance in learning/memory deficits associated with normal aging, epilepsy, schizophrenia, and depression.

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RESEARCH INTERESTS
Collaborating with a multidisciplinary research team investigating the impact of Alzheimer’s disease and other neurological conditions on decision-making abilities. Development of conceptual models of financial and medical decision making loss in neurodegenerative disease.
In addition, investigating the cognitive and quality of life impact of epilepsy and epilepsy surgery. My research activities in this area have also included investigating predictors of epilepsy surgery outcome that have included examination of cognitive, neuroanatomical and demographic factors, as well as understanding the cognitive and quality of life consequences of epilepsy in older adults.

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RESEARCH INTERESTS  
My lab is currently investigating the role of estradiol in hippocampal synapse density, synaptic plasticity and learning. We are particularly interested in determining how loss of estradiol during aging impacts hippocampal function and whether hormone replacement therapy can activate estradiol-dependent mechanisms to restore normal synaptic function in hippocampus as well as hippocampal dependent learning and memory. Ovariectomized female rats treated with estradiol at various intervals following ovariectomy are used as a model system. Experiments involve electrophysiological measurements of NMDA currents, synaptic transmission, and long-term plasticity in acute brain slices. We have recently reported that estradiol increases NMDA transmission mediated by NR2B containing receptors and that is causally related to the heightened LTP induced by estradiol. Determining how estradiol and hormone replacement affects hippocampal function could lead to development of therapies to alleviate hormone-dependent memory loss in aging.

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RESEARCH INTERESTS  
Dr. Meador-Woodruff's primary RESEARCH INTERESTS is on understanding how different parts of the brain communicate with other parts via a variety of chemical signals, and how this communication is disrupted in schizophrenia. His current focus is on studying the expression of genes within individual cells in the nervous system, and exploring abnormalities of receptor trafficking in the brain in schizophrenia. He has a longstanding interest in teaching and mentorship, and nearly 100 trainees have rotated through his lab.
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RESEARCH INTERESTS  
I have had a career-long interest in the roles of glutamate receptor channels in higher brain function for over 20 years. Based on the well-known psychotomimetic action of NMDAR openchannel blockers in healthy subjects, it is hypothesized that one target cell-types would be cortical and hippocampal GABAergic neurons positive for calcium-binding protein parvalbumin (PV). The fast-spiking property of these cells may render NMDA channels depolarized thereby accessible to the open-channel blockers. About 7 years ago we published the first paper demonstrating that postnatal ablation of NMDARs from a subset of cortical GABA neurons (largely PV-containing fast spiking neurons) confers schizophrenia-like phenotypes in mice (Belforte et al, 2010). Currently, we are studying to explore the mechanisms behind this hypothesis using multi-disciplinary approach, including immunocytochemistry, slice physiology, in vivo physiology, in vivo microdialysis, and mouse behavioral testing.

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RESEARCH INTERESTS  
Parpura’s current research includes: i) studying the modulation of calcium-dependent glutamate release from astrocytes in health and disease; ii) visualization of vesicular/receptor trafficking; iii) examination of the nature and energetics of interactions between exocytotic proteins using single molecule detection approaches; iv) development of scaffolds and dispersible materials, most notably modified carbon nanotubes, which can be used in repair after brain injury and v) biomimetic micro-robotics. He has been interfacing neuroscience with nanoscience/ nanotechnology, synthetic biology and biomedical engineering.

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RESEARCH INTERESTS
The long-term research interests of the Pozzo-Miller lab is to characterize the functional role of structurally defined neuronal compartments such as dendritic spines, dendrites and presynaptic terminals, and how they participate in synaptic development, function and plasticity as they relate to learning & memory and neurodevelopmental disorders. We specifically focus on the actions of neurotrophins in the hippocampus. Neurotrophins such as brain-derived neurotrophic factor (BDNF) are secretory proteins that regulate neuronal survival and differentiation, as well as synapse development, function and plasticity. Neurotrophic factors are strong candidates to provide the molecular signaling pathways mediating complex interactions leading to appropriate dendritic maturation and synapse development. We are currently investigating the “BDNF hypothesis” of Rett syndrome, a neurodevelopmental disorder of genetic origin associated with autism and mental retardation. Rett syndrome is associated with mutations in MECP2, a methylated DNA-binding transcriptional regulator of several genes, including BDNF. Tools: acute and cultured brain slices, neuronal cell cultures, transgenic mice, post-mortem brain samples, cDNA plasmids, sh/siRNA.

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RESEARCH INTERESTS
We are actively studying fundamental mechanisms of pathological remodeling in the failing heart, with a particular focus on inflammatory pathways (tumor necrosis factor, nuclear factorkappaB) and immune cell types (e.g., macrophages). We are also interested in the interplay between inflammatory signaling and cardiac stem cell-mediated repair in the failing heart. Our clinical studies examine the effects of mechanical support (ventricular assist devices) on forward and reverse remodeling in human heart failure.

Erik Roberson, MD, PhD
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Co-Director, Center for Neurodegeneration and Experimental Therapeutics
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RESEARCH INTERESTS
The Roberson lab studies the neurobiology of Alzheimer’s disease (AD) and frontotemporal dementia (FTD), with a focus on understanding the cellular and molecular mechanisms of these disorders and identifying new therapeutic strategies. The role of tau in neuronal dysfunction in AD and FTD is a major area of interest, and the lab also studies how progranulin deficiency causes FTD.

In addition to directing his laboratory, Dr. Roberson directs the UAB Alzheimer’s Disease Center and co-directs the McKnight Brain Institute and the Center for Neurodegeneration and Experimental Therapeutics. Dr. Roberson also cares for patients with memory disorders and dementia at the Kirklin Clinic and directs clinical trials related to tauopathies.

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RESEARCH INTERESTS
Basal Ganglia Neurobiology in Normal and Diseased Brain.
Synaptic and mitochondrial organization in human brain at the ultrastructural level.
Neuropathology in Schizophrenia, including dysregulation of dopamine and glutamate systems.
Antipsychotic Drug Effects.

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RESEARCH INTERESTS
Dr. Michael Saag, Professor of Medicine and Director of the UAB HIV Clinic, is an internationally recognized leader in studies of HIV pathogenesis and clinical therapeutics, including development of antiretroviral therapy as well as novel treatments for opportunistic infections. Dr. Saag has established his career path along three general tracks: i) traditional clinical trials; ii) support of basic science research through targeted clinical trials that address pathogenesis questions; and iii) the evaluation of long-term clinical outcomes through the use of a computerized patient database. The UAB HIV clinic was the first study site to evaluate indinavir (Crixivan); the first to evaluate recombinant soluble CD4/IgG as a means of inhibiting viral fusion and entry; one of the first sites to use ritonavir in clinical practice; the first site to utilize BRL 61063, a potent inhibitor of TNF activity; the lead site in demonstrating the use of fluconazole as a treatment for acute cryptococcal meningitis; a lead site in the establishment of the optimal dose of nelfinavir (Viracept); the first site to evaluate BCX-34, an inhibitor of T-cell maturation; the first site to use abacavir (Ziagen) in clinical trials; and one of the first to demonstrate the use of prednisone as potential adjunctive immunotherapy of HIV-infected patients. Dr. Saag is the PI on two major NIH awards, the NIAID AIDS Clinical Trials Group (ACTG) and the UAB AIDS Center Program Project Award, for which
he is the Director, Clinical Core. Each of these awards has been competitively renewed twice under Dr. Saag’s leadership. In addition, Dr. Saag has an outstanding track record in mentoring young investigators, the majority of whom are in academic positions today.

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RESEARCH INTERESTS  
Dr. Sarraf's interests include the flow dynamics of the heart and great vessels, the brainheart interaction in health and disease, and the bioenergetics of the heart in health and disease.

