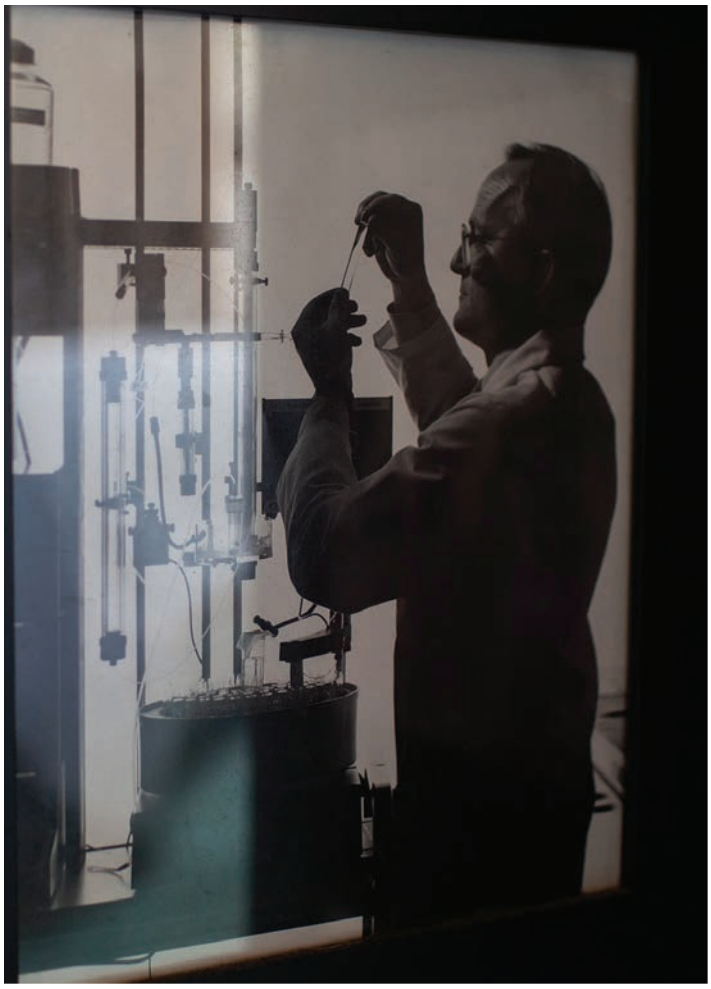
AGE-RELATED MEMORY LOSS (ARML) PROGRAM AND COGNITIVE AGING AND MEMORY (CAM) PROGRAM

2019 ANNUAL REPORT

UF Evelyn F. & William L. McKnight Brain Institute
UNIVERSITY of FLORIDA

Prepared for the McKnight Brain Research Foundation by the University of Florida McKnight Brain Institute and Institute on Aging

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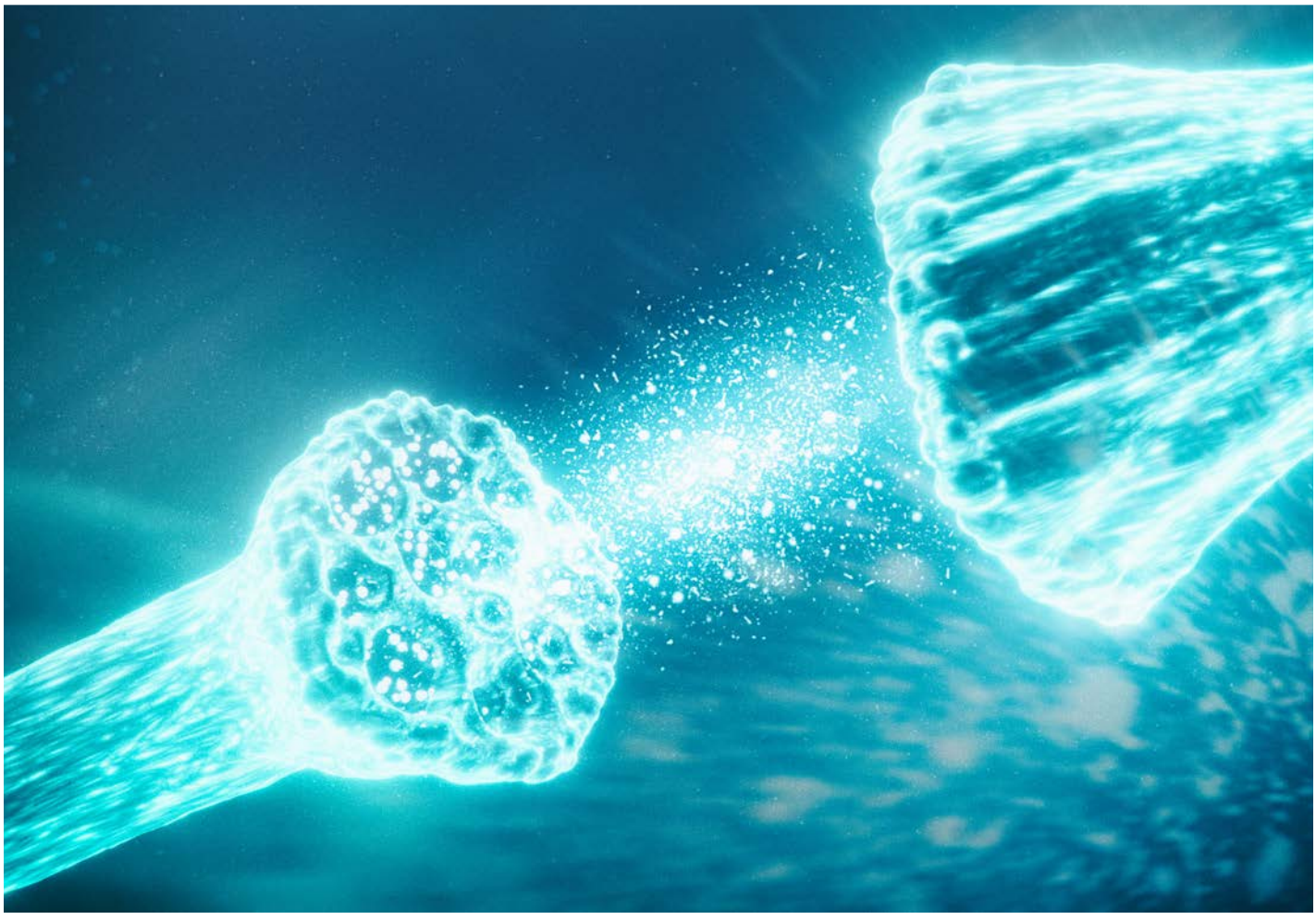

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SATURDAY, FEBRUARY 10, 2001

Local&State

Section B: Obituaries 4B • Business 5B • Weather 8B — The Gainesville Sun

Institute gets new name

■ The McKnight Brain Research Foundation gave a $15 million gift.

By SOPHIA GOODE
Special to The Sun

The UF Brain Institute was renamed the Evelyn F. and William L. McKnight Brain Institute of the University of Florida on Friday thanks to a $15 million grant from the McKnight Brain Research Foundation.

That gift, donated in May, was matched by state money for a total endowment of $30 million.

The focus of the institute,

Evelyn F. McKnight

UF Evelyn F. & William L. McKnight Brain Institute
UNIVERSITY of FLORIDA

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January 16, 2020

The McKnight Brain Research Foundation
SunTrust Bank
Mail Code FL-ORL-Suite 1600
300 South Orange Avenue, Suite 1600
Orlando, FL 32801

Dear Trustees:

We are pleased to submit the 2019 annual report of the activities of the ARML and CAM-CTRP programs supported by the MBRF. The support is deeply appreciated by both the members of the programs and the UF Health leadership. Our investigators continue to advance our understanding of age-related memory loss and evaluate new interventions that might slow or reverse cognitive decline in aging. The multidisciplinary and unique focus of the ARML and CAM-CTRP investigators, in comparative and human studies respectively, is a unique strength of our programs and a source of recruiting of new faculty and new students to the field.

The MBRF supported programs have continued to enjoy great success, as indicated in the enclosed report. Grant funding, qualifications of applicants to train in the programs and their productivity are outstanding. Together with our collaborations with the other three McKnight Brain Institutes, the programs are also increasing their professional and public status; social media efforts have shown growth as well.

Dr. Tom Foster's research and leadership has contributed greatly to the success of the ARML. With the corresponding productivity of CAM under the direction of Dr. Ron Cohen, we now have the opportunity to unify our comparative and human studies under a single comprehensive Center. Over the last 6 months, we have had extensive discussions with MBRF leadership regarding altering the structure of the ARML program. We are now moving towards creating a single CAM-CTRP center that will be co-directed by Drs. Ron Cohen and Jennifer Bizon with Drs. Sarah Burke and Adam Woods as associate directors. There are some complex institutional issues that are being tackled in order to make this happen, but we fully expect this modified structure and leadership to be formalized shortly. We believe that this structure, which we have shared with members of the MBRF board, will facilitate the advancement of the research mission of the MBRF. Drs. Bizon and Cohen have worked closely with MBI and other institutional leadership to ensure that the new center structure will be functional and enable the programmatic science supported by the MBRF funds to continue to flourish. Our communications team is working to improve the visibility and web presence of the reintegrated CAM-CTRP and this team has also worked closely with the MBRF on their own communications plan.

Our leadership is committed to building and sustaining translational programmatic research in the neurosciences. The MBRF has helped us build outstanding programmatic research related to brain aging and cognitive health, and we hope to expand this programmatic research activity in the future. Over the last decade, NIH funding to UF investigators working the neurosciences has doubled, but there has been even larger growth with respect to the MBRF supported programs. Clearly, these programs remain part of our foundational neuroscience research and we look forward to continued scientific impacts that our investigators will make in the future.

Sincerely,

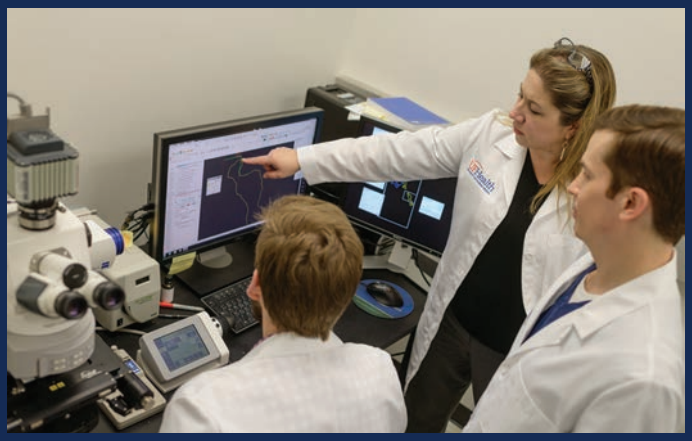
Todd E. Golde, M.D., Ph.D.
Director
Director, 1Florida Alzheimer's Disease Research Center
Professor, Department of Neuroscience
College of Medicine

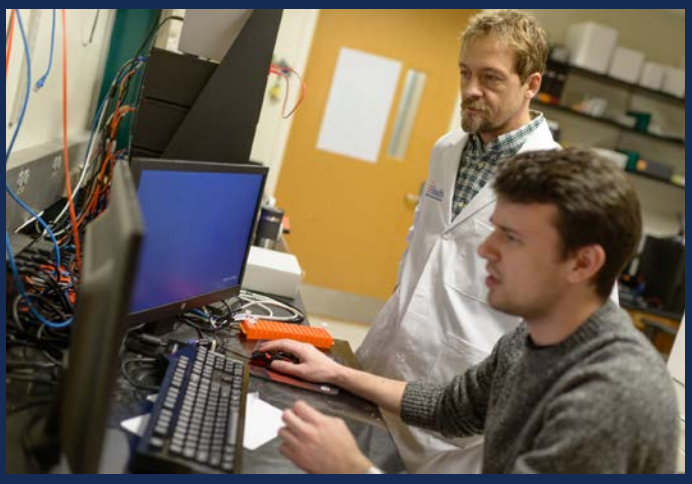
Steven T. DeKosky, M.D.
Deputy Director
Aerts-Cosper Professor of Alzheimer's Research
Associate Director, 1Florida AD Research Center
Professor, Neurology &Neuroscience

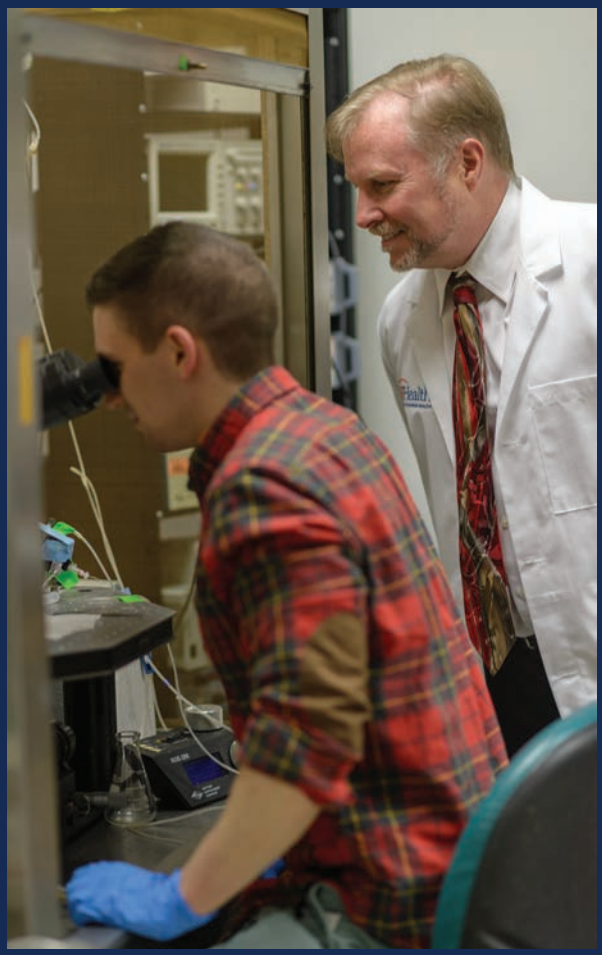
Jada Lewis, Ph.D.
Co-Deputy Director
Professor
Department of Neuroscience
Center for Translational Research in Neurodegenerative Disease
University of Florida

Age-related Memory Loss (ARML) Program and the Evelyn F. McKnight Chair for Brain Research in Memory Loss

2019 PROGRESS REPORT







Annual Report

McKnight Brain Research Foundation
Sponsored Institutes and Research Programs
(Include activity of all McKnight supported faculty and trainees)
Report Period: Dec. 2018-Dec. 2019

Some gift agreements require both Institute reports and Chair reports. If applicable, please clearly state whether a particular response relates to a Chair or Institute.

Any capitalized terms used on the template are intended to have the same meaning as the term is defined in the Gift Agreement.*

1. Summary of scientific achievements since last report

This past year was a productive and exciting one for the Bizon laboratory. Our group published seven manuscripts and we have two others in various stages of the review process. One of these papers was published in *eLife* and highlighted in an *eLife* digest (https://elifesciences.org/articles/46174). This paper was one of the first studies published to date that has applied optogenetic approaches to aged rats. Our study shows that aged rats use different brain circuitry than young rats when making intertemporal decisions. Several follow up optogenetic studies are now underway to further dissect the specific circuits responsible for age-associated changes in decision making. Our decision making research is supported by a 5 year (3.5 million dollar) grant from the National Institute on Aging. A second manuscript from this project is currently under review. In this latter study, we describe previously unreported sex differences associated with intertemporal and risky decision making. These findings have significant implications for understanding the biological factors that influence decision making and how it changes across the lifespan.

The Bizon lab presented 14 posters at the Society for Neuroscience meeting in Chicago and 5 posters at the American College of Neuropsychopharmacology meeting in Orlando. Further, Dr. Bizon is MPI (with Dr. Todd Golde and Dr. Jada Lewis) on a new (3 million dollar) R01 awarded this year from National Institute on Aging that is focused on therapeutically targeting stress hormones to improve cognition in aging.

In addition, Dr. Bizon (w/ Dr. Jada Lewis) launched a T32 training grant that was recently funded by National Institute on Aging. This grant provides funds to create a training program at UF for predoctoral students whose research is focused on brain aging and dementia. It provides 2 years of funding for these PhD students, and incorporates several specialized courses, as well as opportunities for professional development and networking. Four students were accepted into the program in Year 1 and we have just accepted 7 more students who will begin the program in January 2020. All of our first-year students presented at the McKnight Brain Research Foundation reception and in the primary sessions of the Society for Neuroscience meeting in October 2019.

In addition to the T32, two of my postdoctoral fellows obtained independent faculty positions this year. Dr. Joe McQuail is now a tenure-track Assistant Professor at the University of South Carolina and Dr. Caitlin Orsini is now a tenure-track Assistant Professor at the University of Texas, Austin. In addition, Dr. Bizon's recent graduate student, Dr. Caesar Hernandez will be starting as a postdoctoral researcher at the University of Alabama Birmingham in February 2020 under the mentorship of Dr. Lori McMahon (Director of the UAB Comprehensive Neuroscience Center and a McKnight Institute member).

Finally, I have been increasing my leadership role in the aging community nationally and within the neuroscience community at the University of Florida. I was asked to speak and moderate a session at the NIA-supported Meeting on Cognitive Reserve and Resilience held in September in Bethesda, MD and I currently serve as a senior editor at the journal *Neurobiology of Aging.* I also served on multiple NIH study sections this past year. Finally, I serve on the McKnight Brain Research Foundation Communications working group, on the executive committee for the McKnight Brain Institute, and as Associate Chair of the Neuroscience department at University of Florida. With respect to these leadership roles, I am one of two individuals from UF-COM who will be nominated by our Dean, Dr. Adrian Tyndall, to attend a year-long Executive Leadership in Academic Medicine (ELAM) course offered at Drexel University. I'm sure this opportunity will be very beneficial for increasing my effectiveness in my new roles within the McKnight Brain Research Foundation-supported cognitive aging research group at UF as well as within the department and college.

2. Publications in peer reviewed journals

CM. Hernandez[a], CA Orsini[b], AR Wheeler, TWT Eyck[a], SM Betzhold, CC Labiste, B Setlow, **JL Bizon**. Testicular hormones mediate robust sex differences in impulsive choice. *Under Review*.

Kreher MA, Johnson SA, Mizell JM, Chetram DK, Guenther DT, Lovett SD, Setlow B, **Bizon JL**, Burke SN, & Maurer AP. (*in press*). The perirhinal cortex supports spatial intertemporal choice stability. *Neurobiology of Learning and Memory. In Press*

Orsini CA, Blaes SL, Dragone RJ, Betzhold SM, Finner AM, **Bizon JL**, Setlow B. Distinct relationships between risky decision making and cocaine self-administration under short- and long-access conditions. Prog Neuropsychopharmacol Biol Psychiatry. 2019 Oct 30;98:109791. doi: 10.1016/j.pnpbp.2019.109791. [Epub ahead of print]

Hernandez CM, Orsini CA, Labiste CC, Wheeler AR, Ten Eyck TW, Bruner MM, Sahagian TJ, Harden SW, Frazier CJ, Setlow B, **Bizon JL**. (2019) Aging alters the role of basolateral amygdala in intertemporal choice. *eLife*, Apr 24;8. pii: e46174.

Johnson SA, Turner SM, Lubke KN, Cooper TL, Fertal KE, **Bizon JL**, Maurer AP, Burke SN (2019) Experience-dependent effects of muscimol-induced hippocampal excitation on mnemonic discrimination. *Frontiers in Systems Neuroscience*,12:72.

Hernandez AR, Hernandez CM, Campos K, Truckenbrod L, Federico Q, Moon B, McQuail JA, Maurer AP, **Bizon JL**, Burke SN (2018) A ketogenic diet improves cognition and has biochemical effects in prefrontal cortex that are dissociable from hippocampus. *Frontiers in Aging Neuroscience,* 11:239.

Blaes SL, Orsini CA, Holik HM, Stubbs TD, Ferguson SN, Heshmati SC, Bruner MM, Wall SC, Febo M, Bruijnzeel AW, **Bizon JL**, Setlow B. (2019) Enhancing effects of acute exposure to cannabis smoke on working memory performance. Neurobiol Learn Mem. 157:151-162. doi: 10.1016/j.nlm.2018.12.001.

Blaes SL, Orsini CA, Mitchell MR, Spurrell MS, Betzhold SM, Vera K, **Bizon JL**, Setlow B. Monoaminergic modulation of decision-making under risk of punishment in a rat model. Behav Pharmacol. 2018 Dec;29(8):745-761.

3. Publications (other)

4. Presentations at scientific meetings

2019 "How to effectively communicate your science" Annual Inter-Institution meeting of the McKnight Brain Research Foundation, Gainesville Fl. April 2019.

2018 "Neural mechanisms of executive function and decision making in aging" Department of Pharmacology & Therapeutics. Gainesville, Florida

2019 "Neural mechanisms of age-associated cognitive decline" College of Medicine, Penn State University, Hershey, Pennsylvania.

2019 Speaker and facilitator, First Meeting of Reserve and Resilience in Cognitive Aging, Bethesda, Maryland.

Society for Neuroscience Meeting, Chicago, IL (14 total)

A. Hernandez[1], C. M. Hernandez, Iii[2], L. M. Truckenbrod[1], K. Campos[1], Q. Federico[3], **J. L. Bizon[5]**, S. N. Burke[4] *Advanced age and ketogenic diet have dissociable effects across hippocampal subregions.*

M. Ash[1,2], M. Melton[2,3], K. Olczak[1], E. Dirr[1], K. N. Lubke[2,3], J. Nick[2,3], B. Mclaurin[2,4,3], E. Atkinson[1], K. J. Otto[1,3,5,6,7], A. P. Maurer[2,3], D. G. Lamb[4,8,2], B. Setlow[4,2,3], **J. L. Bizon[2,3]**, S. N. Burke. *Acute vagus nerve stimulation increases arc expression in the dentate gyrus of the hippocampus*.

S. Zequeira[1], S. A. Johnson[1], A. Hampton[2], A. P. Maurer[1], **J. L. Bizon[1]**, S. N. Burke[1] *Translational rat model of cognitive aging using a touchscreen operant platform to test visual discrimination and association.*

M. Melton[1], S. Burke[1], M. Ash[1], D. Lamb[1], L. Brattain[2], K. Otto[1], B. Setlow[1], **J. Bizon[1]**, A. Maurer[1], K. Olczak[1], E. Dirr[1] S. N. Burke *A methodology pipeline for clarity and arc imaging following vagus nerve stimulation*.

D. G. Lamb[1], M. Melton[2], **J. L. Bizon[3]**, M. Ash[4], *S. N. Burke[3], K. J. Otto[4], B. Setlow[5], A. P. Maurer[6], E. Dirr[4], L. Brattain. *Automated multichannel centroid detection and coincident analysis of cleared brain tissue following vagus nerve stimulation*.

S. L. Blaes[1], C. A. Orsini[1], H. M. Holik[1], S. M. Betzhold[1], S. M. Singhal[2], C. J. Frazier[3], **J. L. Bizon**, B. Setlow. Regulation of risky decision making via activity in dopaminergic neurons in the ventral tegmental area.

C. A. Orsini[1], S. M. Betzhold[2], A.-R. Wheeler[2], T. W. Ten-Eyck[2], J. Shallcross[2], S. Harden[2], S. M. Singhal[6], M. Schwendt[3], C. J. Frazier[4], **J. L. Bizon**, B. Setlow[5]. *Dissecting the role of the nucleus accumbens in risk taking with optogenetics*

C. M. Hernandez, Iii[1,3], A.-R. Wheeler[1], T. W. Ten Eyck[1], C. C. Labiste[1], B. Setlow[2,1], **J. L. Bizon**. *Optogenetic inactivation of prefrontal cortex during intertemporal choice reveals unique roles for this structure in young and aged rat decision making*.

A.-R. Wheeler[1], C. M. Hernandez[1], C. A. Orsini[1], T. W. Ten Eyck[1], C. C. Labiste[1], B. Setlow[2], **J. L. Bizon**. *Contributions of gonadal hormones to intertemporal choice in male rats*.

R. J. Dragone[1], C. A. Orsini[2], M. Pompilus[2], A.-R. Wheeler[2], M. Febo[2], B. Setlow[2], **J. L. Bizon**. *Aging is associated with risk-averse decision making in Fischer 344 x Brown Norway F1 hybrid rats*.

J. A. Mcquail[1], S. A. Johnson[1], M. N. Litenski[1], S. Ghay[1], B. Hellbusch[1], G. Peguero[1], S. L. Rossi[2], P. Chakrabarty[1], B. I. Giasson[1], P. R. Rapp[2], S. N. Burke[1], **J. L. Bizon**. *Influence of normal aging on tau isoforms and post-translational modifications in transentorhinal cortex.*

L. K. P. Altidor[1], M. M. Bruner[1], J. F. Deslauriers[1], T. S. Garman[1], S. Ramirez[1], D. G. Lamb[2,5], A. M. Finner[1], E. W. Dirr[3], K. P. Olczak[3], A. P. Maurer[1,3], K. J. Otto[3], S. N. Burke[1], B. Setlow[1,2], **J. L. Bizon.** *Vagus nerve stimulation enhances prefrontal-cortical mediated cognitive flexibility.*

M. M. Bruner[1], J. F. Deslauriers[2], D. R. Calderon[11], L. Altidor[3], C. M. Hernandez, Iii[4], J. A. Mcquail[5], E. Dirr[6], K. Olczak[7], A. P. Maurer[8], K. J. Otto[2], S. N. Burke[3], D. G. Lamb[9], B. Setlow[10], **J. L. Bizon**. *Peripheral and central effects of repeated vagus nerve stimulation.*

J. F. Deslauriers[1], M. M. Bruner[6], L. Altidor[2], T. S. Garman[1], S. Ramirez[1], E. W. Dirr[1], K. Olczak[7], A. P. Maurer[3], K. J. Otto[1], S. N. Burke[2], D. G. Lamb[4], B. Setlow[5], **J. L. Bizon**. *Vagus nerve stimulation attenuates impulsivity in a 5-choice serial reaction time task.*

American College of Neuropsychopharmacology Meeting, Orlando Florida (**5 abstracts in total**)

Caesar M. Hernandez, Chase C. Labiste, Alexa-Rae Wheeler, Tyler W. Ten Eyck, Noelle G. Wright, Sara M. Betzhold, C. Jason Frazier, Barry Setlow, **Jennifer L. Bizon**. *Optogenetic inactivation of prefrontal cortex during intertemporal choice reveals unique roles for this structure in young and aged rat decision making.*

Caitlin A. Orsini, Shelby L. Blaes, Caesar M. Hernandez, Sara M. Betzhold, Hassan Perera, Alexa-Rae Wheeler, **Jennifer L. Bizon** & Barry Setlow. *Hormonal regulation of risky decision making in male and female rats*

Jennifer L. Bizon, Caesar M. Hernandez, Alexa-Rae Wheeler, Caitlin A. Orsini, Tyler W. Ten Eyck, Chase C. Labiste, Noelle G. Wright, Barry Setlow. *Contributions of gonadal hormones to intertemporal choice in male and female rats.*

Barry Setlow, Caitlin A. Orsini, Sara M. Betzhold, Alexa-Rae Wheeler, Tyler W. Ten-Eyck, John Shallcross, Sarthak M. Singhal, Scott Harden, Marek Schwendt, Charles J. Frazier, **Jennifer L. Bizon.** *Optogenetic dissection of contributions of the nucleus accumbens shell to decision making under risk of punishment.*

Joseph A McQuail, Argyle V Bumanglag, Brandon Hellbusch, Paramita Chakrabarty, Benoit I Giasson, Sara N Burke, **Jennifer L Bizon.** *Contributions of normal aging to tau pathology in transentorhinal cortex*.

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

6. Awards (other)

2019 Exemplary Teaching Award, University of Florida, College of Medicine
2018-2021 University of Florida Research Foundation Professorship
2017-2020 University of Florida Term Professorship

7. Faculty. Please include abbreviated CV with publications for previous 12 months

8. Trainees
   a. Post doctoral

Dr. Argyle Bumanglag (w/Sara Burke)
Dr. Caesar Hernandez
Dr. Caitlin Orsini (w/ B Setlow)- left in August to take new Assistant Professor position at UT-Austin.
Dr. Joe McQuail- left in August to take a new Assistant Professor position in University of South Carolina Medical School.
Dr. Matt Burns

   b. Pre-doctoral

Sabrina Zaqueira
Wonn Pyon
Joe Dragone (w/ B Setlow and M Febo)
Shelby Blaes (w/ B Setlow)

   c. Other

9. Clinical/translational programs
   a. New programs
   b. Update on existing clinical studies

10. Technology transfer
   a. Patents applications
   b. Revenue generated from technology

11. Budget update (last year's budget and actual results - with an explanation of material variances)
    a. Status of matching funds, if applicable
    b. Projected budget for coming year
    c. Extramural funding

* **When using acronyms, please spell out all acronyms not universally understood.**

12. Educational programs focusing on age related memory loss

a. Scientific

I (along w/ Dr. Jada Lewis) launched a T32 training grant program (recently funded by National Institute on Aging). This grant provides funds to create a training program at UF for predoctoral students whose research is focused on cognitive aging and dementia. It provides 2 years of funding for these PhD students, and incorporates several specialized courses and networking opportunities into their training. Four students were accepted into the program in Year 1 and we have just accepted 7 more students who will begin in January 2020. All of our first-year students presented in the McKnight Brain Research Foundation reception at the Society for Neuroscience meeting and have made exceptional academic and scientific progress this past academic year. This training program currently supports one student mentored by Drs. Burke and Maurer and two students mentored by Dr. Adam Woods.

