Annual Report

2016

David G. Standaert, M.D., Ph.D.
Professor and Chair of Neurology
John N. Whitaker Endowed Chair in Neurology
Interim Director, Evelyn F. McKnight Brain Research Institute

Erik D. Roberson, M.D., Ph.D.
Associate Professor of Neurology and Neurobiology
Patsy W. and Charles A. Collat Endowed Professor of Neuroscience
Director, Alzheimer's Disease Center
Co-Director, Evelyn F. McKnight Brain Research Institute
Co-Director, Center for Neurodegeneration and Experimental Therapeutics

The University of Alabama at Birmingham
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Annual Report
McKnight Brain Research Foundation
Report Period: 2016
Institution: The Evelyn F. McKnight Brain Institute at
The University of Alabama at Birmingham

INSTITUTE DIRECTOR’S OVERALL REPORT

ANNUAL REPORT
2016
INSTITUTE OVERALL

McKnight Brain Research Foundation Report
Evelyn F. McKnight Brain Institute
The University of Alabama at Birmingham

This report provides an overview and summary of the activities and accomplishments for 2016 of The University of Alabama at Birmingham (UAB) Evelyn F. McKnight Brain Institute (MBI) as a whole. The first section is an executive summary prepared according to the suggested format provided by the McKnight Brain Research Foundation (MBRF). The second section is an overall list of the investigators of the UAB MBI. In the third section, selected UAB MBI Investigators have prepared an individual annual report for 2016, which is in a shortened and abbreviated format and includes scientific achievements, publications, awards, and collaborations. The appendices include copies of referenced documents in the summary.

Overview

Highlights for the past year for the Evelyn F. McKnight Brain Institute at UAB include:

- David Standaert, M.D., Ph.D., was appointed interim director of the McKnight Brain Institute by Dr. Selwyn Vickers, Senior Vice President and Dean of the School of Medicine. Dr. Standaert is the John N. Whitaker Professor and Chair of Neurology and the Director of the Division of Movement Disorders. He is a translational neuroscientist with broad interests in aging and neurodegenerative disease. He was the founding Director of the UAB Center for Neurodegeneration and Experimental Therapeutics, and now leads one of the 20 largest departments of neurology in the U.S., with about 70 primary faculty. The department is responsible for a high volume of clinical care, provided through nearly 38,000 outpatients and 2,700 inpatient admissions a year. It also has a major role in clinical and translational research, with over $20M in annual research funding. The UAB Department of Neurology is ranked among the top 25 neurology departments for NIH funding. UAB has been listed among the 50 “Best Hospitals for Neurology and Neurosurgery” by *U.S. News and World Report* for each of the last three years. In addition, Dr. Standaert is Chairman of the Scientific Advisory Board of the American Parkinson Disease Foundation, a member of the Scientific Advisory Board of the Michael J. Fox Foundation for Parkinson Research, and a member of the Board of Directors of the American Neurological Association.

- Dr. Erik Roberson continues in his role as Co-Director of the UAB MBI. Dr. Roberson is the Patsy W. and Charles A. Collat Endowed Professor of Neuroscience, Director of the Alzheimer’s Disease Center, and Co-Director, Center for Neurodegeneration and Experimental Therapeutics.

  The Roberson lab studies the neurobiology of age-related cognitive changes, especially Alzheimer’s disease and frontotemporal dementia (FTD), using mouse models to understand the cellular and molecular mechanisms of these disorders and identify new therapeutic strategies. Dr. Roberson is active in clinical research, patient care, leading clinical trials, and caring for patients with memory disorders and dementia. As a physician-scientist working at the interface between basic science animal model studies and human clinical research, Dr. Roberson helps focus the translational research of the MBI.

- There is a great deal of excitement about the McKnight Brain Aging Registry (MBAR) study. Recruitment and the data acquisition phase of the project are underway. Throughout this year, much effort was been invested by many individuals to prepare this multi-site study with many modalities of data. The protocol involves two visits at which behavioral testing (neuropsychological testing and other behavioral tests including the NIH toolbox) is performed. During one of these visits, blood is acquired from the participants. On the third visit, the participants undergo an extensive MRI battery. The study has a massive number of moving parts, including organizing neurologists to be available on time for participants, blood draws, recruiting potential participants, running MRI scans, and quality checking all the data. This machinery, which took great care to build, is running smoothly and recruiting is on schedule, meeting the goal of one new participant per week.

  The MBAR study will provide tremendous opportunities for learning more about cognitive aging, and UAB MBI investigators have already begun planning ways to leverage the study. Dr. Erik Roberson is exploring partnerships with the UAB Alzheimer's Disease Center's program that would allow for longitudinal follow-up of MBAR participants, as well as neuropathological examination of their brains at death. Dr. Kristina Visscher and Dr. Karlene Ball have submitted an R01application that would support a Phase III study of cognitive enhancement protocols on activities of daily living in MBAR participants. Additional studies are in the planning stages and involve strong collaborations across the MBRF sites.

- The new Civitan International Neuroimaging Laboratory (CINL) opened on the first floor of UAB Highlands Hospital in a newly renovated 5000 sq. ft. suite. It houses a Siemens Prisma 3T whole body scanner for structural and functional brain and body imaging, MRI preparation rooms and interview rooms for patient monitoring and testing, and a fully-equipped experimental suite for behavioral and physiological recording. Research equipment is housed in a dedicated room adjacent to the scanner room with a dedicated research penetration panel. The Siemens MAGNETOM Prisma MRI Scanner offers a 3T whole body MRI platform for the highest quality MRI research. UAB's Prisma is configured for neuroimaging with a 64 channel RF system and spectroshim spectroscopy shimming hardware. The Prisma will be upgraded to add multinuclear capability which will allow investigators to utilize 3He, 7Li, 13C, 19F, 23Na, 31P, and 129Xe MRS and MRI.

  The CINL currently supports 15 NIH-funded studies and one DoD funded study. The currently funded users span nine UAB departments. The MBRF expands the range of researchers who can utilize functional MR imaging, DTI, and MRS, which are essential capabilities for neuroimaging research. The CINL also facilitates implementation of new analysis techniques as they become available through outreach activities including an inviting, methods centric workshop at which users interact and learn the benefits of cutting edge analysis techniques.

  In accordance with the terms of the UAB-MBRF agreement, no MBRF funds were used for the acquisition of this new scanner. It is operated as a University core facility, and it is expected to be of great value to McKnight investigators who will now have access to a truly state-of-the-art imaging facility to study human brain function and its relationship to memory and aging.

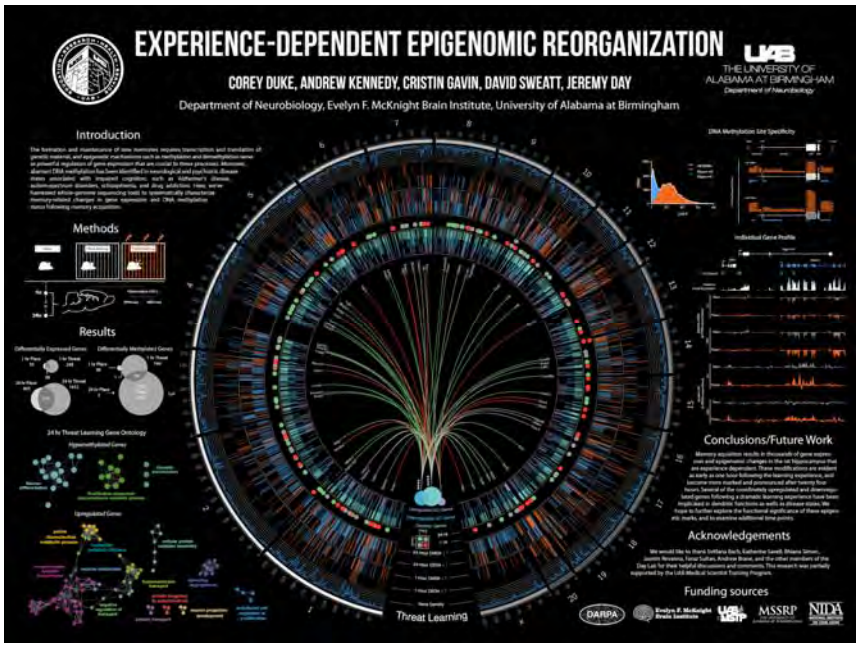
- David Geldmacher, M.D., has launched a new program aimed at providing Alzheimer's disease family caregivers telemedicine training. This exciting new program represents a collaboration between Dr. Geldmacher and the UAB School of Nursing. The work is funded by a new award from the DoD Peer Reviewed Alzheimer's Research Program. The study will examine whether six weeks of personalized coaching, via phone or online, will reduce the burdens felt by the caregiver of family members with dementia. The need to help family caregivers of dementia patients is immense and determining what the family needs are and meeting those family needs is of utmost importance. No MBRF funds are used in

direct support of this, but the experience of developing and implementing patient and caregiver interventions delivered through telemedicine will teach us much that will be valuable in considering how these kinds of techniques might be applied to age-related memory impairment. Appendix A

- Dr. Kristina Visscher made the news as she investigates using fMRI images from several hundred human brains to learn how the brain adapts after long-term changes in visual input. A key to this work is a new supercomputer at UAB. This system, now the fastest in Alabama and one of the fastest in the country, is powered by a new Dell EMC cluster providing over 110 teraflops of computing power. All this power is needed to align and analyze MRI images from large scale human studies. The work going on in Dr. Visscher's lab will have long-term benefits for all of the brain scientists at UAB, as she lays the groundwork for rapid advanced computational analysis of MRI scans. Appendix B

- The lab of Jeremy Day, Ph.D. is part of a UAB research team investigating Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR), a gene-editing technology that could have the potential to prevent disease before patients start to suffer. CRISPR is essentially a pair of molecule-sized programmable scissors—scissors that work on the DNA inside living cells. In the few years scientists have refined the technology, CRISPR has revolutionized gene editing and is emerging as a very powerful tool for modifying the expression of genes in the brain and other target organs. Appendix C

- Dr. Day's laboratory also received attention for their poster presented at the 2016 Society for Neuroscience meeting and McKnight reception. The poster highlights the groups work in identifying epigenetic changes associated with learning and memory. The poster not only attracted scientific attention, but also was featured on the "Better Posters" blog, which highlights top examples of high-quality presentations.



- T he Civitan International Research Center at UAB continues to move forward with a precision medicine epigenomics/bioinformatics initiative which will focus on cognitive impairments. The core will be available and will be utilized to support MBI studies on the epigenomics of cognitive aging.

- McKnight Inter-Institutional Cognitive Aging and Memory Intervention Core. The MBRF approved creation of the CAMI Core a few months past. At present, we have used this time to collect data on 114 investigators, over 30 candidate interventions for further support, and clinical trial resources from the recent McKnight Brain Institute annual reports and Inter-Institute Meeting programs. In addition, we have developed smart forms for additional acquisition of this information for collation and dissemination across all McKnight Brain Institute sites. Direct contact was made with the 114 identified investigators requesting submission of brief descriptions of candidate interventions, as well as improved personal descriptions and keywords describing their expertise and research interests. We also hold bi-monthly calls with the PIs at each site and are currently reviewing ongoing and proposed

intervention studies and collected information for further consideration and completion of potential funding applications to the MBRF. In this vein, a smart form full application has also been developed. This core involves all four McKnight Brain Institutes.

1. Summary of Scientific Achievements since Last Report

Individual McKnight Investigators' scientific accomplishments are noted in a separate section. The next few paragraphs highlight a few of the principal discoveries from the Institute this year.

- *Nature Communications* published "Extra-coding RNAs regulate neuronal DNA methylation dynamics" as a result of research being conducted in the lab of Dr. Jeremy Day. The creation of memories in the brain involves additional or removal of methyl groups at precise spots on chromosomal DNA. The lab believes the key appears to be a special form of RNA called extra-coding RNA, or ecRNA. Appendix D

- "Perineuronal Nets Suppress Plasticity of Excitatory Synapses on CA2 Pyramidal Neurons" was published by the *Journal of Neuroscience*. Long-term potentiation of excitatory synapses on pyramidal neurons in the stratum radiatum rarely occurs in the hippocampal area CA2. Evidence shows that perineuronal nets (PNNS) surround mouse CA2 pyramidal neurons and envelop their excitatory synapses.

2. Publications in Peer Reviewed Journals

Investigators at the UAB MBI published a total of 76 research papers, reviews, and commentaries in peer-reviewed journals in 2016. The journals in which these papers were published included many of the leading scientific journals in the discipline of neuroscience.

3. Publications (Other)

- **Books**
  Two

- **Book Chapters**
  Four

4. Presentations at Scientific Meetings (Also Includes Invited Research Seminars)

Investigators at the UAB MBI presented a total of 40 scientific presentations. UAB MBI Investigators presented their work at numerous prestigious institutions and national meetings, the Society for Neuroscience, and a variety of other universities and biotech forums.

The UAB MBI sponsored a number of seminars throughout the year. Prominent scientists visited UAB and the MBI and gave research presentations concerning their own work. Appendix E

5. Presentations at Public (Non-Scientific) Meetings or Events

Investigators at the UAB MBI presented 11 public-forum presentations.

6. Awards and Honors

- David Standaert and David Geldmacher were named among the "Best Doctors in America."
- David Geldmacher was named to the Warren Family Endowed Chair in Neurology by the UAB trustees.
- Erik Roberson was named the Patsy W. and Charles A. Collat Endowed Professor of Neuroscience by the UAB trustees.
- Vladimir Parpura was invited to become a member of the Dana Alliance for Brain Initiatives.
- Jeremy Day received the Pittman Scholar Award from the UAB School of Medicine.
- Jeremy Herskowitz won the UAB College of Arts and Sciences and School of Medicine Interdisciplinary Team Award.
- Farah Lubin received the Excellence in Editing/Reviewing for Neurobiology of Learning and Memory.
- Linda Overstreet-Wadiche won the Dean's Excellence Award for Mentorship.
- Vladimir Parpura was nominated for an Excellence Award in Teaching, Senior Faculty.

7. Faculty

Two active searches continue for MBI–affiliated positions in the Department of Psychiatry & Behavioral Neurobiology, the *Geropsychiatry Research Chair* and the *F. Cleveland Kinney Endowed Chair in Geriatric Psychiatry.* The search for the McKnight Chair is reported separately below.

8. Trainees, Post-doctoral, Pre-doctoral, Other

The labs of MBI faculty currently involve the training of 41 graduate students and 9 post-doctoral fellows.

9. Clinical/Translational Programs

A. New Programs

The McKnight Brain Aging Registry, with both cognitive and imaging projects, is currently recruiting participants. This project utilizes the new state-of-the-art Prisma MRI recently acquired at UAB.

B. Update on Existing Clinical Studies

Not applicable

C. New Treatments

Not applicable

D. Drug Trials, Future Research and/or Clinical Initiatives

Not applicable

10. Technology

A. Patent Applications

None.

B. Revenue Generated from Technology

Not applicable

11. Budget Update

A full financial report is included in the Finance Section.

12. Educational Programs Focusing on Age-Related Memory Loss

A. Scientific

The new undergraduate honors Neuroscience major at UAB is going strong. It is a unique program—a joint offering between the undergraduate College of Arts and Sciences and the School of Medicine. This will be a recruiting platform for future medical and graduate students interested in memory research with a focus on the brain and its role in behavior and cognitive functions.

B. Public

In conjunction with the Civitan International Research Center, speakers are provided to various community gatherings upon request. A variety of topics are covered throughout the year depending on the requesters topics of interest, including but not limited to Alzheimer's disease and other research areas.

13. Collaborative Programs with other McKnight Institutes, Institutions and Research Programs

UAB MBI Investigators have identified a total of five inter- and intra-MBI collaborations. More details on these collaborations are noted in the section with the individual investigators' data.

14. Collaborative Programs with Non McKnight Institutes, Institutions and Research Programs

UAB MBI Investigators have identified a total of 43 inter- and intra-institutional collaborations locally, nationally, and internationally.

15. Briefly describe plans for future research and/or clinical initiatives.

The Evelyn F. McKnight Brain Institute at The University of Alabama at Birmingham will continue to pursue the vision of the MBRF through ongoing research in age-related memory loss.

The McKnight Brain Aging Registry (MBAR) study is providing tremendous opportunities in cognitive aging research and a possible partnership with the UAB Alzheimer's Disease Center is being explored. Shared knowledge between the two entities can provide a wealth of research possibilities.

The new Siemens Prisma 3T whole body scanner for structural and functional brain and body imaging offers the highest quality MRI research. The equipment is available to the McKnight Brain Institute faculty, and they now have access to a superior imaging facility to study human brain function and its relationship to memory and aging.

16. If applicable, please provide endowment investments results for the report period.

See Finance section 2.1

17. Were any funds used for a Prohibited Purpose during the report period?

No

18. Do you recommend any modification to the Purpose or mandates in the Gift Agreement?

No

19. Did all activities during the report period further the Purpose?

Yes

20. Please describe any negative events (loss of personnel, space, budget, etc.) that occurred during the report period and the possible impact on carrying out the Gift Agreement.