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RESEARCH INTERESTS  
The Standaert laboratory is working on understanding both the root causes of Parkinson disease (PD) as well as the origin of the disabling symptoms that appear after long term treatment of the disease. The lab has a strong translational orientation – the goal is to accelerate the delivery of new therapies for Parkinson disease to the patients who desperately need them. A primary focus of the laboratory is understanding the role of the protein alpha-synuclein in PD pathophysiology, and searching for novel approaches for protecting the brain from the effects of excess alpha-synuclein.

Dr. Standaert's clinical teaching has consisted of: serving as an attending physician on the MGH Neurology inpatient service, one month each year; teaching residents, fellows and medical students in the Movement Disorders clinic on a weekly basis; and teaching in Resident's clinic about once a month. Classroom teaching has consisted of serving as member of the Core Faculty for Harvard Health Sciences Technology Pharmacology course (HST150) and a lecturer for the Harvard Medical School Human Neuroscience and Behavior course.

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RESEARCH INTERESTS  
Dr. Triebel’s research focuses on decisional capacity, cognition, and everyday functioning of patients with a variety of neurological disorders including cancer, traumatic brain injury, mild cognitive impairment, and Parkinson’s disease.
Her clinical work involves neuropsychological evaluation of adults and older adults with a wide variety of neurological disorders, with a specialty focus in cancer, dementia, and movement disorders (including DBS pre-surgical evaluations). Dr. Triebel is also involved in educating graduate students, interns, and postdoctoral fellows in neuropsychology. She has served as Chair on dissertation committees and provides clinical and research supervision to predoctoral trainees, interns, and postdoctoral fellows.

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**RESEARCH INTERESTS**  
Translational basic science of the pathogenesis of autoimmune peripheral neuropathies, particularly Guillain-Barré syndrome (GBS) and chronic inflammatory demyelinating polyradiculoneuropathy (CIDP), and HIV-associated peripheral neuropathies using in vitro and in situ approaches and in vivo animal models, geared towards discovering targeted efficacious molecular therapies for these disorders.

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**RESEARCH INTERESTS**  
Dr. Visscher is interested in characterizing what brain mechanisms underlie the human ability to flexibly process inputs from the environment, and how these mechanisms are modified with experience. We process the same information in different ways at different times. Dr. Visscher uses a variety of tools to better characterize how human brain activity before a stimulus is presented may impact the ways in which that stimulus is processed. Behavioral measurements (psychophysics and eye movements), measurement of electrical activity in the human brain using EEG, and measurement of neural activity through functional MRI allow insight into this question. We are particularly interesting in how these factors change with aging and after experience: including experience with central vision loss, and experience with visual cognitive training paradigms.
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RESEARCH INTERESTS  
Our brain is organized as interconnected groups of neurons with repeating elements, known as circuits, that underlie information processing. The maintenance of neural activity within circuits that endows us with behaviors and thoughts relies on the specialized synaptic junctions between nerve cells. Fundamental knowledge of circuits and synapses is essential for understanding how the nervous system works under normal and abnormal conditions. We use the rodent cerebellar cortex as a model system for probing the function of neural circuits and synapses. The cerebellum is ideal for studying circuits and synapses because its anatomy is among the best characterized in the nervous system, and cerebellar processing is involved in many simple motor behaviors as well as higher brain functions.

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RESEARCH INTERESTS  
The research in the laboratory of Dr. Linda Overstreet-Wadiche is focused on understanding the role of adult generated neurons in a region of the brain that is associated with learning and memory. Most neurons are generated during embryogenesis, but in the hippocampus newborn neurons are continuously produced throughout adulthood and growing evidence suggests that they participate in hippocampal-dependent cognitive and emotive functions. The proliferation, survival and integration of newborn neurons are regulated by many factors including aging and environmental enrichment, allowing adult neurogenesis to provide a link between experience and structural plasticity of the brain. Dr. Overstreet-Wadiche’s lab uses transgenic mouse models and electrophysiological techniques to explore how experience-dependent factors control adult neurogenesis and how newborn neurons in turn participate in hippocampal network activity.
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RESEARCH INTERESTS

I have had a career-long interest in the identification of genes that control the development and function of the nervous system. My laboratory uses spontaneously occurring mouse mutations that affect nervous system development in order to identify key regulatory genes involved in disease. The laboratory generates transgenic mice to determine essential aspects of gene function and to restore nervous system development and function. Using this strategy, we have discovered new roles and mechanisms utilized by the nervous system to regulate ubiquitin-independent activation of protein kinases and endosomal signaling during development. Overall my work seeks to understand the regulatory pathways used during development of the peripheral nervous system.
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RESEARCH INTERESTS
Dr. Alexander's interests focus on the study of brain-behavior relationships in the context of healthy aging and age-related, neurodegenerative disease to help elucidate the mechanisms of human cognitive aging. He uses neuroimaging techniques, including structural and functional magnetic resonance imaging (MRI) and positron emission tomography (PET), in combination with measures of cognition and behavior to address research questions on the effects of healthy aging and risk factors for Alzheimer's disease on the brain. A major focus of his research program includes the use of multivariate network analysis techniques with neuroimaging methods and measures of neuropsychological function, health status, lifestyle, and genetic risk to advance understanding on how these multiple factors interact to influence cognitive function as we age. Dr. Alexander's research also includes the application of these techniques to nonhuman animal models of aging and age-related disease.

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RESEARCH INTERESTS
The central goal of Dr. Barnes' research and teaching program is the question of how the brain changes during the aging process and the functional consequences of these changes on information processing and memory in older individuals. Her research program involves studies of behavior and neurophysiology in young and old laboratory animals. This work provides a basis for understanding the basic mechanisms of normal aging in the brain and sets a background against which it is possible to assess the effects of pathological changes such as Alzheimer's disease. Some current work also includes an assessment of therapeutic agents that may be promising in the alleviation or delay of neural and cognitive changes that occur with age.
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**RESEARCH INTERESTS**

The primary goal of Dr. Chawla's research is the question of how the brain changes during the normal aging process and the functional consequences of these changes on information processing and memory in the elderly. Her research involves behavioral studies of immediate early genes and neural plasticity mechanisms using spatial and temporal compartmental analysis in young and old laboratory animals. This work provides a basis for understanding the basic mechanisms of normal aging in the brain and sets a background against which it is possible to assess the effects of pathological changes such as Alzheimer's disease. Dr. Chawla is an Associate Research Scientist and heads the molecular research team in Dr. Carol Barnes laboratory at the University of Arizona, Evelyn F. McKnight Brain Institute and the ARL Division of Neural Systems Memory and Aging at the University of Arizona.

**Stephen L. Cowen, PhD**
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**RESEARCH INTERESTS**

The human brain is composed of billions of interacting neurons, and the activities of these neurons must be coordinated during decision making, motor control, and learning. How this coordination is achieved is a fundamental question in neuroscience. My research seeks to identify the mechanisms underlying this coordination, and determine how normal aging and in Parkinson’s disease alters cognition and communication between neurons. Results from our investigation of neuronal activity in the hippocampus indicates that aging results in the slowing of high-frequency oscillations implicated in memory formation and learning. This slowing is also accompanied by an increase in the variability of the timing of action potentials and reduced coupling between action potentials and high-frequency “ripple” oscillations associated with memory consolidation. These observations point to changes in the aging brain that may contribute to age-associated memory decline. Our laboratory is also developing new technologies for measuring the simultaneous release of neuromodulators, like dopamine, and the activities of large groups of neurons. These new technologies are allowing us to determine how dopamine regulates neuronal coordination and plasticity during decision making and learning. Future experiments will explore how dopamine loss associated with aging and Parkinson’s disease alters neuronal coordination.
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RESEARCH INTERESTS
Lindsey’s primary interests are in the neurobiological basis of decision-making and memory and how these cognitive constructs are altered in disorders of the nervous system. With regards to decision-making, Lindsey is particularly interested in understanding how effort modulates brain activity both at the level of individual neurons and large-scale oscillatory patterns. Within memory systems her interest is in how large-scale local field potential (LFP) oscillations known to be involved in memory consolidation, particularly cortical spindles and hippocampal ripples, may be altered in Parkinson’s disease. Lindsey is currently involved in a project researching how a mutation of the LRRK2 gene (the most common genetic cause of Parkinson’s disease) affects these memory-consolidation related oscillations in mice. This research may help to uncover biomarkers for early stage Parkinson’s disease and identify possible targets for treatment.