I've also co-directed the Outreach and Education committee for the McKnight Brain Institute at UF. This committee has awarded over $400K of awards to members of the UF community to enhance neuroscience training and education initiatives. Many of these awards and recognitions were given to members of the research community related to cognitive aging. Our committee has also organized numerous events to foster scientific dialogue and facilitate collaboration among UF faculty, including those involved in cognitive aging research.

b. Public

I (along with Todd Taylor and Michelle Jaffee) have represented UF on the McKnight Brain Research Foundation Communications working group, which has been focused on generating educational material for the general public related to cognitive and memory changes in normal aging. I have been working with the UF communications team to improve the Center for Cognitive Aging and Memory website, which will provide better visibility for this Center.

13. Collaborative programs with other McKnight Institutes, institutions and research Programs

None at present

14. Collaborative programs with non-McKnight Institutes, institutions and research programs

I am an MPI on new R01 awarded this year (3 million dollars) that is focused on therapeutically targeting stress hormones to improve cognition in aging with two members of the Center for Translational Research in Neurodegenerative Disease (CTRND) - Dr. Todd Golde and Dr. Jada Lewis). Together with the T32 described above, this represents a second major grant that involves partnerships with CTRND faculty.

I am also actively building collaborations with faculty in the VA and Center for Respiratory Research and Rehabilitation (CRRR) related to sleep apnea and cognitive decline and with members of the Center for Addiction Research and Education (CARE) related to cannabis use in older adults and cognitive function. I expect both of these collaborations will result in new grant submissions in 2020.

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

I. Planned publications:

1. Hernandez CM, McQuail JM, Ten Eyck T, Setlow B, **Bizon, JL** . GABABR signaling in the basolateral amygdala influences impulsive choice. *Final stages of preparation*.
2. Altidor L, Bruner MM, Deslauriers J, Garman T, Ramirez S, Crider AM, Lamb DG, Dirr EW, Delgado F, Olczak KP, Otto KJ, Burke SN, Setlow B, Bizon JL. Vagus nerve stimulation enhances prefrontal cortical-mediated cognitive flexibility in a novel touchscreen-based reversal learning task. *In preparation.*
3. Deslauriers J, Bruner MM, Altidor L, Garman T, Ramirez S, Crider AM, Lamb DG, Dirr EW, Delgado F, Olczak KP, Otto KJ, Burke SN, Setlow B, Bizon JL. Vagus nerve stimulation attenuates impulsive action in 5-choice serial reaction time task. *In preparation.*
4. Hernandez CM, Wheeler A-R, Orsini CA, Ten Eyck TA, Labiste CC, Setlow B, Bizon JL. Female rats show greater impulsive choice than males in an intertemporal choice task. *Under Review*.

In addition to these four manuscripts which are currently in preparation, there are at least two other projects that are nearing completion and that will mostly likely result in publications being submitted in the next year. Finally, there are numerous papers on which I will be a co-author being submitted in the next year.

II. Planned grant submissions:

1. I will resubmit a scored R01 on vagus nerve stimulation as a means for improving cognitive function in aging.
2. I will be submitting a new R01 with cannabis and aging (with Setlow)
3. I have several other collaborative grants in planning stages as described above.

III. Invited talks/meetings:

4. Invited speaker at Winter Conference of Brain Research. Big Sky, Montana. January 2020
5. Invited speaker at iNAV 2020, 3rd international conference on spatial navigation meeting, Cortina d'Ampesso, Italy, June 2020

As discussed with the Trustees, I will work with Dr. Ron Cohen to merge the ARML program into a newly-constituted Center for Cognitive Aging and Memory, which spans preclinical to translational research. Immediate goals include strategic planning, community building and design of a new website.

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

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

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

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

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.

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 otherwise covered elsewhere.

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

Our most important scientific achievement this year was our publication in *eLife* that was highlighted in the eLife digest (https://elifesciences.org/articles/46174). This paper was one of the first studies published to date that has applied optogenetic approaches to aged rats. Our study provides definitive evidence that aged rats use different brain regions than young rats for decision making.

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

*** When using acronyms, please spell out all acronyms not universally understood.**

Cognitive Aging and Memory and the Evelyn F. McKnight Chair for Clinical Translational Research in Cognitive Aging

2019 PROGRESS REPORT

UF Evelyn F. & William L. McKnight Brain Institute
UNIVERSITY of FLORIDA

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January 9, 2020

Dear Trustees of the McKnight Brain Research Foundation:

This progress report for the Cognitive Aging and Memory-Clinical Translational Research Program (CAM-CTRP) summarizes the activity of the program and its faculty for the year ending December 31, 2019. The faculty and staff of the program were extremely active and productive. Our planned research objectives were met, and we had multiple achievements consistent with the mission of the CAM-CTRP.

The program has grown - there are now 47 people working full time in the CAM-CTRP. This includes faculty, study coordinators, an administrator, graduate students, post-doctoral fellows and undergraduate volunteers. The largest growth has occurred with respect to study coordinators and graduate students; the increased number of study coordinators has been necessitated by a significant increase in the number of funded projects. This increase has also provided support for graduate students and fellows with academic interests in cognitive and brain aging. Our core faculty was sought out to serve as primary mentors/advisors for graduate students in the Departments of Clinical and Health Psychology and Neuroscience. As a result, we are very selective and are able to recruit outstanding trainees. Dr. Maraganore, who joined the CAM-CTRP last year, has been very productive and also mentors post-doctoral fellows; he has a study coordinator. Drs. Williamson and Lamb have received grants from NIH and VA, which has led to additional CAM-CTRP-affiliated staff and students.

A major initiative is now underway within the University of Florida McKnight Brain Institute (MBI) in which the Age-Related Memory Loss Program (ARML) and the CAM-CTRP will be merging as the UF Center for Cognitive Aging and Memory. This merger is expected to be completed over the next few months and will be beneficial in several ways. It will create opportunities for increased collaboration between the faculty in the ARML and the CAM/CTRP programs, facilitating translation of basic neuroscience discoveries from animal models to human clinical applications. The merger will also provide for greater integration of resources and expertise, and also further strengthen the visibility of the McKnight Brain Institute and the Center for Cognitive Aging and Memory. With respect to human clinical translation, Dr. Maraganore has not only been very successful in getting his research established and funded at UF, but has also developed a Brain Wellness Clinic that focuses on normal cognitive decline and preventing neurodegenerative disease. He and his colleagues in that clinic are seeing a large number of people on a weekly basis.

<u>Specific areas of growth, and challenges:</u>

- The growth in the number of staff and students in the program has resulted in the need for additional office and clinical space. We have worked with Dr. Golde in securing space for a number of our staff in the McKnight Brain Institute (MBI), which enables them to be close to our clinical research area there. Space continues to be an ongoing issue which we continue to address with Drs. Golde and Smith, who is chairman of the Department of Clinical and Health Psychology.
- Our dedicated clinical research space is now at full capacity. The space is excellent and we are grateful to have it on the ground floor of the MBI in proximity to the MRI scanners and phlebotomy laboratory.
- The phlebotomy laboratory continues to be very active and is being used to near full capacity. Our clinical research assistant draws, processes and stores blood as well as other bio specimens, including those from the Evelyn F. McKnight Brain Aging Registry (MBAR). We have expanded the bio specimen processing to include stool samples for microbiome analyses and saliva for microbiome and genetics studies.
- Our neuroimaging core has made major strides in the implementation of processing pipelines for batch analysis of data from multiple imaging modalities. Our neuroimaging processing systems are housed and integrated into the UF Hipergator system, which provides us with state of the art, powerful

computational capacity.

- Neuromodulation resources have developed dramatically with continued refinement of tDCS, and also incorporation of other approaches, including near infrared and vagal nerve stimulation methods.

Scientific accomplishments.

The Cognitive Aging and Memory: Clinical Translational Research Program faculty and trainees have been extremely successful over the past year. There have been a number of funded studies and many new publications, as highlighted below, with greater detail provided in the biosketches provided with this report.

- Dr. Ron Cohen continues to be fully funded by NIH with all projects progressing as planned and multiple publications resulting from this work over the past year. Two chapters were published this year. One focuses on the neuropsychology of aging and appears in a book on Geriatric Neurology, edited by Dr. DeKosky. The second chapter focuses on neuroimaging for the study of cognitive and brain aging; published in a book on a similar topic edited by Drs. Nadeau and Heilman. We published initial findings from the WISE study of cognitive and brain changes associated with weight loss and reduction in diabetes post-bariatric surgery, continued research on the influence of the gut microbiome on cognitive and brain aging. Dr. Cohen also was instrumental in the successful renewal of the VA Brain Research Rehabilitation Center (BRRC), on which he served on the executive committee and helped implement a cognitive and brain aging registry based on the MBAR.
- Dr. Adam Woods earned tenure and a promotion to Associate Professor this past year. He was extremely productive with 15 published manuscripts. He was section editor for the Encyclopedia of Gerontology and Population Aging, overseeing topics related to cognitive aging and neuroscience of aging, with twenty chapter on these topics as senior author. Dr. Woods' book on neuromodulation was published this year. He was awarded his second NIH R01 grant and also was a co-investigator on a R37 grant on neuromodulation for chronic pain in older adults (Fillingim, PI). He also received other grant awards. His total awarded funding is now $14 million. Dr. Woods currently has 27 post-docs, graduate students, staff and undergraduates in his laboratory.
- Dr. Eric Porges continues to collect data for his K01 career development award study, and has published noteworthy papers focusing on cerebral GABA measured by MR spectroscopy for the study of brain aging. He also has ongoing work focusing on vagal nerve stimulation to enhance cognitive function and reduce negative symptoms associated with aging. Dr. Porges had ten publications in peer reviewed journals in the past year.
- Dr. Joseph Gullett has been appointed as a Research Assistant Professor and full member of CAM-CTRP. He has submitted a K23 career development award to NIA and a KL2 career award to the UF Clinical Translational Science Institute. Dr. Gullett had five publications this past year. He received funding for a pilot study to analyze fMRI network connectivity and white matter pathways in older adults. He has a manuscript on mRNA and cognitive aging which employs advanced machine learning methods, which will be submitted soon. Another manuscript focusing on intracellular free water as a biomarker of neuroinflammation in the context of cognitive aging has been revised and is being resubmitted on the request of the journal.
- Dr. Demetri Maraganore had multiple accomplishments, including his work on the Ethel Moore grant, the moon-shot project, which was funded, and the implementation of the Brain Wellness Clinic. He also submitted a SBIR grant together with Dr. Cohen and Yuval Malinsky of Vigorous Mind Inc. to develop a nutritional module for the Vigorous Mind platform. The project is aimed at helping older-adults transition to a Mediterranean diet.
- Dr. John Williamson received a VA Merit Award (R01 equivalent) to study vagal nerve stimulation in the context of aging, specifically focusing effects on sleep architecture. He received and has initiated in pilot project funded by the MBRF coupling this type of stimulation with cognitive training in older adults. He also is continuing research on traumatic brain injury and aging supported by DOD funding. Dr. Williamson played a major role in the renewal of the VA BRRC, and leads its cognition core. He completed his R56 on heart failure and the brain (Cohen, Co-I) and is in the process of writing up a case series based on these data. He had six manuscripts in refereed journals and 3 chapters published this year.
- Dr. Damon Lamb was funded by the Veterans Administration for a career development award studying age associated changes in the brain's white matter connectivity. He had five publications, presented at eight international conferences, and continued his research funded by DARPA, DOD, NIH and the VA. He has played a key role in the development of the vagal nerve stimulations methods.

Progress on existing projects:

- The Augmenting Cognitive Training in Older Adults (ACT) study has randomized 290 participants to date.
- The MBAR study of successful cognitive aging in people over the age of 85 is also now fully active at the four MBI sites, with approximately 41 participants assessed so far, at the University of Florida.
- We have now almost fully recruited for the NIDDK RO1 study “Obesity and Type II diabetes: Bariatric surgery effects on brain function and aging and completing post-surgery follow-ups”. Initial papers were published on baseline findings, and we have submitted a manuscript to Surgery for Obesity and Related Disorders based on the initial longitudinal analyses.
- The ARCH II study is winding down with results being analyzed and prepared for publication. The SHARC U01 (Cohen and Cook, MPIs) has now recruited over 150 participants, and initial findings are being presented at an upcoming international meeting. The ROUGE study focusing on Aging and the microbiome (NIA R01) has recruited over 60 participants with initial baseline analyses underway.
- The McKnight Brain Research Foundation (MBRF) sponsored inter-institute initiative will be completing assessments over the coming months. Subsequent efforts will be directed at publishing findings from this unique cohort, with Dr. Gene Alexander as PI, and the other site leaders as co-PIs.

Thank you for the continuing support of the McKnight Brain Research Foundation. We look forward to continued productivity and scientific achievements in the coming year.

Sincerely,

Ronald Cohen, Ph.D., ABPP, ABCN
Professor, Clinical and Health Psychology, Neurology, and Psychiatry
Director, Center for Cognitive Aging and Memory Clinical Translational Research (CAM)
Evelyn McKnight Chair for Clinical Translation in Cognitive Aging

SUMMARY OF SCIENTIFIC ACHIEVEMENTS SINCE LAST REPORT:

Ronald A. Cohen, PhD

1. The ACT R01 grant from NIA, a multi-site MBI study to examine the augmenting effects of tDCS brain stimulation on cognitive training in the elderly (Cohen, Woods, Marskike, MPIs) is now operating at near full capacity with recruitment that consistent with targeted enrollment. In addition to quarterly Data Safety Management Board meetings (with Dr. Wagster and other board members), we hold regular laboratory meetings to discuss progress. A manuscript that describes this randomized clinical trial was published (Woods, et., 2018). We are analyzing baseline data to address scientific questions related to cognitive and brain aging that will lead to the first set of publications.

2. The McKnight Brain Aging Registry (MBAR), an inter-institute study of successful cognitive and brain aging in people over 85 years is proceeding according to plan. We have collected large quantities of cognitive, neuroimaging and laboratory data from across the four institutes. Approximately half of intended sample has been recruited and assessed and preliminary analyses have been initiated. Two initial findings were presented this year at the Society for Neuroscience meeting and are being prepared for publication.

3. U01 grant to study of the effects of reducing alcohol consumption among HIV-infected people in the context of aging received IRB approval and recruitment is now underway in Miami. (Cohen, Cook, MPIs);

4. Continuation of several ongoing R01 projects and a R56 study that focus on risk factors affecting cognitive aging. (e.g., WISE study that examines bariatric surgery induced weight loss effects on the brain and cognition). Other NIH supported projects include ARCH, HIV-ETOH 30-day challenge, HIV-ETOH Microbiome study, Marijuana effects of cognition in older adults (MAPLE). The R56 has recruited heart failure patients undergoing cardiac resynchronization to improve cardiac output is wrapping up with cognitive, neuroimaging and vascular indices being analyzed.

5. ROGUE R01 – funded by NIA: Study to examine HIV-aging interactions on the microbiome and effects on the brain and cognition.

6. Publications related to studies chemotherapy effects for breast cancer in older women (CAM-Nursing-Cancer Institute initiative). This year a third manuscript focusing on effects of chemotherapy and breast cancer itself on fatigue was accepted for publication.

7. Multiple manuscripts were published related to my lines of research as listed subsequently.

8. Special edition of Frontiers in Aging Neuroscience that focuses on neuroimaging for the study and assessment of cognitive and brain aging was completed and published this year. Dr. Cohen is the primary editor, Drs. Alexander, Visscher, Wright, and Woods (Co-editors). A list of the manuscripts in this special edition is included in the full report.

9. Mentoring of career development awards for several faculty continues (Woods, Porges, Lamb, Cruz, and Terry). Each has made exceptional progress in their research. Currently, working Dr. Joseph Gullett, a CAM post-doctoral fellow on development of a K01 career development award which we hope will lead to funding supporting a faculty position in CAM for him through the Department of Clinical and Health Psychology. I am also working with the Department of Neurology in the recruitment of a senior neuropsychological researcher who has multiple R01 grants. This individual would work in collaboration with Drs. Maraganore and myself on studies of cognitive and brain aging, and brain wellness.

10. Dr. Maraganore and I have met on an ongoing basis since his arrival at UF in September to facilitate his development of a brain wellness program in Neurology at UF. We also have focused on developing a R01 to examine the effects of the microbiome on cognitive and brain aging in successful agers and also adults with MCI.

11. Collaboration with Gainesville VA Brain Rehabilitation Research Center (BRRC) renewal. I serve on the BRRC executive board and scientific committees. As a central theme of the renewal, the BRRC is developing a registry of neuroimaging and cognitive data that is harmonized with the MBAR registry under my guidance. The goal is to leverage the large VA population of aging veterans to examine brain and cognitive aging, along with the effects of earlier traumatic brain injury, PTSD, and stroke.

12. Drs. DeKosky, Mitchell, Woods, and I have collaborated on the development of pilot study to examine whether intermittent hypoxia therapy has beneficial effects on cognition, specifically neural plasticity, in older adults.

Damon Geoffrey Lamb, PhD

Continued to advance research program through executing research funded by the DARPA, NIH, and VA. This included several proposals to investigate safe, non-invasive forms of vagal nerve stimulation in an aging human population as well as individuals with PTSD, who are at high risk of age-related diseases and disorders. I am also developing new MRI techniques to evaluate diseases of aging and normal age-related decline.

Demetrius M. Maraganore, PhD

I am the Principal Investigator (PI) of the Florida Health Ed and Ethel Moore Alzheimer's Disease Research Program application entitled "Utilizing Data from the Electronic Medical Record to Predict Alzheimer's and Dementia Risk". This was awarded on December 13, 2018. That grant aims to develop an Alzheimer's prediction model using data routinely captured by the University of Florida (UF) electronic medical record (EMR), to replicate the model using EMR data shared by the OneFlorida Clinical Research Consortium, to implement the replicated model into the UF EMR using clinical decision support (CDS) tools, and to share the replicated model and CDS tools with OneFlorida Clinical Research Consortium sites. The long-term goal is to create a Florida statewide Alzheimer's prediction and prevention initiative. I am also the PI of the Agency for Healthcare Research and Quality grant R01HS024057 entitled "Quality Improvement and Practice Based Research in Neurology Using the EMR". I supervised the building of structured clinical documentation support (SCDS) and CDS toolkits within the EMR, for the evaluation and management of patients with 11 different neurological indications (including memory disorders and brain health). These toolkits support the clinical practices of neurologists and are also used to support clinical research (including in cognitive decline, mild cognitive impairment, dementia, and Alzheimer's disease). The EMR toolkits that my team built are being shared with 15+ academic departments across the nation, and in return the participating sites are sharing deidentified electronically captured data into a registry, with the aims of quality improvement and practice-based research in neurology using the EMR. One of the projects includes an EMR-based pragmatic trial comparing the effectiveness of three memory and cognitive enhancing drugs in mild cognitive impairment. Regarding brain health (primary prevention of aging related cognitive decline, dementias, including Alzheimer's disease), as the past Chair of Neurology at NorthShore University HealthSystem in Evanston, IL, I developed and led the NorthShore Center for Brain Health. My team and I targeted populations at risk for dementia through community outreach and continuing medical education of physicians. The Center provided outpatient consultations that included risk assessments (of genetic and modifiable factors), personalized interventions (lifestyle, behavioral, and medical), and annual surveillance (early disease detection). In two years, more than 550 patients were evaluated and managed. This was one of the first brain health clinics in the United States. In the Center, my team and I also conducted clinical research, including point of care electronic data capture via SCDS and CDS tools built into the EMR. We developed a preliminary Alzheimer's prediction model using data routinely captured by the EMR. At the University of Florida, I am building and directing a similar Brain Health Clinic (that will evaluate and manage persons at high risk for dementia identified by the prediction model to be refined, replicated, implemented into the EMR as clinical decision support, and disseminated to OneFlorida Clinical Research Consortium practices via the recently awarded Ed and Ethel Moore grant).

Eric Porges, PhD

1. Initiation of NIH funded study (PI) data collection.
   - Study 1. Cognitive flexibility in the context of HIV and Alcohol
   - Study 2. Transcutaneous vagal nerve stimulation in MCI.
2. Development and testing of method for concurrent edited Magnetic Resonance Spectroscopy measurement of GABA, Glutathione and Alcohol, in humans.
3. Collaboration with ARML to apply Magnetic Resonance Spectroscopy in aging rodent models.

John B. Williamson, PhD

Since the last reporting period, I have made progress on several scientific fronts. I recently accepted a position within the Center for OCD and Anxiety Related Disorders (COARD) in the Department of Psychiatry. Further, Dr. Damon Lamb, from my lab group, also accepted a tenure track position in the COARD. In addition, I was asked to assume a leadership role within the Brain Rehabilitation Research Center as the lead of the Emotion Function Initiative. Together, these changes support our research mission emphasizing the role of chronic stress and mood disruption on the brain and behavioral outcomes. These shifts have already fostered several new initiatives.

I am co-lead on a BRRC wide center project in which we have updated and re-vamped our Center's registry. In the past, the registry was for patients with stroke and was used as a recruitment tool for many studies involving stroke in the group. However, we have now added traumatic brain injury, post-traumatic stress disorder, and, shortly, combat exposed healthy individuals to the registry. We have also added a longitudinal assessment cohort of these groups as well as blood, neuroimaging, and neuropsychological assessments. Dr. Ron Cohen is part of this process and we are intending to use this in a manner that is in concert with the ACTIVE and MBAR aging studies to address differences associated with military experience that modify aging trajectories.

Supporting this move to chronic TBI mechanistic assessment, we recently received DOD funding for a consortium project including the University of Pittsburgh, SUNY Downstate, Baylor, and UF. This project will begin enrolling participants in 2019 and is designed to develop precision medicine data for negative outcomes associated with TBI.

Further, we have multiple clinical trials underway furthering the development of our neurostimulation line of investigation of transcutaneous vagal nerve stimulation. These studies are also in parallel to mechanistic work initiated by our team funded by DARPA (targeted neuroplasticity training grant). Last September, funding for our tVNS and amnestic MCI project started (NIH R21) and we have been steadily enrolling participants with a target completion time of September 2019. Parallel to this, we have acquired promising data demonstrating sleep architecture modification associated with tVNS in veterans with PTSD.

In addition, in our R56 funded heart failure research line, we have added a secondary collaborator site, Mayo Jacksonville, to improve patient access and enable future funding in that regard.

Adam Joshua Woods, PhD

Since last report, I have acquired additional funding for my research on novel non-invasive interventions for remediating cognitive aging. In addition to existing funds for a multisite R01 randomized clinical trial across three of the McKnight Brain Institutes (The ACT study, n=360, $5.8 million), a K01 performing a dose response companion study to my R01 (Stimulated Brain, n=80, $612K), two R21s (1 PI, 1 Co-I) and an RF1 (Co-I), I was recently awarded funding in an MRBF pilot (MPI), U01 (site PI), R37 (Co-I) and VA Merit Grant (Co-I). My research program currently has been awarded over $10 million dollars to find and implement novel non-invasive methods for intervening on cognitive aging and the prevention of dementia. Collectively, this body of work represents the CAM's efforts to pioneer novel non-invasive interventions for combating cognitive aging in older adults. The MBRF pilot investigates a novel form of non-invasive photobiomodulation for enhancing mitochondrial function and cognition in older adilts. The U01 investigates the value of cognitive training in halting functional decline in people with mild cognitive impairment. The R37 investigates the efficacy of transcranial direct current stimulation and mindfulness-based stress reduction in alleviating chronic knee pain in older adults. The VA Merit grant extends our R21 project to a large Phase II clinical trial investigating the benefits of transcranial direct current stimulation paired with complex walking for enhancing executive function and mobility in older adults. My lab has grown to 21 lab members and continues to expand with funding success. https://woodslab.phhp.ufl.edu

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2. O'Shea D, Langer, K., Woods, AJ, Porges, E, **Williamson, JB**, O'Shea, A, Cohen, R. (2018) Educational attainment moderates the associated between hippocampal volumes and memory performances in health older adults. *Frontiers in Aging Neuroscience.*

3. Lamb, DG, Balavage, KT, **Williamson, JB**, Knight, LA, Heilman, KM. (2018) The influence of focused spatial attention and habitation of the allocation of spatial attention. *Journal of the International Neuropsychological Society*, In Press.

4. Mankowska, A., Heilman, K.M., **Willliamson, J.B.**, Harciarek, M. (2018) Age related changes in the allocation of vertical attention. *Journal of the International Psychological Society*, In Press.

5. Makowska, A., Harciarek, M., **Williamson, J.B.**, Heilman, K.M. (2018) The influence of rightward and leftward spatial deviations on spatial attention on emotional picture recognition. *Journal of Clinical and Experimental Neuropsychology*, 1-12.

6. O'Shea, D., Fieo, R., Woods, A., **Williamson, J.B.**, Porges, E., Cohen, R. (2018) Discrepancies between crystallized and fluid ability are associated with frequency of social and physical engagement in community dwelling adults. *Journal of Clinical and Experimental Neuropsychology*, In Press.

7. O'Shea, D., Dotson, V., Woods, A., Porges, E., **Williamson, J.**, O'Shea, A., Cohen, R. (2018). Depressive symptom dimensions and their association with hippocampual and entorhinal cortex volumes in community dwelling older adults. F*rontiers in Aging Neuroscience*.

8. ****Williamson, J. B.**, Lamb, D. G., Burtis, D. B., Haque, S., Zilli, E. M., Kesayan, T., . . . Heilman, K. M. (2018). Right hemispatial ipsilesional neglect with chronic right hemisphere strokes. *J Clin Exp Neuropsychol*, 1-10. doi:10.1080/13803395.2017.1347606

9. Morris, M.K., Bowers, D., **Williamson, J.B.**, Heilman, K.M. (2017). Alterations of emotional reactivity following right temporal lobectomy. *Neurocase*, 1-7.

10. Manikoska, A., Heilman, K.M., **Williamson, J.B.**, Biedunkiewicz, B., Debska-Slizien, A., Harciarek, M. (2017). Leftward bias of visual attention in patients with End-Stage Renal Disease receiving Dialysis: A neglected phenomenon. *Cognitive and Behavioral Neurology*, 30, 176-181.

Adam Joshua Woods, PhD

1. Indahlastari A, Albizu A, Nissim N, Traeger K, O'Shea A, **Woods AJ**. Methods to monitor accurate and consistent electrode placements in conventional transcranial electrical stimulation. *Brain Stimulation.* Accepted October 2018. Impact Factor: 6.078.

2. Cohen R, Gullet J, Porges E, **Woods AJ**, Bryant V, Mcadams M, Tashima K, Cook R, Bryant K, Monnig M, Kahler C, Monti P. Heavy alcohol use and age effects on HIV-associated neurocognitive function. *Alcoholism: Clinical and Experimental Research.* Accepted October 2018. Impact Factor: 2.716.

3. O'Shea D, Langer K, **Woods AJ**, Porges E, Williamson J, O'Shea A, Cohen R. (2018). Educational attainment moderates the association between hippocampal volumes and memory performance in healthy older adults. *Frontiers in Aging Neuroscience.* 10: 361. Impact Factor: 4.504.

4. Soyata A, Aksu S, **Woods AJ**, Iscen P, Sacar K, Karamursel S. Effects of transcranial direct current stimulation on decision making and cognitive flexibility in gambling disorder. *European Archives of Psychiatry and Clinical Neuroscience.* Accepted October 2018. Journal Impact Factor: 3.617.

5. Gedoth N, Esmaeilpour Z, Adair D, Chelette K, Dmochowski D, **Woods AJ**, Kappenman E, Parra L, Bikson M. (2019). Inherent physiological artifacts in EEG during tDCS. *NeuroImage.* 185: 408-424. Impact Factor: 5.835.

6. Wanigatunga A, Gill T, Marsh A, Hsu F, Yaghjyan L, **Woods AJ**, Glynn N, King A, Newton R, Fielding R, Pahor M, Manini T. (2018). Effect of hospitalizations on physical activity patterns in mobility-limited older adults. *Journal of the American Geriatric Society.* 49(11): 2167-2175. Impact Factor: 4.155.

7. Ahn H, Suchting R, **Woods AJ**, Miao H, Green C, Cho R, Choi E, Fillingim R. (2018). Bayesian analysis of the effect of transcranial direct current stimulation on experimental pain sensitivity in older adults with knee osteoarthritis: randomized sham-controlled pilot clinical study. *Journal of Pain Research.* 11: 2071-2082. Impact Factor: 2.645.