Dr. David Sweatt resigned as the Evelyn F. McKnight Endowed Chair and has relocated to a new institution. As described below, a new chair is being recruited, and the terms of the Gift Agreement will be fulfilled as stipulated in the original agreement.

21. Please provide any general comments or thoughts not covered elsewhere – a response is not required. Please respond only if you would like to add something not covered elsewhere.

The Evelyn F. McKnight Brain Institute at The University of Alabama at Birmingham would like to express appreciation to the Evelyn F. McKnight Brain Research Foundation for its support and commitment to furthering research at UAB.

22. What do you consider your most important scientific achievement this year?

It's difficult to select one scientific achievement for the year; however, the McKnight Brain Aging Registry (MBAR) study is a highlight. Recruitment and data acquisition phase of the project is going well. Throughout this year, much effort was been invested by many individuals to prepare this multi-site study with many modalities of data, cognitive, biomarker, and neuroimaging.

23. Signature, date, and title of person submitting report

1/11/2017

Professor and Chair of Neurology
John N. Whitaker Endowed Chair
Interim Director, Evelyn F. McKnight Brain Institute
UAB School of Medicine

1/11/2017

Erik D. Roberson, M.D., Ph.D.
Associate Professor
Charles M. Collat Endowed Professor of Neurology
Co-Director, Evelyn F. McKnight Brain Institute
UAB School of Medicine

Date

FINANCE

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INVESTMENT REPORT

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LISTING OF INVESTIGATORS
AND
INDIVIDUAL FACULTY REPORTS

Investigators of the UAB McKnight Brain Institute

Professors

David Standaert, M.D., Ph.D.
John N. Whitaker Endowed Professor and Chair of Neurology
Interim Director, McKnight Brain Institute
Director, Division of Movement Disorders
Area of Interest: Aging, Neurodegeneration, and Translational Neuroscience

Steve Austad, Ph.D.
Professor and Chair, Department of Biology
Area of Interest: Molecular and organismal biology of aging

Karlene Ball, Ph.D.
Professor and Chair, Department of Psychology
Area of Interest: Aging-related cognitive function

Michael Brenner, Ph.D.
Professor Emeritus, Department of Neurobiology
Area of Interest: Glial cell biology, Alexander Disease

Paul Gamlin, Ph.D.
Professor, Department of Ophthalmology
Area of Interest: Cell biology and systems neuroscience of vision and visual disorders

David Geldmacher, M.D.
Professor, Warren Family Endowed Chair, Department of Neurology
Area of Interest: Aging-related memory disorders and visual cognition in AD.

John Hablitz, Ph.D.
Professor
Interim Chair, Department of Neurobiology
Area of Interest: Modulation of excitability in neocortial circuits

Robin Lester, Ph.D.
Professor, Department of Neurobiology
Area of Interest: Nicotinic receptors in CNS function

Lori McMahon, Ph.D.
Professor and Dean, Graduate School
Professor, Department of Physiology/Biophysics
Director, UAB Comprehensive Neuroscience Center,
Jarman F. Lowder Endowed Professor
Area of Interest: Hormonal control of synaptic plasticity in aging

James H. Meador-Woodruff, M.D.
Professor and Chair, Department of Psychiatry and Behavioral Neurobiology
Area of Interest: Cellular alterations of neural circuitry and molecular expression in psychiatric illnesses

Vlad Parpura, M.D., Ph.D.
Professor, Department of Neurobiology
Area of Interest: Imaging approaches to investigating synaptic and glial cell function

Lucas Pozzo-Miller, Ph.D.
Professor, Department of Neurobiology
Area of Interest: Mechanisms controlling dendritic spine morphology

Anne Theibert, Ph.D.
Professor, Department of Neurobiology
Director, UAB Undergraduate Neuroscience B.S. Program
Area of Interest: PI-3-Kinase signal transduction in neuronal cell biology

Erobo Ubogu, Ph.D.
Professor, Department of Neurology
Director of the Neuromuscular Division of Neurology
Area of Interest: Inflammatory neuropathies

Associate Professors

Virginia Wadley Bradley, Ph.D.
Associate Professor, Division of Gerontology, Geriatrics, and Palliative Care
Director, Dementia Care Research Program
Associate Director, Edward R. Roybal Center for Translational Research on Aging and Mobility
Area of Interest: Mild Cognitive Impairment, Alzheimer's disease, comorbid cerebrovascular disease

Lynn Dobrunz, Ph.D.
Associate Professor, Department of Neurobiology
Area of Interest: Regulation of short-term synaptic plasticity in the hippocampus

Matt Goldberg, Ph.D. (Recruited from UT Southwestern)
Associate Professor, Neurology
Area of Interest: Mechanisms of neurodegeneration

Alecia Gross, Ph.D.
Associate Professor, Department of Vision Sciences
Area of Interest: Signal transduction mechanisms in the CNS

David Knight, Ph.D.
Associate Professor, Department of Psychology
Area of Interest: Human imaging approached to investigating memory

Farah Lubin, Ph.D.
Associate Professor, Department of Neurobiology
Area of Interest: Signal transduction mechanisms in memory and memory disorders

Kazu Nakazawa, Ph.D.
Associate Professor, Department of Psychiatry
Area of Interest: Epigenetics and cognition

Linda Overstreet-Wadiche, Ph.D.
Associate Professor, Department of Neurobiology
Area of Interest: Adult neurogenesis in the dentate gyrus

Erik Roberson, M.D., Ph.D.
Associate Professor, Department of Neurology, Collat Endowed Professor
Co-Director, UAB Center for Neurodegeneration and Experimental Therapeutics
Co-Director, McKnight Brain Institute
Area of Interest: Aging-related memory disorders

Jacques Wadiche, Ph.D.
Associate Professor, Department of Neurobiology
Area of Interest: Synaptic plasticity and function in the cerebellum

Scott Wilson, Ph.D.
Associate Professor, Department of Neurobiology
Area of Interest: The ubiquitin/proteasome system in neuronal function

Assistant Professors

Mark Bolding, Ph.D.
Assistant Professor, Division of Advanced Medical Imaging Research
Area of Interest: Visual cognition, MRI, and neuroimaging

Jeremy Day, Ph.D.
Assistant Professor, Department of Neurobiology
Area of Interest: Epigenetic mechanisms in memory formation

Cristin Gavin, Ph.D.
Assistant Professor, Department of Neurobiology
Co-director, Undergraduate Neuroscience Program
Co-director, Post baccalaureate Research Education Program
Area of Interest: Cellular and molecular mechanisms of structural and functional plasticity

Michelle Gray, Ph.D.
Assistant Professor, Dixon Scholar, Department of Neurology
Area of Interest: Neurogenetics, glial function, and Huntington's disease

Jeremy Herskowitz, Ph.D.
Assistant Professor, Department of Neurology
Area of Interest: Amyloid beta effects on neurons.

Gwen King, Ph.D.
Assistant Professor, Department of Neurobiology
Area of Interest: Memory and aging, Klotho proteins in aging and cognition

Scott Phillips, Ph.D.
Assistant Professor, Department of Neurobiology
Area of Interest: Neurogenetics, neurobiochemistry

Kristina Visscher, Ph.D.
Assistant Professor, Department of Neurobiology
Area of Interest: Human imaging approaches to investigating memory.

McKNIGHT CHAIR REPORT
McKnight Brain Research Foundation
Annual Report 2016
The University of Alabama at Birmingham

Dr. J. David Sweatt, previous holder of the McKnight Chair, left UAB for another institution in July of 2016. Dr. Selwyn Vickers, Senior Vice President and Dean of the UAB School of Medicine, has appointed a search committee to identify the new holder of the McKnight Chair. Candidates from a broad range of relevant neuroscience backgrounds have been considered. A number of qualified candidates have been identified, and several have visited the campus. The search committee hopes to be able to make a recommendation to Dean Vickers in the near future.

The search committee consists of:
David Standaert, M.D., Ph.D.
Professor and Chair of Neurology
John N. Whitaker Endowed Chair in Neurology

John Hablitz, Ph.D.
Professor
Interim Chair, Department of Neurobiology

Erik Roberson, M.D., Ph.D.
Associate Professor of Neurology and Neurobiology
Patsy W. and Charles A. Collat Endowed Professor of Neuroscience
Director, Alzheimer's Disease Center
Co-Director, McKnight Brain Institute
Co-Director, Center for Neurodegeneration and Experimental Therapeutics

Farah Lubin, Ph.D.
Associate Professor, Departments of Neurobiology, Genetics, Cell, Developmental & Integrative Biology
Director, Comprehensive Neuroscience Center EEG Core
Director, NINDS Neuroscience Roadmap Scholar Program
Investigator, McKnight Brain Institute

Richard Shelton, M.D.
Professor
Charles B. Ireland Endowed Professor and Vice Chair for Research
Department of Psychiatry and Behavioral Neurobiology
Comprehensive Center for Healthy Aging
Comprehensive Diabetes Center
Comprehensive Neuroscience Center
Center for Exercise Medicine
Nutrition Obesity Research Center

Jackie Wood
Executive Director of Development
Office of VP Development and Alumni

Recruitment Ad Appendix F

INDIVIDUAL FACULTY REPORTS

1. Summary of Scientific Achievements

Day, Jeremy

- Genome-wide characterization of transcriptional profiles from single neurons in culture and adult brain
- CRISPR/Cas9 mediated genetic and epigenetic editing in neuronal systems to alter gene expression and function in a high selective and controllable fashion. Also developed capacity for optically-regulated control of gene editing systems in the lab for use in cultured neurons and the adult brain.
- Identification and characterization of neuronal non-coding RNAs that interact with DNA methyltransferases to regulate the neuronal epigenome and memory function.

Geldmacher, David

- Ongoing research focusing primarily on treatment approaches for people with dementia. This includes investigator-initiated trials of novel drugs through typical federal- and industry-sponsored multicenter studies.
- Working on developing an alternative model of assessing treatment success in dementia care known as “Family Quality of Life.”

Hablitz, John

- Established optogenetic techniques for studying contribution of selective populations of GABAergic interneurons to synchronization of inhibitory networks.
- Demonstrated role of HCN channels in excitability of GABAergic interneurons and its’ alteration in epilepsy.

Herschkowitz, Jeremy

- The lab identified the Rho Kinases as highly rational therapeutic targets to reduce tau protein level in tauopathies, including Alzheimer’s disease, Corticobasal degeneration, and Progressive Supranuclear Palsy. These findings were published this year in the *Journal of Neuroscience*.
- The lab also discovered that ROCK1 protein levels are increased in mild cognitive impairment and Alzheimer’s disease brains. Furthermore, it was determined that reduction of ROCK1 in neurons or mice reduced amyloid-beta levels, suggesting that inhibiting ROCK1 may be a rational avenue to reduce amyloid-beta levels in Alzheimer’s disease. These findings were published in the *Journal of Neurochemistry*.

King, Gwendalyn

- We have completed the characterization of klotho effects in the klotho overexpressing brain to complement findings in the knockout. This has included becoming proficient in several additional behavioral paradigms. The paper was reviewed at Cell Reports, and we are working on rebuttals.
- We nearly completed characterization of the FGF23 brain. FGF23 is the ligand to klotho, and yet we see independent effects that will allow us to better predict and move forward in identifying mechanisms of klotho action.

- We have discovered that the absence of klotho affects spine density and size in CA1 hippocampal neurons. This effect also occurs in culture and studies are ongoing to determine the form and mechanism of klotho action.

Lubin, Farah

- Most exciting this year was the establishment of the annual NEURAL (**N**ational **E**nhancement of **U**nder **R**epresented **A**cademic **L**eaders) at UAB. This conference has put UAB "on the map" for increasing diversity in the neurosciences in the southeastern region. I have attached the results from the post-conference survey.
- As Director of the UAB Roadmap Scholar Program, we've enroll 13 scholars from the current pool of GBS graduate students and recruited eight additional scholars.
- Manuscript publications continue (4 + 4 in Revision) and co-editing an Elsevier book entitled *Epigenetics and Neuroplasticity: Evidence and Debate.*
- Awarded three grants this past year and continue to pursue additional research funding through submission of grant applications (resubmission of NIH/NINDS R01 NS094743 and NIH/NINDS PPG P01).

Nakazawa, Kazu

My lab hypothesizes that NMDA receptor (NMDAR) hypofunction, a leading hypothesis of schizophrenia pathophysiology, occurs in cortical interneurons in postnatal development.

- We have been analyzed GABA neuron-selective NMDAR knockout mice and found P/Q-type Ca^{2+} channel dysregulation in the NMDAR-deleted GABA neurons, presumably leading to impaired synchronized perisomatic inhibition, tone-evoked gamma oscillation deficits *in vivo* and cognitive dysfunction.
- We also found a blunted dopamine release in medial PFC in response to amphetamine (Amph), while Amph-induced dopamine release was augmented in the mutant striatum, which is consistent with the reported dopamine abnormality in patients with schizophrenia.
- We also discovered 5HT2A receptor-dependent prolonged activation of auditory deep layer pyramidal neurons following tone-stimuli in the mutant animal, suggesting a pro-psychedelic cortical state following NMDAR hypofunction in GABA neurons.

Overstreet-Wadiche, Linda

- We are continuing to study how GABAergic interneurons control the proliferation and maturation of adult-generated neurons, using cre/loxp systems to allow optogenetic manipulation of specific subtypes of hippocampal interneurons. Graduate student Ryan Vaden received an NRSA pre-doctoral fellowship to support this project, and we are preparing an RO1 application to further explore the role of different interneuron subtypes on neurogenesis and inhibition in the DG.
- We found evidence that adult-born neurons compete for (or "steal") existing synaptic terminals from mature neurons, such that neurogenesis generates a redistribution of synaptic connectivity in the EC-DG circuit. We also found that expression of Bax is required for neurogenesis-induced loss of synapses on mature neurons, consistent with an emerging function of the bax/caspase3 signaling pathway in LTD and synapse pruning (manuscript currently under review at *Elife*). We are preparing a grant application on this project.

- We discovered that low synaptic connectivity of immature adult-born neurons counteracts their high intrinsic excitability, potentially providing a mechanism by which adult-born neurons contribute to the computational function of pattern separation that relies on sparse DG activity (published in *Nature Communications*).

Parpura, Vladimir

- Astrocytes play roles in health and disease. Since astrocytes release glutamate and can respond to stimulation by glutamate with Ca^{2+} increases, they may contribute to the pathology of Alzheimer's disease. We initiated a collaborative effort with the Zorec laboratory to begin studying astrocytic contributions to this disease (**JAs 128, 142**).
- The characteristics and function of mGluR5 trafficking within astrocytes had not been previously investigated. We therefore monitored the trafficking of recombinant fluorescent protein chimera of metabotropic glutamate receptor 5 (**JA 137**) and studied its interaction with Homer proteins in gliotransmission, the latter in collaboration with the Bezzi laboratory (**JA 144)**.

Pozzo-Miller, Lucas

- Demonstration that long-term potentiation is impaired in the hippocampus of Rett syndrome mice due to the saturation of the plasticity range at already potentiated synapses that cannot recycle AMPARs. Published in *PNAS*.
- Demonstration that homeostatic synaptic plasticity is impaired in Rett syndrome neurons due to already potentiated synapses that cannot recycle AMPARs. In preparation.
- Demonstration that hippocampal dysfunction in Rett syndrome mice spreads to the medial prefrontal cortex via a direct monosynaptic projection, altering network activity and social behaviors. In preparation.

Roberson, Erik

- Continued development of tau-fyn interaction inhibitors for treatment of tau-related cognitive impairment. This project, currently funded by the BrightFocus Foundation, has identified several leads that block the interaction in cells and reduce Aβ toxicity.
- Identified a new mutation that causes Alzheimer's disease (published in Neurobiology of Aging).
- Participated in the McKnight Brain Institutes' interinstitutional working group on the role of the perirhinal cortex in cognitive aging. A presubmission inquiry for a review/white paper was recently accepted at TiNS.

Standaert, David

- A major focus of the work in the Standaert lab has been identifying the immunological basis for neurodegeneration in Parkinson disease. While the work uses models of PD, the fundamental principles regarding interactions of the brain with the immune system are broadly applicable to studies of brain aging.
- The lab has also been engaged in population epidemiology, and in examining the effects of drug treatments on brain function.

Visscher, Kristina

- Representation of Central Vision is thicker than representation of peripheral vision in V1. This pattern has not been demonstrated before and is consistent with the increased attentive use of

central vision vs. peripheral vision. (Burge et al., in prep) In older adults, this pattern changes. Older adults exhibit selective thinning in peripheral vision only, consistent with visual impairments in that population (Griffs et al, 2016a).

- People who use peripheral vision for attentive tasks show thicker peripheral representations than controls. This is consistent with a structural change with experience. (Burge et al, 2016)
- Centrally- and peripherally-representing areas have very different patterns of functional connections. These map nicely on to known brain networks. These differences are consistent with central and peripheral vision's different functions (Griffs et al, 2016a).

Wadley, Virginia

- My 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. I design and oversee cognitive assessments within multiple epidemiological, observational, clinical, and experimental research protocols. I also contribute to development of computer-based cognitive training paradigms and am conducting randomized controlled trials of these interventions.