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Elaine Cunningham, BSN, RN, MBA, began her tenure with the University of Arizona Foundation as Director of Development, Research Discovery and Innovation for Life Sciences in February 2017. Her role is dedicated to supporting the philanthropic goals of the Evelyn McKnight Brain Institute and the BIO5 Institute, by focusing on major and principle gifts, incorporating interdisciplinary, collaborative basic science research efforts across the UA campus. As an accomplished fundraising professional, with over 20 plus years’ experience, her roles have included positions with the University of Florida Foundation, the University of Connecticut Foundation and Vidant Health Foundation.

Her diverse background includes vocations as a critical care nurse in academic medical centers in NC, CO and FL, a co-owner and manager of a family-owned photography studio, an account executive for Praxels, Inc., the Healthcare Business Director for Training Camp, an online IT educational company, and Director of Community Care Transitions and Marketing with Vidant Home Health and Hospice. She has served on multiple local boards including the YMCA, and Alzheimer’s Association, and is a past member of Rotary International and Toastmasters International.
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RESEARCH INTERESTS
Betty Glisky's include changes in memory and executive function that occur as a result of normal aging or age-related neurological conditions such as MCI or Alzheimer's disease. Recent collaborative work has focused on tracking longitudinal changes in cognitive function in a cohort of normally-aging older adults, and relating those changes to measures of brain integrity, genetic predisposition, and other health variables. The goals of this research are to understand the variability in the normal aging process, to identify early indicators of what might be abnormal aging, and to design and implement interventions that might be instrumental in enabling older adults to maintain optimal memory function into the oldest years. Dr. Glisky's work has been supported by the National Institute on Aging, the Arizona Biomedical Research Council, the Arizona Alzheimer's Consortium, and the Evelyn F. McKnight Brain Institute.

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Daniel's research currently focuses on the relationship between age-related cognitive decline and age-related hearing loss. Using colonies of behaviorally characterized macaque monkeys, Daniel and his team are employing physiological estimates of sensory function, structural and diffusion tensor magnetic resonance imaging, and chemical anatomical techniques to explore this relationship. Daniel is a fifth year graduate student at the University of Arizona in the laboratory of Dr. Carol Barnes.

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RESEARCH INTERESTS
Dr. Matt Grilli’s research focuses on uncovering the cognitive and neural bases of memory and understanding how memory supports other aspects of cognition. Dr. Grilli is particularly interested in understanding how autobiographical memory changes in normal and abnormal cognitive aging, as well as in adults with stable memory impairment secondary to acquired brain injuries. He utilizes cognitive, neuropsychological, neuroimaging, and genetic methods. Ongoing projects are investigating semantic and episodic forms of personal memory across the adult lifespan. He also studies the impact of disrupted autobiographical memory on the self-concept and future-oriented cognition. The goals of this research are to 1) understand the impact of age-related memory changes on cognition, well-being, and everyday functioning, 2) uncover strategies that promote the adaptive uses of memory, and 3) develop interventions for cognitive deficits.

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RESEARCH INTERESTS
Dr. Hay’s laboratory studies the neurobiology of peptide and hormone actions in the brain. Dr. Hay is also President and founder of a new Tucson biotechnology company, ProNeurogen, Inc. (http://www.proneurogen.com/). ProNeurogen is a preclinical and clinical stage biopharmaceutical company developing novel peptide-based therapeutics to treat cognitive impairment in patients at risk for Alzheimer’s disease and brain injury caused by cardiovascular disease and trauma. Dr. Hay and ProNeurogen are collaborating with physicians and scientists at the University of Arizona’s Sarver Heart Center, the Evelyn F. McKnight Brain Institute, BIO5 Institute and Banner Alzheimer’s Institute to advance these peptides through FDA Phase II clinical trials. The goal of these studies is to reduce or prevent memory loss related to decreased brain blood flow and inflammation. Future studies are underway for treatment of traumatic brain injury.

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RESEARCH INTERESTS
I am interested in the neurophysiology of reward and motivation in the context of learning and memory. My current research focuses on testing the link between dopamine cell firing and dopamine release using the DANA system: a novel measurement system designed in our laboratory that allows simultaneous measurement of electrophysiological activity and dopamine release in the brain. Our eventual goal is to utilize this system to better understand mechanisms by which regions of the brain, such as the hippocampus and prefrontal cortex, regulate dopamine release during learning and/or memory consolidation. I am also interested in understanding how the dysregulation of this signaling leads to cognitive deficits during aging, chronic pain, and Parkinson’s disease. A translational goal of this work is to develop pharmacological interventions that can improve cognitive function.

**Mingzhu Hou, ME**

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**RESEARCH INTERESTS**

Mingzhu Hou is a graduate student in the laboratory directed by Dr. Elizabeth Glisky at the University of Arizona. Her research involves behavioral studies of memory strategies on relational memory in young and older adults. Recent evidence shows that the usage of strategies would benefit memory in different populations. Mingzhu Hou is exploring the influences of different encoding strategies, such as self-reference and generation, on young and older adults’ performances on source memory and associative memory tasks, with the consideration of individual differences in memory and executive functioning.

**Matt Huentelman, PhD**

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**RESEARCH INTERESTS**

Dr. Huentelman’s RESEARCH INTERESTS center around the investigation of the “-omics” (genomics, transcriptomics, epigenomics, and proteomics) of neurological traits and disease. His laboratory’s overarching goal is to leverage findings in these disciplines to better understand, diagnose, and treat diseases of the nervous system. His laboratory focuses on the study of cognition, successful aging, Alzheimer’s disease, and rare neurological diseases of unknown cause. Recent work in his laboratory has focused on the use of internet-based study of cognitive aging, the incorporation of wearable device measurements and “internet of things” to study age-related changes in the study subject’s home environment, single cell-based transcriptome sequencing to perform in-depth brain region cell censuses, and the reduction to practice of single dried blood drop transcriptome profiling to power the easier longitudinal assessment of biomarkers of health and disease.
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RESEARCH INTERESTS  
The primary goal of Ashley Lawrence’s research is to understand changes in brain function and cognition in normal aging and how these changes are impacted by certain health and lifestyle factors. Her previous research has centered on the effects of longitudinal changes in cortisol on medial temporal volume and memory in normally aging individuals. Currently she is working on identifying certain aspects of memory that may be relatively preserved in aging and whether this preservation reflects individual differences in medial temporal lobe function, as well as health and lifestyle. Ashley Lawrence is a second year graduate student in the Clinical Neuropsychology program at the University of Arizona.

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RESEARCH INTERESTS  
The central goal of Adam Lester’s dissertation research is the question of how age-associated changes in neural network processing may contribute to impairments in spatial processing in the elderly. It’s been found that certain cells in cortical areas surrounding the hippocampus show increased firing rates when rats are in a specific location in an environment, and that these locations make up a regularly tessellating grid of equilateral triangles. It’s believed that these cells are involved in integrating information from multiple sensory modalities to determine location, and that this information is passed onto the hippocampus for further processing. Given known impairments in connectivity between hippocampus and its surrounding cortical structures with age, Adam is exploring how these impairments may contribute to changes in local and interregional processing between the hippocampus and surrounding cortical structures during spatial navigation in aged rats.