8. Pope C, Stavrinos D, Vance D, **Woods AJ**, Bell T, Ball K, Fazeli P. (2018). A pilot investigation on the effects of combination transcranial direct current stimulation and speed of processing cognitive remediation therapy on simulated driving behavior in older adults with HIV. *Transportation Research Part F: Traffic Psychology and Behavior.* 58: 1061-1073. Impact Factor: 1.935.

9. Gomes-Osman J, Indahlastari A, Freid PJ, Rice J, Cabral D, Nissim N, Aksu S, McLaren M, **Woods AJ**. (2018). Non-invasive brain stimulation: probing intracortical circuits and improving cognition in the aging brain. *Frontiers in Aging Neuroscience*, 10: 177. Impact Factor: 4.504.

10. Gullett J, Lamb D, Porges E, **Woods AJ**, Rieke J, Thompson P, Jahanshad N, Nir T, Tashima K, Cohen R. (2018). The impact of alcohol use on frontal white matter in HIV. *Alcoholism: Clinical and Experimental Research.* 1-12. 42(9): 1640-1649. Impact Factor: 2.716.

11. Thomas C, Datta A, **Woods AJ**. (2018). Effect of aging on cortical current flow due to transcranial direct current stimulation: considerations for safety. *IEEE EMBC.* 3084-3087. Impact Factor: 0.50.

12. O'Shea D, Fieo R, **Woods AJ**, Williamson J, Porges EC, Cohen R. (2018). Frequency of social and cognitive engagement is associated with discrepancies between crystalized and fluid ability in community dwelling adults. *Journal of Clinical and Experimental Neuropsychology.* 40(10): 963-970. Impact Factor: 1.839.

13. White TL, Monnig MA, Walsh EG, Nitenson AZ, Harris AD, Cohen RA, Porges EC, **Woods AJ**, Lamb D, Boyd C, Fekir S. (2018). Psychostimulant drug effects on glutamate, Glx, and creatine in the anterior cingulate cortex and subjective response in healthy humans. *Neuropsychopharmacology.* 43(7): 1498-1509. Impact Factor: 6.403.

14. O'Shea D, Dotson V, **Woods AJ**, Porges E, Williamson J, O'Shea A, Cohen R. (2018). Depressive symptom dimensions and their association with hippocampal and entorhinal cortex volumes in community dwelling older adults. *Frontiers in Aging Neuroscience*, 10: 40. Impact Factor: 4.504.

15. Szymkowicz SM, **Woods AJ**, Dotson V, Porges EC, Nissim N, O'Shea A, Cohen R, Ebner N. Association between subclinical depressive symptoms and reduced brain volume in middle-aged to older adults. *Aging and Mental Health.* Accepted January 2017. Impact Factor: 2.65.

16. Bikson M, Brunoni AR, Charvet LE, Clark V, Cohen LG, Deng Z, Dmochowski J, Edwards D, Frohlich F, Kappenman E, Lim KO, Loo C, Mantovani A, McMullen D, Parra LC, Pearson M, Richardson JD, Rumsey JM, Pejman S, Sommers D, Unal G, Wassermann EM, **Woods AJ**, Lizanby H. (2018). Rigor and reproducibility in research with transcranial electrical stimulation: An NIMH-sponsored workshop. *Brain Stimulation.* 11(3): 465-480. Impact Factor: 6.078.

17. Cohen R, Siegel S, Porges E, Tashima K, **Woods AJ**, Ding MZ. (2018). Neural response to working memory demand predicts neurocognitive deficits in HIV. *Journal of NeuroVirology.* 24(3): 291-304. Impact Factor: 3.206.

18. **Woods AJ**, Cohen R, Marsiske M, Alexander G, Czaja S, Wu S. (2018). Augmenting cognitive training in older adults (The ACT Study): Design and methods of a Phase III tDCS and cognitive training trial. *Contemporary Clinical Trials.* 65: 19-32. Impact Factor: 2.095.

PUBLICATIONS (OTHER):

Ronald A. Cohen, PhD

1. **Cohen, RA**. *Encyclopedia of Clinical Neuropsychology* (2018), Springer, New York (20 Chapters)

2. **Cohen, RA**, Smith, M, Marsiske, M. Neuropsychology of Aging. *In Handbook of Geriatric Neurology*. (DeKosky, ed.), in press

3. **Cohen, RA**, Porges, E, Gullett, *J. Neuroimaging of Brain Aging*. In Cognitive Changes in the Aging Brain (Heilman and Nadeau, eds), in press.

Eric Porges, PhD

1. **Porges E.C.** Pre-Pulse Inhibition. *Encyclopedia of Clinical Neuropsychology.* 2018. New York, NY: Springer Science

2. **Porges E.C.** Attentional Blink. *Encyclopedia of Clinical Neuropsychology.* 2018. New York, NY: Springer Science

3. **Porges E.C.** Backwards Masking. *Encyclopedia of Clinical Neuropsychology.* 2018. New York, NY: Springer Science

4. **Porges E.C.** Priming. *Encyclopedia of Clinical Neuropsychology.* 2018. New York, NY: Springer Science

5. Lamb D.G.; **Porges E.C.** Flanker Task. *Encyclopedia of Clinical Neuropsychology.* 2018. New York, NY: Springer Science

PRESENTATIONS AT SCIENTIFIC MEETINGS:

Ronald A. Cohen, PhD

1. International Neuropsychological Society, Washington, DC. (2018), Cognitive and Brain Aging (3 hr workshop).

2. Florida Society for Neurology. Orlando, FL (2018). NeuroHIV: Clinical manifestations and management issues

3. Society for Obesity: Nashville, Tenm 11-15-18. Weight loss and cognition

4. ARCH annual summer meeting: Brown University, Research Component 1 update

5. SHARC annual meeting: Miami, Florida

Damon Geoffrey Lamb, PhD

1. **D. G. Lamb**, T. S. Garman, S. Ramirez, A. Crider, M. M. Bruner, E. W. Dirr, F. Delgado, K. P. Olczak, A. P. Maurer, K. J. Otto, S. N. Burke, B. Setlow, J. L. Bizon. *Effects of vagus nerve stimulation on selective attention in brown Norway rats.* Society for Neuroscience Annual Meeting, San Diego, CA, 2018

2. S. N. Burke, A. Crider, K. P. Olczak, E. W. Dirr, K. N. Lubke, J. Nick, B. Mclaurin, E. Atkinson, K. J. Otto, A. P. Maurer, **D. G. Lamb**, B. Setlow, J. L. Bizon. *Acute vagus nerve stimulation attenuates novelty-induced arc transcription in dorsal CA1*. Society for Neuroscience Annual Meeting, San Diego, CA, 2018

3. L. Altidor, T. S. Garman, S. Ramirez, A. M. Crider, **D. G. Lamb**, M. M. Bruner, A. M. Finner, E. W. Dirr, F. Delgado, K. P. Olczak, A. P. Maurer, K. J. Otto, S. N. Burke, B. Setlow, J. L. Bizon. *Targeting GABAergic mechanisms to improve prefrontal cortical-mediated cognitive flexibility in a novel touchscreen-based reversal learning task.* Society for Neuroscience Annual Meeting, San Diego, CA, 2018

4. Olczak, Kaitlynn P, Dirr, Elliott, Delgado, Francisco , Crider, Amanda, McLaurin, Bonnie, **Lamb, Damon G**, Maurer, Andrew P, Burke, Sara N, Setlow, Barry, Bizon, Jennifer L, Otto, Kevin J. *Chronic Electrochemical Evaluation of Shape-Memory Polymer Nerve Cuff Electrodes.* Biomedical Engineering Society Annual Meeting, Atlanta, GA, 2018

5. *Neurochemistry of GABA.* Eric Porges and **Damon G. Lamb**. EDITINGSCHOOL, Playa Del Carmen, Mexico, 2018.

Eric Porges, PhD

1. *Frontal Gamma-Aminobutyric Acid Concentrations are Associated with Cognitive Performance in Older Adults.* Presented at "Tenth McKnight Brain Research Foundation, Inter-Institutional Meeting." Birmingham, AL. 2018

2. *The Neurochemistry of GABA*, Presented at the first biannual MRS Editing School. Playa Del Carmen, Mexico. 2018

John B. Williamson, PhD

1. **Invited speaker** **2018**
   Executive functions, Treatment and mediation
   Florida Society of Neurology Annual Conference, CE course

2. **Invited speaker, International Neuropsychological Society** **2018**
   *Vulnerability to Post Traumatic Stress Disorder after TBI
   Chronic Stress and Aging
   Continuing Education Series

Adam Joshua Woods, PhD

1. **Woods AJ**. *Lecture.* Transcranial electrical stimulation. Annual Meeting of the Florida Society for Neurology. Orlando, FL September 28, 2018.

2. **Woods AJ**. *Symposium.* Neuromodulation in Extremes of Age: Elderly. Augmenting Cognitive Training in Older Adults: a Phase III tDCS trial. Neuromodulation Conference & NANS Summer Series, New York, NY, August 25, 2018

3. Nissim N(g), O'Shea A, Richards L, Telles R, Porges E, Cohen R, **Woods AJ**. *Poster.* Effects of bilateral frontal tDCS on the working memory network: an fMRI-tDCS study in healthy older adults. Poster presented at the NYC Neuromodulation Conference & North American Neuromodulation Society Summer Series. New York, NY, USA, August 25, 2018.

4. Indahlstari A(p), Nissim N(g), Traeger K, O'Shea A, **Woods AJ**. *Poster.* Methods to determine accuracy in tDCS electrode placement. Poster presented at the NYC Neuromodulation Conference & North American Neuromodulation Society Summer Series. New York, NY, USA, August 25, 2018.

5. **Woods AJ.** *Symposium.* Current and emerging cognitive interventions. Augmenting cognitive training with neuromodulation. 126th Annual Convention of the American Psychological Association. San Francisco, CA, USA, August 11, 2018.

6. **Woods AJ**, Bikson M, Knotkova H. *Lecture.* Transcranial Direct Current Stimulation: Principles and Outcomes. NYC Neuromodulation Conference & NANS Summer Series, New York, NY, August 23, 2018.

7. **Woods AJ**, Bikson M, Knotkova H. *Lecture.* Transcranial Direct Current Stimulation: stimulation parameters, protocols, electrodes and montages. NYC Neuromodulation Conference & NANS Summer Series, New York, NY, August 23, 2018.

8. **Woods AJ**. *Lecture.* Transcranial Direct Current Stimulation: Safety. NYC Neuromodulation Conference & NANS Summer Series, New York, NY, August 23, 2018.

9. **Woods AJ**, Bikson M, Knotkova H. *Lecture.* Transcranial Direct Current Stimulation: an introduction. International Neuroergonomics Conference. Philadelphia, PA. June 27, 2018.

10. **Woods AJ**. *Lecture.* Transcranial Direct Current Stimulation: principles, mechanisms and targeted outcomes. International Neuroergonomics Conference. Philadelphia, PA. June 27, 2018.

11. **Woods AJ**, Bikson M, Knotkova H. *Lecture.* Transcranial Direct Current Stimulation: stimulation parameters, protocols, electrodes and montages. International Neuroergonomics Conference. Philadelphia, PA. June 27, 2018.

12. **Woods AJ**. *Lecture.* Transcranial Direct Current Stimulation: Safety. International Neuroergonomics Conference. Philadelphia, PA. June 27, 2018.

13. Gradone A, Szymkowicz S(g), McLaren M(g), **Woods AJ**, O'Shea A, Dotson V. Interrelationships between depressive symptoms, memory, and prefrontal surface area in middle-aged to older adults. *Poster* presented at the Cognitive Aging Conference. Atlanta, GA, USA, May 5, 2018.

14. Michalak H, McLaren M(g), Szymkowicz S(g), **Woods AJ**, O'Shea A, Dotson V. Depressive symptom dimensions are associated with cerebellar volumes independent of memory performance. *Poster* presented at the Cognitive Aging Conference. Atlanta, GA, USA, May 5, 2018.

15. McLaren M(g), O'Shea A, Porges E, Cohen R, **Woods AJ**. *Poster.* Frontal structural neural correlates of processing speed performance in older adults. Poster presented at the Cognitive Aging Conference. Atlanta, GA, USA, May 4, 2018.

16. Nissim N(g), O'Shea A, Richards L, Telles R, Porges E, Cohen R, **Woods AJ**. *Poster.* Effects of bilateral frontal tDCS on the working memory network: an fMRI-tDCS study in healthy older adults. Poster presented at the Cognitive Aging Conference. Atlanta, GA, USA, May 4, 2018.

17. **Woods AJ**. *Symposium.* Augmenting Cognitive Training in Older Adults: a Phase III tDCS trial. International Learning and Memory Conference. Huntington Beach, CA, USA, April 20, 2018.

18. McLaren M(g), O'Shea A, Porges E, Cohen R, **Woods AJ**. *Poster.* Frontal structural neural correlates of processing speed performance in older adults. Poster presented at the 46th annual International Neuropsychological Society. Washington, DC, USA, March 17, 2018.

19. **Woods AJ**. *Symposium.* Continuum of Care from Wearables to Non-Invasive Neuromodulation: Clinical Applications of tDCS in the Aging Population. North American Neuromodulation Society, Las Vegas, NV, USA, January 11, 2018.

20. **Woods AJ**. Lecture. Hands-On tDCS. North American Neuromodulation Society, Las Vegas, NV, USA, January 11, 2018.

PRESENTATIONS AT PUBLIC (NON-SCIENTIFIC) MEETINGS OR EVENTS:

Demetrius M. Maraganore, PhD

1. September 12, 2018: "From Brain Disorders to Brain Health: Primary Prevention of Cognitive Decline and Dementia". The Volusia County Medical Society Meeting, Daytona Beach, FL

John B. Williamson, PhD

1. **Invited speaker, VA Sleep Seminar Series** **2018**
   **PTSD, TBI, hyperarousal features and sleep disruption

AWARDS (OTHER):

Ronald A. Cohen, PhD

1. Distinguished Professor Award, Department of Clinical and Health Psychology

Funded Research

1. COHEN, R. P01 AA019072 Monti (PI) 09/01/15 - 05/31/20 1.20 CM NIAAA 110,695
   Alcohol and HIV: Biobehavioral Interactions and Intervention
   One of two primary R01 projects in the Brown University HIV-Alcohol center grant, this study focuses on the interactive effects of HIV and alcohol use on metabolic-vascular disturbances underling brain dysfunction. We are longitudinally assessing HIV infected and seronegative controls who are stratified by alcohol use into three groups (heavy, moderate, none use) over a 36-month period. The study examines MRI-based neuroimaging biomarkers of brain dysfunction including diffusion tensor imaging (DTI), morphometry, and magnetic resonance spectroscopy (MRS) to measure cerebral metabolite abnormalities. Dr.

Cohen is the principal investigator of this R01 project overseeing all aspects of the study.
Role: Co-Investigator

2. R56 HL127175-01 (Williamson, PI) 09/01/15-08/30/20 1.8 CM NHLBI $31,989
The effects of heart failure and cardiac resynchronization on the brain and cognition
The goal of this study is to determine the influence of increased blood flow through cardiac resynchronization on the brain and cognition.
Role: Co-I

3. U24 AA022002 Cook (PI) 09/01/2013-08/31/2017 .36 CM NIAAA $6,313
Southern HIV Alcohol Research Consortium (SHARC) Admin and Research Support Cure.The objective of this proposal is to establish the administrative structure and to provide research support for the SHARC, a collaboration that links several universities and investigators with a common goal of supporting new research related to HIV and alcohol consumption.
Role: Co-I

4 2U01AA010797-06 (Cook, PI; Cohen MPI) 09/01/2016-08/30/2021 1.8CM NIAAA $4,718,864
Effects of experimentally-induced reductions in alcohol consumption on brain cognitive, and clinical outcomes and motivation for changing drinking in older persons with HIV infection.This proposed U01 study will build on our past findings to determine the extent to which marked reductions in alcohol consumption over 4-weeks via contingency management (CM) improves cognitive performance, brain functions and pathophysiology, and HIV-associated health outcomes. We will conduct state-of-the-art neuroimaging, cognitive, and behavioral assessments at each time point and then continue to track long-term drinking and HIV outcomes in our companion Cohort (U24). The Specific Aims of this proposal are: 1) to demonstrate improved cognitive performance and brain function (fMRI) after 4-weeks of CM-induced alcohol reduction among HIV+ adults, followed by worsening of these effects 1-year later if heavy drinking resumes; 2) to demonstrate that cerebral metabolic (MRS) and neuroinflammatory (DTI-free water) markers will also improve with CM-induced alcohol reduction and worsen if drinking resumes post-CM; and 3) Determine whether perceived benefits and challenges to drinking reduction identified during motivational interviewing (MI) predict drinking reductions or relapse one-year post-CM. We will also determine whether changes in cerebral pathophysiology (MRS, DTI-FW) correspond with changes in cognition, brain function (fMRI) and serum inflammatory and liver biomarkers.
Role: MPI

5. AA022002 Cohen (MPI) 09/01/2013-08/31/2017 .36 CM NIAAA $6,313
Effects of experimentally-induced reductions in alcohol consumption on brain cognitive, and clinical outcomes and motivation for changing drinking in older persons with HIV infection Southern HIV Alcohol Research Consortium (SHARC) Admin and Research Support Cure. The objective of this proposal is to establish the administrative structure and to provide research support for the SHARC, a collaboration that links several universities and investigators with a common goal of supporting new research related to HIV and alcohol consumption.
Role: MPI

6. 1R01DK099334 06/25/2014-05/31/2019 3.60 CM NIH $1,826,328
Obesity and type-2 diabetes: Bariatric surgery effects of brain function
The proposed prospective longitudinal study will examine whether cerebral metabolic and vasculardysfunction, including glucose/insulin disturbances (co-morbid diabetes) underlie obesity-associated cognitive dysfunction, and whether significant weight loss and diabetes remission following bariatric surgery reduces these disturbances.
Role: PI

7. NIH 1U54 EB020403 Thompson (PI) 07/01/2014-06/30/2018 .24 CM
ENIGMA Center for Worldwide Medicine, Imaging & Genomics $180,000
ENIGMA is not a project; it is a scientific movement of rapidly and constantly interacting collaborations that support each other. ENIGMA cohorts boost each other's power with gigantic datasets, and the tools and expertise to maximally exploit each other's data, performing some of the world's largest disease studies, beyond what any one site could perform on its own.
Role: Co-I Sub Award PI

8. NIH/NIA 1R01AG054077-01 (Woods/Cohen) 7/1/2016-6/30/2021 1.2 cal months
Augmenting Cognitive Training in Older Adults – The ACT Grant $21,538
This randomized clinical trial examines the effect of augmenting cognitive training with transcranial direct current stimulation to maximize cognitive and functional outcomes older adults experiencing age-related cognitive decline. Change in well-

validated measures of everyday abilities and neurocognitive function will serve as outcome measures. Functional and structural neuroimaging biomarkers of neural plasticity and learning (fMRI, GABA MRS, etc.) will measure intervention-associated alterations in specific brain regions impacted by cognitive aging.

9. NIA K01AG050707-A1 (Woods, PI) 07/01/2016-06/30/21 .0 cal months
   Neuromodulation of Cognition in Older Adults $0
   The goal of this study will be to investigate the ability of transcranial direct current stimulation to enhance the effectiveness of cognitive training targeting attention, speed of processing, and working memory function in older adults.
   Role: Mentor

Damon Geoffrey Lamb, PhD

1. MBI grant supplement ($10,000) for equipment and training to supplement IK2 grant.
2. IK2RX002490 ($965,534, 5yrs) Brain changes underlying emotional and executive alterations in TBI

Eric Porges, PhD

1. K01 AA025306-01A1, NIH/NIAAA **Porges, Eric (PI)** 08/01/17-01/31/22
   Cognitive and functional deficits associated with reduced cortical GABA in HIV-infected heavy drinkers This project will investigate important hypotheses regarding the relationship between regional cerebral GABA concentrations and cognitive flexibility in HIV+ heavy drinkers. To ensure an independent career post award, two critical areas of training will be addressed: 1) Behavioral and biological consequences of alcohol use in the context of HIV and 2) the development of expertise in the measurement of GABA, the principal inhibitory neurotransmitter, using Magnetic Resonance Spectroscopy (MRS). The PI is a cognitive neuroscientist with a strong research background in aging, cognition, experimental design, autonomic measurement, and magnetic resonance imagining (fMRI & MRI). **Role: PI**

John B. Williamson, PhD

1. **NIH R21AG054876 $275,000 2017 – 2019**
   Treatment of mild cognitive impairment with transcutaneous vagal nerve stimulation.
   PI: Williamson
2. **VA 0217BRRC-04 $60,000 2017 – 2018**
   Department of Veterans Affairs Brain Rehabilitation Research Center Pilot Award:
   Transcutaneous vagal nerve stimulation modulation of sleep quality and emotion in mild TBI and PTSD
   PI: Williamson
3. **NIH 1R56HL127175-01 $544,000 2016-2018**
   Brain and cognition effects of cardio resynchronization therapy in heart failure. The goal of this funding is to characterize brain changes as a result of improved cardiac output in heart failure including hemodynamic, task dependent regional brain activation and brain metabolic changes associated with improved cognitive performance and brain health.
   PI: Williamson
4. **1 LK2RX000707-01 CDA-2 (VA-K) $898,188 2012-2018**
   White matter changes and mild TBI: Emotional and autonomic consequences. Funded by the Department of Veterans Affairs: Williamson, Principal Investigator
   PI: Williamson

<u>Pending Submissions</u>

1. **NIH R01/Merit Review ~1.1 million to 2.5 million 2019 – 2023**
   Transcutaneous vagal nerve stimulation modulation of sleep quality and emotion in PTSD
   Status: Follow-up to currently funded BRRC pilot (currently active collecting pilot data)

PI: Williamson
Submission: Late 2018

Adam Joshua Woods, PhD

1. **NIA U01AG062368 (Edwards; PI) 09/30/18-05/31/20 $614,914**
   National Institutes of Health
   Planning an adaptive clinical trial of cognitive training to improve function and delay dementia
   This two-year U01 project will develop the infrastructure for a large Phase II/III clinical trial investigating the impact of various forms of cognitive training on functional abilities and dementia conversation in patients with mild cognitive impairment. I will lead the UF site on this trial and will also lead the neuroimaging and data management for the pilot trial and in the subsequent full trial submission. This grant involves sites at University of South Florida (parent site), University of California San Francisco and the University of Florida.
   Role: Site PI

2. **McKnight Brain Research Foundation (Woods/Bowers, MPIs) 05/1/18-04/31/20 $120,000**
   McKnight Brain Research Foundation
   CAM-CTRP Pilot Study: Near infrared brain stimulation in older adults.
   The goal of this funding is to use near infrared brain stimulation to improve cognition, 31P MRS markers of ATP, and functional neuroimaging biomarkers of cognitive and metabolic decline in healthy aging in a 2 site phase II pilot trial.
   Role: MPI

3. **NIA R37AG033906 (Fillingim; PI) 05/01/19-04/31/24 $6,144,138**
   National Institutes of Health
   Understanding Pain and Limitations in Osteoarthritic Disease
   The goal of this project is to evaluate transcranial direct current stimulation and mindfulness based stress reduction, alone and in combination, as treatments of chronic osteoarthritic knee pain in a two site phase II clinical trial.
   Role: Co-I

4. **VA Merit Review (Clark; PI) 04/01/2019-03/31/23 $1,100,000**
   VA Rehabilitation Research and Development Service
   Cerebral networks of locomotor learning and retention in older adults
   This four-year Merit application extends the ongoing collaborative work in R21AG053736 to investigate the impact of tDCS paired with complex walking as an intervention for mobility decline in older adults to a larger Phase II trial with increased mechanistic insight through multimodal neuroimaging. I will lead all aspects of tDCS clinical trial implementation in the trial.
   Role: Co-I

FACULTY BIOGRAPHICAL SKETCHES/CVs: See page 77

TRAINEES

Ronald A. Cohen, PhD

a. Post-doctoral

1. Joseph Gullett, PhD
2. Ellen Terry, PhD

b. Pre-doctoral

1. Amanda Garcia, PhD (Graduated)
2. Talia Seider, PhD (Graduated)
3. Vaughn Bryant, MS

4. Nicole Nissan, MS

c. Other: Faculty mentoring: K awards, etc.

1. Adam Woods, PhD
2. Eric Porges, PhD
3. Robert Fieo, PhD
4. Yenisel Cruz-Almeda, PhD
5. Natalie Ebner, PhD
6. David Clark, PhD
7. Lisa Delmonico, PhD
8. Ellen Terry, PhD
9. Joseph Gullett, PhD
10. David Clark, PhD
11. Damon Lamb, PhD

Eric Porges, PhD

a. Post-doctoral

1. Joseph M. Gullett, PhD

b. Pre-doctoral

1. Destin Shortell
2. Kathleen Hupfield

c. Other

1. Gennel Samson (undergraduate)

John B. Williamson, PhD

a. Post-doctoral

1. Sudeshna Chatterjee, PhD

b. Pre-doctoral

1. Amy Tran, BS
2. Ryan Pynosky, BS
3. Heather Bouchard, BS
4. Tyron Slack
5. Aaron Colverson, PhD
6. Vaughn Bryant, PhD

Adam Joshua Woods, PhD

a. Post-doctoral

1. Aprinda Indahlastari, PhD

b. Pre-doctoral

1. Nicole Nissim, MS

2. Emanuel Boutzoukas
3. Hanna Hausman
4. Jessica Kraft, MA
5. Nicole Evangelista

c. Other

1. Kathleen Frost (undergrad)
2. Cindy Hernandez (undergrad)
3. Klea Agollari (undergrad)

CLINICAL/TRANSLATIONAL PROGRAMS

Ronald A. Cohen, PhD

a. New programs:

1. VA Brain Rehabilitation Research Center Renewal
2. Brain Wellness Program (Maganore)

b. Update on existing clinical studies

1. ACT study in progress (see above)
2. MBAR project is underway. We are collecting data (see above)
3. MBAR database now in place
4. ACTIVE studies: Manuscripts continue to be written and published, including findings from the Talia Seider (Seeing Brain) and Amanda Garcia (Talking Brain) dissertations.
5. CAM-ARML pilot studies being completed
6. HIV-alcohol-aging studies continuing to recruit. Publishing findings
7. Study of bariatric surgery effects on brain function making excellent progress. We have over 110 participants. Publishing findings
8. Heart failure project to examine effects of increasing cardiac output on cerebral perfusion and brain function in older adults underway.
9. MUSE – Marijuana effects on HIV and aging: In progress
10. Microbiome study of HIV-Alcohol effects: In progress
11. Studies linked to all career development awards initiated

Demetrius M. Maraganore, PhD

b. Update on existing clinical studies:

1. At the University of Florida, I am building and directing a Brain Health Clinic (that will evaluate and manage persons at high risk for dementia identified by the prediction model to be refined, replicated, implemented into the EMR as clinical decision support, and disseminated to OneFlorida Clinical Research Consortium practices via the recently awarded Ed and Ethel Moore grant).

Eric Porges, PhD

b. Update on existing clinical studies:

1. R5 K01 AA025306-01A1, NIH/NIAAA
   Porges, Eric (PI)
   08/01/17-01/31/22
   Cognitive and functional deficits associated with reduced cortical GABA in HIV-infected heavy drinkers
   This project will investigate important hypotheses regarding the relationship between regional cerebral GABA concentrations and cognitive flexibility in HIV+ heavy drinkers. To ensure an independent career post award, two critical areas of training will be addressed: 1) Behavioral and biological consequences of alcohol use in the context of HIV and 2) the development of expertise in the measurement of GABA, the principal inhibitory neurotransmitter, using Magnetic Resonance Spectroscopy (MRS). The PI is a cognitive neuroscientist with a strong research background in aging, cognition, experimental design, autonomic measurement, and magnetic resonance imagining (fMRI & MRI).
   Role: PI
   - **Update: study is underway, preliminary analysis are pending.**

2. NIH R21AG054876(Williamson; PI) 06/01/17-5/31/19
   The goal of this study was to collect pilot data investigating the ability of transcutaneous vagal nerve stimulation (tVNS) to impact MCI symptoms.
   Role: Co-I
   - **Update: study is underway, preliminary analysis are pending.**

3. U01AA020797, NIA/NIAAA
   Ronald, Cohen & Cook, Robert (Co-PI) 09/01/16-08/31/21
   Continuous monitoring with wearable alcohol biosensors (SCRAM) to confirm effects of experimentally induced reductions in alcohol consumption in HIV-infected high risk drinkers on the brain and cognition. This study examines the degree to which reductions in alcohol use via contingency management leads to improvements in cognitive and brain functioning.
   Role: Co-I
   - **Data collection ongoing**

4. Brain Rehabilitation Research Center Pilot, VA
   Williamson, John (PI) 2017-2018
   External autonomic nervous system (ANS) modulation for the treatment of sleep in PTSD.
   The goal of this study is to collect pilot data investigating the ability of transcutaneous vagal nerve stimulation (tVNS) to alleviate anxiety and sleep related PTSD symptoms.
   Role: Co-I
   - **Data collection underway, preliminary analysis have been generated and used to support VA Merit (R01 equivalent) application. Initial submission well scored, resubmission underway**.