Wilson, Scott

- We have determined that the conditional deletion of HGS in Schwann results in a block in myelination similar to those seen in mouse models of Charcot-Marie-Tooth Disease.
- We have successfully implemented several new techniques in the lab to study Schwann cells in vitro included primary Schwann cell culture and dorsal root ganglion Schwann cell co-cultures.

2. Publications in Peer Reviewed Journals

Day, Jeremy

- Savell, K.E., Gallus, N.V.N., Simon, R., Brown, J., Revanna, J.S., Osborn, M.K., Song, E.Y., O'Malley, J.J., Stackhouse, C.T., Norvil, A., Gowher, H., Sweatt, J.D., & Day, J.J. (2016). Extra-coding RNAs regulate neuronal DNA methylation dynamics. Nature Communications 7: 12091.
- Resendez, S.L., Keyes, P.C., Day, J.J., Hambro, C., Austin, C.J., Maina, F.K., Eidson, L., Porter-Stransky, K.A., Nevarez, N., McLean, J.W., Kuhnmeunch, M.A., Murphy, A.Z., Mathews, T.A., & Aragona, B.J. (2016) Dopamine and opioid systems interact within the nucleus accumbens to maintain monogamous pair bonds. eLife 5:e15325.
- Kennedy, A.J., Rahn, E.J., Paulukaitis, B.S., Savell, K.E., Kordasiewicz, H.B., Wang, J., Lewis, J.W., Posey, J., Strange, S.K., Guzman-Karlsson, M.C., Phillips, S.E., Decker, K., Motley, S.M., Swayze, E.E., Ecker, D.J., Michael, T.P., Day, J.J., & Sweatt, J.D. (In press) Tcf4 regulates synaptic plasticity, DNA methylation, and memory function. *Cell Reports*.
- Day, J.J. DNA modifications and memory. In: DNA Modifications in the Brain. Edited by: Tim Bredy. Elsevier Press (In Press).

Gavin, Cristin

- Obesity weighs down memory through a mechanism involving the neuroepigenetic dysregulation of Sirt1. Frankie D. Heyward, Daniel Gilliam, Mark A. Coleman, Cristin F. Gavin, Jing Wang, Garrett Kaas, Richard Trieu, John Lewis, Jerome Moulden, J. David Sweatt. Journal of Neuroscience. 2016 Jan 27, 36(4): 1324-1335.
- Long-Term Potentiation: A Candidate Cellular Mechanism for Information Storage in the CNS

Kimberly E. Hawkins, Cristin F. Gavin, and J. David Sweatt. Learning and Memory: A Comprehensive Reference, J. David Sweatt, Elsevier, 2016

Hablitz, John

- Meadows JP, Guzman-Karlsson MC, Phillips S, Brown JA, Strange SK, Sweatt JD, Hablitz JJ. Dynamic DNA methylation regulates neuronal intrinsic membrane excitability. Sci Signal. 2016;9(442):ra83. PubMed PMID: 27555660.
- Brady LJ, Bartley AF, Li Q, McMeekin LJ, Hablitz JJ, Cowell RM, Dobrunz LE. Transcriptional dysregulation causes altered modulation of inhibition by haloperidol. Neuropharmacology. 2016;111:304-313. PubMed PMID: 27480797.
- Resubmitted - The USP14 inhibitor IU1 is neurotoxic and decreases E1~ubiquitin thioester and ubiquitinated-protein levels concomitantly with lowering ATP levels in rat neurons. Journal of Biological Chemistry.

Herskowitz, Jeremy

- Henderson BW, Gentry EG, Rush T, Herskowitz JH. Pharmacologic inhibition of ROCK1 and ROCK2 reverses dendritic spine morphology abnormalities associated with age-related memory loss and Alzheimer's disease. *Alzheimer's Association International Conference*. Toronto, Ontario, Canada, 2016.
- Henderson BW, Gentry EG, Rush T, Troncoso JC, Thambisetty M, Montine, TJ, Herskowitz JH. Rho-associated protein kinase 1 (ROCK1) is increased in Alzheimer's disease and ROCK1 depletion reduces amyloid-β levels in brain. *Society for Neuroscience*. San Diego, CA, 2016.

King, Gwendalyn

- Han X, Yang J, Huang, J, Xiao Z, King GD, Quarles LD. Conditional deletion of FGFR1 in the proximal and distal tubule identifies distinct roles in phosphate and calcium transport. PLOS ONE (2016), PMC4739706.

Lubin, Farah

- S. Maity*, T.J. Jarome*, J. Blair, **F.D. Lubin**, and P. Nguyen. Norepinephrine Goes Nuclear: Epigenetic Modifications During Long-Lasting Synaptic Potentiation Triggered by Activation of Beta-Adrenergic Receptors. 2016. *Journal of Physiology*. Feb 15;594(4):863-81 **These authors contributed equally*
- G.A. Martínez-Levy, L Rocha, **F.D. Lubin**, M.A. Alonso-Vanegas, A. Nani, R.M. Buentello-García, R. Pérez-Molina, M. Briones-Velasco, F. Recillas-Targa, A. Pérez-Molina, D. San Juan Ortra, J. Cienfuegos, C.S. Cruz-Fuentes. Increased expression of BDNF transcript with exon VI in hippocampus of patients with pharmaco-resistant Temporal Lobe Epilepsy. 2016. *Neuroscience* Feb;314:12-21.
- M.R. Penner, R.R. Parrish, L.T. Hoang, T.L. Roth, **F.D. Lubin***, C.A. Barnes*. Age-related changes in Egr1 transcription and DNA methylation within the hippocampus. 2016. *Hippocampus* Aug;26(8):1008-20. **These authors contributed equally*
- A.A. Butler, W.M. Webb, and **F.D. Lubin**. The Role of Regulatory RNAs in the Control of Epigenetic Mechanisms: Expectations for Cognition and Cognitive Dysfunction. 2016. *Epigenomics* Jan;8 (1):135-51.

Overstreet-Wadiche, Linda

- Dieni CV, Panichi R, Aimone JB, Kuo CT, Wadiche JI, Overstreet-Wadiche L (2016) Low excitatory innervation balances high intrinsic excitability of immature dentate neurons. *Nature*

Communications, 7:11313.

Parpura, Vladimir

- Verkhratsky, A., Zorec, R., Rodríguez, J.J., Parpura, V. (2016) Astroglia dynamics in ageing and Alzheimer's disease. *Curr Opin Pharmacol* 26:74–79
- Stenovec, M., Trkov, S., Terzieva, S., Kreft, M., Rodriguez, J.J., Parpura, V., Verkhratsky, A., Zorec, R. (2016) Expression of familial Alzheimer disease presenilin 1 gene attenuates vesicle traffic and reduces peptide secretion in cultured astrocytes devoid of pathologic tissue environment. *Glia* 64:317–329
- Verkhratsky, A., Matteoli, M., Parpura, V, Mothet, J-P., Zorec, R. (2016) Astrocytes as secretory cells of the central nervous system: Idiosyncrasies of vesicular secretion. *EMBO J.* 35:239-257
- Verkhratsky, A., Zorec, R., Rodríguez, J.J., Parpura, V. (2016) Pathobiology of neurodegeneration: The role for astroglia. *Opera Med Physiol.* 1: 13-22.
- Rodríguez, J.J., Butt, A.M., Gardenal, E., Parpura, V., Verkhratsky, A. (2016) Complex and differential glial responses in Alzheimer´s disease and ageing. *Curr Alzheimer Res* 13, 343-358.
- Vardjan, N., Parpura, V., Zorec, R. (2016) Loose excitation-secretion coupling in astrocytes. *Glia* 64:655–667
- Lee, W., Parpura, V. (2016) Spatio-temporal characteristics of metabotropic glutamate receptor 5 traffic at or near the plasma membrane in astrocytes. *Glia* 64:1050–1065
- Wang, Y-F., Parpura, V. (2016). Central role of maladapted astrocytic plasticity in ischemic brain edema formation. *Front Cell Neurosci.* 10:129.doi: 10.3389/fncel.2016.00129

In Press:

- Parpura, V., Fisher, E., Lechleiter, J.D., Schousboe, A., Waagepetersen, H.S., Brunet, S., Baltan, S., Verkhratsky, A. (2016) Glutamate and ATP on interface between signaling and metabolism in astroglia: examples from pathology. *Neurochem Res*
- Buscemi, L., Ginet, V., Lopatar, J., Montana, V. Pucci, L., Spagnuolo, P., Zehnder, S., Grubišić, V., Truttman, A., Sala, C., Hirt, L., Parpura, V., Puyal, J,. Bezzi, P. (2016) Homer1 scaffold proteins govern Ca^{2+} dynamics in normal and reactive astrocytes. *Cereb Cortex*
- Zorec, R., Parpura, V., Vardjan, N., Verkhratsky, A. (2016) Astrocytic Face of Alzheimer's Disease. Behavior Brain Res

Pozzo-Miller, Lucas

Full research papers

- Li W, X Xu & L Pozzo-Miller (2016). Excitatory synapses are stronger in the hippocampus of Rett syndrome mice due to altered synaptic AMPAR trafficking. *Proceedings of the National Academy of Sciences of the USA* 113: E1575-E1584.
- Carstens KE, ML Phillips, L Pozzo-Miller, RJ Weinberg, SM Dudek (2016). Perineuronal nets suppress plasticity of excitatory synapses on CA2 pyramidal neurons. *Journal of Neuroscience*, 36: 6312-6320.
- Arnold M, R Cross, KS Singleton, S Zlatic, AP Mullin, C Chapleau, I Rolle, C Moore, A Theibert, L Pozzo-Miller, V Faundez, J Larimore (2016). The endosome localized Arf-GAP AGAP1 modulates dendritic spine morphology downstream of the neurodevelopmental disorder factor Dysbindin. *Frontiers in Cellular Neuroscience* 10: 218.

Roberson, Erik

- Arrant, A.E., A.J. Filiano, A.M. Hall, and E.D. Roberson. (2016). Progranulin haploinsufficiency causes biphasic social dominance abnormalities. *Genes Brain Behav.*, 15:588–603.
- Vossel, K.A., K.G. Ranasinghe, A.J. Beagle, D. Mizuiri, S.M. Honma, A.F. Dowling, S.M. Darwish, V.V. Berlo, D.E. Barnes, M. Mantle, A.M. Karydas, G. Coppola, E.D. Roberson, B.L. Miller, P.A. Garcia, H.E. Kirsch, S.S. Nagarajan, and L. Mucke. Incidence and impact of subclinical epileptiform activity in Alzheimer's disease. Submitted.
- Natelson Love, M., D.G. Clark, J.N. Cochran, K.A. Den Beste, D.S. Geldmacher, T.L Benzinger, B.A. Gordon, J.C. Morris, R.J. Bateman, and E.D. Roberson. (2016). Clinical, imaging, pathological, and biochemical characterization of a novel presenilin 1 mutation (N135Y) causing Alzheimer's disease. *Neurobiol. Aging*. Pending minor revisions.
- Arrant, A.E., A.J. Filiano, D.E. Unger, A.H. Young, and E.D. Roberson. Restoring neuronal progranulin reverses deficits in a frontotemporal dementia model. Submitted.
- Li, Z., S.C Buckingham, A.M. Hall, S.M. Wilson, and E.D. Roberson. Protective effects of tau reduction in adulthood. In preparation.
- Guzman-Karlsson, M.C., L.L. Fleming, J.A. Brown, F. Sesay, J.W. Leis, R.L. Lifer, K.E. Hawkins, A.J. Kennedy, J.J. Day, E.D. Roberson, and J.D. Sweatt. Genome-wide transcription and DNA methylation profiling in an APP mouse model of Alzheimer's disease. In preparation.
- Cochran, J.N., T. Rush, B.A. Warmus, A.V. Franklin, S.C. Buckingham, M.Y. Chang, G.C. Prendergast, L.L. McMahon, and E.D Roberson. A role for the Alzheimer's disease risk factor BIN1 in facilitating excitability. In preparation.
- Gerstenecker, A., E.D. Roberson, and I. Litvan. Genetic influences on cognition in progressive supranuclear palsy. In preparation.
- Warmus, B.A. and E. D. Roberson. (2016). Pathophysiology and animal models of frontotemporal dementia. In *Hodges' Frontotemporal Dementia, Second Edition*. B. Dickerson, ed. (Cambridge University Press).

Standaert, David

- Apetauerova D, Scala SA, Hamill RW, Simon DK, Pathak S, Ruthazer R, Standaert DG, Yacoubian TA. CoQ10 in progressive supranuclear palsy: A randomized, placebo-controlled, double-blind trial. Neurol Neuroimmunol Neuroinflamm. 2016 Aug 2;3(5):e266.
- Thome AD, Harms AS, Volpicelli-Daley LA, Standaert DG. microRNA-155 Regulates Alpha-Synuclein-Induced Inflammatory Responses in Models of Parkinson Disease. J Neurosci. 2016 Feb 24;36(8):2383-90. doi: 10.1523/JNEUROSCI.3900-15.2016. PubMed PMID: 26911687; PubMed Central PMCID: PMC4764660.
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- Figge DA, Eskow Jaunarajs KL, Standaert DG. Dynamic DNA Methylation Regulates Levodopa-Induced Dyskinesia. J Neurosci. 2016 Jun 15;36(24):6514-24. doi: 10.1523/JNEUROSCI.0683-16.2016. PubMed PMID: 27307239.
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Visscher, Kristina

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- Griffis, J, Elkhetali, A, burge, W, chen, R, Bowman, A, Szaflarski, J, Visscher, K (2016). Retinotopic patterns of functional connectivity between V1 and large-scale brain networks during resting fixatioin. NeuroImage, 1, 1-13, http://doi.org/10.10174/CBO9781107415324.004

Wadley, Virginia

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- Jackson JL, Judd SE, Panwar B, Howard VJ, Wadley VG, Jenny NS, Gutierrez OM. Associations of 25-hydroxyvitamin D with markers of inflammation, insulin resistance and obesity in black and white community-dwelling adults. J Clin Transl Endocrinol 2016 Sep;5:21-25.

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Manuscripts submitted but not yet accepted

- McDonnell, M.M., Hillier, S.L., Roth, D.L., Judd, S.E., Haley, W.E., Esterman, P.J., Wadley, V.G., Howard, V.J. Self-reported pre-stroke physical activity levels and functional ability following incident stroke.
- Lassen-Greene, C.L., Steward, K., Okonkwo, O., Porter, E., Crowe, M., Vance, D.E., Griffith, H.R., Ball, K., Marson, D.C., Wadley, V.G. Mild Cognitive Impairment and changes in everyday function over time: the importance of evaluating both speed and accuracy.

3. Publications (Other)

Geldmacher, David

Book Chapters

- Natelson Love MC, Geldmacher DS. Alzheimer's disease. In: Yudofsky S, Hales R Arciniegas, D, ed. American Psychiatric Publishing Textbook of Neuropsychiatry and Behavioral Neuroscience, Sixth ed. Washington: American Psychiatric Press. (in press.)
- Lyerly MJ, Bag A, Geldmacher DS. Spinal cord vascular disease. In: Daroff RB, Fenichel GB, Jankovic J, Mazziotta J (eds). Bradley's Neurology in Clinical Practice, 7th Ed. Philadelphia: Elsevier 2016:1007-1014

King, Gwen

- Klotho regulates postnatal neurogenesis to protect against age-related cognitive decline. Laszczyk AM, Fox-Quick S, Nettles D, Overstreet-Wadiche L, King GD. Is currently under petition for revision at Cell Reports.

Lubin, Farah

- William M. Webb, Richard G. Sanchez, Timothy J. Jarome, Gabriella Perez, Anderson A. Butler, Rebecca M. Hauser, Megan C. Rich, Aiden L. O'Bierne, Daniel L. Ross, and F.D. Lubin. Memory retrieval triggers H3K4me3 in association with increased DNA hydroxymethylation activity at memory-permissive genes. Provisionally accepted in *Neurobiology of Learning and Memory*
- Timothy J. Jarome, Anderson A. Butler, Gabriella Perez, Megan C. Rich, and F.D. Lubin. Histone Ubiquitination controls heterochromatin and euchromatin dynamics during memory consolidation. Submitted to *Neuron.*
- R. Ryley Parrish*, Richard G. Sanchez*, Roxanne M. Lockhart, Kazuhito Nakao, Susan C. Buckingham,, Kristen Riley, Tore Eid, and F.D. Lubin. Increasing *O*-GlcNAc levels in the hippocampus is anti-consultant and reduces epileptiform activity. In preparation.
- Wheeler, W. Haselden, R.R. Parrish and F.D. Lubin. The effects of Levetiracetam on Histone methylation levels in the epileptic hippocampus. In preparation.

Nakazawa, Kazutoshi

Books and Reviews

- Nakazawa K, Jeevakumar V, and Nakao K. (2016) Spatial and Temporal Boundaries of NMDA receptor Hypofunction Leading to Schizophrenia. Npj Schizophrenia *in press*
- Nakazawa K (2016) Electrophysiological evidence for defective fast-spiking GABAergic neurons in a schizophrenia model. Acta Physiologica, DOI: 10.1111/apha.12817

Parpura, Vladimir

COMMENTARIES

- Tewari, S.G., Gottipati, K.M., Parpura, V. (2016) Mathematical modeling in Neuroscience: Neuronal activity and its modulation by astrocytes. *Front. Integr. Neurosci.* 10:3. doi: 10.3389/fnint.2016.00003 [opinion]
- Parpura, V. (2016) Tissue engineering: Nanoelectronics for the heart. Nat. Nanotechnol. 2016 Jun 27. doi: 10.1038/nnano.2016.123.