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RESEARCH INTERESTS
Stephanie Matijevic's research explores the relationship between cognition and the brain's structural and functional integrity in healthy aging. She is particularly interested in examining the role of physiological, lifestyle and genetic factors in moderating the associations between white matter health and cognition in older adults. She has used diffusion tensor imaging to investigate the influence of hypertension and APOE E4 status on age-related changes in white matter integrity. More recently, Stephanie has developed an interest in exploring how functional and structural connectivity changes might underlie differences in memory retrieval strategies between young and older adults.

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RESEARCH INTERESTS
Andrew's previous work investigated sleep disturbances in older adults with mild cognitive impairment and/or a lifetime history of depression by identifying factors that differentiate those with and without these disturbances. In particular, he utilized resting-state fMRI to identify the presence of default mode network abnormalities across sleep measurement modalities in these individuals.

Andrew's current research focuses on identifying relevant vascular risk factors influencing brain structure and function in cognitively intact older adults. Additionally, he is involved in a clinical trial investigating the use of the Ang-(1-7) peptide for preventing and treating cognitive impairment in those undergoing coronary artery bypass graft surgery.

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RESEARCH INTERESTS
Molly Memel's research investigates age-related variability in memory processes including pattern separation/completion, familiarity/recollection, and strategy utilization at encoding and retrieval. In order to understand age-related changes in these processes, I have developed and utilized object recognition, associative memory, and context-shift paradigms for behavioral use and fMRI. Across research paradigms, I placed a strong emphasis on the ecological validity of stimuli in order to understand how object and scene processing might drive some of the cognitive patterns observed during aging. Given the critical contributions of prefrontal and medial temporal regions to associative memory, my work investigates age-related changes in functional activation within these regions that predicts memory performance. Finally, in order to understand how the structural
connectivity between these regions influences memory, I utilize diffusion weighted imaging to examine the relationship between frontotemporal white matter integrity and associative memory.

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**RESEARCH INTERESTS**
Dr. Ryan’s research on the neural basis of memory has focused on understanding the hippocampal processes mediating autobiographical and semantic memory, how memory changes across the adult lifespan, and how those changes relate to brain structure and function. Recent studies using morphometric analyses and diffusion imaging have investigated factors that influence individual differences in age-related cognitive function, including genetic markers, cardiovascular health including obesity and hypertension, and anti-inflammatory drug use. As a clinical neuropsychologist, Dr. Ryan has worked with individuals and families who are coping with chronic and progressive diseases that affect cognitive functioning, including multiple sclerosis, Parkinson’s disease, and Alzheimer’s disease. Dr. Ryan teaches undergraduate and graduate courses in memory, neuropsychology, neuroanatomy, and cognitive neuroscience. She has been very active in mentoring programs at the University of Arizona that encourage women and underrepresented students to pursue a career in science.

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**RESEARCH INTERESTS**
Ariana Stickel investigates the connections between physical health (e.g., body fat), brain structure, and cognition among late middle age and older adults. She also examines how single nucleotide polymorphisms (e.g., the fat mass and obesity gene) moderate such relationships. Ariana uses neuroimaging techniques, such as diffusion weighted imaging and voxel-based morphometry, to study the aging brain. Ariana’s newest investigations aim to characterize brainbehavior relationships among aging Hispanics.
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RESEARCH INTERESTS
I am researching age-dependent and pathological changes in electrophysiological sleep patterns. It has been shown in rats that the same hippocampal place cell sequences during behavior are replayed in subsequent sleep periods, pre-played during preceding sleep periods and moreover, correlate strongly with sleep ripples, short high-frequency neural oscillations found in the hippocampus. These ripples are thought to help send memories from the hippocampus to the cortex for long-term storage and correlate strongly with sleep spindles, long low-frequency cortical oscillations. Given the relationship between memory impairments and sleep disruptions, I am exploring how electrophysiological sleep patterns change in aged rats as well as the LRRK2 transgenic mouse model of Parkinson's Disease.

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RESEARCH INTERESTS
Cindy Woolverton’s current research focus is on social and cognitive factors in aging. Specifically, she is interested in evaluating the impact of social interactions on cognitive performance and social cognition in both older and younger adults. Using intergenerational interactions, she hopes to evaluate how this intervention impacts young adult’s: perceptions of aging; attitudes toward aging; anxiety towards interacting with older adults; and communication skills. Similarly, she hopes to further understand how this type of intervention provides cognitive and social benefits for older adults.
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**RESEARCH INTERESTS**
Dr. Bauer’s research program uses clinical and experimental neurocognitive probes along with structural and functional MRI to evaluate preclinical biomarkers of neurocognitive decline in aging and traumatic brain injury. Novel experimental cognitive probes include a virtual human adaptation of the Morris water maze, and object recognition paradigms thought to be sensitive to dysfunction in perirhinal cortex/anterior temporal lobe memory network. His laboratory is also investigating factors that hasten cognitive decline, including depletion of cognitive reserve, sleep disturbances, and other risk factors operative in the transition from normal aging to dementia. He is best methods for rehabilitation of memory dysfunction and other symptoms after mild/moderate traumatic brain injury with the goal of developing personalized approaches to rehabilitation that can maximize rehabilitation outcomes in individuals with specific structural or functional phenotypes. This work utilizes cognitive rehabilitation and timed aerobic exercise as primary interventions. A final line of research seeks to understand factors that predispose to complicated recovery or chronic symptoms after concussion/mild TBI.

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**RESEARCH INTERESTS**
Dawn Bowers directs the Cognitive Neuroscience laboratory at the Center for Movement Disorders and Neurorestoration. She co-directs (MPI), along with David Vaillancourt, the only predoctoral T32 in the country that is devoted to Interdisciplinary Training in Movement Disorders and Neurorestoration. Historically her laboratory has used various tools (startle, pupillometry, ERP, computational modeling, face digitizing, advanced statistical approaches) to better understand mechanisms that underlie emotional and cognitive changes in age related neurodegenerative disorders. One ongoing research emphasis is the development of hypothesis driven methods for enhancing emotional reactivity in blunted Parkinson patients via a vis emotion regulation and ERP metrics. A second line of research involves mechanisms underlying poor performance of individuals with cerebellar abnormalities (essential tremor) on classic emotional neuroscience tasks. Third, along with other McKnight investigators she is examining the validity of novel NIR stimulation for enhancing memory in older adults.
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RESEARCH INTERESTS
Dr. Bizon’s research program is broadly focused on understanding brain aging and its implications for cognitive function. Specifically, her laboratory employs an integrative approach that combines sensitive cognitive assessments with molecular, pharmacological and optogenetic methodologies. Recent work has uncovered disruptions in both glutamatergic and GABAergic signaling in the aged brain that contribute to impairments in cognitive flexibility, working memory and decision making (for example, Banuelos et al., 2014; McQuail et al., 2016, Beas et al., 2017). Dr. Bizon regularly reviews for the National Science Foundation and the National Institutes of Health and is a Senior Editor at Neurobiology of Aging. She also currently serves as the Associate Chair of Department of Neuroscience and as the Chair of the Outreach Committee for the McKnight Brain Institute at the University of Florida.

Sara N. Burke, PhD
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RESEARCH INTERESTS
Although a large proportion of older adults experience cognitive decline that interferes with their quality of life, understanding the neurobiology of these impairments in advanced age remains elusive. A significant barrier to uncovering the neurobiology of age-related cognitive decline is that these processes are distributed throughout the brain and a fundamental gap exists in our understanding of how different brain structures interact over the lifespan. The long-term goal of my laboratory’s research is to determine the alterations in network-level interactions that underlie cognitive impairment in advanced age. Current projects are focused on uncovering mechanisms of age-related impairments in sensory discrimination across modalities, identifying age-associated changes in medial temporal lobe-prefrontal functional connectivity that contribute to memory deficits, and testing whether diet can globally improve neural network function in old animals. To answer these questions, we are integrating neurophysiology and anatomy with behavioral analysis in order to determine the extent that age-related memory impairments manifest from dysfunction in inter-regional communication. Our rationale is that by elucidating how aging influences systems-level dynamics, we will be better positioned to develop interventions that broadly improve cognition.
Ronald Cohen, PhD, ABPP, ABCN
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RESEARCH INTERESTS
Cognitive Aging and Memory Clinical Translational Research (CAM) is a multidisciplinary research program focused on factors that influence cognitive aging that will integrate neurocognitive, neuroimaging, and laboratory biomarker methods. A primary goal of this center is clinical translational in nature with a focus on translating neuroscience findings from the laboratory to clinical application for both improvement assessment and intervention. Dr. Cohen has extensive background in neuroimaging and the neuroscience of attention-executive functions, and strong record of research involving the use of functional and structural neuroimaging methods in studies of age-associated brain disorders and neurodegenerative brain disorders. Dr. Cohen’s CAM laboratory has been conducting human studies employing multimodal neuroimaging in conjunction with MRS to examine pathophysiological changes occurring in normal and pathological brain aging, and also secondary to risk factors including obesity, diabetes, heart disease, viral infections (e.g., HIV), and neurodegenerative disease such as AD.