John B. Williamson, PhD

b. Update on existing clinical studies

I have two clinical trials active. One is a BRRC funded pilot on the role of tVNS in the modification of sleep quality in Veterans with PTSD. We have enrolled ~15 people with a target n of 20 in a cross-over design polysomnography study in which we are measuring sleep architecture, changes in emotional state, and cognitive performance effects of tVNS.

The second clinical trial is funded by NIH via an R21 and is designed to assess the impact of tVNS on cognitive performance in patients with amnestic MCI. The team includes Drs. Porges, Lamb, DeKosky and I. We have enrolled ~20 people with a target sample size of 60.

Adam Joshua Woods, PhD

a. New programs

Planning an adaptive clinical trial of cognitive training to improve function and delay dementia

This two-year U01 project will develop the infrastructure for a large Phase II/III clinical trial investigating the impact of various forms of cognitive training on functional abilities and dementia conversation in patients with mild cognitive impairment. I will lead the UF site on this trial and will also lead the neuroimaging and data management for the pilot trial and in the subsequent full trial submission. This grant involves sites at University of South Florida (parent site), University of California San Francisco and the University of Florida.

Near infrared brain stimulation in older adults.
The goal of this funding is to use near infrared brain stimulation to improve cognition, 31P MRS markers of ATP, and functional neuroimaging biomarkers of cognitive and metabolic decline in healthy aging in a 2-site phase II pilot trial. In October, our team submitted data from this effort for an NIA R01. Data collection in the pilot are ongoing.

Understanding Pain and Limitations in Osteoarthritic Disease
The goal of this project is to evaluate transcranial direct current stimulation and mindfulness based stress reduction, alone and in combination, as treatments of chronic osteoarthritic knee pain in older adults in a two site phase II clinical trial. The project will start in April of 2019, but notice of funding has already been received. 300 participants at the University of Florida and University of Alabama at Birmingham will participate.

Cerebral networks of locomotor learning and retention in older adults
This four-year Merit application extends the ongoing collaborative work in R21AG053736 to investigate the impact of tDCS paired with complex walking as an intervention for mobility decline in older adults to a larger Phase II trial with increased mechanistic insight through multimodal neuroimaging. The project will start in April of 2019, but notice have funding has already been received.

b. Update on existing clinical studies

Augmenting Cognitive Training in Older Adults: ACT
ACT is a multisite phase III randomized clinical trial testing the benefits of transcranial direct current stimulation for cognitive training gains in older adults (n=360). This study is a $5.8 million R01 funded across 3 McKnight sites: UF, University of Arizona, and University of Miami. The trial began 9/1/16 and is currently enrolling participants. This is the largest tDCS trial in history and the first multi-McKnight site clinical trial. 147 participants have been randomized to date.

Neuromodulation of Cognition in Older Adults: The Stimulated Brain Study
This study is a funded off of a K01 awarded to Dr. Woods and builds on the prior Stimulated Brain study funded as a CAM pilot. This study serves as a dose response study building off of the ACT study. It will enroll 80 older adults into a four arm Phase II randomized clinical trial investigating an abbreviated intervention dose of tDCS and cognitive training, as compared to ACT. 30 participants have been recruited and randomized in the study over the past 6 months.

The UPFRONT Study
The UPFRONT study is an NIA-funded R21 phase 2 RCT investigating enhancement in mobility and executive function in older adults using combined tDCS and complex walking intervention in 60 older adults. This study is currently in its second year. Based on this project, we have a new VA Merit grant extending this work into a larger population.

Mechanism and dosimetry exploration in transcranial electrical stimulation using magnetic resonance current mapping methods
This project is an NIMH Brain Initiative funded RF1 (4 year R01) that will pioneer an objective measure of current flow in the brain using state of the art magnetic resonance imaging methods combined with in scanner application of tDCS and tACS. This project will also assess the relationship between activation in working memory related regions from an NBACK fMRI task and correspondence of change following F3-F4 in scanner tDCS. This project will provide an invaluable tool for titrating tDCS dose in our clinical interventions. This project is in its second year.

Stimulating Theta Oscillations to Enhance Working Memory
This project is a NIMH Brain Initiative funded R21 that will evaluate the impact of transcranial alternating current stimulation (tACS) on working memory network synchrony in the theta band of EEG using electrophysiology and functional magnetic resonance imaging. This study may provide a novel method for improving working memory in older adults. This study is in its second year with over 45 participants recruited.

TECHNOLOGY TRANSFER:

Ronald A. Cohen, PhD

a. **Patents applications**
Porges, Lamb, Williamson received a patent for their TVNS stimulation system.

Damon Geoffrey Lamb, PhD

a. **Patents applications**
Pending: 15/535965 docket 450-N0013US and PCT/US15/65524 – System and method for monitoring and controlling nervous system behavior using autonomic features

Eric Porges, PhD

a. **Patents applications**
US Patent Application for: SYSTEM AND METHOD FOR MONITORING AND CONTROLLING NERVOUS SYSTEM BEHAVIOR USING AUTONOMIC FEATURES
Inventors: Williamson, Lamb & **Porge**s
USAN 15/535.965; filed 6/14/2017 O/Ref. No. 10457-331US1; UF#15256

John B. Williamson, PhD

a. **Patents applications**
We have a patent currently pending

b. **Revenue generated from technology**
We are in the process of starting a spinoff company via UF's tech transfer program.

BUDGET UPDATE: See page 61

Demetrius M. Maraganore, PhD

c. **Extramural funding**
"Quality Improvement and Practice Based Research in Neurology Using the EMR," Principal Investigator, $1,205,979 from the Agency for Healthcare Research and Quality (1R01HS024057) July 1, 2015 – April 40, 2020

"Utilizing Data from the Electronic Medical Record to Predict Alzheimer's and Dementia Risk," Principal Investigator, $237,500 from Florida Health Ed and Ethel Moore Program (9AZ14) December 2018-December 2020

EDUCATIONAL PROGRAMS FOCUSING ON AGE-RELATED MEMORY LOSS:

Eric Porges, PhD

a. **Scientific**
Instructed undergraduate student class "Survey of cognitive science methods." Significant focus of the class was age related functional changes. Research on cognitive aging presented by Dr. Porges, Dr. Woods, Dr. Ebner, and postdoc in Dr. Burke Lab.

COLLABORATIVE PROGRAMS WITH OTHER MCKNIGHT INSTITUTES, INSTITUTIONS AND RESEARCH PROGRAMS

Ronald A. Cohen, PhD

The CAM-CTRP has continued to make considerable progress in fulfilling the mission of the center and meeting our objectives from last year, including the extension of collaboration with investigators in the UF ARML program, other UF departments, and across the other McKnight institutes. These are objectives are listed below along with...

Clinical translation: We have continued to emphasize: 1. translation of pre-clinical research on cognitive aging in humans to clinical applications; and 2. integrating basic neuroscience findings coming from the AMRL faculty into the human realm with a focus on clinical translation and developing new clinical outcomes and biomarkers for cognitive aging and also novel interventions. Several initiatives are underway related to the first of these objectives:

1. Collaboration with Dr. Bizon and her group to develop agents to enhance cognitive and behavioral function in the elderly;
2. Studies bridging high field in vitro and in vivo MR methods in laboratory animals with human MRI and MRS approaches to study neuroinflammation, blood-brain-barrier function, and epigenetic mechanisms contributing to age-associated cognitive decline (Febo, DeKosky, Woods, Cohen);
3. Genetic and epigenetic analyses of blood from the CAM ACTIVE brain study of older adults (Foster, Woods, Cohen).
4. The initiation of the ACT grant represents a major accomplishment related to clinical translation in humans. Other clinical translation accomplishments, include the WISE study, Papaya study and a number of other projects. The status of these initiatives are outlined later in this report.
5. Collaboration with UF ADRC to harmonize data for successful agers with the ADRC database for comparative analyses
7. Collaboration with Mt. Sinai and UF researchers on analysis of PET beta-amyloid relative to resting state fMRI and structural brain data from ADRC.

Damon Geoffrey Lamb, PhD

Initiated expanded ARML & CAM-CTRP collaboration through local events to foster cross-fertilization of research groups.

Eric Porges, PhD

McKnight Brain Research Foundation funded MBAR study of neurocognitive function in those 85 and older. (University of Florida, University of Alabama – Birmingham, University of Arizona & University of Miami)

Collaborative project has been initiated with ARML at the UF to apply Magnetic resonance spectroscopy measures used in our aging research to rodent models of aging. In collaboration with Drs. Burke and Febo we have done initial analysis, revealing increased Myo-inositol levels in aged rodents, this measure has been associated with neuroinflammation. We plan to extend this collaboration to look at Dr. Burke's rodents fed a ketogenic diet.

John B. Williamson, PhD

Center for OCD and Anxiety Related Disorders

Center for Cognitive Aging and Memory

Adam Joshua Woods, PhD

MBRF Cognitive Aging and Memory Intervention Core – The CAMI Core first round RFA produced 2 funded studies. These studies are ongoing across MBI sites. The core is in the process of soliciting a second round of LOIs for interest in a second round RFA.

ACT study. Dr. Woods is leading the ACT Phase III multisite cognitive aging and tDCS clinical trial with sites at the University of Florida and University of Arizona. This large study is ongoing.

A new study investigating the effects of tDCS on chronic knee pain is now funded through the NIA with collaboration across UF and UAB.

Our funded MBRF pilot across University of Florida and University of Arizona is currently underway.

COLLABORATIONS ACROSS UF AND MCKNIGHT INSTITUTES:

Ronald A. Cohen, PhD

CAM-CTRP has a number of collaborations that meet these objectives. These include:

1. CTSI investigators in epidemiology, biostatistics, and health outcomes (e.g., SHARC U-grant, ARCH-2);
2. Veterans Administration Hospital Brain Rehabilitation Research Center investigators (multiple projects including TBI and aging, heart failure, and HIV);
3. biomedical engineering and nanotechnology (closed end feedback brain stimulation grant with Jack Judy, PhD);
4. cardiology (cardiac resynchronization for heart failure)
5. Epidemiology and Infectious Medicine (SHARC, ARCH-2)
6. ADRC collaboration
7. Collaboration with DeKosky (neurology) and Mitchell (Physical Therapy) on Intermittent Hypoxia Therapy

COLLABORATIVE PROGRAM WITH NON-MCKNIGHT INSTITUTES, INSTITUTIONS AND RESEARCH PROGRAMS:

Ronald A. Cohen, PhD

1. ARCH project: Involves Brown University and UF collaboration
2. SHARC: University of Miami, FIU collaboration with UF
3. ENERGISE study: Multi-site study of anti-inflammatory drug treatment effects in the elderly. Study involves: UF, Tufts, Yale, Pittsburgh, etc.

Demetrius M. Maraganore, PhD

Agency for Healthcare Research and Quality (AHRQ); Maraganore (PI); 05/01/15-04/30/20
Quality Improvement and Practice Based Research in Neurology Using the EMR
Aim 1: We will create a national network for quality improvement and practice based patient-centered outcomes research in Neurology using the electronic medical record (EMR) to make health care safer and to improve healthcare efficiency, in keeping with the mission and priority areas of the Agency for Healthcare Research and Quality. Aim 2: We will conduct pragmatic trials using the EMR and subgroup-based adaptive design tools that determine which treatments are most effective for specific patients, individualizing medicine at the point of care.

Eric Porges, PhD

The aforementioned project with Dr. Burke involves Dr. Jamie Near at the McGill University (Canada), who will provide high field Magnetic resonance spectroscopy support (11 tesla).

In collaborative multisite study with Dept. of Radiology at Johns Hopkins University to establish site to site variation in GABA MRS. The results of this collaboration are under review and have generated normative values in an adult population, this will immediately facilitate use of this measure as a possible clinical tool/biomarker in our aging research.

John B. Williamson, PhD

1. Alzheimer's Disease Research center.
2. Brain Rehabilitation Research Center, TBI and PTSD programs, cognitive and emotion initiatives.

Adam Joshua Woods, PhD

Dr. Woods has ongoing collaborations in his areas of expertise in tDCS and neuroinflammation brain imaging at University of Arkansas for Medical Sciences, (UAMS); University of Alabama at Birmingham (UAB), University of California-San Diego, University of New Mexico, University of Miami, University of Arizona, Arizona State University, City College of New York, University of Michigan, Brown University, University of South Florida, University of California San Francisco, Imperial College London, Istanbul University, and Catholic University of Korea.

BRIEFLY DESCRIBE PLANS FOR FUTURE RESEARCH AND/OR CLINICAL INITIATIVES:

Ronald A. Cohen, PhD

1. Continued expansion and development of current lines of research
2. Clinical translational studies testing effects of novel drugs for enhancing cognitive function in the elderly
3. Longitudinal studies of the MBAR cohort.
4. Obtain R01 funding for current heart failure research
5. Apply for funding to conduct neuroimaging studies of chemotherapy and cancer effects on brain function in women with breast cancer.
6. Facilitate current work on pain effects in cognitive and brain aging in collaboration with Dr. Cruz and her collaborators.
7. Collaborate with other CAM investigators on their lines of research, including tDCS and vagal nerve stimulation methods.

Damon Geoffrey Lamb, PhD

Longitudinal studies of non-invasive intervention for aMCI populations, continue work on stress & anxiety related disorders which can lead to 'accelerated aging.'

Demetrius M. Maraganore, PhD

I am the Principal Investigator (PI) of the Florida Health Ed and Ethel Moore Alzheimer's Disease Research Program application entitled "Utilizing Data from the Electronic Medical Record to Predict Alzheimer's and Dementia Risk". This was awarded on December 13, 2018. That grant aims to develop an Alzheimer's prediction model using data routinely captured by the University of Florida (UF) electronic medical record (EMR), to replicate the model using EMR data shared by the OneFlorida Clinical Research Consortium, to implement the replicated model into the UF EMR using clinical decision support (CDS) tools, and to share the replicated model and CDS tools with OneFlorida Clinical Research Consortium sites. The long-term goal is to create a Florida statewide Alzheimer's prediction and prevention initiative. I am also the PI of the Agency for Healthcare Research and Quality grant R01HS024057 entitled "Quality Improvement and Practice Based Research in Neurology Using the EMR". I supervised the building of structured clinical documentation support (SCDS) and CDS toolkits within the EMR, for the evaluation and management of patients with 11 different neurological indications (including memory disorders and brain health). These

toolkits support the clinical practices of neurologists and are also used to support clinical research (including in cognitive decline, mild cognitive impairment, dementia, and Alzheimer's disease). The EMR toolkits that my team built are being shared with 15+ academic departments across the nation, and in return the participating sites are sharing deidentified electronically captured data into a registry, with the aims of quality improvement and practice-based research in neurology using the EMR. One of the projects includes an EMR-based pragmatic trial comparing the effectiveness of three memory and cognitive enhancing drugs in mild cognitive impairment. Regarding brain health (primary prevention of aging related cognitive decline, dementias, including Alzheimer's disease), as the past Chair of Neurology at NorthShore University HealthSystem in Evanston, IL, I developed and led the NorthShore Center for Brain Health. My team and I targeted populations at risk for dementia through community outreach and continuing medical education of physicians. The Center provided outpatient consultations that included risk assessments (of genetic and modifiable factors), personalized interventions (lifestyle, behavioral, and medical), and annual surveillance (early disease detection). In two years, more than 550 patients were evaluated and managed. This was one of the first brain health clinics in the United States. In the Center, my team and I also conducted clinical research, including point of care electronic data capture via SCDS and CDS tools built into the EMR. We developed a preliminary Alzheimer's prediction model using data routinely captured by the EMR. At the University of Florida, I am building and directing a similar Brain Health Clinic (that will evaluate and manage persons at high risk for dementia identified by the prediction model to be refined, replicated, implemented into the EMR as clinical decision support, and disseminated to OneFlorida Clinical Research Consortium practices via the recently awarded Ed and Ethel Moore grant).

Eric Porges, PhD

My near term plans will include multiple branches.

1. The extension of my work with GABA MRS in older adults, and accelerated aging populations including HIV+ and Heavy Drinkers. Here we are exploring the relationship and role of GABA as indexed non-invasively using MRS to multiple domains of cognitive function, with an emphasis on cognitive flexibility. Relevant to this, I was recently awarded a K01 by NIAAA/NIH to investigate the relationship of GABA to cognitive flexibility. I am CO-I on studies investigating the relationship between GABA and motor function, GABA and pain and, GABA and social cognition. In the near future we plan to target GABAergic influences on these important domains via pharmacological intervention.

2. We are developing transcutaneous vagal nerve stimulation (tVNS) applications for the modulation of cognitive function. To enable this, we were recently awarded a NIAAA/NIH R21 to explore the capacity of tVNS to improve cognitive function in older adults, including those with MCI. An R01 submission based on this work is forthcoming.

3. Dr. David Clark, Dr. Steven DeKosky and I have recently submitted an R01 and Dr. Clark and I have a VA Merit (R01 equivalent), both to be resubmitted. Both projects use ambulatory autonomic measurement to predict falls in older adults related to cognitive load, anxiety and their interaction. The primary objective is to develop a clinical assessment to predict falls. A secondary goal, is to leverage the small, non-intrusive nature of the ambulatory sensors into a device that could be worn outside of a clinical environment (e.g. home) to predict fall risk and alert the individual or care taker during period when fall risk increases.

4. As an extension of my Magnetic resonance spectroscopy work we have been developing methods that allow for the dynamic characterization of changes to Glutathione (endogenous antioxidant, responsive to oxidative stress) in the brain in response to acute experimental interventions. Our initial application of this is in response to alcohol administration in a control population. We have begun the IRB and regulatory process that will allow us to apply this protocol to older adults as well as other populations with increased vulnerability to oxidative stress. IRB dependent, data collection should begin in the spring.

John B. Williamson, PhD

I have a clinical trial that was scored well on its initial submission to the VA which is now pending review of the resubmission. If that goes well, that will start in 2019. The R21 project results should be analyzable in late 2019 if recruiting continues going well. That will determine if we submit an R01 follow-up for our memory enhancing effects. I have another line of clinical trial studies for which Dr. Carol Mathews and I will be applying for funds in January. Further, we recently received funding on two consortium projects, one in microbiome relationship to cognition in patients with HIV funded by NIH and aging and another, funded by the DOD to understand mechanisms of behavioral decline associated with traumatic brain injury. Further, the consortium group that we started last year, the DOD funded Brain Heart Consortium, will be publishing a position paper in early 2019. We will be following that up with chronic stress and aging project proposals.

Adam Joshua Woods, PhD

Dr. Woods currently has multiple grants under review and several in preparation. Each of these grants represents the investigation and application of novel non-invasive interventions for cognitive aging. He will continue to pursue external funding, but with current grant success is nearing an upper limit regarding new projects that can be run directly out of his large laboratory (n=21). As such, he will be working in the coming year to facilitate his junior faculty and post-doctoral fellows toward success in some of these funding endeavors, with the hope of expanding the overall bandwidth of the CAM for cognitive aging interventions and grooming a new cadre of interventional cognitive neuroscientists focused on cognitive aging. In addition, due to the size of his lab, Dr. Woods is currently striving to find creative space solutions that will allow his large dynamic lab group to work in a unified space. The lab is currently spread across 3 locations across campus, which undermines efficiency and limits overall potential for productivity. In addition, Dr. Woods is strongly interested in approaches that will allow the University of Florida to capitalize on the many world-firsts achieved by UF faculty in the area of neuromodulation. Working toward a central mechanism for synergizing these investigators could not only push forward the use of varied neuromodulation methods for aging research, but make significant impacts in numerous age-related diseases/disorders. Over the coming years, Dr. Woods will be working toward realizing this goal.

IF APPLICABLE, PLEASE PROVIDE ENDOWMENT INVESTMENT RESULTS FOR THE REPORT PERIOD: See page 69

WERE ANY FUNDS USED FOR A PROHIBITED PURPOSE DURING THE REPORT PERIOD? No

DO YOU RECOMMEND ANY MODIFICATION TO THE PURPOSE OR MANDATES IN THE GIFT AGREEMENT? No

DID ALL ACTIVITIES DURING THE REPORT PERIOD FURTHER THE PURPOSE? Yes

NEGATIVE EVENTS (LOSS OF PERSONNEL, SPACE, BUDGET ETC.): NA

ADDITIONAL COMMENTS: See letter on page 31

SIGNATURE, DATE AND TITLE OF PERSON SUBMITTING THE REPORT:

Ronald A. Cohen, PhD, ABPP, ABCN
Professor, Aging, Neurology, and Psychiatry
Director, CAM-CTRP, and Evelyn McKnight Endowed Chair for Clinical Translation in Cognitive Aging Program

William G. Luttge Lectureship in Neuroscience

UF UNIVERSITY of FLORIDA

College of Medicine
Department of Neuroscience
McKnight Brain Institute

1149 Newell Drive
Room L1-100
PO Box 100244
Gainesville, FL 32611-0244
352-627-9200 Tel
352-392-8347 Fax

December 13, 2019

Dear McKnight Brain Research Foundation Trustees,

On March 11, 2019 the 7th Annual William G. Luttge Lectureship in Neuroscience was held with Dr. George F. Koob as the lectureship speaker. Dr. Koob's lecture titled ""Alcohol and Drug Addiction: The Gain in the Brain is in the Pain" was delivered to a full audience in the DeWeese Auditorium at the McKnight Brain Institute. Dr. Koob is an internationally recognized expert on alcohol and stress, and the neurobiology of alcohol and drug addiction. He is the Director of the National Institute on Alcohol Abuse and Alcoholism (NIAAA), where he provides leadership in the national effort to reduce the public health burden associated with alcohol misuse. As NIAAA Director, Dr. Koob oversees a broad portfolio of alcohol research ranging from basic science to epidemiology, diagnostics, prevention, and treatment.

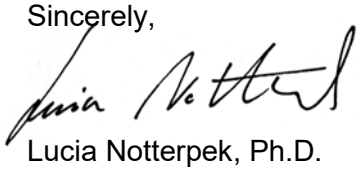
Dr. Koob received his PhD in Behavioral Physiology from the Johns Hopkins University School of Public Health. Among his many scientific accomplishments, Dr. Koob has significantly broadened knowledge of the adaptations within reward and stress neurocircuits that lead to addiction. His work in this area has directly advanced our understanding of the physiological effects of alcohol and other substance use and why some people transition from use to misuse to addiction, while others do not. He served as Professor and Chair of the Scripps' Committee on the Neurobiology of Addictive Disorders as well as Director of the Alcohol Research Center at the Scripps Research Institute prior to his current directorship. He has published more than 650 peer-reviewed scientific papers and is a co-author of *The Neurobiology of Addiction*, a comprehensive textbook reviewing the most critical neurobiology of addiction research conducted over the past 50 years. His research, mentorship, and international scientific collaboration has been recognized with numerous awards including the E.M. Jellinek Memorial Award for outstanding contributions to understanding the behavioral course of addiction in 2018. In 2017, Dr. Koob was elected to the National Academy of Medicine (NAM). In 2016, the government of France awarded Dr. Koob with the insignia of Chevalier de la Légion d'honneur (Knight of the Legion of Honor) for developing scientific collaborations between France and the United States.

Members of the Luttge Lectureship Committee are:

- Steven T. DeKosky, MD, Deputy Director of the Evelyn F. and William L. McKnight Brain Institute at UF; Rene Aerts/ Virginia J. Cosper Professor of Alzheimer's Research; Associate Director, Florida Alzheimer's Disease Research Center; and Professor of Neurology
- Lucia Notterpek, PhD, Chair and Professor of the Department of Neuroscience
- Tom C. Foster, PhD, Professor of Neuroscience, and Evelyn F. McKnight Chair for Research on Age-related Memory Loss
- David R. Borchelt, PhD, Professor of Neuroscience, Director of the Santa Fe Health Alzheimer's Disease Research Center, and Director of CTRND
- Sara Jo Nixon, PhD, Professor of Psychiatry, Addiction Research Division Chief, and Director of the Neurocognitive Laboratory
- Jennifer Bizon, PhD, Professor of Neuroscience

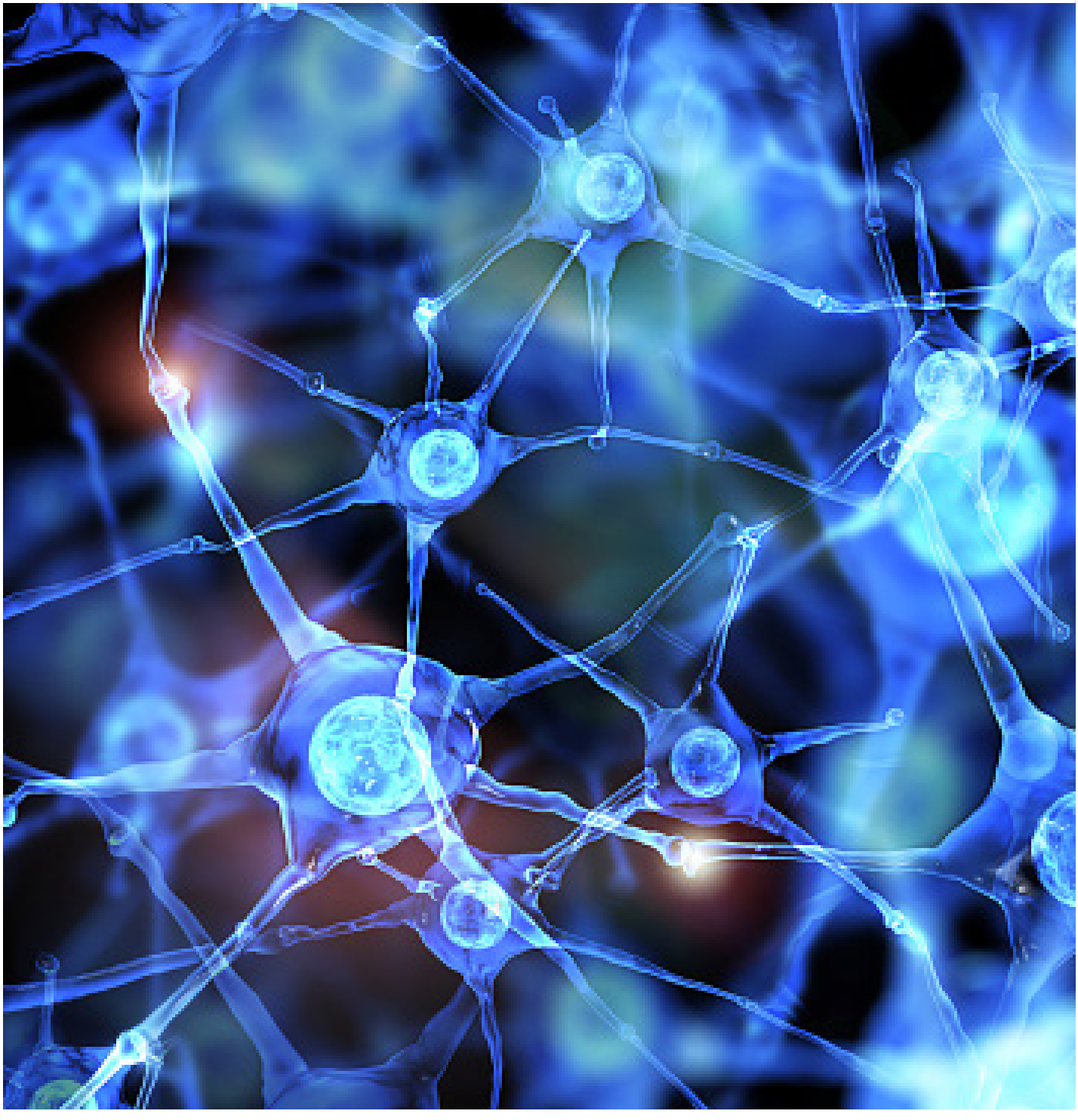
The committee is now organizing the 8th Annual William G. Luttge Lectureship which will be held on Thursday, April 23, 2020 with Dr. Carla Shatz as the speaker. The lectureship will be held as a highlight of the celebration of the 50th anniversary of the Department of Neuroscience, which was chaired by Dr. Luttge from 1978-96. Dr. Shatz is a Sapp Family Provostial Professor, David Starr Jordan Director of Stanford Bio-X, and Professor of Biology and of Neurobiology at Stanford University. Dr. Shatz is one of the most distinguished neuroscientists in the country, whose research aims to understand how brain circuits are tuned up by experience during critical periods of development.