INVITED CHAPTERS (Technical/Refereed)

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- Verkhratsky, A., Zorec, R., Rodríguez, J.J., Parpura V. (2016). Neuroglia: Functional paralysis and reactivity in Alzheimer's disease and other neurodegenerative pathologies. Adv. Neurobiol. In Press.

Roberson, Erik

- Amthor, F., E.D. Roberson, A.M. Theibert, and D.G. Standaert. *Clinical Neuroscience*. (New York: McGraw-Hill Companies
- Warmus, B.A. and E. D. Roberson. (2016). Pathophysiology and animal models of frontotemporal dementia. In Hodges' Frontotemporal Dementia, Second Edition. B. Dickerson, ed. (Cambridge University Press).
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Standaert, David

- Calabresi P, Standaert DG, Chiasserini D, Parnetti L, Biomarkers in Parkinson's disease: From pathophysiology to early diagnosis. Mov Disord. 2016 Jun;31(6):769-70. doi: 10.1002/mds.26683. PMID: 27245116
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Wadley, Virginia

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- Ball, K.K., Clay, O.J., **Wadley, V.G.**, Roth, D.L., Edwards, J.D., Roenker, D.L. Predicting driving performance in older adults with the Useful Field of View test: a meta-analysis. In Rizzo, M., Lee, J.D., & McGehee, D. (Eds.). (2005). *Proceedings of Driving Assessment 2005: The Third Annual International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design*. Iowa City, IA: The University of Iowa.

Published Abstracts

- Zhu W, Howard VJ, **Wadley VG**, Hutto, B, Vena JE, Colabianchi N, Hooker SP. Longitudinal association between low- and high-light intensity physical activity and cognitive function in

older adults: REGARDS study. Med Sci Sports Exerc. 2016 May;48(5 Suppl 1):557. Doi: 10.1249/01.mss.0000486672.73750.eb.

4. **Presentations at scientific meetings**

Day, Jeremy

- Invited Speaker, University of Michigan, Department of Human Genetics Seminar Series
- Invited Speaker, McKnight Brain Research Foundation 2016 Inter-Institutional Meeting
- Invited Speaker, HHMI/Janelia Research Conference on Behavioral Epigenetics

Geldmacher, David

- Cognition in Parkinson's Disease and Dementia with Lewy Bodies, Invited Lecture, Movement Disorders Society Young Neurologist's Course, Atlanta, Georgia, April 2016

Hablitz, John

- Vanderbilt University, Department of Cell and Developmental Biology
- Keynote Presentation at Ots Undergraduate Research Day, Department of Psychology, UAB

Herskowitz, Jeremy

- Alzheimer's Association International Conference. Washington, DC.
- University of Alabama, Birmingham, AL, Department of Neurology Grand Rounds.
- University of Alabama, Birmingham, AL, Center for Neuro and Experimental Therapeutics Retreat

King, Gwen

- Simpson-Ramsey Neurodevelopment Symposium – April 2016 = posters

Lubin, Farah

- F.D. Lubin. Epigenetics targeting in memory. Minisymposium. The Society for Neuroscience Annual Meeting, San Diego, CA.
- F.D. Lubin. American Epilepsy Society Special Interest Group (SIG) on grant review. NINDS/NIH Program Director and Tracy Dixon-Salazar from Citizens United for Research in Epilepsy (CURE).
- F.D. Lubin. National Enhancement of UnderRepresentative Academic Leaders (NEURAL) conference in Birmingham AL. Drs. Farah Lubin and Lori McMahon Roadmap Scholar Co-directors and Dr. Brian Sims conference director. Invited Speakers, Drs. Gordon Legge, Helen Scharfman, Carl Hart, Michelle Jones-London, and Gabriel Gasque.
- F.D. Lubin. Society for Neuroscience, Neuroscience Scholar Program (NSP) webinar panelist. F.D. Lubin. Neuro-Epigenetic basis of Memory, Behavior, and Its disorders. Civitan Symposium at UAB.
- F.D. Lubin. Neuro-Epigenetic basis of Memory, Behavior, and Its disorders. Department of Molecular and Integrative Physiology at the University of Illinois at Urbana-Champaign.

Nakazawa, Kazu

- "Towards an Understanding of Schizophrenia Pathophysiology", at Niigata University Brain Institute, Niigata, Japan, November 24, 2016.
- "Neuropsychiatric signs produced by NMDAR hypofunction in GABA neurons", at UAB Comprehensive Neuroscience Center Retreat 2016. Birmingham, AL, October 7, 2016.
- "Towards an Understanding of Schizophrenia Pathophysiology", at Dept Brain Science Doshisha University, Kyotanabe, Japan, August 31, 2016.
- "Neuropsychiatric signs produced by NMDAR hypofunction in GABA neurons", at International Symposium on "Microendophenotype on psychiatric disorders". Yokohama, Japan. July 19, 2016.

Overstreet-Wadiche, Linda

- Invited speaker at Univ Wisc Madison Neuroscience Department

Parpura, Vladimir

Parpura-Invited talks

- "Probing neural cells with carbon nanotubes: Implications for translational medicine", In Symposium 11: Nanomaterial Promotion of Regeneration in Spinal Cord Injury (Organizer: DiAnna Hynds, Texas Women's University, Denton, TX; Chair: Sarah Stabenfeldt, Arizona State University, Tempe, AZ), National Neurotrauma Society 2016 Symposium Lexington, KY

Pozzo-Miller, Lucas

- Speaker in the *Translational Science* session at the 14th Meeting of *RettSyndrome.org*, Chicago, IL.
- Speaker at symposium *Therapeutic Strategies for Rett Syndrome*, Rett Syndrome Research Trust, Boston MA.

Published Abstracts

- Phillips M, W Li, L Pozzo-Miller (2016). Stronger contribution and impaired LTP of hippocampal inputs to the medial prefrontal cortex in the *Mecp2* mouse model of Rett syndrome *Society for Neuroscience Abstracts* 496.02
- Xu X, L Pozzo-Miller (2016). EEA1 overexpression reduces synaptic strength and restores homeostatic synaptic plasticity in cultured hippocampal neurons from *Mecp2* knockout mice. *Society for Neuroscience Abstracts* 496.04
- Li W, L Pozzo-Miller (2016). Impaired intrinsic and synaptic properties of striatal medium spiny neurons in *Mecp2* knockout mice *Society for Neuroscience Abstracts* 764.07
- Schina R, N Morello, M Phillips, E Calcagno, O Plicato, F Pilotto, L Pozzo Miller & M Giustetto (2016). MeCP2 regulates cortical network activity by modulating excitatory synaptic transmission onto GABAergic interneurons. *FENS Forum Abstract* 2016, index # 3618.
- Dudek SM, K Carstens, D Lustberg, M Phillips, L Pozzo-Miller, R Weinberg & (2016). Perineuronal nets suppress plasticity of excitatory synapses on CA2 pyramidal neurons. *FENS Forum Abstract* 2016, index # 178.
- Bellot-Saez A & L Pozzo-Miller. Intracellular Ca^{2+} imaging revealed enhanced spiking activity in *Mecp2* knockout neurons. *Society for Neuroscience Abstracts* DP07.05 (dynamic poster).

Roberson, Erik

- Society for Neuroscience Meeting, San Diego, Minisymposium
- American Epilepsy Society Meeting, Houston, Special Interest Group
- University of Alabama Medical Alumni Association
- HDDD2/Progranulin family meeting, Linden Baptist Church, Linden, AL
- UAB Comprehensive Center for Healthy Aging Symposium
- "Alzheimer's Disease Update 2016", Birmingham, AL

Standaert, David

- Huntsville Hospital Foundations of Neurology Conference, "Parkinson Disease Update"
- UAB 43rd Annual Medical Alumni Weekend, "Parkinson disease"
- International Parkinson and Movement Disorders Congress, "Late breaking advances in clinical, basic and translational science: Translating pearls of basic science to the wisdom of the clinic in Parkinson's disease"
- Tyler's Hope for a Dystonia Cure Think Tank, "Cholinergic mechanisms in DYT1 dystonia"
- World Parkinson Congress, Plenary Session Chair
- NINDS/ANA Career Development Symposium, mentor and speaker
- Neurology Grand Rounds, Rush University, Chicago, "Neuro-inflammation in

Parkinson Disease
- Neurology Grand Rounds, UCSD, "Neuro-inflammation in Parkinson disease"

Wadley, Virginia
- Lerner, A.J., Chelune, G., Harmon-Still, C., Rapp, S., Sink, K., **Wadley, V.**, Williamson, J., Pajewski, N. What is the best question? The Functional Activity Questionnaire in the Systolic Pressure Intervention Trial (SPRINT) and SPRINT-MIND. Accepted for presentation at the 8th Annual Meeting of Clinical Trials in Alzheimer's Disease, San Diego, CA, December, 2016.
- Sink, K.M., Chelune, G., Coker, L., Gaussoin, S., Lerner, A., Nichols, L., Pajewski, N.M., Rapp, S., **Wadley, V**., Williamson, J. The Montreal Cognitive Assessment (MoCA) in 8,724 SPRINT participants: Implications for use as a screening tool in clinical trials. Accepted for presentation at the 8th Annual Meeting of Clinical Trials in Alzheimer's Disease, San Diego, CA, December, 2016.

5. **Presentations at public (non-scientific) meetings or events**

Geldmacher, David
- Neuroscience Café (sponsored by UAB Comprehensive Neuroscience Center) Hoover, AL
- Osher Lifelong Learning Institute – Birmingham Chapter, Vestavia Hills, AL

Herskowitz, Jeremy
- Atlanta Science Festival Science Expo. Booth "Exploring the Microscopic World"

Lubin, Farah
- F.D. Lubin. Summer Health Enrichment Program (SHEP) at the UAB School of Medicine. Invited by Dr. Marquita Hicks.
- F.D. Lubin. My Scientific Life path. The Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) Chapter at UAB. Invited by Ricardo Sanchez.
- F.D. Lubin. My scientific Journey. UAB Program for Research Experience in Pathology (PREP). Invited by Dr. Cristin Gavin.
- F.D. Lubin. Summer Health Enrichment Program (SHEP) at the UAB School of Medicine. Invited by Dr. Marquita Hicks.

Parpura, Vladimir
- "Glia-more than cement", Outreach talk, Hong Kong Biotech Horizons "Health-Longevity-Brain", Honk-Kong (live audio-video transmission on the web; 9D technology; see summary clip https://drive.google.com/file/d/0B2MRWpiGJFxNa21tRzdjVTdCZ3c/view?pref=2&pli=1

Pozzo-Miller, Lucas
- Presenter for the *Neurobiology of Social Behavior* press conference at the Society for Neuroscience Annual Meeting (selected scientific abstract)
- *Neuroscience Café*, UAB Comprehensive Neuroscience Center, Hoover Public Library

Standaert, David G.
- Partners for Parkinson's, panelist for 'Parkinson's Research: The Road Ahead' (Birmingham, AL) World Parkinson Congress, Leader of Roundtable on continuous levodopa therapy

6. **Awards**

Day, Jeremy
- **Avenir Award from National Institute on Drug Abuse (began July 1st, 2015)** Early-career award supporting investigators proposing highly innovative studies that open new areas of research for the genetics or epigenetics of addiction
- **Pittman Scholar, UAB School of Medicine**
  Early-stage investigator award highlighting research accomplishments at UAB School of Medicine

Gavin, Cristin

- Blaze Leadership Academy
- National Academy of Academic Advisors (NACADA) – Outstanding Faculty Advisor
- UAB Outstanding Academic Advisor, Faculty
- Honors College Faculty Fellow

Herskowitz, Jeremy
College of Arts and Science and School of Medicine Interdisciplinary Team Award, University of Alabama at Birmingham

Lubin, Farah
- Excellence in Editing/Reviewing- Neurobiology of Learning and Memory J
- American Epilepsy Society Basic Sciences Committee

Overstreet-Wadiche, Linda
- Deans Excellence Award for Mentorship

Parpura, Vladimir
- Nomination, School of Medicine, Dean's Excellence Award in Teaching, Senior Faculty

Visscher, Kristina
- Kavli/National Academy of Sciences Frontiers in Science Fellow
- NIH/NEI Sensory and Perceptual Processing study section

7. **External collaborations with other McKnight Institutes, institutions and research programs**

Lubin, Farah
- Carol Barnes - University of Arizona
- Matt Huentelman

Overstreet-Wadiche, Linda
- Jacques Wadiche, UAB
- Gwen King, UAB
- Jeremy Day, UAB

Nakazawa, Kazu
- John Hablitz's lab for assessment of P/Q-type Ca^{2+} channels in slice preparation.
- David Standaert's lab for extracellular dopamine measurement by *in vivo* brain microdialysis.
- Lynn Dobrunz's lab for the effect of reduced GABA levels on hippocampal physiology

Roberson, Erik
- Interinstitutional working group on perirhinal cortex

Visscher, Kristina
- McKnight MRI Standardization Workgroup
- Adam Woods – University of Florida
- McKnight Brain Aging Registry

8. Collaborative programs with non-McKnight institutes, institutions and research programs

Day, Jeremy
A. Within the UAB system
- Rita Cowell, UAB

Project to use CRISPR/Cas9 technology to regulate PGC-1a function in parvalbumin interneurons

B. Outside the UAB system
- Sarah Clinton, Virginia Tech

Project using whole-genome sequencing approaches to identify epigenetic modifications in rat models of emotional behavior
- David Sweatt, Vanderbilt

Project to characterize extra-coding RNAs in neuronal systems
- Brandon J. Aragona, University of Michigan

Project investigating epigenetic mechanisms in social attachment in prairie voles
- Charles Gersbach, Duke University

Project using CRISPR/Cas based systems for epigenetic editing
- Chris Newland, Auburn University

Project using whole genome sequencing to identify epigenetic signatures of developmental methylmercury exposure

Lubin, Farah

A. Within UAB
- Standaert Lab
- Chatham Lab
- Ver Hoef Lab
- Riley Lab
- Riddle Lab
- Roberts Lab
- Gamble Lab
- Cowell Lab
- Mobley Lab

B. Outside of UAB
- Harold Sontheimer, VA Tech
- Sarah Clinton – VA Tech
- Nguyen – University of Toronto
- Huentelman - Tgen
- Nigel Jones – University of Melbourne, Australia
- Robert Lipsky - INOVA
- Molly Meffert – John Hopkins
- Laura Schrader – Tulane University

Nakazawa, Kazu
- Dr. Kim Q. Do at University of Lausanne Hospital, Switzerland, for assessment of oxidative stress in NMDAR KO mutant model.
- Dr. Tim Bussey at University of Cambridge, UK, for the cognitive battery tests using NMDAR KO mutant mice.
- Dr. Kenji Hashimoto at Chiba University, Japan, for electrophysiological assessment of psychotomimetic action by ketamine-related compounds.
- Dr. Hiroyuki Nawa at Niigata University, Japan, for transcriptional profiling of auditory cortex under the pro-psychedelic cortical state.