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RESEARCH INTERESTS
My long-term RESEARCH INTERESTS involve learning and memory and a motivation in aging. As a graduate student, my thesis work was on the role of estrogen signaling in Autism Spectrum Disorder (ASD). I mastered animal behavior, animal breeding, rodent surgical techniques, western blotting, and qRT-PCR. My project yielded the first paper that found a reduction in mRNA and protein levels of estrogen receptor beta in human prefrontal cortical tissues of individuals with ASD as compared to age- and gender-matched control subjects. I also developed a novel model of ASD, which induces endoplasmic reticulum stress in rodents, which is known to be elevated in individuals with ASD. My graduate training provided me with an excellent background in modeling neurodevelopmental and neuropsychiatric disorders in rodents. For my postdoctoral training I am building upon this foundation and incorporating new molecular and behavioral techniques.
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RESEARCH INTERESTS
I have a longstanding interest in understanding the mechanisms underlying the observed interindividual variability of the complex, multidimensional pain experience. This area of interest stems from my previous research training in the fields of Epidemiology, Neuroscience, and Immunology within the context of pain research. During my doctoral work, I studied brain metabolites associated with pain phenotype profiles in persons with spinal cord injury combining Magnetic Resonance Spectroscopy (MRS) and Quantitative Sensory Testing (QST). Consistent with preclinical research, our studies in humans supported that glial activation were specifically associated with greater clinical and experimental pain after spinal cord injury, and not just to spinal cord injury alone. During my post-doctoral training, I became familiar with experimental methods to assess endogenous pain modulation and systemic inflammation in older adults. My K01 Career Development Award has allowed me to set-up my laboratory within the University of Florida to study pain in older individuals with additional training in cognitive aging neuroscience. Currently, I am investigating pain as a risk factor for cognitive decline in our older population.

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RESEARCH INTERESTS
Nick DiCola is a first-year graduate student working in the labs of Dr. Sara Burke and Dr. Andrew Maurer. His primary RESEARCH INTERESTS are in the inter and intra regional networks of the hippocampus and how communication within these networks change as a function of aging. The current focus is on both lateral entorhinal and dorsal CA1 connections as well as dorsal CA3 to CA1 connections. The primary techniques he uses is electrophysiology recordings with multishank, moveable probes.

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RESEARCH INTERESTS
Dr. Foster is the Evelyn F. McKnight Chair for Research on Cognitive Aging and Memory and Professor of Neuroscience and the Genetics and Genomics Program at the University of Florida.
Dr. Foster’s research program utilizes a combination of behavioral characterization with biochemical, molecular, and electrophysiological techniques to obtain a vertically integrated perspective on neural aging, from the molecular to the cognitive level. Electrophysiological techniques, including patch-clamp recording, are employed to investigate the relationship between age-related cognitive decline and altered synaptic transmission and synaptic plasticity. Techniques for next generation sequencing of RNA and DNA methylation are employed to test hypotheses of gene regulation in resiliency in the face of aging, inflammation, stress, and changing hormonal milieu. Finally, studies in humans and animal models examine miRNA from plasma exosomes as markers of aging and disease.

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RESEARCH INTERESTS
Alzheimer’s disease, amnestic mild cognitive impairment, novel behavioral biomarkers, imaging, comparative neuropsychology, behavioral neuroscience

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RESEARCH INTERESTS
Interests include the application of Diffusion Weighted Imaging tractography to the study of white matter, biological variables, and neurocognitive function in various clinical populations and successful aging. Is also interested in further developing multimodal neuroimaging approaches with the addition and integration of resting-state fMRI and Magnetic Resonance Spectroscopy into current DWI tractography skillset.

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RESEARCH INTERESTS
The focus of Abbi’s research is on identifying mechanisms of decline in network-level interactions across the brain that explain loss of cognitive function with advancing age and ways to treat these declines. One of the major challenges in treating age-related cognitive decline is that distinct brain regions manifest deficits in different ways. For example, both hyperactivity and declines in excitation of neurons are observed across the aged brain. Thus, effective therapeutic strategies need to be able to globally tune brain networks. What is ubiquitous to the aging brain is deficits in neuronal glucose metabolism. Therefore, Abbi’s dissertation project is aimed at
developing a potential therapeutic intervention to ameliorate age-related cognitive decline through the implementation of a ketogenic diet. This diet contains a macronutrient profile that is high in fat and low in carbohydrates in order to shift the main fuel source away from glucose towards the utilization of ketone bodies, which is hypothesized to reinstate the balance between inhibition and excitation across the brain. Abbi is evaluating the efficacy of the ketogenic diet at multiple levels of analysis that include behavior, physical performance, changes in body composition, transporter protein quantification and neuronal activity via immediate early gene expression.

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**RESEARCH INTERESTS**
The broad goal of Caesar’s research is to understand the neural basis of age-related alterations to decision making and executive functions within the basolateral amygdala and medial prefrontal cortex, and to use this information to design effective clinical interventions that will promote positive cognitive outcomes in older adults. Specifically, Caesar’s experiments in Dr. Bizon’s laboratory have been designed to test the broad hypothesis that shifts in the balance of excitation and inhibition are the underlying cause of age-related alterations to decision making and executive function. Most recently, Caesar has been instrumental in establishing in vivo optogenetic tools in Dr. Bizon’s laboratory, which he is using to define the contributions of the basolateral amygdala (BLA) to cost-benefit decision making. Specifically, by taking advantage of the precise temporal specificity offered by optogenetic inactivation, Caesar’s experiments have defined two distinct roles of the BLA in intertemporal choice, and shown that these roles differ as a function of age. Other ongoing experiments are probing the cellular/molecular alterations in aged BLA that might contribute to these age differences. Completion of these studies should help elucidate both cellular and circuit contributions of the BLA to age-associated changes in decision making.

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**RESEARCH INTERESTS**
My long term research goal is to develop medical devices and improve people’s quality of lives. I am a biomedical engineer by training, and have been involved in computational modeling studies, specifically using finite element modeling to predict the effects of biomedical devices. Currently, I am involved in phase II and III clinical trials to investigate the coupling use of cognitive training and a non-invasive brain stimulation called tDCS to remediate cognitive decline in healthy older adults.
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RESEARCH INTERESTS
Sarah Johnson is a Postdoctoral Research Associate in the laboratory of Dr. Sara Burke at the University of Florida. The overarching goal of her research is to determine neural mechanisms underlying memory maintenance and the impact of aging on these processes. In particular, she has developed behavioral tasks to assess age-related changes in the discrimination of similar stimuli, and in sensitivity to novel stimuli. Her approach involves integrating multi-site in vivo neurophysiological recordings and cross-region mapping of immediate early gene activity with these behavioral tasks. Her research is supported by a McKnight Brain Research Fellowship.