Sincerely,



Lucia Notterpek, Ph.D.
Chair and Professor
Department of Neuroscience

Program Financials



Age-related Memory Loss Program

Financial Summary
January 1 to December 31, 2019

Foundation Spendable Account		**Amount**
Endowment income transferred in:		
Mar 31, 2019	$ 262,078	
Jun 30,2019	262,078	
Sept 30, 2019	263,051	
Dec 31, 2019	263,051	
Total endowment income transferred in		1,050,258
Additional funds from MBRF:	N/A	
Total funds available		1,050,258

UF PeopleSoft Accounts		**Amount**
Received from foundation spendable account		$ 1,050,258
Total funds available		1,050,258
Transferred out:		
Dr. Maurer startup and project support[(b)]	236,000	
Dr. Sarah Johnson	49,760	
Dr. Shinichi Someya project support	25,000	
Dr. Bizon project support	123,057	
Dr. DiCola project support	23,087	
Dr. Sara Burke	100,000	
CAM transfers	390,484	
Total transferred out		947,387
Expenditures:		
ARML faculty salaries	95,024	
Travel and other	4,079	
Fluorescence Microscope	82,228	
Total expenditures		181,330
Total transfers out and expenditures		1,128,718
Net change in UF Peoplesoft accounts		(78,460)
Beginning balance, Jan. 1, 2018		1,104,107
Ending balance, Dec. 31, 2019		**$ 1,025,647**
Due to CAM		785,357
Total funds available to ARML, Dec. 31, 2019		**$ 240,290**

McKnight Endowed Chair for Brain Research in Memory Loss

Tom Foster, PhD

Financial Summary

January 1 to December 31, 2019

Foundation Spendable Account		**Amount**
Endowment income transferred in:		
January, 2019	35,189	
April, 2019	35,189	
July, 2019	35,320	
September, 2019	35,320	
Total endowment income transferred in		141,018
Transferred to UF Peoplesoft spendable accounts		140,888
Net change in foundation spendable account		131
Beginning balance, January 1, 2019		34,953
Ending balance, Dec. 31, 2019		**$ 35,189**

UF PeopleSoft Accounts		**Amount**
Received from foundation spendable account		$ 140,888
Transfers and Expenditures:		
Faculty and research staff salaries[(b)]	156,762	
Research equipment, supplies, and services	109,901	
Travel and other	6,812	
Total transfers and expenditures		273,475
Net change in UF Peoplesoft accounts		(132,587)
Beginning balance, January 1, 2019		365,457
Ending balance, Dec. 31, 2019		**$ 248,123**
Total funds avail. to McKnight ARML Chair, Dec. 31, 2019		**$ 283,312**

[(a)]Transfers from foundation spendable account to Peoplesoft account in 2019

Cognitive Aging & Memory

Clinical Translational Research Program

Financial Summary

January 1 to December 31, 2019

UF PeopleSoft Accounts		**Amount**
Received from McKnight Brain Research Foundation		$ 390,484
Program expenditures and commitments:		
Faculty, Research Staff & Staff Earnings	295,991	
Graduate Assistant & Post Doctoral	21,514	
Research equipment, supplies, and services	60,493	
Tuition Waivers	4,039	
Publications	3,761	
Travel and other	4,936	
Total program expenditures and commitments		390,734
Net change in UF Peoplesoft accounts		(250)
Beginning balance, Jan. 1, 2019		577,253
Ending balance, Dec. 31, 2019		**$ 577,003**
*Due from McKnight Brain Research Grant		785,357
Total funds available to CAM-CTRP, Dec. 31, 2019		**$ 1,362,360**

*The amount of funds due to CAM-CTRP from McKnight Brain Research Grant have NOT been transferred.

FY 2019 Quarter 1	$	130,161
FY 2019 Quarters 2, 3, 4 ($131,039.13 each quarter)		393,117
FY 2020 Quarters 1 & 2 ($131,039.13 each quarter)		262,078
Total Due to CAM through December 2019	$	785,357

McKnight Endowed Chair for Clinical Transl. Research in Cognitive Aging

Ron Cohen, PhD

Financial Summary

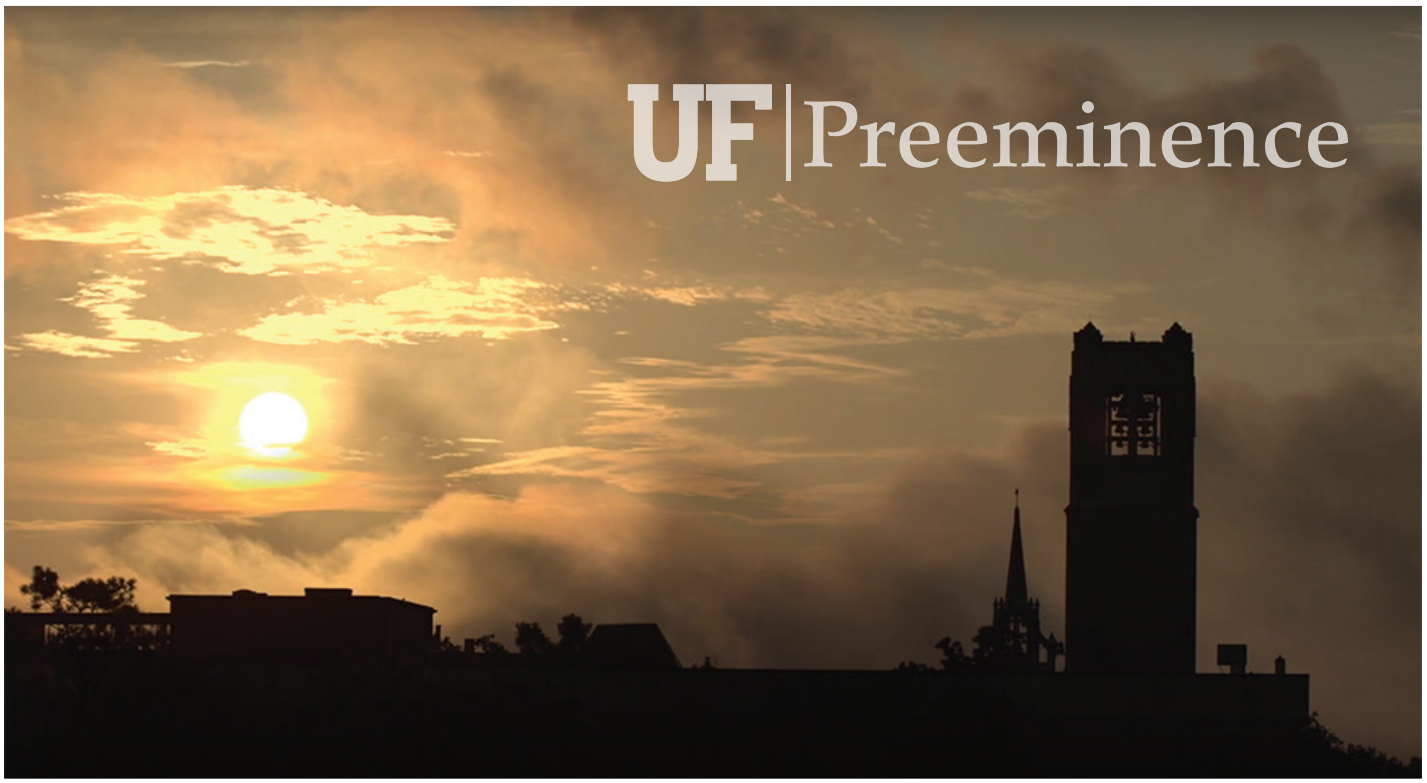
January 1 to December 31, 2019

Foundation Spendable Account		**Amount**
Endowment income transferred in:		
March 31, 2019	35,174	
June 30,2019	35,174	
Sept 30, 2019	35,305	
Dec 31, 2019	35,174	
Total endowment income transferred in to Peoplesoft		140,827
Transferred to UF Peoplesoft spendable accounts		140,696
Net change in foundation spendable account		131
Beginning balance, January 1, 2019		34,938
Ending balance, Dec. 31, 2019		**$ 35,069**

UF PeopleSoft Accounts		**Amount**
Total endowment income transferred in		$ 140,827
New Department Identification established funds transferred		$ 82,921
Total Amount of Funds available		$ 223,748
Expenditures:		
Faculty and research staff salaries	119,425	
Research equipment, supplies, and services	-	
Travel and other	-	
Total expenditures		119,425
Net change in UF Peoplesoft accounts		104,323
Beginning balance, January 1, 2019		64,557
Ending balance, Dec. 31, 2019		**$ 168,881**
Total funds avail. to McKnight CAM Chair, Dec. 31, 2019		**$ 203,950**

[(b)]Transfers from foundation spendable account to Peoplesoft account in 2019.

UF Foundation Endowment Reports



UF UNIVERSITY of FLORIDA ADVANCEMENT

FUND IMPACT REPORT

Evelyn F. McKnight Chair for Brain Research in Memory Loss

Book Value as of 09/30/19	$3,995,676.90
Market Value as of 09/30/2019	$4,152,564.98
Projected Spendable Income for 2019/20	$141,279.19

Endowment Management

Endowment assets are invested through the University of Florida Investment Corporation (UFICO), created in 2004 to manage UF's investment portfolios. UFICO is headed by a Chief Investments Officer who reports to a volunteer Board of Directors and to the President of the University of Florida.

UF UNIVERSITY of FLORIDA ADVANCEMENT

FUND IMPACT REPORT

Evelyn F. McKnight Cognitive Aging and Memory Research Fund

Book Value as of 09/30/19	$25,967,781.35
Market Value as of 09/30/2019	$30,926,976.22
Projected Spendable Income for 2019/20	$1,052,202.16

Endowment Management

Endowment assets are invested through the University of Florida Investment Corporation (UFICO), created in 2004 to manage UF's investment portfolios. UFICO is headed by a Chief Investments Officer who reports to a volunteer Board of Directors and to the President of the University of Florida.

UF UNIVERSITY of FLORIDA ADVANCEMENT

FUND IMPACT REPORT

William G. Luttge Lectureship in Neuroscience

Book Value as of 09/30/19	$250,300.00
Market Value as of 09/30/2019	$285,984.88
Projected Spendable Income for 2019/20	$9,729.81

Endowment Management

Endowment assets are invested through the University of Florida Investment Corporation (UFICO), created in 2004 to manage UF's investment portfolios. UFICO is headed by a Chief Investments Officer who reports to a volunteer Board of Directors and to the President of the University of Florida.

UF UNIVERSITY of FLORIDA ADVANCEMENT

FUND IMPACT REPORT

Evelyn F. McKnight Chair for Clinical Translational Research in Cognitive Aging

Book Value as of 09/30/19	$4,000,000.00
Market Value as of 09/30/2019	$4,150,769.68
Projected Spendable Income for 2019/20	$141,218.11

Endowment Management

Endowment assets are invested through the University of Florida Investment Corporation (UFICO), created in 2004 to manage UF's investment portfolios. UFICO is headed by a Chief Investments Officer who reports to a volunteer Board of Directors and to the President of the University of Florida.

UF UNIVERSITY of FLORIDA ADVANCEMENT

FUND IMPACT REPORT

McKnight Brain Research Foundation

Evelyn F. McKnight Chair for Brain Research in Memory Loss (007889)

Spendable Fund Transfers since endowment inception

FY 2019/2020	**$35,320 (09/30/2019 YTD)**
FY 2018/2019	**$140,521**
FY 2017/2018	**$139,814**
FY 2016/2017	**$139,814**
FY 2015/2016	**$143,923**
FY 2014/2015	**$170,407**
FY 2013/2014	**$162,162**
FY 2012/2013	**$156,803**
FY 2011/2012	**$156,485**
FY 2010/2011	**$148,182**
FY 2009/2010	**$143,584**
FY 2008/2009	**$165,660**
FY 2007/2008	**$178,827**
FY 2006/2007	**$161,019**
FY 2005/2006	**$134,384**
FY 2004/2005	**$127,813**
FY 2003/2004	**$124,127**
FY 2002/2003	**$125,768**
FY 2001/2002	**$100,869**
FY 2000/2001	**$99,417**
FY 1999/2000	**$3,438**
TOTAL	**$2,758,337**

UF UNIVERSITY of FLORIDA ADVANCEMENT

FUND IMPACT REPORT

McKnight Brain Research Foundation

Evelyn F. McKnight Cognative Aging and Memory Research Fund (008057)

Spendable Fund Transfers since endowment inception

FY 2019/2020	**$263,051 (09/30/2019 YTD)**
FY 2018/2019	**$1,046,557**
FY 2017/2018	**$1,041,290**
FY 2016/2017	**$1,041,290**
FY 2015/2016	**$1,071,895**
FY 2014/2015	**$1,117,603**
FY 2013/2014	**$1,063,533**
FY 2012/2013	**$1,028,384**
FY 2011/2012	**$1,026,301**
FY 2010/2011	**$971,846**
FY 2009/2010	**$941,689**
FY 2008/2009	**$1,086,475**
FY 2007/2008	**$1,172,824**
FY 2006/2007	**$1,056,031**
FY 2005/2006	**$881,347**
FY 2004/2005	**$843,131**
FY 2003/2004	**$729,335**
FY 2002/2003	**$651,801**
FY 2001/2002	**$657,852**
FY 2000/2001	**$648,384**
TOTAL	**$18,340,619**

UF UNIVERSITY of FLORIDA ADVANCEMENT

FUND IMPACT REPORT

McKnight Brain Research Foundation

William G. Luttge Lectureship in Neuroscience (018093)

Spendable Fund Transfers since endowment inception

FY 2019/2020	**$2,432 (09/30/19 YTD)**
FY 2018/2019	**$9,678**
FY 2017/2018	**$9,628**
FY 2016/2017	**$9,627**
FY 2015/2016	**$9,909**
FY 2014/2015	**$9,386**
FY 2013/2014	**$9,074**
FY 2012/2013	**$6,754**
TOTAL	**$66,488**

Evelyn F. McKnight Chair for Clinical Translational Research in Cognitive Aging (020105)

Spendable Fund Transfers since endowment inception

FY 2019/2020	**$35,305 (09/30/19 YTD)**
FY 2018/2019	**$140,460**
FY 2017/2018	**$139,854**
FY 2016/2017	**$139,754**
FY 2015/2016	**$143,861**
TOTAL	**$599,234**

UF | UNIVERSITY of FLORIDA INVESTMENT CORPORATION

Quarterly Performance Report

UF Foundation – Endowment Pool

September 30, 2019

UF Foundation – Endowment Pool

Endowment Pool

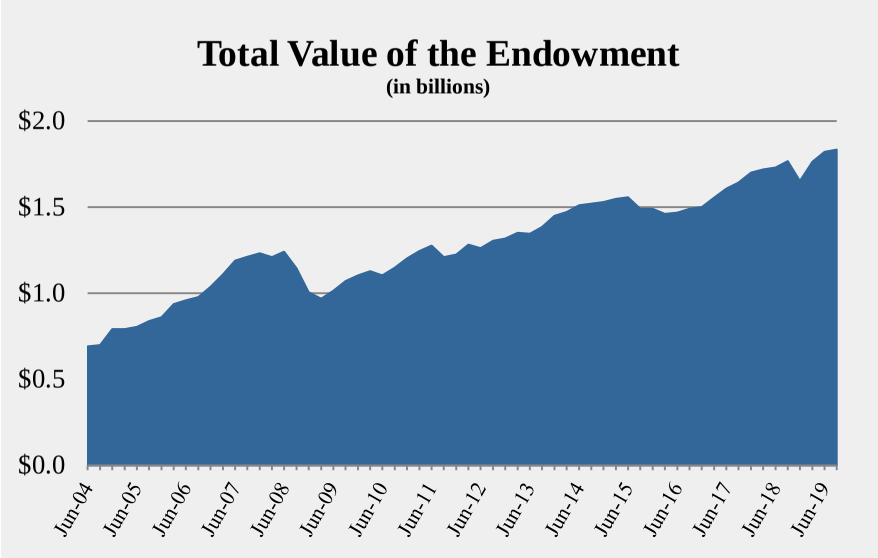
Since the founding of the University of Florida (UF) in 1853, generous alumni, corporations, foundations, parents and friends have contributed financial resources to assist UF in achieving its long-term mission of providing a superb education for undergraduates while maintaining excellent graduate programs and professional schools. As a result, UF's total endowment market value is among the largest public university endowments in the United States.

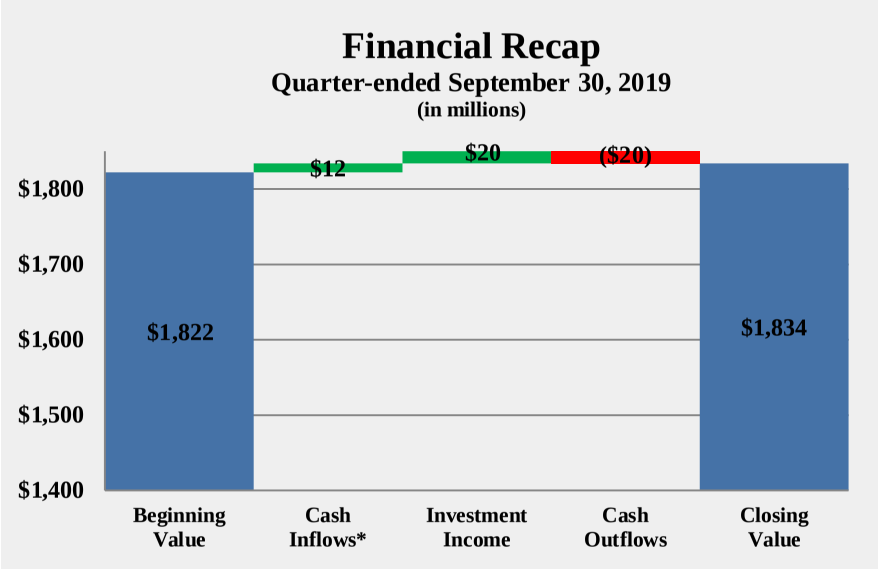
The UF endowment assets reside with the University of Florida Foundation (UF Foundation). The UF Foundation is a private, not-for-profit, 501(c)(3) direct support organization of the University that raises and manages all gift money for the benefit of the University of Florida. The management of the Endowment Pool is designed to accomplish two goals:

- Provide a total return from assets invested that will preserve or increase the purchasing power of the endowment capital, and;
- Generate the maximum current spendable income stream to support activities of funds held for colleges and units of the University.

Endowments are an irreplaceable source of quality, stability, productivity and creativity for the University of Florida. The thoughtful individuals and organizations who create endowments provide security and confidence for our students and faculty, now and in the future. As such, the UF Foundation invests gift assets to protect the ability of the endowment to provide, in perpetuity, an income stream sufficient to support the University activity designated by the donor, and to ensure the proceeds thereof are used in accordance with their designation.

For the first quarter of the 2020 fiscal year, the Endowment Pool started with a balance of $1.82 billion. During the quarter, there was $12 million of cash inflows to the Endowment Pool thanks to the generous support of donors. Endowment investments resulted in a net addition of $20 million during the quarter and there was $20 million of cash paid out during the quarter in support of the University of Florida and its programs. The quarter ended with an Endowment Pool balance of $1.83 billion.





* The timing of cash inflows does not always correspond with the timing of endowment gifts.

UF Foundation – Endowment Pool

Investment Objectives

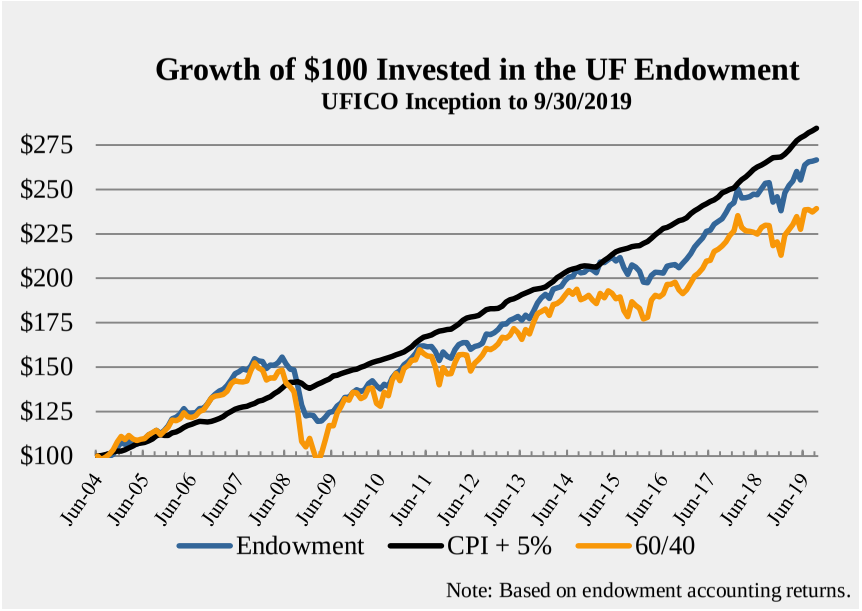
Since the inception of the University of Florida Investment Corporation (UFICO) in June 2004, the investment of the Endowment Pool has been managed by UFICO. Through UFICO's management of the Endowment Pool, the UF Foundation seeks to achieve an annualized real rate of return of at least 5% net of fees to preserve and enhance the purchasing power of the endowment. Returns are measured over the long-term as the Endowment Pool is able to tolerate variability in the short and intermediate-term given its long investment horizon.

To measure performance results, investment returns are compared against the following benchmarks:

Benchmark	Purpose
CPI + 5%	The consumer price index plus the average gross spending rate for the endowment. This is a long-term growth benchmark that seeks to measure the purchasing power of the endowment over time.
60/40	Comprised of 60% - MSCI All Country World Index and 40% - Barclays Global Aggregate Bond Index, this benchmark represents the investible alternative for the endowment.

UFICO manages the Endowment Pool based on the objectives for the endowed assets as established by the Finance Committee of the UF Foundation Board of Directors. UFICO has constructed a long-term strategic asset allocation for the endowment portfolio based on the prioritization of these requirements including:

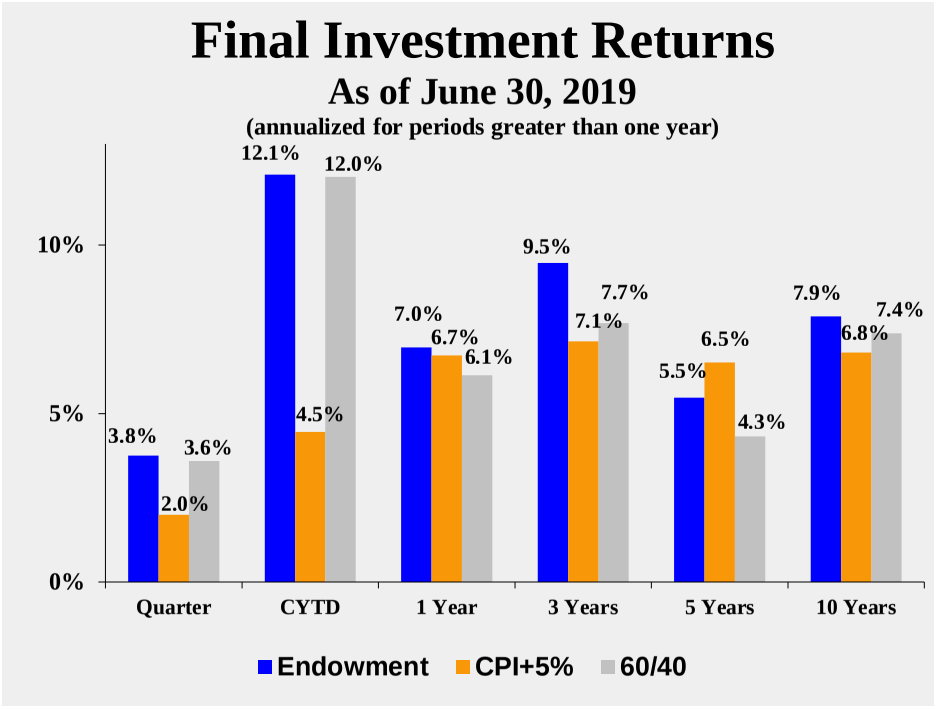
- **Positive Real Returns** – Intergenerational equity and maintaining the real purchasing power of the assets
- **Liquidity** – Retaining the ability to fund endowment obligations in all market conditions
- **Good Stewardship** – Maximizing *risk adjusted* returns
- **Growth** – Increasing the endowment's ability to support the University

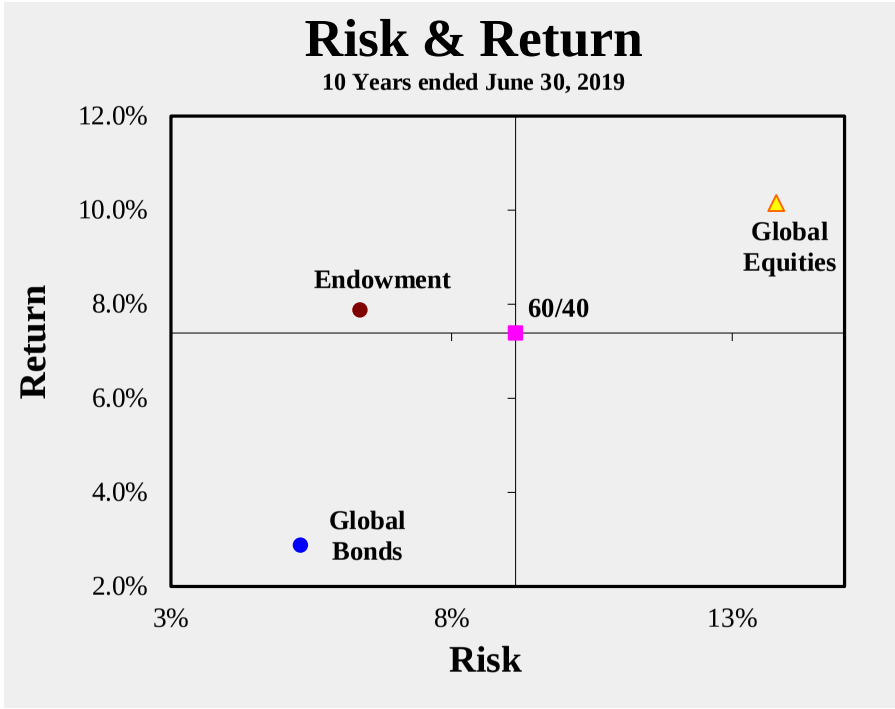


Note: Based on endowment accounting returns.

Strategic Asset Allocation As of 9/30/2019			
Strategy	Asset Classes	Target Allocation	Actual Allocation
Growth	Public Equities Hedged Strategies Private Equity	80.0%	77.9%
Diversifying	Hedged Strategies	10.0%	11.6%
Liquidity	Fixed Income Cash	10.0%	10.5%

UF Foundation – Endowment Pool





Faculty Biographical Sketches

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Bizon, Jennifer Lynn

eRA COMMONS USER NAME (credential, e.g., agency login): jbizon

POSITION TITLE: Professor of Neuroscience and Psychiatry

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of North Carolina at Chapel Hill, Chapel Hill, North Carolina	BS	05/1993	Psychology
University of California, Irvine, Irvine, California	PhD	08/1998	Neurobiology and Behavior
John Hopkins University, Baltimore, MD	Postdoctoral Fellow	09/2002	Neuroscience and Psychological Sciences

A. Personal Statement

My NIH-funded research program is broadly focused on determining the neural processes that support cognition and that contribute to cognitive impairments in aging and disease. Using rodent models, my laboratory employs an integrative approach in rodents that combines cognitive assessments with cellular, molecular, optogenetic and pharmacological methodologies. We have uncovered disruptions in both glutamatergic and GABAergic signaling in the aged brain (ref a-c) that contribute to impairments in cognitive flexibility, memory and decision making (ref a-d). Moreover, we have demonstrated that pharmacological targeting of GABAergic and glutamatergic signaling improves prefrontal cortical (PFC) dependent cognition in aged rats (ref a, b). Most recently, we have been exploring how vagus nerve stimulation (VNS) modulates both cognitive function and age-associated alterations in GABA/glutamate signaling proteins in both PFC and hippocampus. Other lines of research include investigating the neural circuitry underlying age-associated alterations in decision-making and the influences of psychological stress on brain aging and Alzheimer's disease. Dr. Bizon is co-director of a T32 for pre-doctoral training in Alzheimer's disease and related dementias.

a. Bañuelos C, Beas BS, McQuail JA, Gilbert RJ, Frazier CJ, Setlow B, **Bizon JL**. (2014) Prefrontal cortical GABAergic dysfunction contributes to age-related working memory impairment. *The Journal of Neuroscience.* 34(10):3457-66. PMCID: 3942567.

b. McQuail JA, Frazier CJ, **Bizon JL.** (2015) Molecular aspects of age-related cognitive decline: Role of GABA signaling. *Trends in Molecular Medicine* 2015 Jul;21(7):450-60.

c. McQuail JA, Beas BS, Simpson K, Kyle K, Frazier CJ, Setlow B, **Bizon JL** (2016) NR2A-containing NMDA receptors in the prefrontal cortex are required for working memory and predict age-related cognitive decline. *The Journal of Neuroscience.* 36(50):12537-12548. PMCID: 5157101.

d. Hernandez CM, Orsini CA, Labiste CC, Wheeler AR, Ten Eyck TW, Bruner MM, Sahagian TJ, Harden SW, Frazier CJ, Setlow B, **Bizon JL**. (2019) Aging alters the role of basolateral amygdala in intertemporal choice. *eLife*, Apr 24;8. pii: e46174.