Overstreet-Wadiche, Linda

A. Within the UAB system
- Candace Floyd, UAB
- Karen Gamble, UAB

B. Outside the UAB system
- Brad Aimone, Sandia Labs
- Roberto Panichi, University of Perugia, Italy
- Chay Kuo, Duke University
- María Llorens-Martín, Madrid

Pozzo-Miller, Lucas

A. Within the UAB system
- Sandipan Pati (Neurology)

- Alan Percy (Pediatrics)
- Manimaran Ramani (Pediatrics)
- Victor Mark (Physical Medicine and Rehabilitation)
- Ed Taub (Psychology)
- Gitendra Uswatte (Psychology)

B. Outside the UAB system

- Frank Longo Stanford University, San Francisco, CA
- Tien-Le Xu, Jiao-Tong University, Shanghai, China
- James Eubanks, Toronto Western Hospital, Canada
- Alan Kozikowski, University of Illinois
- Steve Gray, University of North Carolina at Chapel Hill
- Suzanne Oberholster, Sanford University, Birmingham, AL
- Takafumi Inoue, Easeda University, Tokyo, Japan
- Arturo Romano, University of Buenos Aires, Argentina

Roberson, Erik

- Mark Suto and Corinne Augelli-Szafran, Southern Research
- Harry Sontheimer, Virginia Tech
- Rick Myers and Nick Cochran, HudsonAlpha
- Tim Kraft, UAB
- Lori McMahon, UAB

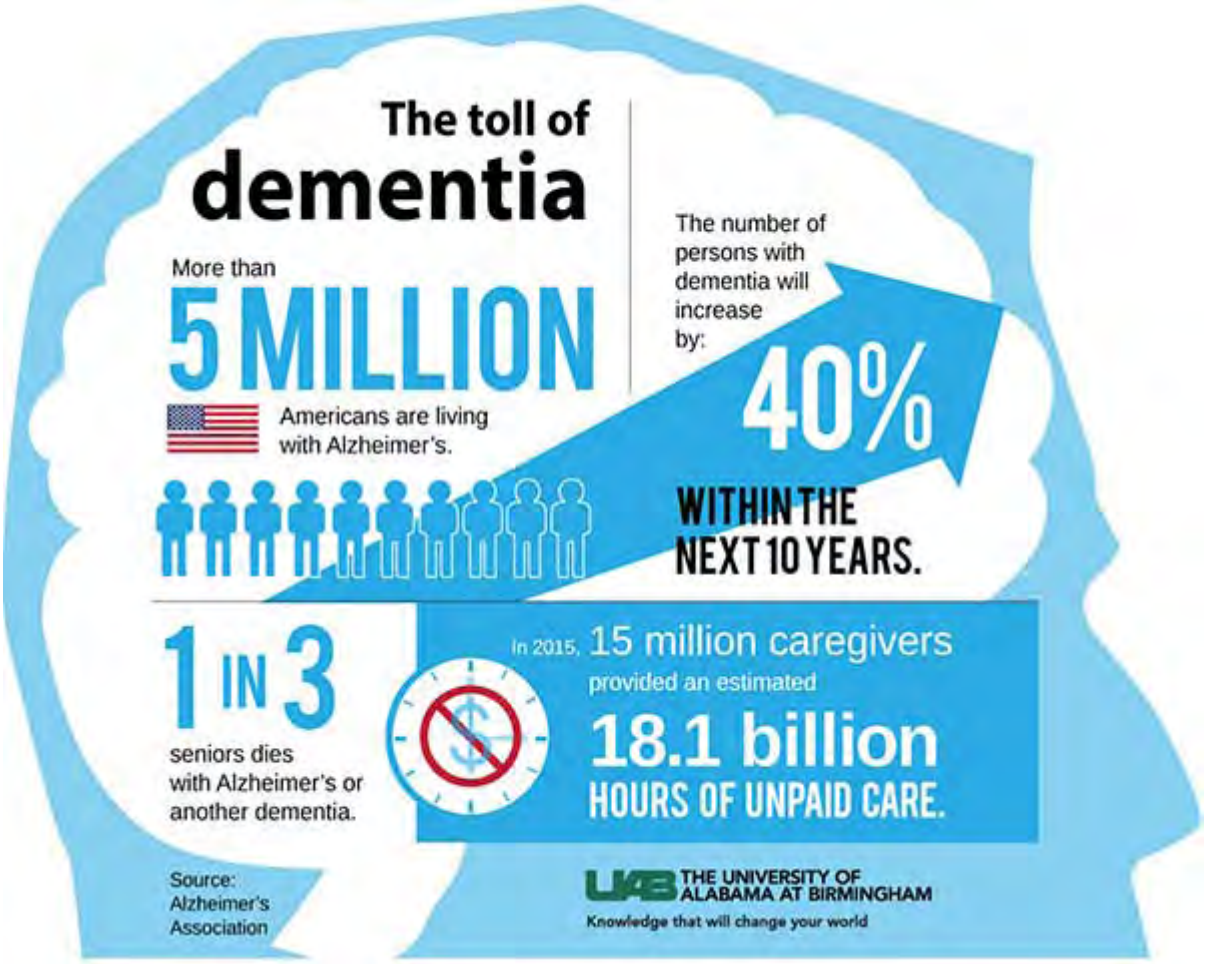
APPENDICES

Alzheimer's disease family caregivers will get telemedicine training

by Jeff Hansen

- November 03, 2016

A UAB study will test whether training to modify care-resistant behavior can improve quality of life for family caregivers of dementia patients.



Patients with Alzheimer's disease or dementia from traumatic brain injury may resist care efforts from family members, such as taking a bath, taking medicine, routine mouth care, abstaining from alcohol or going to a medical appointment.

When this resistance is accompanied by agitation, aggression and irritability, it can trigger distress and health issues among family members, reducing their quality of life and increasing the cost of care for the affected person.

Armed with preliminary evidence that professional caregivers can be taught strategies to alter such behavior, University of Alabama at Birmingham researchers are now launching a three-year study to see if family caregivers can benefit from those same strategies.

The hope is that six weeks of personalized coaching, via phone or online, will reduce the burdens felt by the caregivers of family members with dementia.

"We want to know what the family needs are. How do we meet those family needs?" said David Geldmacher, M.D., professor of the UAB Department of Neurology and director of the Division of Memory Disorders and Behavioral Neurology. "Where do they see gaps? What limits their quality of life?"

The need to help family caregivers of dementia patients is immense. According to the Alzheimer's Association, more than 5 million Americans are living with Alzheimer's, and in 2015, more than 15 million caregivers provided an 18.1 billion hours of unpaid care.

Each family will be trained by Rita Jablonski-Jaudon, Ph.D., associate professor in the UAB School of Nursing and a nurse practitioner in UAB Memory Disorders Clinic, and Vicki Winstead, program manager in the School of Nursing.

Caring for a family member

Jablonski-Jaudon has firsthand experience, as a researcher, clinician and daughter-in-law.

"I cared for my mother-in-law, who had early stage dementia," she said. "We had to move her from her home to ours. After a particularly rough and humbling week, I remarked to a colleague, 'I am considered a nursing and research expert in dementia; if I'm struggling, how much harder is this for other caregivers?'"

In nursing home research of older adults with dementia, Jablonski-Jaudon and her staff were able to use specific behavioral techniques to minimize care-resistant behavior.

"We were focused on mouth care, the one activity that consistently triggers resistance to care in persons with dementia," Jablonski-Jaudon said, adding that those techniques were useful to counter a variety of refusal behaviors.

Jablonski, Geldmacher

In the current study of family-member caregivers, the UAB team will enroll 50 families of patients with behavioral and psychological symptoms of dementia, and 25 families of patients with traumatic brain injury, or TBI, who have behavioral symptoms that are triggered by caregiver requests. All families will come from patient pools at UAB's Kirklin Clinic and Spain Rehabilitation Center.

Family members will be able to watch short videos that cover many of the topics and questions Jablonski-Jaudon has encountered in her outpatient clinics. The videos show techniques to prevent and minimize care-resistant behavior, and family-member caregivers will also receive six, once-a-week coaching sessions, via the GoToMeeting computer app. This will enable face-to-face discussion at convenient times for the families, without the need to travel away from home.

A need to help veterans

The UAB study is funded by a $500,000 grant from the U.S. Department of Defense. The Pentagon is interested in dementia for two reasons, Geldmacher says: Surviving World War II and Korean War veterans are growing ever older, and TBI — a risk factor for dementia — is an important type of injury from the Iraq and Afghanistan wars.

Geldmacher says his team will characterize the nature of the problem for each caregiver family. After Jablonski-Jaudon and Winstead finish their coaching, outcomes will be measured by objective data, such as the number of emergency room visits, and self-reported data, using the standard dementia quality of life surveys. There will also be a long-term follow-up at six, 12 and 18 weeks after the coaching.

"So much is based on an individual's perceived quality of life," Geldmacher said. "Something that helps one caregiver family might make another family worse. We anticipate that the study will mostly be families where a child takes care of a parent."

Geldmacher says he used to give dementia patients periodic exams, and he would usually have to tell the family that the patient was getting worse. That routine was jolted when the son of one patient said, “We know she is getting worse. What can we do?”

That challenge changed Geldmacher’s focus. He began to question how well he was treating the family’s quality of life and how he might better help family caregivers.

At UAB, Geldmacher holds the Patsy W. and Charles A. Collat Endowed Professorship in Neuroscience.

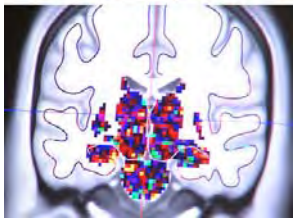
> “I cared for my mother-in-law, who had early stage dementia… After a particularly rough and humbling week, I remarked to a colleague, ‘I am considered a nursing and research expert in dementia; if I’m struggling, how much harder is this for other caregivers?’”
>
> —Rita Jablonski-Jaudon

Appendix B

UAB researchers use expanded computing power to accelerate big-data science by Jeff Hansen

Computing challenges are found across the UAB campus, from physics and neurology to genetics and the microbiome. Alabama's most advanced supercomputer is now at UAB, making it possible to solve these challenges.

Kristina Visscher is using fMRI images from several hundred brains to learn how the brain adapts after long-term changes in vision.



What do the human brain, the 3 billion base-pair human genome and a tiny cube of 216 atoms have in common?

All of them, from the tiny cube to the 3-pound human brain, create incredibly complex computing challenges for University of Alabama at Birmingham researchers, and aggressive investments in UAB's IT infrastructure have opened new possibilities in innovation, discovery and patient care.

For example, Kristina Visscher, Ph.D., assistant professor of neurobiology, UAB School of Medicine, uses fMRI images from several hundred human brains to learn how the brain adapts after long-term changes in visual input, such as macular degeneration. Frank Skidmore, M.D., an assistant professor of neurology in the School of Medicine, studies hundreds of brain MRI images to see if they can predict Parkinson's disease.

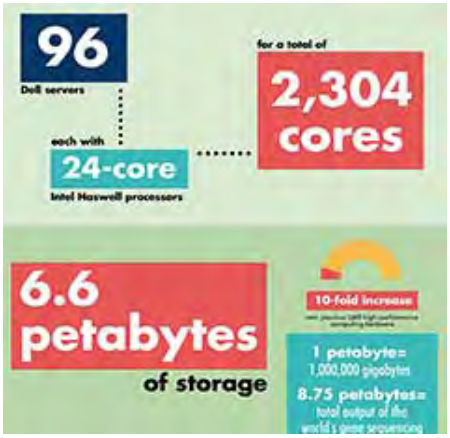
David Crossman, Ph.D., bioinformatics director in UAB's Heflin Center for Genomic Science, deciphers the sequences of human genomes for patients seeking a diagnosis in UAB's Undiagnosed Diseases Program, and he processes DNA sequencing for UAB researchers who need last-minute data for their research grant applications.

Ryoichi Kawai, Ph.D., an associate professor of physics in the UAB College of Arts and Sciences, is laying the groundwork for a better infrared laser by calculating the electronic structure for a cube made up of just 216 atoms of zinc sulfide doped with chromium or iron.

Each researcher faces a mountain range of computational challenges. Those mountains are now easier to scale with UAB's new supercomputer — the most advanced in Alabama for speed and memory.

The tiny cube

The 216-atom electronic structure problem "is the largest calculation on campus, by far," Kawai said. "If you give me 2,000 cores, I can use them. If you give me 10,000 cores, I can use them all without losing efficiency." (UAB's new supercomputer has 2,304 cores.)



Learn more about UAB's new supercomputer in this story

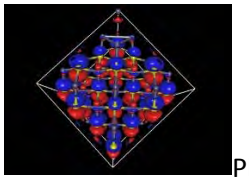
Using 1,000 cores, it would take two to three months of continuous computing to solve the structure, Kawai says. Both the increased number of cores and faster processing nodes in the new computer cluster will speed up that task so much that Kawai's graduate student Kyle Bentley can investigate more different cases.

Brains

In their research, both Skidmore and Visscher have to compare brains with other brains. Because each brain differs somewhat in size, shape and surface folds, every brain has to be mapped onto a template to allow comparisons.

Physicist Kawai describes his computations as the most intensive on campus. "We want to capture information in an image, such as information on an individual's brain condition," Skidmore said. "The information we are trying capture, however, can often be difficult to see in the sea of data we collect. One brain may contain millions of bits of data in the form of 'voxels,' which are a bit like the pixels on your TV but in three dimensions."

"When we map to a template," Skidmore said, "we quadruple the data. When we ask, 'How does this compare to a healthy brain?' we double the data again. Then if we look across one brain or across multiple kinds of brain images, the amount of data truly explodes."


Physicist Ryoichi Kawai's complex calculations of the electronic structure of a cube of atoms are laying the groundwork for better lasers. "This is made even more complex by the fact that a given image can include more than three dimensions of information," he said. "One type of image we use generates 5-dimensional brain maps. Since we can't see in five dimensions, we ask the computer to work in these higher-dimensional spaces to help us pull the information out of the data."

To look at the adult brain's plasticity — the ability to change function and structure through new synaptic connections — Visscher studies visual processing.

"Because we look at spatial and temporal data, the number of pieces of information is huge — gigabytes per subject," she said. "We need to do correlations on all the data points at the same time. To get faster, we optimize the data analysis with a lot of feedback. Then we run what we learned from one brain on a hundred brains."

UAB customers

Crossman deciphers the sequences of human genomes for patients seeking a diagnosis, and he processes DNA sequencing for UAB researchers. Providing excellent customer service to his clients is vital, Crossman says, and it takes computer power to crunch genome sequencing data for those researchers, physicians and patients.

Managing traffic on the new UAB computer cluster

Size:

- The new cluster has 2,304 cores. It also has eight accelerators, composed of four Nvidia K80 GPU cards and four Intel Xeon Phi 7210 accelerators.

Queues:

- While one could use all of these processors as a single job, a queuing system exists to make sure one user does not take over the entire cluster. The different number of cores used in a queue are allocated based on the users' requests.

Scheduling

- User jobs differ in terms of how many cores they need and how long each job takes to run. To balance these conflicting demands, a scheduler considers the availability of the cores, how many jobs a user is already running and how long the new job will run.

The new supercomputer "will drastically improve our computing capacity from what we have had," Crossman said. "With the old cluster, my job might sit in a queue for a couple of weeks. With undiagnosed diseases, that is not acceptable because that's a patient." "And I cannot tell a researcher, 'I'm sorry, we won't meet that grant deadline,'" Crossman said. "You know, science can't stop."

The data floodgates of genomics burst open about a dozen years ago with the arrival of next-generation, high-throughput sequencing, says Elliot Lefkowitz, Ph.D., director of Informatics for the UAB Center for Clinical and Translational Science. Lefkowitz has been serving the bioinformatics needs of the UAB Center for AIDS Research for 25 years, and now also handles bioinformatics for the UAB Microbiome Facility. His team has grown to five bioinformaticians and several programmers.

"We deal with billions of sequences when we do a run through the DNA sequencing machine," Lefkowitz said. "We need to compare every one of the billion 'reads' (the 50- to 300-base sequence of a short piece of DNA) to every other one. With high-performance computing and thousands of nodes, each one does part of the job."

"In not too many years," Lefkowitz speculated, "we will be sequencing every patient coming into University Hospital."

Changes like that mean ever-increasing computer demands.

"Biomedical research," Crossman said, "now is big data."

Molecular Scissors.....

Molecular scissors could point the way to genetic cures

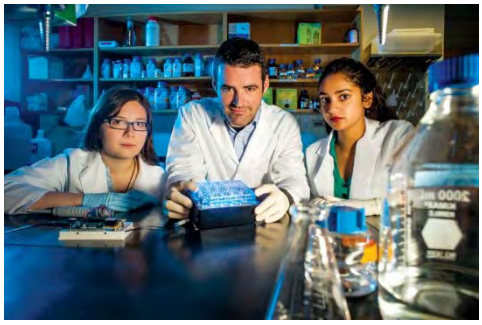
By Erin Burns, Amber Guidry, Nicholas Potochick, and Charles Buchanan • Photos by Steve Wood

Guan-En Graham is determined to find out exactly what happened to her father. When she was a child, he developed brain cancer. Since then, she has worked to understand the intricate genetic mechanisms that trigger brain diseases so that one day, perhaps, she can shut them down for good.

Now Graham might have the tool to do it. In the lab of Jeremy Day, Ph.D., the sophomore neuroscience major from Las Vegas is part of a UAB research team investigating CRISPR, a piece of gene-editing technology that could have the potential to prevent disease before patients start to suffer.

Precise and Programmable

CRISPR, or Clustered Regularly Interspaced Short Palindromic Repeats, is essentially a pair of molecule-sized programmable scissors—scissors that work on the DNA inside living cells. In the few years since scientists have refined the technology, CRISPR has revolutionized gene editing.



Jeremy Day (center) and undergraduate students Guan-En Graham (left) and Jasmin Revanna (right) use CRISPR technology to illuminate the power and reach of epigenetic modifications in brain diseases.