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RESEARCH INTERESTS
The overall goal is in the pursuit of fundamental knowledge of mechanisms underlying prefrontal cortex (PFC) and hippocampal-mediated cognition over the lifespan, as well as the application of that knowledge to promote healthy and successful aging, while reducing the encumbrances of cognitive aging and age-related neurodegenerative diseases. Toward this goal, a central focus of my research involves the role of various interventions such as environmental enrichment, exercise, and viral-vector mediated upregulation of target proteins in restoring/improving age-associated impaired learning and memory, synaptic plasticity, and cell excitability. My work has helped to define age-related changes in the response of G-protein coupled cholinergic, glutaminergic, and estrogen receptors on cell excitability and synaptic plasticity in the senescent brain. Recent work highlighted the link between age-associated oxidative stress and a decrease in N-methyl-D-aspartate (NMDA) receptor function; what many believe underlie a decline in PFC-hippocampal-mediated cognition including spatial memory and executive function. Dr. Kumar also studies the effects of estrogen on hippocampal function across the lifespan, and our results indicate that estrogen rapidly increases neuronal excitability, decreases AHP, and augments the strength of synaptic transmission. Finally, my research will determine upregulation of glutamatergic neurotransmission on hippocampal and PFC-mediated synaptic function during senescence and delineate the mechanisms that contribute to impaired cognition over the life span.
My long-term goal is to bridge cutting edge basic science and clinical/treatment focused research. The goal of this research proposal is to improve our understanding of autonomic function and modulations of learning and memory. In particular, I am investigating transcutaneous vagal nerve stimulation (tVNS) as a novel treatment for amnestic mild cognitive impairment (aMCI) to enhance cognition both in healthy individuals as well as amnestic mild cognitive impairment. tVNS is an exciting approach based on our understanding of the neurophysiological basis of memory and cognitive function, as well as pilot data. I look forward to extending our knowledge of this mechanistic impact of this innovative tool, laying a foundation for future clinical applications. I also have DARPA funding to further elucidate the neural circuit impacted by vagal nerve stimulation, providing complementary animal model data for the development of this approach. Apropos the mission of the Cognitive Aging and Memory Clinical Translational Research Program, my funded work on novel potential preventative treatments for aMCI (i.e., prodromal Alzheimer’s) continues to show translational promise.

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RESEARCH INTERESTS
Dr. McQuail is a Postdoctoral Fellow in the Department of Neuroscience at the University of Florida. He earned his B.S. with highest honors in Neuroscience from the College of William & Mary and his Ph.D., also in Neuroscience, from Wake Forest University. Broadly, his work examines age-related changes to excitatory and inhibitory signaling in the frontal and medial temporal lobes that contribute to distinct forms of memory impairment. Ongoing work examines how experiential and physiological factors accumulate over the lifespan to precipitate molecular and behavioral changes, with a specific focus on psychogenic stress and glucocorticoid signaling. His training has been supported by a number of fellowships including an appointment to Wake Forest's T32 training grant from the National Institute on Mental Health, individual predoctoral (F31) and postdoctoral (F32) fellowships from the National Institute on Aging and a postdoctoral fellowship from the UF McKnight Brain Institute.
My research focus is on individual differences in age-related changes to cognitive and social-cognitive function, with an emphasis on mechanisms that may provide interventional opportunities. To conduct my research, I integrate neuroimaging and behavioral and affective research methods with autonomic nervous system measures, genetics (oxytocin receptor polymorphism), salivary endocrine measures (cortisol and testosterone) and in vivo measurement of concentrations of \( \gamma \)-Aminobutyric acid (GABA), the principal inhibitory neurotransmitter, using magnetic resonance spectroscopy (MRS).

My recent work measuring cortical GABA concentrations in a healthy aging population extends the previous use of MRS, and was the first exploration of the relationship of cortical GABA concentrations to general cognitive function. Previous reports had provided evidence of decreasing GABA concentrations during adulthood. It had been unclear, however, how age-related decrements in cerebral GABA concentrations contribute to cognitive functioning, or whether previously reported declines in cerebral GABA concentrations persist during healthy aging.

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RESEARCH INTERESTS
Dr. Smith’s interests include lifestyle modifications to reduce the risk for mild cognitive impairment and dementia; cognitive functions on which behavioral interventions can build, such as procedural memory, in healthy elderly as well as in patients with mild cognitive impairment and dementia; and patient preferences in treatment outcomes for patients with mild cognitive impairment and dementia.

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RESEARCH INTERESTS
I have conducted clinical neuroscience research that has incorporated neuroimaging, cognitive and autonomic data in the study of cerebrovascular disease (vascular cognitive impairment and vascular dementia), heart failure and traumatic brain injury including both NIH and VA funding sources. Current funded research includes NIH support to understand the role of improvement in cardiac output in patients with heart failure on brain healthy, cerebral hemodynamics, and cognitive function, NIA support to determine the effects of Transcutaneous Vagal Nerve Stimulation (tVNS) on cognition in people with amnestic mild cognitive impairment in the Alzheimer’s spectrum, VA funding to determine autonomic mechanisms in the impact of mild traumatic brain injury on the development and presentation of Post Traumatic Stress Disorder (PTSD), and VA funding to determine the effects of tVNS on sleep architecture and daily emotional functioning in people with PTSD.
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RESEARCH INTERESTS
Cognitive function declines as we age. As our thinking and memory skills decline, the rate of functional dependence, mortality, and acute illness requiring hospitalization increases. Increased rates of cognitive and functional decline associated with dementia represent a growing concern in light of our rapidly aging population. There are currently a paucity of effective treatments for preventing dementia or recovering age-related cognitive decline.

My work demonstrates that combining treatments like cognitive training with non-invasive brain stimulation facilitates neural plastic response, improves cognitive abilities (specifically working memory, attention, and speed of processing), and leads to long-term improvement. My lab investigates novel methods for improving brain metabolism, neuroplasticity, and cognitive function. Collectively, my work aims to slow or reverse the effects of cognitive aging and slow the onset of dementia using non-invasive and minimally invasive approaches. In addition, the extension of my work to chronic pain and mobility decline in older adults represents an exciting new arm of my intervention work.

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RESEARCH INTERESTS
Dr. Yegla employs a system-levels approach to examining age-related prefrontal decline, incorporating biochemical, molecular, cellular, circuit-level, and behavioral techniques. During predoctoral training, Dr. Yegla utilized a variety of behavioral paradigms in conjunction with AAV technology and high temporal resolution in vivo recordings of cholinergic and glutamatergic signaling for a multi-level approach in investigating the impact of aging on neural function and cognitive processing. More specifically, she examined the impact of multiple factors, including beta amyloid and neurotrophic signaling, on corticopetal cholinergic function in normal and pathological aging. Since joining Dr. Foster’s lab, her postdoctoral research expands upon these age-related vulnerabilities of cortical and subcortical circuits and their impact on cognitive capacity, specifically in relation to chronic peripheral inflammation and its corresponding disruption of neural and cognitive processes related to prefrontal function. Currently, her primary area of interest involves evaluating contributing factors of resiliency in aging and discovering new therapeutic interventions for its modulation. Age-related shifts in cellular metabolism, its impact on synaptic plasticity, and the mitigating capacity of interventions, such as specialized diets and exercise, are currently being investigated. In addition, next generation sequencing of exosome contents is being utilized to assess exosomes as biomarkers, as well as potential
therapeutic tools in aging mammals. Overall, Dr. Yegla’s RESEARCH INTERESTS encompass the examination of age-related vulnerabilities to shifts in inflammation, metabolism, and neural functionality, with the intention of diminishing age-related cognitive decline and bolstering resilience against pathological aging.
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RESEARCH INTERESTS
Noam Alperin came to the University of Miami in May 2009 from the University of Illinois at Chicago. He obtained his Graduate Degree from the University of Chicago's Medical Physics program. Dr. Alperin's research focuses on blood and CSF flow dynamics using flow sensitive MRI techniques. A primary aim of the research is to provide noninvasively, important physiologic parameters among which are cerebral blood perfusion and intracranial pressure. These parameters play an important role in a wide range of neurological problems, including hydrocephalous and stroke. Since joining the University of Miami, Dr. Alperin's Advance Image Processing laboratory is working closely with the Evelyn F. McKnight Center for Age Related Memory Loss, using different MRI modalities to characterize and quantify morphologic and physiologic changes in the brain associated with aging as well as the coupling between age related brain tissue volume loss and cerebral blood flow decrease.