B. Positions and Honors

1993-1998 Graduate Student Assistant, University of California, Irvine, Laboratory of Dr. Christine Gall
1998-2003 Postdoctoral Fellow, Johns Hopkins University, Laboratory of Dr. Michela Gallagher
2002-2004 Assistant Research Scientist, Dept. of Psychology, Johns Hopkins University
2004-2010 Assistant Professor of Psychology, Texas A&M University

2004-2010 Faculty of Neuroscience, Texas A&M University
2010-2016 Associate Professor of Neuroscience and Psychiatry, University of Florida College of Medicine
2016- present Full Professor of Neuroscience and Psychiatry, University of Florida College of Medicine

Selected Professional Experience

2013-2016	Director, Interdisciplinary Graduate Program, Neuroscience Concentration, University of Florida
2010-2019	Member, Alzheimer's Drug Discovery Foundation Review Board
2016-2018	Chair, NIH, Neurodevelopment, Synaptic Plasticity and Neurodegeneration Scientific Review Panel
2014-present	Senior Editor, Behavior, Cognition and Physiology Section, *Neurobiology of Aging*
2017-present	Associate Chair, Department of Neuroscience, College of Neuroscience, Department of Medicine, University of Florida
2017-present	Executive Committee, Evelyn F. and William L. McKnight Brain Institute, University of Florida

Selected Scientific Review

2014	Member, NIH Neurodegeneration and Environmental Insults Special Emphasis Scientific Review Panel (ZES1 LWJ-K)
2015	Member, NIH, Clinical Neuroscience and Neurodegeneration Special Emphasis Scientific Review Panel (ZRG1-CNNR-08)
2015-2016	*Ad-hoc* Member, NIH, National Institute on Aging Study Scientific Review Panel (NIA-N)
2012-2018	Member, NIH Neurodevelopment, Synaptic Plasticity and Neurodegeneration Fellowship Scientific Review Panel (F03A)
2018	Member, NIA, Next Generation of Alzheimer's Disease Researchers Scientific Review Panel (ZAG1 ZIJ7 J1)
2019	Member, NIMHD, Research Centers in Minority Institution (U54) Scientific Review Panel, (ZMD1 MLS M1)
2019	Member, NIAID, Special Emphasis Scientific Review Panel- Program Project, (2019/10 ZAI1 JA-I S3)

Honors and Awards

1994	UC Regents Graduate Fellowship, UC Regents
1995	Individual NRSA, F31 pre-doctoral award, National Institute of Mental Health
2001	Individual NRSA, F32 post-doctoral award, National Institute on Aging
2008	Montague Center for Teaching Excellence Award, College of Liberal Arts, Texas A&M University
2009	Leadership and Service Award, Faculty of Neuroscience, Texas A&M University
2011-2016	Exemplary Teaching Award, College of Medicine, University of Florida
2017-2020	University of Florida Term Professorship
2018-2020	University of Florida Research Foundation Professorship
2019	Exemplary Teaching Award, College of Medicine, University of Florida

C. Contributions to Science
Full list of published work in My Bibliography: https://www.ncbi.nlm.nih.gov/pubmed/?term=bizon+jl

1. A primary focus of my laboratory is to understand how alterations in excitatory/inhibitory (E/I) signaling dynamics in the prefrontal cortex (PFC) contribute to age-related cognitive decline. To date, much of our work has focused on GABA(B) receptors (refs a,b), which contribute to GABA signaling via both pre- and postsynaptic mechanisms. In PFC, we have documented a number of biochemical (refs a,c) and electrophysiological (ref b) changes in GABA(B)R signaling, which together suggest that pyramidal neurons in this brain region are subject to age-related increases in tonic inhibition (refs a, c). Potentially in response to this increased inhibition, GABA(B)R subunit expression is significantly reduced in the aged PFC (refs b, c). We have found that lower PFC GABA(B)R subunit expression strongly predicts better working memory abilities among aged rats (ref a). We have further identified specific excitatory signaling alterations that contribute to dysregulation of the normal balance of excitation and inhibition in PFC and working memory impairments in aging, including reductions in presumptive synaptic NR2A-NMDARs (ref d). Based on these

findings, my laboratory has explored the use of GABA(B)R antagonists and positive allosteric modulators of synaptic NMDARs for improving age-related cognitive decline. More recently, we have been exploring vagus nerve stimulation as a means to influence E/I signaling and improve cognitive dysfunction.

a. Bañuelos C, Beas BS, McQuail JA, Gilbert RJ, Frazier CJ, Setlow B, **Bizon JL**. (2014) Prefrontal cortical GABAergic dysfunction contributes to age-related working memory impairment. *The Journal of Neuroscience.* 34(10):3457-66. PMCID: 3942567.

b. Carpenter HE, Kelly KB, **Bizon JL**, Frazier CJ. (2016) Age related changes in tonic activation of pre- and post-synaptic GABA(B) receptors in medial prefrontal cortex. *Neurobiology of Aging*. 45:88-97. PMCID: 523522.

c. McQuail JA, Frazier CJ, **Bizon JL** (2015) Molecular aspects of age-related cognitive decline: Role of GABA signaling. *Trends in Molecular Medicine.* 21(7):450-60. PMCID: 4500156.

d. McQuail JA, Beas BS, Simpson K, Kyle K, Frazier CJ, Setlow B, **Bizon JL** (2016) NR2A-containing NMDA receptors in the prefrontal cortex are required for working memory and predict age-related cognitive decline. *The Journal of Neuroscience.* 36(50):12537-12548. PMCID: 5157101.

2. Deciding among options that include both benefits and risks of adverse outcomes is fundamental to our ability to effectively navigate everyday life. As part of a long-standing collaboration with Dr. Barry Setlow, (which has expanded in recent years to include Dr. C. Jason Frazier), my laboratory has a strong interest in using animal models to understand the neural processes that support decision making. One element of this work involves elucidation of the neural circuits and signaling mechanisms that mediate how individuals weigh rewards against putative costs such as punishment or delay to reward delivery (ref c). A second element of this research is to determine how cost-benefit decision making is altered across the lifespan (refs a, b, d). Our work was the first to show that aged rats have a strong preference for delayed over immediate rewards relative to young adult rats. These data are highly consistent with observations showing that aged individuals are better at delaying gratification and suggest that age-related neurobiological alterations can cause behavioral changes considered to be beneficial in some contexts (ref a).

   a. Simon NW, LaSarge CL, Montgomery KS, Williams MT, Mendez IA, Setlow, B, **Bizon, JL.** (2010) Good things come to those who wait: attenuated discounting of delayed rewards in aged Fischer 344 rats. *Neurobiology of Aging*. 31(5):853-62. PMCID: 2866647.

   b. Hernandez CM, Vetere LM; Orsini CA; McQuai JA; Maurer AP; Burke SN; Setlow B, **Bizon, JL.** (2017) Decline of prefrontal cortical-mediated executive functions but attenuated delay discounting in aged Fischer 344 x Brown Norway hybrid rats. *Neurobiology of Aging* Dec;60:141-152. PMCID in progress.

   c. Orsini CA, Hernandez CM, Kelly KB, Sarthak S, Frazier CJ, **Bizon JL**, Setlow B. (2017) Optogenetic inhibition reveals distinct roles for basolateral amygdala activation during discrete timepoints in risky decision making. *The Journal of Neuroscience.* 37, 11537-11548. PMCID in process.

   d. Hernandez CM, Orsini CA, Labiste CC, Wheeler AR, Ten Eyck TW, Bruner MM, Sahagian TJ, Harden SW, Frazier CJ, Setlow B, **Bizon JL**. (2019) Aging alters the role of basolateral amygdala in intertemporal choice. *eLife*, Apr 24;8. pii: e46174.

3. My laboratory has developed sensitive behavioral methods to model hippocampal/medial temporal lobe-mediated deficits in aged rodents (refs a, b, c) and has used these behavioral models to investigate underlying neural mechanisms of cognitive decline in aging. Specifically, in the past several years, we have established sensitive behavioral tools for investigating how the perception and encoding of sensory stimuli is altered in aging and how such alterations contribute to mnemonic decline (refs a, c, d*).* We are now employing these same rigorous psychophysical methods (ref d) to better understand cognitive decline associated with Alzheimer's disease, using virally-mediated delivery of wild type and mutant tau to middle-aged and aged rat perirhinal cortex. Using this model, we will determine whether perceptual discrimination learning assessments have utility as a behavioral biomarker for disease pathology.

   a. LaSarge CL, Montgomery KS, Tucker C, Slaton GS, Griffith WH, Setlow B, **Bizon JL**. (2007) Deficits across multiple cognitive domains in a subset of aged Fischer 344 rats. *Neurobiology of Aging*. Jun;28(6):928-36.

   b. **Bizon JL**, LaSarge CL, Montgomery KS, McDermott AN, Setlow B, Griffith WH. (2009) Spatial reference and working memory across the lifespan of male Fischer 344 rats. *Neurobiology of Aging*. 30(4):646-55. PMCID: 2703480.

c. Montgomery, KS, Edwards, G, Kumar, A, Levites, Y, Meyers CA, Gluck M, Setlow, B and **Bizon, JL.** (2016) Deficits in hippocampal-dependent transfer generalization learning and synaptic function in mouse models of amyloidosis. *Hippocampus*. 26(4):455-71.PMCID: 4803574.

d. Yoder WM, Gaynor, L, Burke SN, Setlow B, Smith DW, **Bizon JL.** (2017) Interaction between age and perceptual similarity in olfactory discrimination learning: relationship with spatial learning impairment. *Neurobiology of Aging.* 53:122-137. PMCID 5669385.

4. My early research showed that memory loss is associated with impaired HPA axis function and protracted glucocorticoid release following a stressor, and that such changes occur in the absence of frank hippocampal neural loss. Instead, we found that these changes are likely attributable to attenuated GR/MR expression within both aged hippocampus and prefrontal cortex (ref a). Other findings in neuroscience during this time period highlighted the remarkable neurogenic capacity of the adult hippocampus (Kempermann and Gage, 1998; Gould and McEwen, 1993), and led to questions about whether age-related changes in this phenomenon could contribute to the decline of mnemonic abilities associated with aging. My postdoctoral studies examined hippocampal neurogenesis in relation to age-related memory loss and showed that while there is a marked attenuation of new neurons born in the aged hippocampus (>-90% decline), new neuron production and differentiation did not predict the memory abilities of aged rats (refs b-d). Indeed, many aged rats were able to maintain spatial learning performance on par with young adults despite dramatic reductions in hippocampal neurogenesis. While these studies did not specifically address the role of hippocampal neurogenesis in normal learning and memory, they do indicate that reduced neurogenesis in normal aging is not sufficient to account for spatial memory dysfunction.

   a. **Bizon JL**, Helm KA, Han JS, Chun HJ, Pucilowska J, Lund, PK, Gallagher, M (2001) Hypothalamic-pituitary-adrenal axis function and corticosterone receptor expression in behaviourally characterized young and aged Long-Evans rats. *European Journal of Neuroscie*nce 14(10):1739-51.

   b. **Bizon JL**, Gallagher M. (2003) Production of new cells in the rat dentate gyrus over the lifespan: relation to cognitive decline. *European Journal of Neuroscience*. 18(1):215-9.

   c. **Bizon JL**, Lee HJ, Gallagher M. (2004) Neurogenesis in a rat model of age-related cognitive decline. *Aging Cell*. 3(4):227-34.

   d. **Bizon JL**, Gallagher M. (2005) More is less: neurogenesis and age-related cognitive decline in Long-Evans rats. *Science Aging Knowledge Environment*. 2005(7):re2.

5. I have had a long-standing interest in the neuromodulation of cortical circuits and memory function. Highlights of this work include several studies from my pre-doctoral training in the laboratory of Dr. Christine Gall, in which we identified sources of local trophic support for basal forebrain and striatal cholinergic neurons (ref a, Bizon et al., 1996, Lauterborn et al., 1995). Subsequently, I used the selective neurotoxin 192-IgG saporin to demonstrate that removal of cholinergic neurons influences spatial learning strategies (ref b) and HPA function (Han et al., 2002) in young rats. More recently, we have investigated both the number (ref d) and electrophysiological properties (ref c, Dubois et al., 2014) of cholinergic neurons in relation to age-related hippocampal-dependent spatial memory impairment. Our findings show that while there is modest cholinergic neuron loss with advanced aging, such changes cannot fully account for spatial learning deficits. Notably, our studies highlight a role for co-distributed basal forebrain GABAergic neurons in both cholinergic dysfunction (Dubois et al. 2014) and impaired memory (ref d).

   a. **Bizon JL**, Lauterborn JC, Gall CM. (1999) Subpopulations of striatal interneurons can be distinguished on the basis of neurotrophic factor expression. *Journal of Comparative Neurology*. 408(2):283-298.

   b. **Bizon JL**, Han JS, Hudon C, Gallagher M. (2003) Effects of hippocampal cholinergic deafferentation on learning strategy selection in a visible platform version of the water maze. *Hippocampus*. 13(6):676-84.

   c. Murchison D, McDermott AN, LaSarge CL, Peebles KA, **Bizon JL**, Griffith, WH (2009) Enhanced calcium buffering in F344 rat cholinergic basal forebrain neurons is associated with age-related cognitive impairment. *Journal of Neurophysiology*. 102(4):2194-207 PMCID: 2775378.

   d. Bañuelos C, LaSarge CL, McQuail JA, Hartman JJ, Gilbert RJ, Ormerod, B, **Bizon, JL**. Age-related changes in rostral basal forebrain cholinergic and GABAergic projection neurons: relationship with spatial impairment. *Neurobiology of Aging*. 2013 Mar;34(3):845-62. PMCID: 3632262.

D. Research Support

Neural mechanisms of age-related cognitive decline
R01 AG02942 NCE
Bizon PI
Agency: National Institute on Aging

Decision making and basolateral amygdala dysfunction in aging
R01AG60778 2018/09/01-2023/08/31
MPI Bizon with Setlow, Frazier
Agency: National Institute on Aging

Interactions of perirhinal tau pathology and aging in cognitive dysfunction
R21AG05824 2018/03/15-2020/03/01
Interactions of perirhinal tau pathology and aging in cognitive dysfunction
MPI Bizon with Burke
Agency: National Institute on Aging

Cognitive augmentation through neuroplasticity
DARPA TNT Award 2017/01/1-2020/12/31
Bizon Project Leader (Otto PI)
Agency: DARPA

Clinical and Translational Pre-doctoral Training in Alzheimer's and Related Dementias
T32AG061892 2018/09/01-2023/08/31
MPI Bizon with Lewis
Agency: National Institute on Aging

Immunotherapy Targeting the HPA Axis in Alzheimer's Disease
R01AG064942 2019/07/01-2024/06/30
MPI Bizon with Golde, Lewis
Agency: National Institute on Aging

Risk taking and cocaine use: interactions, mechanisms, and therapeutic targets
R01 DA036534 2015/03/15-2020/03/14
Role: co-I (Setlow, PI)
Agency: National Institute on Drug Abuse

The contribution of declines in functional connectivity to cognitive aging
R01 AG049722 1/1/16-12/31/20
Role: co-I (Burke PI)
Agency: National Institute on Aging

Testing and forecasting hippocampal theta wave propagation in learning and memory
R01 MH109548 11/1/16-10/1/21
Role: co-I (Maurer PI)
Agency: National Institute on Metal Health

Metabolic interventions for enhancing cognitive resilience in aging and AD
R01 AG060977 2/1/19-1/31/24
Role: co-I (Burke PI)
Agency: National Institute on Aging

Current Mentored Support
Epigenetic mechanisms of stress and age-related cognitive decline
Principal Investigator: Joseph McQuail, Sponsor: Bizon
K01AG061263 2019/05/01-2024/04/30
National Institute of Aging

Neural circuits and mechanisms underlying maladaptive risk-taking following cocaine self-administration
Principal Investigator: Caitlin A Orsini, co-Sponsor: Bizon (with Setlow)
K99DA041493 3/1/16-2/28/20
Agency: National Institute on Drug Abuse

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.

Follow this format for each person. DO NOT EXCEED FIVE PAGES.

NAME: BURKE, SARA

eRA COMMONS USER NAME (agency login): sburke

POSITION TITLE: Associate Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
University of Oregon, Eugene, OR	BS	08/1999	Psychology, Chemistry
University of Oregon, Eugene, OR	MS	12/2000	Psychology
University of Arizona, Tucson, AZ	PHD	05/2009	Neuroscience, pharmacology
University of Arizona, Tucson, AZ	Postdoctoral Fellow	09/2013	Non-human primate and rodent models of cognitive aging

A. PERSONAL STATEMENT

My NIH-funded research program is focused on determining the mechanisms that are responsible for cognitive decline that occurs during aging and early Alzheimer's disease, and potential strategies for alleviating age-related memory loss (e.g. ref a). To do this, my laboratory uses multiple levels of analysis that span from gene expression to large-scale neurophysiological recordings during behaviors that encompass olfactory and object discrimination, associative memory, behavioral flexibility and episodic memory. Currently, we are quantifying hippocampal-cortical interactions across levels of analysis as well as labeling the expression of activity-dependent immediate-early genes in anatomically defined circuits to identify the populations of neurons across the CNS that are activated during behavior. Recently, we have developed and validated behavioral paradigms that are sensitive to detecting early stages of hippocampal dysfunction (refs b and c) and, in collaborating with Dr. Jennifer L. Bizon, used viral vector technology to induce tau pathology in the brains of aged rats.

a. Hernandez AR, Campos KT, Truckenbrod LM, Hernandez CM, Sakarya Y, McQuail JA, Carter CS, Bizon JL, Maurer AP, **Burke SN** (2018). The anti-epileptic ketogenic diet reduces adiposity and alters hippocampal transporter levels in aged rats. *Journal of Gerontology, Series A.* PMID: 29040389; PubMed Central PMCID: PMC2773228; DOI: 10.1093/gerona/glx193.

b. Johnson SA, Sacks PK, Turner SM, Gaynor LS, Ormerod BK, Maurer AP, Bizon, JL, **Burke SN** (2016). Discrimination performance in aging is vulnerable to interference and dissociable from spatial memory. *Learning & Memory,* 23(7):339-48. PMID: 27317194; PMCID: PMC4918781.

c. Johnson SA, Turner SM, Santacroce LA, Carty KN, Shafiq L, Bizon JL, Maurer AP, **Burke SN** (2017). Rodent age-related impairments in discriminating perceptually similar objects parallel those observed in humans. *Hippocampus*. 27(7):759-776. PubMed PMID: 28342259; PubMed Central PMCID: PMC5479708.

B. POSITIONS AND HONORS

Positions and Employment

1997 - 1999 Undergraduate Research Assistant , Dr. Richard Marrocco's Visual-Attention laboratory, University of Oregon, Eugene, OR

1999 - 2000 Graduate Research Associate, Dr. Richard Marrocco's Visual-Attention laboratory, University of Oregon, Eugene, OR

2000 - 2002	Research Associate, Dr. Alvin Eisner's Visual Adaptation laboratory, Oregon Health & Science University, Portland, OR
2003 - 2004	Graduate Teaching Assistant for MSB407: Cellular, Molecular Neuroscience , University of Arizona, Tucson, AZ
2006 - 2011	Teaching Assistant for NRSC4/524: Gerontology, University of Arizona, Tucson, AZ
2013 – 2019	Assistant Professor, Department of Neuroscience, University of Florida, Gainesville, FL
2019 –	Associate Professor, Department of Neuroscience, University of Florida, Gainesville, FL

Other Experience and Professional Memberships

2002 -	Member, Society for Neuroscience
2008 - 2009	Mentor and small group leader, Undergraduate Biology Research Program, Univ. of Arizona
2010 - 2011	Membership Survey Advisory Group , Society for Neuroscience
2010 - 2011	Mentor, University of Arizona Assurance Program
2014 -	Mentor, HHMI Science for Life
2014 -	Member, North Central Florida Chapter of the Society for Neuroscience
2014 -	Mentor, University of Florida Scholar Award
2015 -	Judge for speaker competition, Junior Science, Engineering and Humanities Symposium
2015 -	Member of Council for Undergraduate Research
2015 -	Member Faculty for Undergraduate Neuroscience
2016 -	Director of the UF Summer Neuroscience Internship Program

Honors

1999	Departmental Honor's in Psychology, University of Oregon
1999	Magna Cum Laude, University of Oregon
1999	Inducted, Phi Beta Kappa
2002	National Institute of Health Training Grant Recipient, University of Arizona
2006	Recipient of the Ruth L. Kirschstein National Research Service Award, National Institute of Health
2008	D.G. Marquis Behavioral Neuroscience Award , American Psychology Association
2009	Mentor of the Year Award, Undergraduate Biology Research Program, University of Arizona
2010	D.G. Marquis Behavioral Neuroscience Award , American Psychology Association
2012	Honorable Mention, Mentor of the Year, Undergraduate Biology Research Program, University of Arizona
2014	Best Talk, Department Data Blitz, Department of Neuroscience, University of Florida
2014-2015	Exemplary Teaching Award, University of Florida College of Medicine
2015	Claude D. Pepper Older Americans Independence Junior Scholar
2014-2015	Exemplary Teaching Award, University of Florida College of Medicine
2016	Excellence Awards for Assistant Professors
2017	American Psychological Association Early Career Award for Distinguished Contribution in Cognitive and Behavioral Neuroscience
2018	McKnight Brain Institute Leadership Award

C. Contribution to Science

1. One aspect of my current research program is to examine the alterations in network-level interactions across different brain structures that underlie cognitive dysfunction in aging and the early stages of Alzheimer's disease. Our rationale is that by elucidating how aging and disease influence systems-level dynamics, we will be better positioned to develop interventions that broadly improve cognition. In support of this objective, we have published a series of experiments that examine the role of prefrontal cortical-medial temporal communication in higher cognition. Specifically, we have shown that performance on Object-Place Paired Associated Task (OPPA; to be used in the current proposal) is highly sensitive to detecting deficits in old age compared to more traditional cognitive tests used to quantify age-related impairments, such as the Morris water maze (a), or spatial non-match to sample test (b). Moreover, we have linked the age-associated

impairments on the bi-conditional association task to disrupted communication between the medial prefrontal cortex and the perirhinal cortex (c).

a. Hernandez AR*, Maurer AP*, Reasor JE, Turner SM, Barthle SE, Johnson SA, **Burke SN** (2015). Age-related impairments in object-place associations are not due to hippocampal dysfunction. *Behavioral Neuroscience,* 129(5):599-610. PMID: 26413723; PMCID: PMC4945158.

b. Johnson SA, Sacks PK, Turner SM, Gaynor LS, Ormerod BK, Maurer AP, Bizon, JL, **Burke SN** (2016). Discrimination performance in aging is vulnerable to interference and dissociable from spatial memory. *Learning & Memory,* 23(7):339-48. PMID: 27317194; PMCID: PMC4918781.

c. Hernandez AR, Reasor JE, Truckenbrod LM, Lubke, K, Johnson SA, Bizon JL, Maurer AP, **Burke SN** (2016). Medial Prefrontal-Perirhinal Cortical Communication is Necessary for Flexible Response Selection. *Neurobiology of Learning and Memory,* 137:36-47. PMID: 27815215; PMCID: PMC5214530.

2. In young animals, dynamic hippocampal activity patterns support learning and memory. I have been involved in a series of papers that show how behavior-dependent modulation of hippocampal activity is compromised in aged animals to produce memory deficits (ref a-c). Moreover, we have shown that altering NMDA receptor currents with the Alzheimer's disease therapeutic memantine can restore experience-dependent plasticity in aged memory-impaired rats (ref a). This paper, on which I was first author, received the D.G. Marquis Behavioral Neuroscience Award from the American Psychological Association for the best paper published in *Behavioral Neuroscience* in 2008. More recently, we have shown how these deficits may be linked to disrupted neurometabolism in the hippocampus. Specifically, we have observed that expression of several ATP-dependent transporters is reduced in old compared to young rats. Importantly, reduced transporter expression in old animals can be normalized by a ketogenic diet (ref d). These papers demonstrate my expertise regarding the physiological signatures of neural dysfunction and my commitment to exploring potential therapeutics for treating cognitive aging, both of which are central features of the current proposal.

   a. **Burke SN**, Maurer AP, Yang Z, Navratilova Z, Barnes CA (2008). Glutamate receptor-mediated restoration of experience-dependent place field expansion plasticity in aged rats. *Behav Neurosci*. 122(3):535-48. PubMed PMID: 18513124; PubMed Central PMCID: PMC2773228.

   b. Gerrard JL, **Burke SN**, McNaughton BL, Barnes CA (2008). Sequence reactivation in the hippocampus is impaired in aged rats. J Neurosci. 28(31):7883-90. PubMed PMID: 18667620; PubMed Central PMCID: PMC2703197.

   c. Hartzell AL, **Burke SN**, Hoang LT, Lister JP, Rodriguez CN, Barnes CA (2013). Transcription of the immediate-early gene *Arc* in CA1 of the hippocampus reveals activity differences along the proximodistal axis that are attenuated by advanced age. *J Neurosci.* 20;33(8):3424-33. PubMed PMID: 23426670; PubMed Central PMCID: PMC3711759.

   d. Hernandez AR, Campos KT, Truckenbrod LM, Hernandez CM, Sakarya Y, McQuail JA, Carter CS, Bizon JL, Maurer AP, **Burke SN** (2018). The anti-epileptic ketogenic diet reduces adiposity and alters hippocampal transporter levels in aged rats. *Journal of Gerontology, Series A.* PMID: 29040389; PubMed Central PMCID: PMC2773228; DOI: 10.1093/gerona/glx193.

3. My prior publications were the first to demonstrate that age-related deficits in object recognition memory are mediated by perirhinal cortical dysfunction. The perirhinal cortex is an area of the brain that receives sensory information from all modalities and is interconnected with the hippocampus to support memory. Using neurophysiological approaches (ref a) and activity-induced gene expression (ref b), my work showed that both excitatory and inhibitory perirhinal activity is blunted in aged rats (ref c) during an object exploration task and that this decline in perirhinal activity is tightly related to behavioral performance.

   a. **Burke SN**, Hartzell AL, Lister JP, Hoang LT, Barnes CA (2012). Layer V perirhinal cortical ensemble activity during object exploration: a comparison between young and aged rats. *Hippocampus* 22(10):2080-93. PubMed PMID: 22987683; PubMed Central PMCID: PMC3523702.

   b. **Burke SN**, Maurer AP, Nematollahi S, Uprety A, Wallace JL, Barnes CA (2014). Advanced age dissociates dual functions of the perirhinal cortex. *J Neurosci.* 34(2):467-80. PubMed PMID: 24403147; PubMed Central PMCID: PMC3870932.

c. Maurer AP*, **Burke SN***, Diba K, Barnes CA (2017). Advanced Age is Associated with Attenuated Principal Cell and Interneuron Activity in the Perirhinal Cortex. *J Neurosci,* 37(37):8965-8974. *These authors contributed equally. PubMed PMID: 28821661; PubMed Central PMCID: PMC5597979.

4. A long-standing presumption in the field of cognitive aging had been that aged animals have difficulty recognizing stimuli because they "forget" items that have been previously experienced. This idea, however, was difficult to reconcile with other data showing that aged subjects have an increase in false memories. I designed a series of experiments to elucidate the origins of age-associated recognition memory impairments that led to the novel observation that old animals have recognition memory deficits because they have a reduced ability to discriminate novel stimuli from those that are familiar, which manifests as a false memory (ref a). This work led to foundational insights regarding age-associated declines in recognition memory, which presumably arise from perirhinal cortical dysfunction, and was later replicated in monkeys (ref b) and humans (ref c). We have recently extended this work to show that recognition impairments are due to a reduced ability of aged rats to discriminate between similar stimuli with a LEGO©-object discrimination task (ref d). Moreover, the paper published in 2010, of which I designed and implemented the experimental procedures, analyzed the data, and prepared the manuscript earned the D.G. Marquis Behavioral Neuroscience Award.

   a. **Burke SN**, Wallace JL, Nematollahi S, Uprety AR, Barnes CA (2010). Pattern separation deficits may contribute to age-associated recognition impairments. *Behav Neurosci*. 2010 Oct;124(5):559-73. PubMed PMID: 20939657; PubMed Central PMCID: PMC3071152.

   b. **Burke SN**, Wallace JL, Hartzell AL, Nematollahi S, Plange K, Barnes CA (2011). Age-associated deficits in pattern separation functions of the perirhinal cortex: a cross-species consensus. *Behav Neurosci*. 125(6):836-47. PubMed PMID: 22122147; PubMed Central PMCID: PMC3255096.

   c. **Burke SN**, Ryan L, Barnes CA (2012). Characterizing cognitive aging of recognition memory and related processes in animal models and in humans. *Front Aging Neurosci*. 2012;4:15. PubMed PMID: 22988437; PubMed Central PMCID: PMC3439640.

   d. Johnson SA, Turner SM, Santacroce LA, Carty KN, Shafiq L, Bizon JL, Maurer AP, **Burke SN** (2017). Rodent age-related impairments in discriminating perceptually similar objects parallel those observed in humans. *Hippocampus*. 27(7):759-776. PubMed PMID: 28342259; PubMed Central PMCID: PMC5479708.