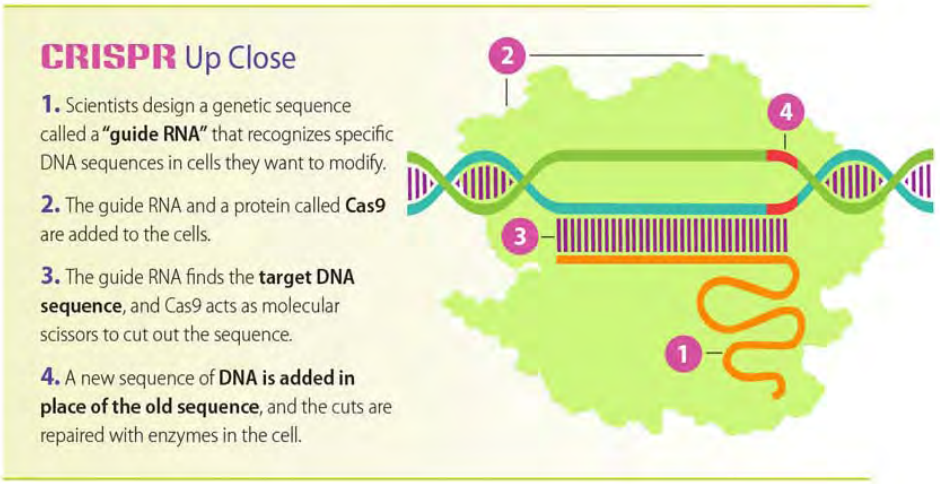
The concept of adding, deleting, or otherwise altering an existing DNA sequence is nothing new; scientists have done it in laboratories for decades. But earlier gene-editing technologies can produce “off-target” effects, unintentionally tinkering with other pieces of DNA. CRISPR is more precise, efficient, versatile, and affordable than its predecessors, which has changed how scientists address questions and the speed in which they answer them.

Day, a UAB School of Medicine assistant professor of neurobiology, studies epigenetics, a group of molecular modifications that influence gene activity without changing the DNA sequence. CRISPR enables his research group “to explore how epigenetic modifications affect expression of specific genes. The ability to express genes in a selective fashion gives rise to the amazing diversity of cell types that we possess.”

Jasmin Revanna, another neuroscience major working with Day, describes the work as “changing ‘tags’ on DNA that affect its function in the cell.” The goal is to discover the roles those tags, or epigenetic modifications, play in diseases that don’t result from

DNA mutations, adds the freshman from Jacksonville, Alabama.

“We are applying this to addiction-related diseases to understand how drugs of abuse engage the epigenome to generate long-term alterations in neuron function and behavior,” Day says. The findings could lay the groundwork for a variety of CRISPR-related epigenetic treatments—perhaps boosting or restoring memories for Alzheimer’s patients or tamping them down for people with post-traumatic stress disorder. “While our current studies are in their infancy, this technology is a huge leap forward,” Day says.



Cut, Paste, Treat

CRISPR originated in certain bacteria, where it functions as protection against invading viruses. Essentially, it’s a “highly efficient and specific” cellular immune system, explains Tim Townes, Ph.D., professor of biochemistry and molecular genetics in the UAB School of Medicine. The molecular mechanism recognizes viral DNA and cuts it up to prevent the virus from replicating inside the bacteria.

Where CRISPR cuts DNA, researchers can delete or insert a DNA sequence. Townes’s lab has applied this technology to successfully correct the genetic mutation causing sickle cell disease (SCD), which can cause chronic pain and organ damage. Current SCD treatments are lifelong and can have severe side effects.

“All patients with SCD have the exact same mutation in the exact same location on the exact same gene—meaning we need to correct only one mutation in the bone marrow cells to cure someone of this condition forever,” Townes says. The process involves retrieving bone marrow cells from the patient, treating the genes, and then implanting the cells back into the patient. Because the cells are the patient’s own, there would be no need for a transplant or risk of rejection. “With CRISPR we have an effective rate of correction for the sickle cell mutation between 30 and 50 percent. Just that portion of cells is enough to cure someone of sickle cell,” Townes says.

Currently, each baby born in the United States is tested for the sickle mutation, allowing researchers to know within a month whether the baby will develop the disease. SCD symptoms typically do not appear until children are a year old, “which leaves 11 months to

cure them, and they may never have to experience the disease," Townes says. A similar approach could benefit patients with other diseases. In published research, Townes and his team have shown how they used CRISPR to correct the DNA that triggers severe combined immunodeficiency disease, in which children are born with no immune response.

A Key to Personalized Medicine

Both Townes and Day expect human clinical trials of CRISPR-based therapeutics to begin in the next few years. Genetic disorders arising from single-gene mutations, like SCD, are ideal CRISPR candidates because they require only one small correction to be made, and the correction is always the same. However, most genetic disorders aren't so simple, involving complex mutations in multiple genes. As CRISPR technology improves, it may be adaptable for a wider range of disorders, and both Townes and Day predict that it will play a key role in the development of personalized medicine, with treatments tailored to each patient's genetic makeup.

Researchers led by Tim Townes (left) have used CRISPR (illustrated above) to correct the genetic mutation causing sickle cell disease—a discovery that points to a potential cure.

Babies born in Alabama hospitals currently are tested for 35 diseases, "but for about the same price, we could sequence their genome" and pinpoint genes that put them at risk for disease, Townes says. Then, "long before someone develops one of these genetic predispositions, we could correct the gene so that they never experience that disease," Townes says.

Even when gene editing is difficult or impossible, CRISPR's ability to introduce desirable epigenetic modifications may become highly useful, Day adds. "This will be possible in several years as we develop our basic understanding of how epigenetic marks regulate single genes."

Safety Monitors

Could CRISPR lead science down a slippery slope, with people wanting to alter their genes—or their children's genes—for cosmetic reasons, for example? Safety and ethical considerations are key to CRISPR's progress, Day and Townes say. "We already use many different therapeutics that are capable of altering how our genes are expressed and capable of producing long-term effects," Day says. "The ethical considerations that arise have more to do with the application of technology than with the technology itself. Ultimately, the benefits of CRISPR will outweigh potential risks, provided there is adequate screening and careful observation."

Townes agrees, noting that "overall the scientific community has done well in regulating these new technologies and not acting irresponsibly."

The Food and Drug Administration, which must approve any clinical trial of CRISPR in humans, also is developing regulations on

safety and the use of gene-editing technology.

• Learn more about the ground breaking research and educational opportunities in the UAB Department of Neurobiology and Department of Biochemistry and Molecular Genetics.

Published October 2016

Extra-coding RNAs regulate DNA methylation in the adult brain

by Jeff Hansen

- July 07, 2016
- Print
- Email

The ecRNAs appear to act in memory formation, and may offer a new therapeutic approach to neuropsychiatric diseases.

The creation of memories in the brain involves addition or removal of methyl groups at precise spots on chromosomal DNA. But what controls the careful targeting of these neuronal DNA methylation dynamics?

The key appears to be a special form of RNA called extra-coding RNA, or ecRNA, according to Jeremy Day, Ph.D., and colleagues at the University of Alabama at Birmingham and Purdue University. The ecRNAs, they say, are fundamental regulators of DNA methylation patterns in the adult brain through interaction with DNA methyltransferase enzymes, and the ecRNAs may offer a promising future therapeutic avenue to treat neuropsychiatric disease states associated with changes in DNA methylation, as they report in the July 7 issue of Nature Communications.

To demonstrate the critical role for ecRNA-directed methylation, first author Katherine Savell, a graduate student in the Day lab, blocked one specific ecRNA for the Fos gene locus in the hippocampus of the rat brain. Decrease in this specific ecRNA prevented formation of a long-lasting fear memory, where rats learn to associate mild electrical shocks with a particular place. This highlights a potential role for ecRNAs in cognitive function of the brain.

As the name suggests, ecRNA partially overlaps with a gene sequence that produces messenger RNA; but it also includes RNA sequences from DNA beyond the gene boundary. Each ecRNA is specific to the gene it overlaps. Experiments by the UAB researchers included both a broad, genomewide look at ecRNAs and gene expression, and a detailed example using the Fos gene locus.

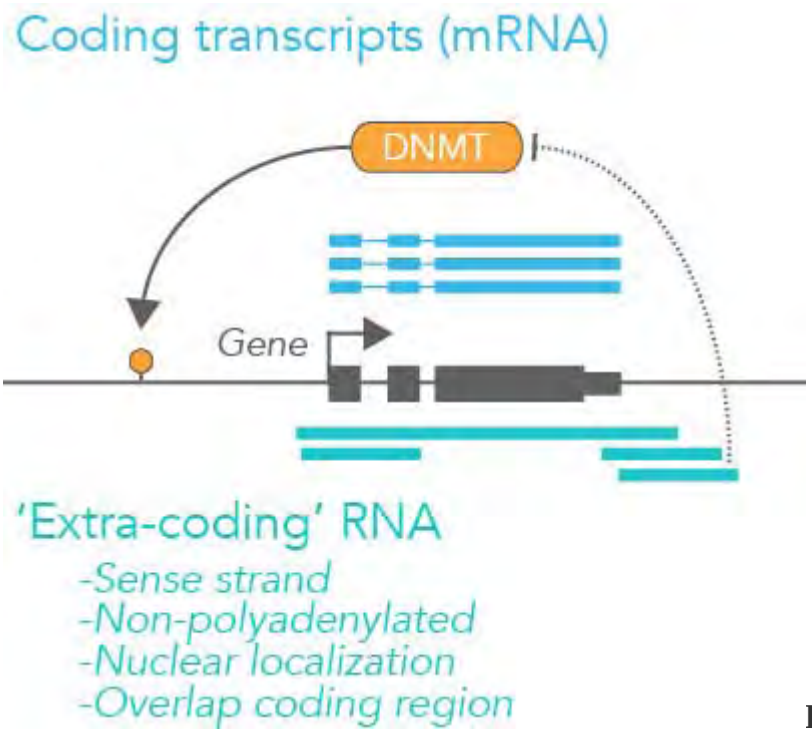
Genomewide experiments

The researchers performed genomewide classification of neuronal ecRNAs and showed ecRNA species are generated from genes that are vital for nerve cell responses to stimulation. Treating neurons with drugs that increase or decrease neuronal activity modified ecRNA production.

This novel genomewide evidence showed that, in the absence of ecRNA production, genes tended to have methylated promoters and were silent, meaning they did not produce messenger RNA. On the other hand, genes that generated ecRNAs had demethylated promoters and actively produced messenger RNA.

The researchers showed these relationships between ecRNA production and gene activity in neurons included genes whose expression is altered by neuronal activity and genes implicated in developmental and neurodegenerative disorders.

Thus, ecRNAs are one of the first potential mechanisms for activity- and experience-dependent alterations of DNA methylation status at specific genes in brain neurons.



Detailed example

The researchers also provided a detailed analysis of ecRNAs arising from the Fos gene locus. They found that:

- The Fos ecRNAs bound tightly to DNA methyltransferases.
- DNA methylation states at Fos were altered after an increase in ecRNA.
- Fos ecRNAs had a distinct synthesis and regulation as compared with Fos messenger RNA, and knockdown of Fos ecRNA increased DNA methylation and repressed Fos messenger RNA.
- Fos ecRNA was induced by memory-forming experiences in rats, and knockdown of Fos ecRNA in a region of the rat hippocampus significantly impaired long-term memory formation after contextual fear conditioning.

A model and therapeutic potential

Day and colleagues propose a model where ecRNAs directly interact with the catalytic domain of DNA methyltransferases to block the ability of the methyltransferases to target and silence the overlapping gene for each specific ecRNA.

The model requires the ecRNA to stay near or at the gene after synthesis in order to regulate the methyltransferases just at that gene location. One possibility, the researchers say, is that the ecRNAs have a very short half-life, so they would disappear before moving very far from a specific gene. A second, more intriguing possibility is that the ecRNAs form a triplex structure with DNA that stabilizes and anchors the ecRNA at the gene location.

The researchers also note that many neuropsychiatric and neurological diseases are associated with chronic alterations of specific gene products in neurons. Targeting ecRNAs in the brain could be an attractive therapeutic approach to reorganizing epigenetic landscapes at specific genes, thus alleviating longstanding pathologies associated with dysfunctional methylation patterns.

Besides Day, authors of the Nature Communications paper, “Extra-coding RNAs regulate neuronal DNA methylation dynamics,” are Katherine E. Savell, Nancy V.N. Gallus, Rhiana Simon, Jordan Brown, Jasmin S. Revanna, Mary Katherine Osborn, Esther Y. Song, John J. O’Malley, Christian T. Stackhouse and J. David Sweatt, all of the UAB Department of Neurobiology and the Evelyn F. McKnight Brain Institute; and Allison Norvil and Humaira Gowher, Purdue University Department of Biochemistry.

Day is an assistant professor in the UAB Department of Neurobiology and the Evelyn F. McKnight Brain Institute.

This work was supported by NIH grants DA034681, DA039650, MH091122 and MH57014; DARPA grant HR0011-12-1-0015; and start up funds from UAB and the Evelyn F. McKnight Brain Research Foundation.

List of Seminar Speakers sponsored by the Evelyn F. McKnight Brain Institute at UAB

Evelyn F. McKnight Brain Institute Seminars 2016		
01-28-2016	Laura Ranum, Ph.D. Professor University of Florida	"RAN translation in neurologic disease : lessons from SCA8, C9orf72ALS/FTD and HD"
02-25-2016	Garret Stuber, Ph.D. Assistant Professor University of North Carolina, Chapel Hill	"Dissecting the Neural Circuits that Mediate Motivated Behaviors"
03-10-2016	Charles Gersbach, Ph.D. Associate Professor Duke University	"Genome and Epigenome Editing for Gene Therapy, Programming Cell Phenotype and Functional Genomics"
Symposium 03-17-2016	Arne Schousboe, Ph.D. Professor University of Copenhagen, Denmark	"Astrocytes in GABA homeostasis and epilepsy"
	Nina Vardjan, Ph.D. Assistant Professor University of Ljubljana, Slovenia	"Beta-adrenergic activation: modulation of astrocyte excitability, morphology and metabolism"
	Robert Zorec, Ph.D. Professor University of Ljubljana, Slovenia	"Astrocytic vesicle dynamics in Alzheimer's disease"
	Vedrana Montana, Ph.D. Associate Professor University of Rijeka, Croatia	"Metabolic regulation of vesicular glutamate release from cultured astrocytes"
	Vidar Gundersen, M.D., Ph.D. Professor University of Oslo, Norway	"Microglia – neuron contacts in the brain"
	Linda H. Bergersen, Ph.D. Professor University of Oslo, Norway	"Lactate transport and reception action in the brain: rescue of cognitive decline"
	Helle Waagepetersen, Ph.D. Professor University of Copenhagen	"Regulation of astrocyte energy metabolism by AMPK and Ca+"
Symposium 04-21-2016	Christopher Cowan, Ph.D. Harvard University	"Regulation of cortical synapse balance in intellectual disabilities and autism"
	Brian Dias, Ph.D. Emory University	"Ancestral imprints on descendant neurobiology

	Elisabeth Dykens, Ph.D. Vanderbilt University	"Reducing stress in parents of children with developmental disabilities"
	Marcel Just, Ph.D. Carnegie Mellon University	"Autism as a neural systems disorder: A theory of frontal-posterior underconnectivity"
	Ian Maze, Ph.D. Icahn School of Medicine at Mount Sinai	"Histone monoaminylation in the developing and adult brain: novel mechanisms of 'epigenetic' plasticity"
	A. J. Robinson, Ph.D. Mississippi State University	"Transcriptional mechanisms of normal and pathological hippocampal function"
	Stephan Sanders, Ph.D. University of California, SF	"From genes to etiology in autism"
05-03-2016	MacKenzie Howard, M.D. University of California, SF	"Therapeutic interneuron transplantation drives neural plasticity"
05-04-2016	Florian Plattner, Ph.D. UT Southwestern	"Intracellular signaling mechanisms underlying memory enhancement"
05-11-2016	Jason J. Yi, Ph.D. University of North Carolina,	"Tracing a molecular pathway to autism"
05-18-2016	Aaron McGee, Ph.D. University of Southern CA	"Genetic regulation of critical periods for neural plasticity"
07-29-2016	Gyorgy Lur, Ph.D. Yale School of Medicine	"Function and Regulation of Layer 5 Cortical Subnetworks"
08-29-2016	Andrew Trevelyan Newcastle University	"Opogenetic manipulation of inhibitory restraints on activity in cortical networks"
09-08-2016	Jorge J. Palop, Ph.D. University of California, SF	"Interneuron Dysfunction and Network Abnormalities in Alzheimer's disease"
09-15-2016	Anthony Hannan, Ph.D. Florey Institute of Neuroscience	"Gene-environment interactions mediating experience-dependent plasticity in the healthy and
09-22-2016	Selva Baltan, M.D., Ph.D. Cleveland Clinic, Lerner Research	"Epigenetic regulation of white matter stroke"
10-13-2016	Thomas Kukar, Ph.D. Emory University	"Targeting Progranulin to Treat Frontotemporal Dementia Alzheimer's disease and Beyond"
10-27-2016	Laura Volpicelli-Daley, Ph.D. UAB	Mechanisms of pathogenic templating of alpha-synuclein"
11-03-2016	Maria Lehtinen, Ph.D. Boston Children's Hospital	"Instructive cues for neural stem cells in the cerebrospinal fluid"
12-01-2016	Vivek Unni, M.D., Ph.D. Oregon Health & Science	"Putting the nucleus back in synuclein: new mechanisms of neurodegeneration in Lewy body

Appendix F

Evelyn F. McKnight Endowed Chair

for Learning and Memory in Aging

The School of Medicine at the University of Alabama at Birmingham (UAB) invites applications and nominations for the position of Evelyn F. McKnight Endowed Chair for Learning and Memory in Aging.