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RESEARCH INTERESTS
Dr. Blanton received her PhD in Human Genetics from Virginia Commonwealth University/Medical College of Virginia. She obtained post-doctoral training in Biostatistics (University of Pittsburgh) and Population Oncology (Fox Chase Cancer Center). Her primary research has focused on the mapping of genes for Mendelian and complex diseases; she has been instrumental in studies identifying over twenty genes/loci for Mendelian disorders. Stroke and the underlying genetics of its risk factors, hearing loss, retinal diseases, skeletal dysplasias, cleft lip/palate, and clubfoot are among the diseases which she currently studies. She collaborates with Drs. Sacco, Wright and Rundek to identify genetic factors influencing white matter and cognition and their relation to ageing. In addition, she has been involved in developing and implementing genetic education materials for Federal and appellate level judges and science writers in an ELSI sponsored project. Dr. Blanton is the Associate Director of Collaborations and Compliance in the John P. Hussman Institute for Human Genomics. She is a Professor in the Dr. John T. Macdonald Foundation Department of Human Genetics.
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RESEARCH INTERESTS
Dr. Camargo’s interests include epigenetic mechanisms of cognitive dysfunction, identification of biomarkers for prediction of cognitive decline and the therapeutic use of stem cells in primary neurodegenerative disease.

Dr. Camargo did his undergraduate studies at the Massachusetts Institute of Technology (MIT,) where he majored in Brain and Cognitive Sciences as well as in Music. He conducted research into the molecular mechanisms of learning and memory, including a year under the tutelage of Nobel Laureate Dr. Susumu Tonegawa. He graduated from medical school at the Cleveland Clinic Lerner College of Medicine of Case Western Reserve University. He completed an internship in surgery at Washington Hospital Center where he was awarded the "Silvero Cabellon" Award for best performance by a junior resident by the Department of Vascular Surgery. He then completed his Neurology residency training at the University of Miami in 2017. He is currently a research Fellow in Cognitive Neurology at the University of Miami Evelyn F. McKnight Brain Institute.

Michelle Rae Caunca
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RESEARCH INTERESTS
Michelle Caunca’s aspires to be an academic neurologist and epidemiologist studying cognitive aging and translating epidemiological findings into public health and clinical practice.

She received her BS. In Neurobiology with a minor in Psychology at the University of California, Irvine, graduating cum laude with Honors in Biological Sciences and Campuswide Honors. She worked in the The 90+ Study at UCI where she published her Honors thesis on amyloid PET imaging and cognitive performance in the oldest-old in the Journal of Undergraduate Research. Michelle is currently in the MD/PhD Program at the University of Miami Miller School of Medicine, pursuing her PhD in Epidemiology. Under the mentorship of Tatjana Rundek MD, PhD and Clinton B. Wright, MD, MS, she was awarded Ruth L. Kirschstein National Research Service Award Fellowship (F30) to study regional brain MRI markers of cognitive aging in the Northern Manhattan Study (NOMAS). She is also completing a dissertation on multi-level psychosocial and contextual determinants of brain aging in diverse populations under the mentorship of Adina Zeki Al Hazzouri, PhD and Tatjana Rundek, MD, PhD, using datasets from NOMAS, the Coronary Artery Disease Risk in Young Adults study, and Health and Retirement Study.
Kunjan R. Dave, PhD  
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RESEARCH INTERESTS  
Dr. Dave received his PhD in Biochemistry in 2000 from the M. S. University of Baroda, India. During his PhD training he worked on several research projects including secondary complications of diabetes, Alzheimer’s disease and drug toxicity among others. From 1999 to 2000 Dr. Dave served at the Zandu Pharmaceutical Works in Mumbai, India as a Biochemist, where he participated in a drug development program. The goal of Dr. Dave’s current research is to study potential signaling pathways responsible for neuronal death in neurodegenerative diseases, especially cerebral ischemia. Investigation of intracellular signaling pathways may lead to the development of novel therapies for patients with neurodegenerative diseases and stroke. Dr. Dave’s research also investigates the effect of cerebral ischemia on cognitive and motor functions in young and old rats.

Susan Fox-Rosellini, MBA  
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INTERESTS  
Susan has 30+ years experience and a proven track record in developing new business and clients, new markets and new products and improving the revenues of for-profit and not-for-profit businesses. She joined UM Neurology in 2007 and after a year off to develop the Foundation for Miami Jewish Health System has rejoined the Department as the Executive Director for Development and Marketing. Prior to UM, Susan worked as a development leader with the Family Resource Center, the Coconut Grove Playhouse and the Miami City Ballet. She also has experience in domestic and international business development for for-profit organizations.  

Susan has been very active in Miami-area organizations including the Miami City Ballet, where she served as President of the Board of Trustees, the Coconut Grove Playhouse, the Jackson Foundation Board and has served as Chair of the Little Havana Community Partnership. In 2008 she went back to School at UM and got her M.B.A in Health Policy and Administration. Susan has been an active patron of the arts, particularly ballet, and loves old movies, about which she has written a book. She speaks French and Spanish.

Sarah Getz, PhD  
Neuropsychology Postdoctoral Fellow  
Department of Neurology, Division of Neuropsychology  
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Sarah Getz, PhD, is a postdoctoral fellow in the Division of Neuropsychology, in the Department of Neurology of the University of Miami, Miller School of Medicine. Dr. Getz earned her doctorate in psychology with a specialization in cognitive neuroscience at Princeton University in 2013. Her dissertation research focused on the role of cognitive control in decision making processes. She completed her clinical training in Boston, including advanced externships at Harvard Medical School, and her clinical internship at the Miami VA Medical Center. Current lines of clinical research include investigations into the role of lifetime emotional factors in developing the frailty syndrome, cognitive and socio-affective correlates of scam susceptibility and deception, and cognitive and emotional factors in mTBI.

Hong Jiang, MD, PhD
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RESEARCH INTERESTS
As a neuro-ophthalmologist at the Bascom Palmer Eye Institute, Dr. Jiang specializes in the diagnosis and treatment of various neuro-ophthalmologic disorders, such as vision loss due to brain tumor or dementia, optic neuritis and double vision. In the Department of Neurology, Dr. Jiang provides expertise in the evaluation and treatment of various neurologic diseases such as memory disorders, headaches, spine diseases and Multiple Sclerosis.

Dr. Jiang’s RESEARCH INTERESTS is to study the ocular microvascular dysfunction in ocular and central nervous system diseases, such as dry eye, dementia and multiple sclerosis. She has multiple publications in ocular microvascular function studies. She is interested in studying the vascular pathway in the pathogenesis of Alzheimer’s disease. With support from both the McKnight Brain Institute and North American Neuro-Ophthalmology society (NANOS), she and her team at Bascom Palmer Eye Institute recently found that decreased retinal microvascular network density and blood flow volume in patients with Alzheimer’s disease compared to normal controls.

Bonnie E. Levin, PhD
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RESEARCH INTERESTS
Dr. Levin is a neuropsychologist whose research examines neurocognitive and affective changes associated with neurodegenerative disease and the normative aging process. Her work examines the role of cardiometabolic risk factors in cognitive decline. Another focus has been the interrelationship between behavioral and motor symptoms in Parkinson’s disease and the neural circuitry underlying memory and age related cognitive change. Her current work is aimed to advance our understanding of frontal striatal circuit function in cognition and to generate data that will improve our knowledge of key clinical parameters associated with differential rates of cognitive decline. Current projects include: examining which components of the metabolic syndrome predict cognition, identifying imaging and clinical correlates of white matter changes associated with the aging process and linking structural and metabolic markers underlying different symptom profiles in neurodegenerative disease.