5. Although the spatial correlates of hippocampal firing properties have been extensively described, less is known regarding the influence on non-spatial sensory information (e.g., 3-dimensional objects) on the activity patterns of these neurons. The perirhinal cortex is extensively interconnected with the hippocampus and receives sensory input from most neocortical sensory areas. Prior to my research it was believed that this structure supported recognition memory with changes in firing rate as a stimulus goes from novel to familiar. My work produced two foundational insights regarding the perirhinal cortex and its interactions with the hippocampus. First, we showed the perirhinal cortical neurons selectively respond to objects, but that firing rates do not change as a function of novelty (ref a). This observation called for a refinement of standard models of recognition memory. Second, we found that the neurons in the hippocampal subregion receiving direct perirhinal input are robustly modulated by objects (ref b).

   a. Burke SN, Maurer AP, Hartzell AL, Nematollahi S, Uprety A, Wallace JL, Barnes CA (2012). Representation of three-dimensional objects by the rat perirhinal cortex. *Hippocampus* 22(10):2032-44. PubMed PMID: 22987680; PubMed Central PMCID: PMC3447635.

   b. Burke SN, Hartzell AL, Lister JP, Hoang LT, Barnes CA (2012). Layer V perirhinal cortical ensemble activity during object exploration: a comparison between young and aged rats. *Hippocampus* 22(10):2080-93. PubMed PMID: 22987683; PubMed Central PMCID: PMC3523702.

   c. Burke SN, Barnes CA (2015). The neural representation of 3-dimensional objects in rodent memory circuits. *Behav Brain Res*. 285: 60-6. PubMed PMID: 25205370. PubMed Central PMCID: PMC4362856.

Complete List of Published Work in My Bibliography:
http://www.ncbi.nlm.nih.gov/myncbi/sara.burke.1/bibliography/47433007/public/?sort=date&direction=ascending

D. RESEARCH SUPPORT

Ongoing Research Support

02/01/2019-01/31/2024
NIH/NIA RF1AG060977, Role: PI
Title: Metabolic Interventions for Enhancing Cognitive Resilience in Aging and Alzheimer's Disease
The goal of this award is to determine the mechanisms by which dietary ketosis improves cognition in aged animals.

01/01/2016-11/30/2020
NIH/NIA 1R01AG049722, Role: PI,
Title: The Contribution of Declines in Functional Connectivity to Cognitive Aging
The major goal of this proposal is to determine how alterations in systems-level neural coordination in old animals produce cognitive impairments.

2017/01/01-2020/12/31
DARPA Targeted Neuroplasticity Training**,** Role: co-PI (project leader for Task 1.1)
Title: Cognitive Augmentation through Neuroplasticity
The major goal of this award is to define the mechanisms by which peripheral stimulation of the vagus nerve improves behavioral performance.

03/15/2018 - 02/29/2020
NIH/NIA R21AG058240 (multiple-PI with Bizon)
Title: Interactions of Perirhinal Tau Pathology and Aging in Cognitive Dysfunction
The goal of this award is to determine in the interaction between tau pathology, age, and declines in stimulus discrimination.

2017/04/01-2022/01/31
NIH/NIMH R01MH109548, PI: Maurer, Role: co-I,
Title: Testing and forecasting hippocampal theta wave propagation in learning and memory
The goal of this award is to understand the relationship between hippocampal oscillatory dynamics and memory.

09/15/2017-08/30/2022
NIH/NIA R01AG055544, PI: Maurer, PI, Role: co-I
Title: Age-associated changes in hippocampal circuits and cognitive function
The goal of this award is to determine if age-related changes in hippocampal circuit dynamics is due to synaptic senescence for adaptive compensation.

07/01/2018-06/30/2023
NIH/ NIA 1R01AG060778-01, PI: Bizon, Role: co-I
Title: Decision making and basolateral amygdala dysfunction in aging
The goal of this project is to understand how basolateral amygdala dysfunction contributes to altered decision making in aging.

Completed Support

1R21AG051004, National Institute on Aging, Role: PI, 2016/08/15-2018/05/31
Title: Single-Cell Imaging of Functional Connectivity as a Window into Cognitive Aging

2015/08/15-2017/05/31
1R03AG049411-01A1, National Institute on Aging (Primary), Role: contact-PI
Neurogenesis and Memory Network Dynamics during Normal Aging

2015/08/01-2017/3/31
Claude D. Pepper Older Americans Independence Center Junior Scholar Award and Pilot Grant
A Novel Rodent Model of Age-related Motor-Cognition Dual-Task Deficits, Role: PI

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: DeKosky, Steven T.

eRA COMMONS USER NAME (credential, e.g., agency login): DeKoskyST

POSITION TITLE: Professor of Neurology

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Bucknell University, Lewisburg, PA	A.B.	1968	Psychology
University of Florida, Gainesville, FL	Grad. School	1968-70	Psychology/Neuroscience
University of Florida College of Medicine	M.D.	1974	Medicine
The Johns Hopkins Hospital, Baltimore, MD	Internship	1974-75	Internal Medicine
University of Florida College of Medicine	Residency	1975-78	Neurology
University of Virginia, Charlottesville, VA	Post Doc	1978-79	Neurochemistry

A. Personal Statement

I have worked in Alzheimer's disease (AD) and related disorders for over 30 years, studying neurochemical, neuroanatomical, genetic, and pathological changes (amyloid, neurofibrillary tangles) in AD, MCI, and normal elderly. I have also been involved with epidemiological studies of dementia in several populations, including in western Pennsylvania and rural India. My neurochemistry and molecular neuroscience lab was funded extramurally for over 30 years; to translate my bench research studies, I began clinical studies in cognitive, behavioral, neuroimaging and therapeutic interventions correlating imaging and cognition, trials of new medications including First in Man studies in the Pitt Alzheimer Center, and large scale (>3,000 Ss) long term (>6 years) multicenter dementia prevention trials using Gingko biloba; I was PI of the GEM trial. I was founding co-director (1985-1990; U. Kentucky) then director (1994-2008; Pittsburgh) of Alzheimer's Disease Research Centers (ADRCs), and serve as chair of Drug Safety Monitoring Boards. I have served as consultant/advisor for multiple pharma and biotech companies, ADRCs, and chaired the Alzheimer's Association Med-Sci Advisory Council, and the Med-Sci Advisory Panel of Alzheimer's Disease International. I chaired the American Academy of Neurology's Practice Parameter Workgroup on Early Detection, Diagnosis, and Treatment of Dementia, and served on or chaired multiple committees for the NIA regarding aging and dementia. I also served on the NCCAM (now NCCIH) Council and was a member of the NIH Council of Councils (overseeing the Common Fund). I chaired the University of Pittsburgh department of neurology for 8 years. In these capacities I have supervised undergraduates, PhDs, post docs, and both basic and clinical research faculty. Then, as Vice President and Dean of the University of Virginia School of Medicine (2008-2013) I developed further skills in management of large research and academic projects, My return to research via a sabbatical year at Penn (bioethics) and Pitt (in the PET labs) facilitated my re-entry into research and research administration. I now am Deputy Director of the McKnight Brain Institute, the center of neuroscience research and teaching at UF, Associate Director of the NIA-funded 1Florida ADRC, and involved in several research grants focused on human and animal models of age related memory loss and therapeutic interventions..

B. Positions and Employment

1979-1990 Asst.to Assoc. Prof, Depts. Neurology & Anatomy/Neurobiology, Univ. Kentucky, Lexington, KY
and Staff Neurologist, Lexington VA Medical Center
1985-1990 Co-Director/Co-PI, Alzheimer's Disease Research Center, Univ. of Kentucky, Lexington, KY

1985-1987 Interim Chair, Department of Neurology, University of Kentucky, Lexington, KY
1985-1987 Director, Neurology Residency Training Program, University of Kentucky, Lexington, KY
1990-2002 Professor of Psychiatry, Neurology, and Neurobiology, University of Pittsburgh School of Medicine and Western Psychiatric Institute and Clinic (WPIC), Pittsburgh, PA
1990-1994 Co-Director, Alzheimer's Disease Research Center, University of Pittsburgh, Pittsburgh, PA
1992-2001 Director, Div. of Geriatrics & Neuropsychiatry, Dept. of Psychiatry/WPIC, Univ. of Pittsburgh
1994-2008 Director, ADRC, University of Pittsburgh Medical Center, Pittsburgh, PA
1997-2008 Professor, Dept. of Human Genetics, Graduate School of Public Health, University of Pittsburgh
2000-2008 Chair, Department of Neurology, University of Pittsburgh, Pittsburgh, PA
2008-present Adjunct Professor of Neurology, University of Pittsburgh School of Medicine
2008-2013 Vice President and Dean, University of Virginia School of Medicine, Charlottesville, VA; Physician in Chief, University of Virginia Health System
2008-2014 Professor of Neurology and Psychiatry and Behavioral Sciences, UVA School of Medicine
2013-2014 Visiting Professor, Department of Medical Ethics and Health Policy, University of Pennsylvania Perelman School of Medicine, Philadelphia, PA [Sabbatical]
2014-2015 Visiting Scholar, Department of Radiology (PET Center) and Neurology, University of Pittsburgh School of Medicine/UPMC, Pittsburgh, PA [Sabbatical]
2015-present Professor of Neurology Emeritus, University of Virginia
2015-present Professor, Neurology and Neuroscience, Univ. of Florida College of Medicine, Gainesville, FL
2015-present Deputy Director, McKnight Brain Institute, University of Florida
2015-2016 Interim Executive Director, McKnight Brain Institute, University of Florida
2015-present Associate Director, 1Florida Alzheimer's Disease Center

Other Experience and Professional Memberships
1994-2010 National Board of Directors, Alzheimer's Association, Chicago, IL; Vice-Chairman, 1998-2001
1997-2001 NIH Study Section, Neuroscience of Aging Review Committee (NIA) (Chair, 2002-2001)
1997-2001 Chair, Medical and Scientific Advisory Council, Alzheimer's Association
2002-2005 Chair, Medical and Scientific Advisory Panel, Alzheimer's Disease International
2004-2010 Member & Vice President (2010), American Board of Psychiatry & Neurology (ABPN)
2004-2007 Member, Peripheral & Central Nervous System Drugs Advisory Committee, FDA; now advisor
2005-2015 Member, Board of Directors, American Society for Experimental NeuroTherapeutics (ASENT)
2008-2104 Founding Chair, ISTAART (International Society to Advance Alzheimer Research & Treatment)
2008-2013 Council of Deans, American Association of Medical Colleges (AAMC)
2009-2012 National Advisory Council, National Center on Complementary and Alternative Medicine (NCCAM; now National Center on Complementary and Integrative Health, NCCIH)
2013-2015 Council of Councils (National Advisory Council to the NIH Director for the Common Fund)

Honors
1972 Alpha Omega Alpha Research Award, University of Florida College of Medicine
1974 Roger Schnell Award for Excellence in Clinical Neurology (University of Florida)
1978-1979 National Research Service Award in Developmental Neurology (Neurochemistry) NINCDS
1980-1985 Teacher-Investigator Development Award, NINCDS
1988 Presidential Award, American Neurological Association
1994-present *The Best Doctors in America*
2000 Distinguished Alumnus, University of Florida College of Medicine ("Wall of Fame")
2003-present Elected American College of Neuropsychopharmacology (ACNP)
2003-present *America's Top Doctors*
2003 Rita Hayworth Award, Alzheimer's Association
2005 Ronald and Nancy Reagan Research Institute Award for research/care/advocacy in AD.
2006 NIH Clinical Center Great Teachers Award
2008 Alzheimer's Association Zaven Khachaturian Award
2008-2013 James Carroll Flippin Professor of Medical Science, University of Virginia
2009-present Elected Fellow, American College of Physicians
2014--present Thompson Reuters Top 1% of Cited Papers
2015 Who's Who in America (Platinum edition)
2015-present Aerts-Cosper Professor of Alzheimer's Research, University of Florida
2017-present Who's Who in the World

2018, 2019 Albert Nelson Marquis Lifetime Achievement Award

C. Contributions to Science
Science (chosen from >488 publications) https://www.ncbi.nlm.nih.gov/pubmed/?term=dekosky+s

1) Neurochemistry and synaptic plasticity in aging, MCI, and dementia
I was first to report (with Steve Scheff) the loss of synapses (by quantitative EM) in living humans with AD (biopsies), that synapse counts correlated with cognition, and that enlargement of residual synapses occurred with synaptic loss. I also demonstrated that unlike prior understanding, cholinergic enzymes were increased in the hippocampus and frontal cortex (but not other cortical areas) during MCI--a neuroplastic attempt to compensate for neurodegeneration, which then decreased as progression to AD occurred.

DeKosky, ST and Scheff, SW Synapse loss in frontal cortex biopsies in Alzheimer's disease: Correlation with cognitive severity. Annals of Neurology 27:457-464, 1990.
DeKosky, ST, Harbaugh, RE, Schmitt, FA, Bakay, RAE, Chui, HC…Senter, HJ, Markesbery, WR, and the Intraventicular Bethanecol Study Group. Cortical biopsy in Alzheimer's disease: Diagnostic accuracy and neurochemical, neuropathological and cognitive correlations. Annals Neurology 32:625-632, 1992.
DeKosky, ST, Ikonomovic, MD, Styren, SD, Beckett, L, Wisniewski, S, Bennett, D, Kordower, JH, and Muston, EJ. Up-regulation of choline acetyltransferase activity in hippocampus and frontal cortex of elderly subjects with mild cognitive impairment. Annals of Neurology 51:145-155, 2002.
Ikonomovic, MD, Klunk, WE, Abrahamson, EE, Wuu, J, Mathis, CA, Scheff, SW, Mufson, EJ and Cohen, A, Price, J, Weissfeld, L, James, J, Rosario, B, Bi, W, Nebes, R, Saxton, J, Snitz, B, Aizenstein, H, Wolk, D, DeKosky, ST, Mathis, C and Klunk, W. Basal cerebral metabolism may modulate the cognitive effects of Aβ in MCI: An example of brain reserve. J Neurosci 29:14770-8, 2009. PMCID: 2810461

2) Amyloid imaging in Alzheimer's Disease
I held the IND, was PI of the initial Program Project Grant, and led the clinical studies of the first PET amyloid imaging compound Pittsburgh Compound B (PiB). I participated in clinical study design, assessment of the relationship of amyloid load to clinical status and cortical metabolism as indexed by FDG-PET.

Ikonomovic, MD, Klunk, WE, Abrahamson, EE, Mathis, CA, Price, JC, Tsopelas, ND, Lopresti, BJ, Ziolko, S, Bi, W, Paljug, WR, Debnath, ML, Hope, CE, Isanski, BA, Hamilton, RL and DeKosky, ST Post-mortem correlates of in vivo PiB-PET amyloid imaging in a typical case of Alzheimer's disease. Brain 131:130-1645, 2008. PMCID 2408940
Wolk, DA, Price, JC, Madeira, C, Saxton, JA, Snitz, BE, Lopez, OL, Mathis, CA, Klunk, WE and DeKosky, ST. Amyloid imaging in dementias with atypical presentation. Alz. & Dementia 8:389-8, 2012 PMCID: 3517915
Snitz, BE, Weissfeld, LA, Lopez, OL, Kuller, LH, Saxton, J, Singhabu, DM, Klunk, WE, Mathis, CA, Price, JC, Ives, DG, Cohen, AD, McDade, E and DeKosky, ST. Cognitive trajectories associated with β-amyloid deposition in the oldest-old without dementia. Neurol 80:1378-1384, 2013. PMCID: PMC3662268
Golde TE, DeKosky ST, Galasko D. Alzheimer's disease: The right drug, the right time. Science. 14;362(6420):1250-1251, 2018. doi: 10.1126/science.aau0437.PMID: 30545877

3) Experimental Brain Trauma:
In the early 1990s (before transgenic mouse models were available), I studied TBI to study cascades similar to Alzheimer's. My lab demonstrated up-regulation of NGF and its control by IL1-beta, elevation of APP and A beta in TBI, and a number of interventions to stop elevation of A beta after injury, applicable to human studies.

DeKosky, ST Goss, JR, Miller, PD, Styren, SD, Kochanek, PM, and Marion, D. Up-regulation of nerve growth factor following cortical trauma. Experimental Neurology 130:173-177, 1994.
DeKosky, ST, Taffe, KM, Abrahamson, EA, Dixon, CE, Kochanek, PM, and Ikonomovic, MD Time course analysis of hippocampal nerve growth factor and antioxidant enzyme activity following lateral controlled cortical impact brain injury in the rat. Journal of Neurotrauma 21:491-500, 2004. Abrahamson, EE, Ikonomovic, MD, Ciallella, JR, Hope, CE, Paljug, WR, Isanski, BA, Flood, DG, Clark, RSB, and DeKosky, ST Caspase inhibition therapy abolishes brain trauma-induced increases in Aß peptide: Implications for clinical outcome. Experimental Neurology 197:437-450, 2006.
Abrahamson, EE, Ikonomovic, MD, Dixon, DE and DeKosky, ST Simvastatin therapy prevents brain trauma-induced elevations in ß-amyloid peptide levels. Annals of Neurol 66:407-414 2009. PMID: 19798641

4) Human Brain Trauma:

With Bennet Omalu I described the first case of CTE in an American football player, then 4 additional cases. Our human brain tissue studies following acute TBI confirmed rapid up-regulation of APP, Aβ and Aβ plaques (within 2 hours), a risk factor for subsequent cognitive decline, suggesting acute post-TBI interventions and bringing study of AD and TBI together. We now study tau as a biomarker of CTE in living subjects.

Omalu, BI, DeKosky, ST, Minster, RL, Kamboh, MI, Hamilton, RL and Wecht, CH Chronic traumatic encephalopathy in a National Football League (NFL) player. Neurosurgery 57:128-134, 2005.

DeKosky, ST, Abrahamson, EE, Ciallella, JR, Paljug, WR, Wisniewski, SR, Clark, RS, and Ikonomovic, MD Association of increased cortical soluble Aß42 levels with diffuse plaques after severe brain injury in humans Archives of Neurology 64:541-544, 2007.

DeKosky, ST, Ikonomovic, MD and Gandy, S Traumatic brain injury: Football, warfare, and long-term effects. New England Journal of Medicine 363:1293-1296, 2010. PMID: 21265421

DeKosky, ST, Blennow, K, Ikonomovic, MD and Gandy, S. Acute and chronic traumatic encephalopathies: Pathogenesis and biomarkers. Nature Reviews Neurology 9:192-200, 2013. PMCID: 4006940

5) Mild Cognitive Impairment and Prevention of Dementia

I chaired the AAN Practice Parameter Committee that first defined MCI, showed multiple ways neuroplasticity occurred in MCI, had a leading role in the redefinition of MCI 10 years later, and directed the first prevention trial for AD, the NIH-funded GEM Study, using *Ginkgo biloba*. I have published multiple studies of MCI in imaging, cognition, and behavioral symptoms.

Petersen, RC, Stevens, JC, Ganguli, M…and DeKosky, ST (2001) Practice parameter: Early detection of dementia: Mild cognitive impairment (an evidence-based review). Neurology 56:1133-1142.

Albert, MS, DeKosky, ST, Dickson, D, Dubois, B, et al., The diagnosis of MCI due to Alzheimer's disease: Recommendations from the National Institute on Aging-Alzheimer's Association workgroups on diagnostic guidelines for Alzheimer's disease. Alzheimers Dement 7:270-279, 2011. PMCID: 3312027

DeKosky ST, Williamson JD, Fitzpatrick AL, Kronmal RA…Furberg CD. (2008) Ginkgo Evaluation of Memory (GEM) Study Investigators. Ginkgo biloba for prevention of dementia: a randomized controlled trial. JAMA. 19;300:2253-62. PMCID: PMC2823569.

Curiel, RE, Loewenstein, DA, Rosselli, M, Penate, A, Greig-Custo, MT, Bauer, RM, Guinjoan SM, Hanson KS, Li C, Lizarraga G, Barker WW, Torres, V, DeKosky, ST, Adjouadi, M, Duara, R. (2018). Semantic Intrusions and Failure to Recover from semantic interference in mild cognitive impairment: Relationship to amyloid and cortical thickness. Curr Alz Res. https://doi.org/10.2174/1567205015666180427122746

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Thomas C Foster

eRA COMMONS USER NAME (credential, e.g., agency login): Tom_Foster

POSITION TITLE: Professor and Evelyn F. McKnight Chair for Research on Cognitive Aging and Memory

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of Arizona, Tucson AZ	BS	1981	Psychology
Bowman Gray, School of Medicine, W-S, NC	Ph.D.	1987	Physio/Pharm
University of Colorado, Boulder CO	Postdoctoral	1991	Neurophysiology and behavior

A. Personal Statement

My long-term goal is the amelioration of memory deficits associated with aging and disease of aging. My research focuses on understanding the relationship between cognitive decline due to aging or diseases of aging and mechanisms of brain aging. My research program utilizes a combination of behavioral characterization with biochemical, molecular, and electrophysiological techniques and treatments (behavioral, pharmacological and viral) to obtain a vertically integrated perspective on neural aging, from the molecular to the cognitive level. I have been continuously funded through NIH as a principle investigator since 1992 and my work includes over 130 publications on memory mechanisms and the aging brain. My lab has developed a battery of behavioral tasks that are sensitive to the onset and trajectory of age-related cognitive decline and control for sensory-motor or motivational factors. Other techniques that are routine in the lab and relate to the current proposal include protocols for examining redox regulation of senescent physiology including electrophysiological recording of NMDAR synaptic responses. In addition, we have developed techniques for next generation sequencing and examining DNA methylation as a mechanism for regulation of transcription. Finally, we recently published several papers related to the idea that age-related cognitive decline is mediated through redox regulation of the NMDA receptor.

Reviews related to our work:

a) **Foster**, TC. (2012) Dissecting the age-related decline on learning and memory tasks in rodent models: N-methyl-D-aspartate receptors and voltage-dependent Ca^{2+} channels in senescent synaptic plasticity. *Prog Neurobiol* 96:283-302. PMID: 22307057.

b) Febo, M., and **Foster**, TC. Preclinical Magnetic Resonance Imaging and Spectroscopy Studies of Memory, Aging, and Cognitive Decline Front Aging Neurosci, 2016, 8, 158. PMCID: 4942756.

c) **Foster**, TC., Kyritsopoulos, A., and Kumar, A., Central role for NMDA receptors in redox mediated impairment of synaptic function during aging and Alzheimer's disease. Behav Brain Res, 2017. 322, 223-232. PMID: 27180169

d) Kumar, A., Yegla, B., **Foster**, TC. Redox signaling in neurotransmission and cognition during aging. Antioxid Redox Signal (2018), 18, 1724-1745. PMCID: 5962336.

B. Positions and Honors

1. Positions and Employment

Assistant Professor, 1991-1992 Dept. Psych. University of Connecticut
Assistant Professor, 1992-1998, Dept. Psych. University of Virginia

Associate Professor, 1998-2003, Dept. Pharmacology, University of Kentucky Medical School
Associate Professor, 2003-2006, Dept. Neurosci, University of Florida
Professor 2006-present, Dept. Neurosci, University of Florida

2. Academic Honors and Awards
McKnight Chair for Research on Aging and Memory, University of Florida 2003-present
National Advisory Council on Aging NIH Method to Extend Research in Time (MERIT) Award (2011-2019)
Member of the planning Committee for the Cognitive Aging Summits I (2006), II (2010), III (2017)
Associate Editor Frontiers in Aging Neuroscience 2009-present
2018-present Section Editor (Neuroscience) Experimental Gerontology
Member for > 10 NIH Special Emphasis Review Panels (2001-2015)
Member NIH IFCN-7 Study Section 1999-2004
Member NIH Learning and Memory study section (7/2014-6/2018)
Shannon Investigators Award, 1992

C. Contribution to Science

1. In general, my research has focused on understanding mechanisms for modifying synaptic transmission and their relationship to memory, particularly in the context of cognitive decline during aging. My early work employed *in vivo* recording and showed that neuronal discharge activity in the hippocampus, a brain structure involved in memory, could represent the history of experience and the association of sensory-motor information.
   a) **Foster**, TC., Christian, EP., Hampson, RE., Campbell, KA. and Deadwyler, SA. (1986) Sequential dependencies regulate sensory evoked responses of single units in the rat hippocampus. Brain Research 408:86-96. PMID: 3594233
   b) **Foster**, TC., West, MO., Hampson, RE. and Deadwyler, SA. (1988) Control of sensory activation of granule cells in the fascia dentata by extrinsic afferents: Septal and entorhinal inputs. Journal of Neuroscience 8:3869-3878. PMID: 3193182
   c) **Foster**, TC., Castro, CA. and McNaughton, BL. (1989) Spatial selectivity of rat hippocampal neurons: Dependence on preparedness for movement. Science 244: 1580-1582. PMID: 2740902

2. Synaptic plasticity is thought to mediate the associative and information storage properties of neurons. I employed electrophysiological techniques to determine the mechanisms for altered synaptic strength (quantal analysis) and provide illumination on age-related changes in mechanisms, which regulate the induction and expression of synaptic plasticity associated with cognitive decline. Recent work links impaired NMDA receptor function to increased redox stress of aging.
   a) Norris, C.M., Korol, D.L. and **Foster**, T.C. (1996) Increased susceptibility to induction of long-term depression and long-term potentiation reversal during aging. Journal of Neuroscience 16: 5382-5392. PMID: 8757251
   b) Bodhinathan, K., Kumar A., **Foster**, T.C. Intracellular redox state alters NMDA receptor response during aging through Ca2+/calmodulin-dependent protein kinase II. Journal of Neurosciences 2010; 30(5):1914-1924.PM:20130200
   c) Guidi, M., Kumar, A., and **Foster** T.C. Impaired attention and synaptic senescence of the prefrontal cortex involve redox regulation of NMDA receptors. Journal of Neuroscience 2015, 35(9) 3966-3977. PMCID: 434819.
   d) Kumar, A., Thinschmidt, J., and **Foster**, T.C. Mechanism for NMDA receptor hypofunction and redox sensitivity of hippocampal synaptic transmission during aging. (2019) Aging-US, 11, 5140-5157. **PMCID:** 6682512**.**

3. To examine the molecular mechanisms for altered synaptic plasticity and determine how synaptic plasticity contributes to transcription and cell health, I have developed molecular techniques including next generation sequencing, DNA methylation, and viral mediated gene expression. The results indicate that during aging expression of neuroinflammation genes increase and expression of neural activity-dependent genes and synaptic genes declines. In some cases, we have been able to alter synaptic function and cognition using gene delivery.
   a) Lee WH, Kumar A, Rani A, Herrera J, Xu J, Someya S, **Foster** TC. Influence of viral vector-mediated delivery of superoxide dismutase and catalase to the hippocampus on spatial learning and memory

during aging. Antioxid Redox Signal 2012; 16(4):339-350. PMCID: PMC3246419

b) Ianov, L., Rani, A., Beas, B. S., Kumar, A., and **Foster**, T.C. Transcription profile of aging and cognitive-related genes in the medial prefrontal cortex. Front Aging Neurosci, 2016, 8, 113. PMCID: 4868850.

c) Ianov, L., Riva, A., Kumar, A., **Foster**, T.C. DNA methylation of synaptic genes in prefrontal cortex is associated with aging and age-related cognitive impairment. Front. Aging Neuroci. 2017, 9, 249. PMCID: 5539085

d) Cruz-Almeida, Y., Sinha, P., Rani, A., Huo, Z., Fillingim, R.B., **Foster**, T.C. Epigenetic Aging is Associated with Clinical and Experimental Pain in Community-Dwelling Older Adults, (2019) Molecular Pain, 15, **PMCID:** 6710702.

4. More recently, my work has focused on peripheral inflammation as a mechanism that promotes a poor trajectory of cognitive aging. This body of work combines behavior, electrophysiology, and molecular studies. My work demonstrates that aging is associated with increased markers of inflammation in the periphery (i.e. systemic inflammation) and in the brain (i.e. neuroinflammation) and the two are linked. Peripheral inflammation was characterized by examining cytokine levels and exosomal microRNA in the plasma.

a) Scheinert, R.B., Asokan, A., Rani, A., Kumar, A., **Foster**, TC. Ormerod, B.K. Some hormone, cytokine and chemokine levels that change across lifespan vary by cognitive status in male Fischer 344 rats. Brain, Behavior, and Immunity 2015, 49 216-232. PMCID: 4567443

b) Kumar, A., Rani, A., Scheinert, R.B., Ormerod, B.K., and **Foster**, T.C. Nonsteroidal anti-inflammatory drug, indomethacin improves spatial memory and NMDA receptor function in aged animals. Neurobiology of Aging (2018), 70, 184-193. PMCID: 6119103.

c) Barter, J., Kumar, A., Stortz, J.A., Hollen, M., Nacionales, D., Efron, P.A., Moldawer, L.L., and **Foster**, T.C. Age and Sex Influence the Hippocampal Response and Recovery Following Sepsis. (2019) Molecular Neurobiology (56) 8557-8572.

d) Yegla, B. and **Foster**, T.C. Interaction of age, systemic LPS treatment, and food restriction on attentional function and neuroinflammation in male Fischer-344 rats. Frontiers in Aging Neuroscience.