The Evelyn F. McKnight Brain Institute at UAB has the long term goal of translating discoveries from basic biomedical research into processes and products to minimize the deleterious effects of normal aging on human learning and memory. The holder of the Evelyn F. McKnight Chair will engage in research and translational studies aligned with this goal. Candidates from a broad range of relevant neuroscience backgrounds will be considered, including both basic neuroscientists and clinicians with training in areas such as Neurology, Psychiatry, and Neuropsychology. Areas of study may include, but are not limited to, studies of the effects of aging on mechanisms of memory in model systems; studies employing biomarkers, imaging and related techniques to examine human cognitive aging; and interventional studies to address cognitive aging and memory decline. Qualified candidates should have an outstanding national and international reputation in research on age related memory disorders, as well as a record of transformative, collaborative, and visionary leadership. Candidates should be highly regarded as a research leader in his/ her fields. S/he will be a passionate supporter of diversity and inclusion programs.

The successful candidate will hold a senior faculty position at the Associate Professor or Professor rank in a neuroscience department (Neurobiology, Neurology, or Psychiatry), will be a part of the McKnight Institute leadership team at UAB and will represent UAB on the national McKnight Leadership Council. An outstanding resource package to support the position will be developed in accordance with the needs of the research programs planned.

With more than 1,200 full time faculty and almost 1,200 medical and graduate students, the UAB School of Medicine has grown into a world class, research intensive school consistently ranked in the top 30 of NIH ranked Schools of Medicine. The School of Medicine includes 26 academic departments, some rank in the top 10 nationally among academic departments in funding from the NIH. Its historical success in its teaching mission is reflected in the fact that 80% of physicians in Alabama owe their training to the School of Medicine.

Inquiries, nominations and applications are invited. Interested candidates should submit confidentially, in electronic form (Microsoft Word or Adobe PDF files preferred), a curriculum vitae and any supporting materials deemed relevant to:

Heather B. McGuire, MBA
hmcguire@uab.edu 205.934.1853

University of Alabama, Birmingham is an Equal Opportunity/ Affirmative Action Employer committed to fostering a diverse, equitable and family-friendly environment in which all faculty and staff can excel and achieve work/ life balance irrespective of race, national origin, age, genetic or family medical history, gender, faith, gender identity and expression as well as sexual orientation. UAB also encourages applications from individuals with disabilities and veterans.

A pre-employment background investigation is performed on candidates selected for employment. In addition, physicians and other clinical faculty candidates who will be employed by the University of Alabama Health Services Foundation (UAHSF) or other UAB Medicine entities, must successfully complete a pre-employment drug and nicotine screen to be hired.

Appendix G

BIOGRAPHICAL SKETCHES

BIOGRAPHICAL SKETCH

NAME **David Standaert**		POSITION TITLE Professor	
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	YEAR(S)	FIELD OF STUDY
Harvard University	A.B.	1982	
Washington University Sch of Med	M.D., Ph.D.	1988	Pharmacology

Positions

1992-1995	Research and Clinical Fellow in Neurology, Harvard Medical School, Boston, MA
1995-2000	Assistant Professor of Neurology, Harvard Medical School, Boston, MA
2000-2006	Associate Professor of Neurology, Harvard Medical School, Boston, MA
2006-2011	John T. and Juanelle D. Strain Professor of Neurology, University of Alabama at Birmingham, Birmingham, AL
2008-2011	Director, UAB Comprehensive Neuroscience Center
2006-2013	Director, UAB Center for Neurodegeneration and Experimental Therapeutics
2006-present	Professor of Neurobiology, UAB (secondary appointment)
2006-present	Professor of Cell Biology, UAB (secondary appointment)
2006-present	Faculty, UAB Medical Scientist Training Program
2006-present	Graduate Faculty, UAB
2006-present	Senior Scientist, UAB Center on Aging
2006-present	Senior Scientist, Civitan International Research Center
2006-present	Investigator, McKnight Brain Institute
2006-present	Faculty Member, UAB Integrated Genetics Program
2007-present	Senior Scientist, UAB Gene Therapy Center
2009-present	Senior Scientist, UAB Center for Clinical and Translational Science (CCTS)
2010-present	Professor of Pharmacology and Toxicology, UAB (secondary appointment)
2011-present	John N. Whitaker Endowed Chair in Neurology
2012-present	Senior Scientist, UAB Center for Exercise Medicine
2012-present	Senior Scientist, UAB Comprehensive Arthritis, Musculoskeletal and Autoimmunity Center
2016-present	Interim Director, Evelyn McKnight Brain Institute at UAB

Honors, Awards, and Advisory Committees

1988	Levy Prize in Neurology and Neurological Surgery, Washington University
1991	Zeritsky Residents Research Award in Neurology, University of Pennsylvania
1992	Physician Research Fellow, Howard Hughes Medical Institute
1992	Research Fellowship Award in Neuropharmacology, American Academy of Neurology
1993	Research Award, National Parkinson Foundation
1996	Cotzias Fellowship, American Parkinson Disease Association
2002	Thomas T. Hoopes prize (for mentor of Senior Thesis project), Harvard University
2008	Fellow, American Academy of Neurology
2008	First Place, Alabama Science and Engineering Fair (won by Anya Glandon, high school student mentored in lab)
2007-2016	“Best Doctors in America”

Publications (2016)

Calabresi P, Standaert DG, Chiasserini D, Parnetti L, Biomarkers in Parkinson's disease: From pathophysiology to early diagnosis. Mov Disord. 2016 Jun;31(6):769-70. doi: 10.1002/mds.26683. PMID: 27245116

Volpicelli-Daley LA, Kirik D, Stoyka LE, Standaert DG, Harms AS. How can rAAV-α-synuclein and the fibril α-synuclein models advance our understanding of Parkinson disease? J Neurochem. 2016 Mar 28. doi: 10.1111/jnc.13627. [Epub ahead of print] PMID: 27018978

Volpicelli-Daley LA, Standaert DG. Invisible Killers. Mov Disord. 2016 Jan;31 (1):44. doi: 10.1002/mds.26465. Epub 2016 Jan 9. PubMed PMID: 26748962.

BIOGRAPHICAL SKETCH

NAME **Jeremy J. Day**		POSITION TITLE Assistant Professor	
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	YEAR(S)	FIELD OF STUDY
Auburn University	B.A.	2000-2003	Psychology
University of North Carolina at Chapel Hill	M.A.	2004-2006	Psychology
	Ph.D.	2006-2009	Psychology
University of North Carolina at Chapel Hill		2009-2014	Neurobiology
University of Alabama at Birmingham			

Positions

2016-present	Interim Associate Director, Civitan International Research Center	UAB
2016-present	Scientist, Alzheimer's Disease Center	UAB
2015-present	Associate Scientist, Civitan International Research Center	UAB
2014-present	Graduate Faculty	UAB
2014-present	Assistant Professor, Dept. of Neurobiology (Primary)	UAB
2014-present	Assistant Professor, Dept. of Genetics (Secondary)	UAB
2014-present	Assistant Professor, Dept. of CDIB (Secondary)	UAB
2014-present	Assistant Professor, Dept. of Psychology (Secondary)	UAB

Honors, Awards, and Advisory Committees

Faculty

2016	Pittman Scholar, UAB School of Medicine
2015	Avenir Award, National Institute on Drug Abuse
2015	Early Career Travel Award, American College on Neuropsychopharmacology

Reviewer, grant proposals

2015	Parkinson's Disease Society of the United Kingdom, ad hoc reviewer
2015	National Science Foundation CAREER Awards, ad hoc reviewer
2015	NIH/NIDA Scientific Review Group ZDA1 JXR-G (16) R
2016	NIH/NIDA Scientific Review Group ZDA1 SXM-M (13) S

Postdoctoral Training

2013-2014	NIH-NIDA Pathway to Independence Award
2010-2013	NIH-NIDA National Research Service Award
2012	Poster Award, Winter Conference on Brain Research
2011	Travel Award, NIDA Frontiers in Addiction Research Mini-convention
2011	1st place, UAB Dept. of Neurobiology Retreat Postdoctoral Oral Presentation
2010	Scholars Award, UAB Office of Postdoctoral Education
2010	Faculty of 1000 Associate Faculty Member

Graduate Education

2006-2009	NIDA National Research Service Award
2009	Travel Award, Gordon Research Conference on Catecholamines
2009	Travel Award, Gordon Research Conference: Graduate Research Seminar on Catecholamines

2009 Irwin J. Kopin "Young Investigator" Award, Honorable Mention
2008 Poster Award, 12th Conference on In Vivo Methods in Neuroscience
2008 Transportation Grant, University of North Carolina Graduate School
2007 Travel Award, Gordon Research Conference: Graduate Research Seminar on Catecholamines

2007 Teaching Fellowship, University of North Carolina Graduate School
2006 Poster Award, 11th Conference on In Vivo Methods in Neuroscience
2004-2006 NIH Pre-doctoral Training Fellowship (T32 DA007244)

Undergraduate Education
2003 Summa Cum Laude, Auburn University
2003 Undergraduate Research Fellowship, Auburn University

Publications (2016)

1. Savell, K.E., Gallus, N.V.N., Simon, R., Brown, J., Revanna, J.S., Osborn, M.K., Song, E.Y., O'Malley, J.J., Stackhouse, C.T., Norvil, A., Gowher, H., Sweatt, J.D., & Day, J.J. (2016). Extra-coding RNAs regulate neuronal DNA methylation dynamics. *Nature Communications* 7: 12091.
2. Resendez, S.L., Keyes, P.C., Day, J.J., Hambro, C., Austin, C.J., Maina, F.K., Eidson, L., Porter-Stransky, K.A., Nevarez, N., McLean, J.W., Kuhnmeunch, M.A., Murphy, A.Z., Mathews, T.A., & Aragona, B.J. (2016) Dopamine and opioid systems interact within the nucleus accumbens to maintain monogamous pair bonds. *eLife* 5:e15325.
3. Kennedy, A.J., Rahn, E.J., Paulukaitis, B.S., Savell, K.E., Kordasiewicz, H.B., Wang, J., Lewis, J.W., Posey, J., Strange, S.K., Guzman-Karlsson, M.C., Phillips, S.E., Decker, K., Motley, S.M., Swayze, E.E., Ecker, D.J., Michael, T.P., Day, J.J., & Sweatt, J.D. (2016) Tcf4 regulates synaptic plasticity, DNA methylation, and memory function. *Cell Reports* 16:1-20.
4. Day, J.J. DNA modifications and memory. In: DNA Modifications in the Brain. Edited by: Tim Bredy. Elsevier Press (In Press).

BIOGRAPHICAL SKETCH

NAME **David S. Geldmacher**		POSITION TITLE Patsy and Charles Collat Endowed Professor	
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	YEAR(S)	FIELD OF STUDY
University of Rochester State University of New York	B.A.	1978	
Health Science Center at Syracuse Syracuse, New York	M.D.	1982 1986	

Positions

1991 - 1992	Assistant Professor of Neurology	Robert Wood Johnson School of Medicine, University of Medicine and Dentistry of New Jersey
1993 - 2001	Assistant Professor of Neurology	"
2001 - 2002	Associate Professor of Neurology	Case Western Reserve University
2002 - 2006	Associate Professor of Neurology (without term)	"
2006 - 2011	Harrison Distinguished Teaching Associate Professor of Neurology (without term)	University of Virginia School of Medicine
2011 – 2014	Patsy and Charles Collat Endowed Scholar in Neuroscience	"
2011 - present	Professor of Neurology (tenured) Professor of Neurobiology	"
2014 - present	Patsy and Charles Collat Endowed Professor in Neuroscience	University of Alabama at Birmingham

AWARDS/HONORS

Honors

2015	Alpha Omega Alpha Medical Honors Society, Inductee
2014	Who's Who in the World Selection
2014-current	America's Top Doctors Selection, Castle-Connolly, Inc.
2013	Appointment to Fellow, American Neurological Association
2011-current	Best Doctors listing, *Birmingham* magazine
2008	Election to Fellow, American College of Physicians
2006	Election to membership, American Neurological Association
2006	Leading Health Professionals of the World, Selection
2005	Appointment to Academy of Distinguished Educators, University of Virginia School of Medicine
2002-current	The Best Doctors in America Selection
1998	The Best Doctors in America Selection, Woodward/White, Inc.
1998	Top Doctors Listing, *Cleveland* Magazine
1982	Phi Beta Kappa, Inductee
1978-82	National Merit Scholar
1978-82	New York State Regents' Scholar
1978	Valedictorian, Southside HS, Elmira, NY

Awards

2012	Residency Teaching Award, Department of Neurology, University of Alabama-Birmingham
2003	Residency Teaching Award, Department of Neurology, University of Virginia
2001	Award for Achievement: Science and Technology Division Northern Ohio Live Magazine Annual Awards
1995	Monitors' Choice Award – Best Overall Clinical Trials Site Trial E2020-A-01-301, Eisai America, Inc.
1985	Merck Medical Student Achievement Award, SUNY-HSC, Syracuse

Publications (2016)

Geldmacher DS, Pilonieta G. The factorial structure of the Alabama Brief Cognitive screener in a Memory Disorders clinic population. Presented at the American Geriatrics Society 2016 Annual Scientific Meeting, Long Beach, CA, May 2016

Natelson Love M, Pilonieta G, Geldmacher DS. Alabama Brief Cognitive screener scores vary appropriately by diagnosis, resemble mmse scoring distributions, and predict level of impairment in instrumental activities of daily living in a Memory Disorders Clinic. Presented at the American Geriatrics Society 2016 Annual Scientific Meeting, Long Beach, CA, May 2016

BIOGRAPHICAL SKETCH

NAME **John Hablitz**		POSITION TITLE Professor	
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	YEAR(S)	FIELD OF STUDY
State University of New York, Plattsburgh	B.A.	1968	
University of Houston, Houston, Texas	M.A.	1970	Physiological Psychology
University of Houston, Houston, Texas	Ph.D.	1972	Physiological Psychology

Positions

Postdoctoral Fellow, Department of Physiology, Baylor College of Medicine, and Department of Neurophysiology, The Methodist Hospital, Houston, TX, 1972-73
Instructor, Department of Physiology, Baylor College of Medicine, 1973-74
Assistant, Neurophysiology Service, The Methodist Hospital, 1973-1988
Assistant Professor of Physiology, Baylor College of Medicine, 1974-77
Assistant Professor of Neurology, Baylor College of Medicine, 1977-83
Visiting Scientist, Institute of Neurophysiology, University of Oslo, Oslo Norway, 1978-79
Member, Program in Neurosciences, Baylor College of Medicine, 1978-1988
Associate Professor of Neurology, Baylor College of Medicine, 1983-1988
Visiting Scientist, Department of Neurophysiology, Max- Planck Institute for Psychiatry, Munich, Germany, 1984-85
Associate Professor of Physiology and Molecular Biophysics, Baylor College of Medicine, 1986-1988
Professor of Physiology and Biophysics, University of Alabama at Birmingham, 1989-present
Senior Scientist, Neurobiology Research Center, University of Alabama at Birmingham, 1989-1996
Professor of Psychology, University of Alabama at Birmingham, 1995-present
Professor of Neurobiology, University of Alabama at Birmingham, 1996-present
Chairman, UAB Committee on Graduate Study in Neuroscience, 1997-2001
Vice Chairman, Department of Neurobiology 2002-present
Interim Chair, Department of Neurobiology 2005-2006
Associate Director, Evelyn F. McKnight Brain Research Institute 2008-present

Honors, Awards, and Advisory Committees

Javits Neuroscience Investigator Award, 1989
UAB Joint Health Science Department's Teaching Award, 1992
Kellaway Lectureship in Epilepsy, Baylor College of Medicine, 2005
UAB Graduate Dean’s Award for Excellence in Mentorship, 2008

Other Activities:
Member, Neurological Sciences 2 Study Section, NIH 1987-1991
Member, American Epilepsy Soc Investigators’ Workshop Committee, 1998-2001
Member, Veterans Administration Neurology A Merit Review Panel, 2000-2003
Member, American Epilepsy Society Scientific Program Committee, 2001-2003
Member, Neurobiology of Learning and Memory Study Section, NIH 2003-2007

Member, Developmental Brain Disorders Study Section, NIH 2008-2012.
Member, DOD, AIBS Peer Reviewed Medical Research Review Panel, 2010.

Guest reviewer, Behavioral Neuroscience, Brain Research, British Journal of Pharmacology, Cellular and Molecular Neurobiology, Epilepsy Research, Experimental Biology and Medicine, Experimental Neurology, Journal of Neurophysiology, Journal of Neuroscience, Journal of Physiology, Molecular Pharmacology, Neuroscience, Neuroscience Letters, Pflugers Archive.

Publications (2016)

1. Meadows JP, Guzman-Karlsson MC, Phillips S, Brown JA, Strange SK, Sweatt JD,Hablitz JJ. Dynamic DNA methylation regulates neuronal intrinsic membrane excitability. Sci Signal. 2016;9(442):ra83. PubMed PMID: 27555660.

2. Brady LJ, Bartley AF, Li Q, McMeekin LJ, Hablitz JJ, Cowell RM, Dobrunz LE. Transcriptional dysregulation causes altered modulation of inhibition by haloperidol. Neuropharmacology. 2016;111:304-313. PubMed PMID: 27480797.