Katalina Fernández McInerney, PhD
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RESEARCH INTERESTS
Dr. McInerney’s research focuses on intervention and rehabilitation strategies for neurologically compromised individuals along with the understanding and promotion of healthy aging. She is currently engaged in research examining neuropsychological and affective changes associated with frailty in older age and the effect of moderate and high intensity exercise on sedentary individuals. Additionally, she is involved in several studies examining decision making, including identifying markers of competency in healthy cognitive aging. She is working on a screening questionnaire to assess financial and medical capacity in Hispanic and non-Hispanic individuals with mild cognitive impairment and the oldest old. Her prior research focused on the neurocognitive correlates of hazard perception and probabilistic learning in healthy aging older adults.

Stacy S. Merritt, MA, CCRP
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RESEARCH INTERESTS
Stacy Merritt, MA received her Master’s Degree in Gerontology from the University of South Florida. She has been involved in research and policy aimed at improving quality of life for the aging population and culturally competent care for the minority aged. She was a Program Coordinator for the Florida Department of Elder Affairs (DOEA) Elder Abuse Prevention Program and for the Central and North Florida Chapter of the Alzheimer’s Association. At the University of Florida’s Department of Neurology, she was the Assistant Director of Clinical Trials overseeing research on neurological disorders including a post-mortem DBS brain bank. As the Research
and Administration Director for the Evelyn F. McKnight Brain Institute, she works with research projects involving normal cognitive and memory changes in aging as well as pathological changes.

Miguel A. Perez-Pinzon, PhD
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RESEARCH INTERESTS
A major emphasis in our group is directed towards understanding the mechanisms of neuroprotection by ischemic preconditioning (IPC) against cerebral ischemia (as elicited by a stroke or cardiac arrest). Our laboratory is fully engaged in defining how these signaling pathways protect neurons against cell death. We are currently studying how these pathways alter synaptic plasticity and ameliorate mitochondrial function.

- Another area of emphasis in our group is defining mechanisms by which some signaling pathways alter synaptic function following cardiac arrest. Cardiopulmonary arrest remains one of the leading causes of death and disability in the U.S.A. Cardiac arrest with its consequent disruption of blood flow sets in motion a cascade of cellular derangements that result in brain damage.

- A third area of emphasis in our group is the definition of the mechanisms of mitochondrial dysfunction following cerebral ischemia. It has been postulated that delayed cell death after brain ischemia may result from two different mechanisms: apoptosis and/or necrosis. In both pathways however, mitochondrial dysfunction appears to play a pivotal role. We are currently investigating the signaling pathways that lead to mitochondrial dysfunction following cerebral ischemia.

Alberto Ramos, MD, MSPH, FAASM
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RESEARCH INTERESTS
Dr. Ramos research is aimed at the intersection between sleep disorders, cerebrovascular disease and neurocognitive aging in population based studies and serves as a primary consultant for Sleep Research. Dr. Ramos obtained an R21 through the National Institutes of Aging to evaluate sleep phenotypes, neurocognitive decline and incident dementia in HCHS/SOL. He was also the site-PI for the Sueño study-Sleep as a Risk Factor for Disease in HCHS/SOL—at the Miller school of Medicine. This NHLBI ancillary study evaluated the determinants of abnormal sleep patterns with actigraphy and their effect on cardiometabolic diseases. Dr. Ramos was the principal investigator of an HCHS/SOL ancillary study evaluating sleep apnea and cerebral hemodynamics as an early marker of cerebrovascular risk at the Miami field site. This study was supported by a K12 mentored award from the Clinical Translational...
Research Institute at the Miller School of Medicine. He is a member of American Academy of Sleep Medicine and American Academy of Neurology.

**Tatjana Rundek, MD, PhD, FANA**
Scientific Director, Evelyn F. McKnight Brain Institute
Professor of Neurology, Epidemiology and Public Health
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**RESEARCH INTERESTS**

Dr. Rundek is a stroke neurologist, clinical researcher and principal investigator of several NIH/NINDS funded R01 grants on genetic determinants of carotid atherosclerosis and stroke. She participates in large stroke genetic consortia including the NINDS Stroke Genetic Network and International Stroke Genetic Consortium. Dr. Rundek was a Fulbright Scholar and the recipient of the research awards from the Hazel K. Goddess and the Dr. Gilbert Baum Funds. Dr. Rundek serves on the editorial boards of several scientific journals including Stroke, Neurology, Journal of Ultrasound in Medicine and Cerebrovascular Diseases. She has published over 210 scientific publications, editorials, reviews, and book chapters. She is a fellow of the American Neurological Association, a member of the American Heart Association and American Academy of Neurology. She is past President of the Neurosonology Communities of Practice of the American Institute in Ultrasound in Medicine, the largest professional medical ultrasound organization in the U.S. Dr. Rundek serves on the Intersocietal Accreditation Commission (IAC) Vascular Testing Board of Directors, a national organization that accredits clinical echocardiography, nuclear/PET, MRI, CT and Dental laboratories and carotid stenting programs.

**Ralph L. Sacco, MD, MS, FAHA, FAAN**
Chairman, Department of Neurology
Olemberg Family Chair in Neurological Disorders
Miller Professor of Neurology, Public Health Sciences, Human Genetics and Neurosurgery
Executive Director, Evelyn F. McKnight Brain Institute
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**RESEARCH INTERESTS**

Dr. Sacco is the Principal Investigator of the 26-year NINDS-funded Northern Manhattan Study, the Florida Puerto Rico Collaboration to Reduce Stroke Disparities, and the Family Study of Stroke Risk and Carotid Atherosclerosis, as well as co-investigator of multiple other NIH grants. He has also been the Co-Chair of international stroke treatment and prevention trials. Dr. Sacco
has published extensively in the areas of stroke prevention, treatment, epidemiology, risk factors, vascular cognitive impairment, human genetics and stroke recurrence. His research has also addressed stroke and vascular disparities. He has lectured extensively at national and international meetings. He served on the National Academy of Medicine panel on Preventing Cognitive Decline and Dementia, 2017.

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RESEARCH INTERESTS
Dr. Sun's research activities have been primarily focused on Alzheimer’s disease and related disorders. Her earlier work includes characterization of biochemical properties of tau protein in the axonal transport and roles of amyloid protein in Alzheimer’s disease. She is one of the earliest researchers to establish quantitative amyloid ELISA in the field. Her long-term efforts are dedicated to identifying biomarkers for the diagnosis of Alzheimer’s disease. Currently, she is working on the role of CSF synaptic proteins in cognitive function. She has been invited to be a reviewer for multiple journals on Alzheimer’s research. Dr. Sun provides clinical care to patients with cognitive disorders at the Memory disorder clinic of the University of Miami. She is also involved in educational programs for medical students, neurology residents, and is the Education Director for the Evelyn F. McKnight Brain Institute at the University of Miami.

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RESEARCH INTERESTS
Dr. Wang is the Scientific Co-Director of Experimental Imaging Laboratory for the Bascom Palmer Eye Institute. After MD training in China, Dr. Wang obtained his PhD in vision science at University of Waterloo, Waterloo, Canada. He came to the University of Miami in July, 2006 from the University of Rochester, Rochester, NY. Dr. Wang has established the advanced ophthalmic imaging laboratory at the Bascom Palmer Eye Institute and is working closely with a group of neuro-ophthalmologists to study vasculature in the eye and neurological disorders. His research focuses on imaging microvasculature and microstructure of the eye as a window of the central nerve system. Currently, he and his collaborators in the Evelyn F. McKnight Center for Age Related Memory Loss are working on ocular microvascular dysfunction in age-related dementia. The aim of the study is to determine whether microvascular dysfunction plays a role in age related memory loss.