BIOGRAPHICAL SKETCH

NAME **Jeremy H. Herskowitz**		POSITION TITLE Assistant Professor	
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	YEAR(S)	FIELD OF STUDY
University of North Carolina Chapel Hill, NC	B.S.	2001	Chemistry
Emory University Atlanta, GA	Ph.D.	2007	Microbiology and Molecular Genetics

Positions
-2001-2007 Graduate Student with Professor Samuel Speck, Department of Microbiology, Emory University, Atlanta, GA.
-2007-2012 Postdoctoral Research with Professors Allan Levey and James Lah Department of Neurology, Emory University, Atlanta, GA.
-2012-2014 Instructor, Department of Neurology, Emory University, Atlanta, GA
-2014- Assistant Professor, Departments of Neurology and Neurobiology, University of Alabama at Birmingham

Honors, Awards, and Advisory Committees
-2001 David L. Stern Scholarship Academic Achievement in Chemistry, University of North Carolina at Chapel Hill
-2012 Member of Emory University 1% Club
-2014 Patsy W. and Charles A. Collat Scholar in Neuroscience Endowment, University of Alabama at Birmingham
-2015 Outstanding Early Career Investigator in Alzheimer's disease, Charleston Conference
-2016 College of Arts and Science and School of Medicine Interdisciplinary Team Award, University of Alabama at Birmingham

<u>Competitive Fellowships, Faculty Development Awards</u>
-2007-2009 NIH Ruth L. Kirschstein National Research Service Award, T32 Institutional Postdoctoral Training Grant, NINDS
-2009-2010 Ellison Medical Foundation/American Federation for Aging Research, (AFAR) Postdoctoral Fellowship
-2010-2012 BrightFocus/American Health Assistance Foundation (AHAF), Alzheimer's Disease Research Postdoctoral Fellowship
-2012-2014 NIH K99/R00 Pathway to Independence Award, NIA priority score = 10
-2015-2017 Alzheimer's Association New Investigator Research Grant

Publications (2016)
-Henderson BW, Gentry EG, Rush T, Herskowitz JH. Pharmacologic inhibition of ROCK1 and ROCK2 reverses dendritic spine morphology abnormalities associated with age-related memory loss and Alzheimer's disease. *Alzheimer's Association International Conference*. Toronto, Ontario, Canada, 2016.

BIOGRAPHICAL SKETCH

NAME **Kazutoshi Nakazawa**		POSITION TITLE Associate Professor Department of Psychiatry & Behavioral Neuro	
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	YEAR(S)	FIELD OF STUDY
-Keio University, Tokyo, Japan	M.D.	1987	Medicine
-Graduate School of Medicine Keio University, Tokyo, Japan	Ph.D.	1991	Biological Science
-Post-Graduate Training Neural Networks Laboratory Riken Institute, Japan		1991-1995	
-Picower Center for Learning & Mem Massachusetts Institute of Tech Cambridge, MA		1995-2003	

Positions

2003/3-2013/8 Principal investigator, Intramural Program, National Institute of Mental Health
2013/9 – present Associate Professor, Department of Psychiatry and Behavioral Neurobiology, University of Alabama at Birmingham

Honors, Awards, and Advisory Committees

- Awards and Scholarships
  1987-1991: Scholarship for graduate school from Japan Scholarship Foundation
  1995-1997: Human Frontier Science Program (HFSP) Long-Term Fellowship
  1997-1999: Howard Hughes Medical Institute, Postdoctoral fellow
  2010: National Institute of Mental Health (NIMH) Director's Merit Award
- Professional Memberships
  1992-present: The Society for Neuroscience (ID#: 000161297)
  1992-present: International Brain Research Organization (IBRO)
  1992-present: Japan Neuroscience Society

Publications (2016)

Radke AK, Nakazawa K, Holmes A (2015) Cortical GluN2B deletion attenuates punished suppression of food reward-seeking. Psychopharmacology (Berl). 232, 3753-3761 [PMID: 26223494]

Brigman JL, Daut R, Saksida L, Bussey TJ, Nakazawa K, Holmes A (2015) Impaired discrimination learning in interneuronal NMDA-GluN2B mutant mice. NeuroReport 26, 489-494 [PMC4446170]

Kiselycznyk C, Jury N, Halladay L, Nakazawa K, Mishina M, Sprengel R, Xu W, Grant SGN, Svenningsson P, and Holmes A. (2015) NMDA receptor subunits and associated signaling molecules mediating antidepressant-related effects of NMDA-GluN2B antagonism. Behav. Brain Res 287, 89-95 [PMC4425283]

BIOGRAPHICAL SKETCH

NAME **Erik D. Roberson**		POSITION TITLE Associate Professor Virginia B. Spencer Professor of Neuroscience	
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	YEAR(S)	FIELD OF STUDY
Princeton University, Princeton, NJ	A.B.	1990	Molecular Biology
Baylor College of Medicine	Ph.D.	1997	Neuroscience
Baylor College of Medicine	M.D.	1999	

Positions

2005–08 Assistant Adjunct Professor of Neurology, UCSF
2006–08 Staff Scientist, Gladstone Institute of Neurological Disease
2008–12 Assistant Professor of Neurology, UAB
2012– Associate Professor of Neurology with tenure, UAB
2013–15 Associate Director, UAB Alzheimer's Disease Center
2013– Co-Director, UAB Center for Neurodegeneration and Experimental Therapeutics
2015– Co-Director, Evelyn F. McKnight Brain Institute at UAB
2015– Director, UAB Alzheimer's Disease Center

Concurrent Appointments

2008–12 Assistant Professor of Neurobiology, UAB (joint appointment)
2012– Associate Professor of Neurobiology, UAB (joint appointment)
2008– Investigator, UAB Center for Neurodegeneration and Experimental Therapeutics
2008– Investigator, McKnight Brain Institute, UAB
2008– Neurologist, UAB Division of Memory Disorders and Behavioral Neurology
2008– Faculty, UAB Graduate School
2008– Faculty, UAB Medical Scientist Training Program
2008– Scientist, UAB Comprehensive Center for Healthy Aging
2010– Scientist, UAB Center for Glial Biology in Medicine

Honors, Awards, and Advisory Committees

- Valedictorian, Washington High School, Cedar Rapids, IA, 1986
- Phi Beta Kappa, 1990
- NIH Medical Scientist Training Program fellowship, 1990–1999
- Baylor College of Medicine Presidential Scholar, 1990–1999
- Baylor College of Medicine Dean's Award for Excellence, 1992–1997
- Life & Health Insurance Medical Research Fund Young Scientist Scholar, 1992–1997
- Alpha Omega Alpha, 1999
- UCSF Chief Resident in Neurology, 2002–2003
- S.D. Bechtel, Jr. Young Investigator Award, 2004
- Kathryn Grupe Award for Excellence in Alzheimer's Disease Research, 2005
- Virginia B. Spencer Endowed Scholar in Neuroscience at UAB, 2008–2013
- Fellow, American Neurological Association, 2012
- McNulty Civitan Scientist Award, 2012

- Virginia B. Spencer Endowed Professor of Neuroscience at UAB, 2013–
- Derek Denny-Brown Neurological Scholar Award, American Neurological Association, 2015

Publications (2016)

Warmus, B.A. and E. D. Roberson. (2016). Pathophysiology and animal models of frontotemporal dementia. In *Hodges' Frontotemporal Dementia, Second Edition*. B. Dickerson, ed. (Cambridge University Press).

Arrant, A.E., and E.D. Roberson. (2017). Frontotemporal dementia. In *The Cerebral Cortex in Neurodegenerative and Neuropsychiatric Disorders: Experimental Approaches to Clinical Issues*. N. Weishaupt and D. Cechetto, eds. (London: Elsevier).

Roberson, E.D., and A. Kao. Animal models of dementia. In *The Behavioral Neurology of Dementia, 2nd Ed.*, B.L. Miller and B.F. Boeve, eds. (Cambridge: Cambridge University Press). In press.

E.D. Roberson. Treatment of central nervous system degenerative disorders. In *Goodman & Gilman's The Pharmacological Basis of Therapeutics, Thirteenth Edition.* L. Brunton, ed. (New York: McGraw-Hill Companies, Inc.). In press.

BIOGRAPHICAL SKETCH

NAME **Kristina Visscher**		POSITION TITLE Assistant Professor	
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	YEAR(S)	FIELD OF STUDY
Carleton College, Northfield MN (Cum Laude)	BA	1998	Physics
Washington University, St. Louis, MO	Ph.D.	2004	Neuroscience

Positions

2004-2008 Postdoctoral Researcher, Brandeis University, Waltham, MA
Postdoctoral Advisor – Robert Sekuler

2008-2009 Postdoctoral Researcher, Harvard University, Cambridge, MA
Postdoctoral Advisor – Randy Buckner

2009-present Assistant Professor, Neurobiology, University of Alabama, Birmingham
Secondary appointments in Psychology, Vision Sciences, Biomedical Engineering, and Ophthalmology

Honors, Awards, and Advisory Committees

- Kavli/National Academy of Sciences Frontiers in Science Fellow (2016)
  Jointly sponsored by the US National Academy of Sciences and The Kavli Foundation, the Kavli Frontiers of Science bring together some of the very best young scientists to discuss exciting advances and opportunities in their fields
- Study section for NIH/NEI Sensory and Perceptual Processing study section.

Publications (2016)

Griffis, J., Elkhetali, A., Burge, W., Chen, R., Bowman, A., Szaflarski, J., & Visscher, K. (2016a). Retinotopic patterns of functional connectivity between V1 and large-scale brain networks during resting fixation. NeuroImage, 1, 1–13. http://doi.org/10.1017/CBO9781107415324.004

Griffis, J. C., Burge, W. K., & Visscher, K. (2016b). Age-dependent cortical thinning of peripheral visual field representations in primary visual cortex. Frontiers in Aging Neuroscience, 8(October), 1–7. http://doi.org/10.3389/fnagi.2016.00248

Burge, W., Griffis, J., Nenert, R., Elkhetali, A., DeCarlo, D., ver Hoef, L., Ross, L., Visscher, K., (2016). Cortical thickness in human V1 associated with central vision loss. Scientific Reports, Mar 24, 6:23268 PMID: 27009536

DeCarlo, D. K., Swanson, M., McGwin, G., Visscher, K., & Owsley, C. (2016). ADHD and Vision Problems in the National Survey of Children's Health. Optometry and Vision Science : Official Publication of the American Academy of Optometry, 5, 459–465. PMID: 26855242

Kraguljac NV, White DM, Hadley JA, Visscher KM, Knight D, ver Hoef L, Falola B, Lahti AC (2016) Abnormalities in large scale functional networks in unmedicated patients with schizophrenia and effects of risperidone. NeuroImage Clinical. 10, 146

BIOGRAPHICAL SKETCH

NAME **Virginia G. Wadley**		POSITION TITLE Professor	
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	YEAR(S)	FIELD OF STUDY
University of Alabama at Birmingham	B.S.	1991	Psychology and English
University of Alabama at Birmingham	M.A., Ph.D.	1994, 1997	Medical Psychology
Duke University Medical Center	Internship	1996-1997	Clinical Psychology

Positions

Postdoctoral Training

1997 - 1998 Clinical Associate and Postdoctoral Fellow Duke University Medical Center
Department of Psychiatry and Behavioral Sciences
Division of Behavioral Medicine
Supervisor: James Blumenthal, Ph.D.

1998 - 1999 Instructor and Postdoctoral Fellow University of Alabama at Birmingham
School of Medicine, Department of Neurology
Division of Neuropsychology
Supervisor: Daniel Marson, Ph.D.

2015 - pres. Professor, Department of Medicine, Division of Gerontology, Geriatrics, and Palliative Care; School of Social and Behavioral Sciences, Department of Psychology (secondary appointment); and Department of Ophthalmology (secondary appointment), University of Alabama at Birmingham, Birmingham, AL

2012 - pres. Senior Scientist, Center for Outcomes and Effectiveness Research and Education, University of Alabama at Birmingham, Birmingham, AL

2009 - 2015 Associate Professor, Department of Medicine, Division of Gerontology, Geriatrics, and Palliative Care; School of Social and Behavioral Sciences, Department of Psychology (secondary appointment); and Department of Ophthalmology (secondary appointment—2014-2015)), University of Alabama at Birmingham, Birmingham, AL

2009 - pres. Scientist, appointed, UAB Comprehensive Neuroscience Center

2007 - pres. Associate Director, UAB Edward R. Roybal Center for Translational Research on Aging and Mobility, University of Alabama at Birmingham, Birmingham, AL

2007 - pres. Graduate Faculty, University of Alabama, Tuscaloosa, AL

2005 - 2009 Assistant Professor, Department of Medicine, Division of Gerontology, Geriatrics, and Palliative Care; and School of Social and Behavioral Sciences, Department of Psychology (secondary appointment), University of Alabama at Birmingham, Birmingham, AL

2005 - pres. Director, Dementia Care Research Program, Division of Gerontology, Geriatrics, and Palliative Care, University of Alabama at Birmingham, Birmingham, AL

2005 - pres. Director, Alzheimer's Family Program, Comprehensive Center for Healthy Aging, University of Alabama at Birmingham, Birmingham, AL

2002 - 2009 Scientist, UAB Alzheimer's Disease Research Center

2000 - pres. Senior Scientist (2015), UAB Comprehensive Center for Healthy Aging

2000 - 2005 Research Assistant Professor, School of Social and Behavioral Sciences, Department of Psychology, University of Alabama at Birmingham, Birmingham, AL

1999 - 2007 Assistant Director, UAB Edward R. Roybal Center for Translational Research on Aging and Mobility (formerly Center for Research on Applied Gerontology), University of Alabama at Birmingham, Birmingham, AL

1998 - 1999 Instructor, School of Medicine, Department of Neurology, Division of Neuropsychology, University of Alabama at Birmingham, Birmingham, AL

Honors, Awards, and Advisory Committees

1989 Harry S. Truman Scholar for state of Alabama
1990 Outstanding Student, UAB Department of Psychology
1990 Dean's Award, Outstanding Undergraduate in Social and Behavioral Sciences, UAB
1993 - 1994 National Institutes of Health Predoctoral Trainee, Spain Rehabilitation Center, UAB
1994 - 1995 Merit Fellow, UAB Department of Medical Psychology
1996 Outstanding Graduate Student, UAB Department of Medical Psychology
1996 Dean's Award, Outstanding Graduate Student in Social and Behavioral Sciences, UAB
2003 - 2007 Awardee, NIH Loan Repayment Program
2006 Winner, UAB Center for Aging Abstract Competition and Annual Meeting (one of four selected for oral presentation and cash prize)
2010 - 2011 Research Excellence Award, UAB Department of Medicine (cash award for professional development)
2011 - 2012 Research Excellence Award, UAB Department of Medicine (cash award for professional development)
2012 Invited participant, White House Roundtable, Federal Motor Carrier Safety Administration, U.S. Department of Transportation
2012 Winner, UAB Center for Aging Oral Abstract Competition and Annual Meeting (one of four selected for oral presentation and cash prize)
2013 American Psychological Association Nominee to National Heart, Lung and Blood Institute (NHLBI) advisory board
2013 Invited Speaker, Alzheimer's Association Research Roundtable
2012 - 2013 Research Excellence Award, UAB Department of Medicine (cash award for professional development)
2013 - 2014 Research Excellence Award, UAB Department of Medicine (cash award for professional development)
2014 - 2015 Research Excellence Award, UAB Department of Medicine (cash award for professional development)
2016 Invited Speaker, Health Disparities Committee of Alzheimer's Disease and Related Disorders Summit 2016, National Institute of Neurological Disorders and Stroke (NINDS), Washington, DC, March 29-30, 2016
2016 Invited Speaker, Advanced Psychometrics Methods in Cognitive Aging Research: Strengthening Causal Inference in Cognitive Aging Research. National Institute on Aging (NIA) conference grant to UC Davis. Friday Harbor, San Juan Island, Washington, June 5-10, 2016

Publications (2016)

1. Wadley Bradley, V.G. Processing speed training to preserve driving and functional competencies in MCI. Invited lecture presented at the UAB Behavioral Neurology and Neuropsychology Educational Conference, January, 2016.
2. Wadley Bradley, V.G. Intensive blood pressure control in adults age 75 and older in SPRINT. Vascular Biology and Hypertension Seminar Series, jointly sponsored by the UAB Vascular Biology and Hypertension Division of Cardiovascular Disease, Department of Medicine, May, 2016.

3. Wadley Bradley, V.G. Preserving driving and IADLs in persons with Mild Cognitive Impairment: the APPS study. Invited lecture presented at the UAB Comprehensive Center for Healthy Aging Scientific Seminar Series, May, 2016.
4. Bradley, V.G., Chair. Life course trajectories of blood pressure and cardiovascular disease: effects of aging. Presented at the 27th Annual Vascular Biology and Hypertension Symposium, Division of Cardiovascular Disease, Department of Medicine, UAB, October 17-18, 2016.
5. Bradley, V.G. Moderator, Translational Science Breakout Session. Presented at the 27th Annual Vascular Biology and Hypertension Symposium, Division of Cardiovascular Disease, Department of Medicine, UAB, October 17-18, 2016.