Complete List of Published Work in My Bibliography:
https://www.ncbi.nlm.nih.gov/sites/myncbi/thomas.foster.1/bibliography/40906731/public/?sort=date&direction=ascending

D. Research Support

Ongoing Research Support

NIA R01 AG049711 (PI Foster) 09/01/2015 to 4/30/2020
The major goals of this project are to examine the hypothesis that systemic peripheral inflammation due to LPS will influence the onset and progression of age-related changes in NMDAR signaling mediating memory deficits.
OVERLAP: None.
Role: PI

NIA R01 AG052258 (PI Foster) 05/05/2016 to 4/30/2021
This project employs viral-mediated expression of specific cytokines in peripheral tissue to determine their effect on brain function.
OVERLAP: None.
Role: PI

NIA R01 AG037984-11 (PI: Foster) 9/15/2018 to 7/31/2023
The major goals of this project are to test the hypothesis that the beneficial effects of estrogen on cognition over the lifespan are due to transcriptional regulation of redox state and epigenetically mediated loss of function

NIA P30AG028740 (PI Pahor) 7/1/2006-3/31/2017
Claude D. Pepper Older Americans Independence Center

The mission of the University of Florida Older Americans Independence Center (OAIC) is to assess the risk factors of physical disability in older adults, develop and test effective prevention therapies, and train new investigators in research on aging and disability, while developing their leadership qualities.
OVERLAP: None.
Role: advice on animal models of aging and age-related cognitive decline

Completed Research Support

R37 AG036800 Foster (PI Foster) 09/01/2014 to 03/31/19
The major goals of this project are to examine the hypothesis that age-related changes in NMDAR signaling mediate memory deficits and changes in synaptic plasticity.
OVERLAP: None.
Role: PI

NINDS R37 NS040389 (PI Ranum) 8/1/2015 – 7/31/2017
The purpose of this project is to use molecular genetic approaches to better understand the pathophysiology of spinocerebellar ataxia type 8. As part of this effort we have developed and are characterizing two distinct SCA8 transgenic models.
OVERLAP: None.
Role: advice on synaptic physiology and plasticity in transgenic animals

R21NS091435 (PI Notterpek) 9/1/2017 – 8/31/2017
This projects targets chaperone pathways for myelin repair in hereditary neuropathies
OVERLAP: None.
Role: advice on statistical analysis of behavior and transcription

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Todd E Golde

eRA COMMONS USER NAME (credential, e.g., agency login): tgolde

POSITION TITLE: Professor of Neuroscience
Executive Director, McKnight Brian Institute University of Florida

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Amherst College	BA	05/1985	Biology/Immunology
Case Western Reserve University	PhD	05/1991	Pathology
Case Western Reserve University	MD	05/1994	Medicine

A. Personal Statement.

I am Director of the Evelyn F. and William L. McKnight Brain Institute (MBI) at the University of Florida where I oversee, champion, and facilitate our neuroscience and neuromedicine research programs at an enterprise level. Over 120 faculty are members of the MBI, and the annual extramural grant portfolio for neuroscience research now totals over $75M/year. I have generated a vision for the MBI that is based on programmatic translational science and an Institute without walls. I was previously the founding director of the Center for Translational Research in Neurodegenerative Disease at UF (2010-16), and prior to that appointment served as Chair of Mayo Clinic's Department of Neuroscience. In these roles, as well as in my previous positions as Chair of the Department of Neuroscience at Mayo Clinic Florida and member of the Mayo Foundation Research Committee, I have gained substantial administrative and research strategic planning experience in two very different organizations. At both, I have promoted and implemented a vision whereby wet-bench laboratories are linked to patient based research activities, enabling ongoing interaction between clinical and basic investigators. The success of the faculty in these groups has been impressive, in terms of both scientific impact and per-investigator funding. Further, at UF I have reached out to build collaborative teams spanning multiple colleges not only within UF but also with five other Florida Institutions.

With respect to my own research program, during almost 30 years of focus on the study of Alzheimer's disease (AD), I believe I have made significant contributions to the field (see page 6-9). My research activities remain robust and cutting-edge with a broadening focus that extends to other neurodegenerative diseases, cancer, and pain. I am currently:

- Principal investigator (PI) of a recently awarded NIH funded Alzheimer's Disease Research Center (NIH/NIA P50)
- Contact PI for a large U01 grant focusing on leveraging systems biology to find new therapeutic targets for Alzheimer's disease
- PI of another R01 related to inflammation and immunotherapies for Alzheimer's disease
- Project Leader on a multi-institutional P01 relating to repurposing of γ-secretase inhibitors to treat cancer and autoimmune disease.

I have played an active role in mentoring and career development at all levels from student to postdoctoral fellow to faculty. I am especially proud of my accomplishments with respect to promoting and advocating for junior faculty. For example, at Mayo Clinic many faculty, whom I originally appointed during my tenure as chair continue to thrive and are recognized as emerging (or emerged) leaders in various areas of neurodegenerative disease research, and here at UF, our group is now maturing to the point where several of our postdoctoral fellows are now advancing to faculty positions. I am very concerned about the training of the next-generation of biomedical

scientists, and believe that highly collaborative networks and teams of investigators with diverse experience not only provide ideal training environment, but that these kinds of interactions are essential to drive more than incremental advances. At Mayo, we had a very small graduate program and the opportunities for mentoring graduate or MD-PhD students were very limited. I have enjoyed the higher level of engagement here at UF with the graduate and MD-PhD programs. Notably, my administrative roles have not detracted from the success of my recent mentees. Dr. Amanda Sacino, a recent MD-PhD graduate who was co-mentored by Dr. Benoit Giasson and myself, was accepted into the Neurosurgery residency program at Johns Hopkins University. Dr. Sacino published 10 manuscripts including eight first author manuscripts during her graduate and medical training. Most of these studies centered on how pathology spreads in Parkinson's disease, and these articles are having a significant impact on the field, having collectively been cited over 300 times in the one to three years since they have been published. Another recent graduate trainee Dr. Joo In Jung also published 8 manuscripts including 4 first author publications from her graduate studies in my laboratory relating to gamma-secretase mechanism of cleavage and mechanism of action of gamma--secretase modulators. Dr. Paramita Chakrabarty a postdoctoral fellow and then research assistant professor in my lab recently competed successfully for an independent R01 and was promoted to the tenure track.

In addition to my research and intramural administrative activities, in recent years I have been an active advocate for AD and neurodegenerative disease research at the state, national and international levels. At the national level, I serve on the medical and scientific advisory board for the National Alzheimer's Association and the Bright Focus Foundation. At the state level, I have served on several advisory boards relating to AD and have worked with a benefactor to secure over $7.5M dollars of State support for Alzheimer's research at UF, and implement a statewide grants program to support AD research. Through my scientific reviews and presentations at national and international conferences, I not only discuss scientific advances, but also highlight the many challenges that we face in combating the AD epidemic (see, for example, Golde et al Alz Res & Therapy 2011, Golde et al Neuron 2011, Golde J. Neurochemistry 2016, Golde et al. Science 2018, Dawson et al Nature Neuroscience 2018, Golde, Neuron 2019).

B. Positions and Honors

Positions and Employment

1990-92	Postdoctoral Fellow, Institute of Pathology Case Western Reserve University
1994-96	Resident, Clinical Pathology and Laboratory Medicine, University of Pennsylvania
1996-97	Assistant Professor, Department of Pathology & Laboratory Medicine, University of Pennsylvania School of Medicine
1997-2001	Senior Associate Consultant and Assistant Professor Department of Pharmacology, Mayo Clinic
2001-2005	Consultant and Associate Professor, Department of Neuroscience, Mayo Clinic Jacksonville
2003-2009	Chair Department of Neuroscience, Mayo Clinic College of Medicine
2005-2009	Consultant and Professor, Department of Neuroscience, Mayo Clinic College of Medicine
2009-	Professor, Department of Neuroscience;
2009-2016	Director, Center for Translational Research in Neurodegenerative Disease; University of Florida, Gainesville, FL
2016-	Director, Evelyn F. and William L. McKnight Brain Institute, University of Florida, Gainesville, FL

Honors

1993	Experimental Pathologist-in-Training Award, American Society for Investigative Pathology
1996	Chief Resident Clinical Pathology, University of Pennsylvania
1997	Paul Beeson Physician Faculty Scholar, American Federation for Aging Research
1998	Ellison Medical Foundation New Scholar
1999-	Ad hoc reviewer MDCN-2 (1999-2000), MSDB (2000), BDCN-3 (2002), AFAR NSAC (2003-current), Member CDIN Study Section (2004-2007), AHAF/Bright Focus Scientific Review Board (2005-current), ADDF grant reviewer 2014-current), Member CNDBT study section 2018-
2005	Zenith Award, Alzheimer's Association
2007	CART Award
2010	Met Life Foundation Award for Medical Research
2010	Ellison Medical Foundation Senior Scholar Award
2011-15	AAIC planning committee
2012	Member State of Florida Purple Ribbon Task force For a Statewide Alzheimer's Plan
2013-	National Alzheimer's Association Medical and Scientific Advisory Committee

C. Contributions to Science. (from over 260 publications, h index (Google Scholar) 87, >32000 Citations)

1. As a MD PhD student and postdoc with Dr. Steven Younkin, I played a pivotal role in studies showing that the amyloid β protein (Aβ) was a normal metabolite and that mutations that cause AD alter Aβ production in a manner that promote Aβ aggregation. These studies provided pivotal support for the Aβ aggregate (amyloid) hypothesis of AD and enabled drug discovery programs aimed at altering Aβ accumulation.

a. Suzuki N, Cheung TT, Cai XD, Odaka A, Otvos L, Jr., Eckman C, Golde TE, Younkin SG. An increased percentage of long amyloid beta protein secreted by familial amyloid beta protein precursor (beta APP717) mutants. Science. 1994;264(5163):1336-40.

b. Cai XD, Golde TE, Younkin SG. Release of excess amyloid beta protein from a mutant amyloid beta protein precursor. Science. 1993;259(5094):514-6.

c. Shoji M*, Golde TE*, Ghiso J, Cheung TT, Estus S, Shaffer LM, Cai XD, McKay DM, Tintner R, Frangione B, et al. Production of the Alzheimer amyloid beta protein by normal proteolytic processing. Science. 1992;258(5079):126-9. (equal contribution)

d. Golde TE, Estus S, Younkin LH, Selkoe DJ, Younkin SG. Processing of the amyloid protein precursor to potentially amyloidogenic derivatives. Science. 1992;255(5045):728-30.

2. In studies conducted in collaboration with Dr. Edward Koo's laboratory (UCSD), we demonstrated that select non-steroidal anti-inflammatory agents (NSAIDs) could modulate Aβ42 production and that this effect was attributable to direct alteration of γ-secretase activity. Subsequently we identified compounds that lowered Aβ42 but lacked cyclooxygenase activity. These data provided the rationale for many other pharmaceutical companies to develop and test what we now refer to as γ-secretase modulators (GSMs) as potential therapeutics for AD. We have also identified compounds that increased Aβ42; thus, mimicking the effect of AD causing mutations and raising the possibility that small molecules could modulate γ-secretase cleavage in a way that might increase one's risk for AD. Finally, we demonstrated that the target of NSAID-like γ-secretase modulators was not the enzyme alone but likely involve tripartite interactions with the substrate. These later studies not only have implications for AD therapeutics but also more generally broaden the notion of what is "druggable." Most recently we have identified cholesterol metabolites as a putative endogenous γ-secretase modulator, and conducted studies showing that short Aβ peptides are potentially protective form Aβ42 toxicity.

a. Moore, B.D., Martin, J., de Mena, L., Sanchez, J., Cruz, P.E., Ceballos-Diaz, C., Ladd, T.B., Ran, Y., Levites, Y., Kukar, T.L., Kurian, J.J., McKenna, R., Koo, E.H., Borchelt, D.R., Janus, C., Rincon-Limas, D., Fernandez-Funez, P., and Golde, T.E. (2018). Short Abeta peptides attenuate Abeta42 toxicity in vivo. J Exp Med 215, 283-301.

b. Jung JI, Ladd TB, Kukar T, Price AR, Moore BD, Koo EH, Golde TE*, Felsenstein KM*. Steroids as gamma-secretase modulators. FASEB journal : official publication of the Federation of American Societies for Experimental Biology. 2013;27(9):3775-85. PMCID: 3752532. *Co-corresponding authors

c. Kukar T, Murphy MP, Eriksen JL, Sagi SA, Weggen S, Smith TE, Ladd T, Khan MA, Kache R, Beard J, Dodson M, Merit S, Ozols VV, Anastasiadis PZ, Das P, Fauq A, Koo EH, Golde TE. Diverse compounds mimic Alzheimer disease-causing mutations by augmenting Abeta42 production. Nature medicine. 2005;11(5):545-50.

d. Weggen S, Eriksen JL, Das P, Sagi SA, Wang R, Pietrzik CU, Findlay KA, Smith TE, Murphy MP, Bulter T, Kang DE, Marquez-Sterling N, Golde TE, Koo EH. A subset of NSAIDs lower amyloidogenic Abeta42 independently of cyclooxygenase activity. Nature. 2001;414(6860):212-6.

3. A parallel area of interest to GSMs has been the therapeutic utility of targeting intramembrane cleaving protease in a variety of indications. In 2002, in collaboration with Dr. Chris Ponting, we identified a family of intramembrane protease that was related to γ-secretase. In work conducted in collaboration with Drs. Osborne (UMASS), Miele (LSU/Tulane), and Greenbaum (U Penn), we have evaluated targeting these proteases in cancer, immunologic disease, and malaria.

a. Ponting CP, Hutton M, Nyborg A, Baker M, Jansen K, Golde TE. Identification of a novel family of presenilin homologues. Human molecular genetics. 2002;11(9):1037-44.

b. Ran Y, Ladd GZ, Ceballos-Diaz C, Jung JI, Greenbaum D, Felsenstein KM, Golde TE. Differential Inhibition of Signal Peptide Peptidase Family Members by Established gamma-Secretase Inhibitors. PloS one. 2015;10(6):e0128619. doi: 10.1371/journal.pone.0128619. PubMed PMID: 26046535; PubMed Central PMCID: PMC4457840.

c. Harbut MB, Patel BA, Yeung BK, McNamara CW, Bright AT, Ballard J, Supek F, Golde TE, Winzeler EA, Diagana TT, Greenbaum DC. Targeting the ERAD pathway via inhibition of signal peptide peptidase for

antiparasitic therapeutic design. Proceedings of the National Academy of Sciences of the United States of America. 2012;109(52):21486-91. PMCID: 3535666.

d. Ran, Y., Hossain, F., Pannuti, A., Lessard, C.B., Ladd, G.Z., Jung, J.I., Minter, L.M., Osborne, B.A., Miele, L., and Golde, T.E. (2017). γ-Secretase inhibitors in cancer clinical trials are pharmacologically and functionally distinct. EMBO Mol Med 9, 950-966.

4. Another focus of my laboratory has been to try to understand how anti-Aβ immunotherapy works. These studies have led to a number of publications suggesting that the antibodies work centrally and that efficacy does not require effector functions. The knowledge and experience gained form these studies is integral to the current proposal.

a. Levites Y, Smithson LA, Price RW, Dakin RS, Yuan B, Sierks MR, Kim J, McGowan E, Reed DK, Rosenberry TL, Das P, Golde TE. Insights into the mechanisms of action of anti-Abeta antibodies in Alzheimer's disease mouse models. FASEB journal: official publication of the Federation of American Societies for Experimental Biology. 2006;20(14):2576-8.

b. Levites Y, Jansen K, Smithson LA, Dakin R, Holloway VM, Das P, Golde TE. Intracranial adeno-associated virus-mediated delivery of anti-pan amyloid beta, amyloid beta40, and amyloid beta42 single-chain variable fragments attenuates plaque pathology in amyloid precursor protein mice. The Journal of neuroscience : the official journal of the Society for Neuroscience. 2006;26(46):11923-8.

c. Levites Y, Das P, Price RW, Rochette MJ, Kostura LA, McGowan EM, Murphy MP, Golde TE. Anti-Abeta42- and anti-Abeta40-specific mAbs attenuate amyloid deposition in an Alzheimer disease mouse model. The Journal of clinical investigation. 2006;116(1):193-201. PMCID: 1307561.

d. Das P, Howard V, Loosbrock N, Dickson D, Murphy MP, Golde TE. Amyloid-beta immunization effectively reduces amyloid deposition in FcRgamma-/- knock-out mice. The Journal of Neuroscience: the official journal of the Society for Neuroscience. 2003;23(24):8532-8.

5. Over the last 10 years, my research has expanded into the area of innate immunity's role in neurodegenerative disease. Recent work from my lab has challenged a long-standing hypothesis that inflammatory processes in AD accelerate Aβ deposition. Published studies also reveal a potential novel role of interferon-γ in nigrostriatal degeneration. We have now expanded these studies to broadly explore immune modulators as mediators of neurodegenerative pathways. Notably, these studies have utilized a novel method for gene delivery to the brain that results in widespread transduction, and we are currently evaluating how we may harness innate immunity for therapeutic benefit in AD, PD, and ALS.

a. Chakrabarty P, Li A, Ceballos-Diaz C, Eddy JA, Funk CC, Moore B, DiNunno N, Rosario AM, Cruz PE, Verbeeck C, Sacino A, Nix S, Janus C, Price ND, Das P, Golde TE. IL-10 Alters Immunoproteostasis in APP Mice, Increasing Plaque Burden and Worsening Cognitive Behavior. Neuron. 2015;85(3):519-33. PMCID: 4320003.

b. Chakrabarty P, Rosario A, Cruz P, Siemienski Z, Ceballos-Diaz C, Crosby K, Jansen K, Borchelt DR, Kim JY, Jankowsky JL, Golde TE, Levites Y. Capsid serotype and timing of injection determines AAV transduction in the neonatal mice brain. PloS one. 2013;8(6):e67680. PMCID: 3692458.

c. Chakrabarty P, Ceballos-Diaz C, Lin WL, Beccard A, Jansen-West K, McFarland NR, Janus C, Dickson D, Das P, Golde TE. Interferon-gamma induces progressive nigrostriatal degeneration and basal ganglia calcification. Nature Neuroscience. 2011;14(6):694-6. PMCID: 3780582.

d. Ayers, J.I., Fromholt, S., Sinyavskaya, O., Siemienski, Z., Rosario, A.M., Li, A., Crosby, K.W., Cruz, P.E., DiNunno, N.M., Janus, C., Ceballos-Diaz, C., Borchelt, D.R., Golde, T.E., Chakrabarty, P., and Levites, Y. (2015). Widespread and efficient transduction of spinal cord and brain following neonatal AAV injection and potential disease modifying effect in ALS mice. Mol Ther 23, 53-62.

Complete List of Published Work in my Bibliography
http://www.ncbi.nlm.nih.gov/myncbi/1PYpZnZ1P9V5n/cv/10576/
on google scholar https://scholar.google.com/citations?user=X_9xacsAAAAJ&hl=en

D. Additional Information: Research Support

Ongoing Research Support

1P01CA166009-05 (Osborne, PI, Golde PL) 09/01/2009 – 08/31/2019 (on a NCE) 0.6 months while on NCE
NIH/NIA $200,000 direct/yr
P01 Title: Targeting Multiple Diseases through Gamma Secretase
Project 2: Profiling γ-Secretase activity and inhibition

Major Goals are to understand why different GSI have different biological activities.
Overlap: None

U01AG046139-05 (Golde Contact MPI) 9/020/2013 -8/30/2018 2.4 months
NIH/NIA $995,000 direct/yr
A system approach to targeting innate immunity in AD
The major goal of this proposal is to use a systems biology approach to identify novel targets in the immune system for AD.
Overlap: None (About to be renewed NGA anyday)

R01 AG018454-15 (Golde, PI) 05/15/2014 – 02/28/2019 2.4 months
NIH/NIA $290,763 direct/yr
Immune Mediated Mechanisms Underlying CNS Abeta Clearance
Major goals of this grant will explore (Aim 1) sTLRs as novel immunotherapies for AD and mechanism of action of these sTLRs, (Aim 2) how preconditioning by altering innate immune activation states alters efficacy of anti-Aβ immunotherapy , and (Aim 3) the pharmacokinetics of antibody exposure in the brain.
Overlap: None

P50 AG047266-01A1/P50 AG047266 03S1 (Golde, Director) 08/01/2015 -05/31/2020 2.4 months
One Florida ADRC $996,381 direct/yr administrative supplement $99,741 for 2017-18
The UF-MSMC ADRC “1Florida ADRC” is focused on achieving a number of specific goals spanning a variety of research and educational activities. Clinical research activities include identification of i) markers for the earliest prodromal stages of cognitive impairment and ii) predictors of cognitive and functional decline in Hispanic and non-Hispanic individuals. Another important patient oriented aspect of the ADRC is to facilitate testing of novel therapies for AD and related dementias in our diverse population. Further the ADRC will provide unique community and professional training and educational opportunities relevant to AD and related dementias, and thus have a broad state-wide educational impact, including training junior investigator training and recruiting trainees and investigators at all levels to participate in dementia research. Finally, the ADRC will support translational research studies that are designed to provide additional insights into Alzheimer’s disease that may one day lead to the development of novel therapeutic approaches and novel diagnostic paradigms.

1R56AG057933-01 (Borchelt, PI, Golde Co-I) 09/01/2017 – 08/31/2018 0.36 months
NIH/NIA $456,066 direct/yr
APOE AS A MODIFIER OF PRION-LIKE SPREAD IN DEMENTIA
Major Goals: This grant looks at the role of APOE in spread of proteinopathies
Overlap: None

1R21NS102926-01 (Lakshymyya, PI, Golde Co-I) 08/01/2017 – 07/31/2019 0.12 months
NIH/NINDS $456,066 direct/yr
PERIODONTAL BACTERIA AND ALZHEIMER’S DISEASE
Major Goals: Oral bacteria may be associated with AD, but the role of these bacteria in induction of AD are not known. This proposal will explore the complex interplay between the oral bacteria, overt infection, and the brain immune system that could play a role in AD pathology
Overlap: None

T32 NS082168 (Bowers, Vaillancourt, MPI, Golde Co-I) 05/01/2015 – 04/30/2020 0.00 months
Interdisciplinary Training in Movement Disorders and Neurorestoration
NIH/NINDS $191,419 direct
Major Goals: This T32 will expose predoctoral students to training in molecular and cellular biology, translational neuroscience and physiology, and human motor and cognitive neuroscience with a central focus on movement disorders. The goal is to train a new cadre of researchers in movement disorders.

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Jada Lewis

eRA COMMONS USER NAME (credential, e.g., agency login): GENESPLICR

POSITION TITLE: Professor of Neuroscience

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of Tennessee, Knoxville, TN	B.A.	08/92	Genetics(Coll. Scholars)
University of North Carolina, Chapel Hill, NC	Ph.D.	08/96	Genetics/Mol. Biology
University of North Carolina, Chapel Hill, NC	Fellowship	05/98	Pharmacology
Mayo Clinic, Jacksonville, FL	Fellowship	12/00	Neuroscience

A. Personal Statement

I am an established scientist with over 20 years of expertise in transgenic mouse modeling and gene targeting technology. I co-created the first mouse model of neurofibrillary tangle pathology and neuronal loss and subsequently co-created the doxycycline-responsive rTg4510 mouse model of tauopathy that is a gold standard model in the field and its sister model, iP301L. Additionally, my collaborators and I provided some of the first direct evidence that amyloid influenced tauopathy in a bigenic tau/APP mouse model that I co-created. I am well versed in mouse genetics and neuropathological, biochemical, and behavioral analysis of tau mouse models. Additionally, I have a strong commitment to supporting neuroscience education as witness by my extensive training history with undergraduates, graduate students, post-doctoral fellows and junior faculty.

B. Positions and Honors

2019-present Co-Deputy Director of the McKnight Brain Institute (MBI)
University of Florida, Gainesville, FL

2017-2020 University Term Professorship

2015-present Professor with tenure
Department of Neuroscience and
Center for Translational Research in Neurodegenerative Disease (CTRND)
University of Florida, Gainesville, FL

2010-present Coordinator of Animal Modeling
Center for Translational Research in Neurodegenerative Disease (CTRND)
University of Florida, Gainesville, FL

2010-2015 Associate Professor
Department of Neuroscience and
Center for Translational Research in Neurodegenerative Disease (CTRND)
University of Florida, Gainesville, FL

2009-2010 Associate Professor and Consultant
Department of Neuroscience
Mayo Clinic, Jacksonville, FL

2007-2009 Senior Associate Consultant
Department of Neuroscience
Mayo Clinic, Jacksonville, FL

2003-2007 Associate Consultant II
Department of Neuroscience
Mayo Clinic, Jacksonville, FL

2000-2002 Associate Consultant
Department of Neuroscience
Mayo Clinic, Jacksonville, FL

C. Contributions to Science
https://www.ncbi.nlm.nih.gov/sites/myncbi/jada.lewis.1/bibliography/46096202/public/?sort=date&direction=descending

1) I co-developed the first mouse models of neurofibrillary tangles and neuronal loss, a model that faithfully recapitulated aspects of frontotemporal dementia. I then co-create a second-generation model which developed neurofibrillary tangles, neuronal loss, and behavior deficits akin to that observed in Alzheimer's Disease. This model is broadly used in the field and is considered a "gold standard" model. We utilized this model to demonstrate that neurofibrillary tangles were not the initial neurotoxic species in tauopathies.

Lewis, J., et al (2000). Neurofibrillary tangles, amyotrophy and progressive motor disturbance in mice expressing mutant (P301L) tau protein. Nat Genet, 25(4):402-5. PMID: 10932182 (**cited 1177 times**)

SantaCruz, K*., **Lewis, J*.,** Spires, T*., et al (2005). Tau suppression in a neurodegenerative mouse model improves memory function. Science, 309(5733):476-81. PMCID: PMC1574647 (*co-first author) (**cited 1515 times**)

Spires-Jones, T.L., et al (2008). In vivo imaging reveals dissociation between caspase activation and acute neuronal death in tangle-bearing neurons. J Neurosci, 28(4):862-7. PMID: 18216194

2) I co-developed the Tau/APP (TAPP) model which provided some of the first evidence in a mouse model that APP(Abeta) could enhance tauopathy.

Lewis J*, Dickson DW*, Lin WL, Chisholm L, Corral A, Jones G, Yen SH, Sahara N, Skipper L, Yager D, Eckman C, Hardy J, Hutton M, McGowan E. (2001). Enhanced neurofibrillary degeneration in transgenic mice expressing mutant tau and APP. Science, 293(5534):1487-91. (**cited 1542 times**)

3) I helped define a role for the FTD-associated granulin gene (progranulin) in neuronal ceroid lipfuscinosis & helped provide a concrete link between neuronal ceroid lipofuscinosis & frontotemporal dementia.

Ahmed, Z., et al**.** (2010) Accelerated lipofuscinosis and ubiquitination in granulin knockout mice suggest a role for progranulin in successful aging. American Journal of Pathology. 177(1): 311-324. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2893674/

Smith, K.R., et al. (2012) Strikingly different clinicopathological phenotypes determined by progranulin-mutation dosage. American Journal of Human Genetics. 90(6): 1102-1107. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3370276/

4) I helped define a role for the ALS associated protein TDP-43 in mitochondrial biology by establishing both constitutive and conditional TDP-43 transgenic models.

Xu, Y.F., et al. (2010). Wild-type human TDP-43 expression causes TDP-43 phosphorylation, mitochondrial aggregation, motor deficits, and early mortality in transgenic mice. J. Neurosci, 30(32):10851-9 PMID:20702714 (**cited 355 times**)

Xu, Y.F., et al. (2011). Expression of mutant TDP-43 induces neuronal dysfunction in transgenic mice. Mol. Neurodegener, 6(73) PMID: 2202957

Cannon A., et al. (2012) Neuronal sensitivity to TDP-43 overexpression is dependent on timing of induction. Acta. Neuropathol. 123(6):807-23. Epub 2012 Apr 27. PMID: 22539017 (*corresponding author).

Stoica R, et al. (2014) ER-mitochondria associations are regulated by the VAPB-PTPIP51 interaction and are disrupted by ALS/FTD-associated TDP-43. Nature Communications. 5: 3996.

5) I helped define an interaction between LRRK2 and tau, identified physiological factors that influence the interaction and identified key epitopes that appear to be targeted by LRRK2.

Bailey RM, Covy JP, Melrose HL, Rousseau L, Watkinson R, Knight J, Miles S, Farrer MJ, Dickson DW, Giasson BI, Lewis J. (2013) LRRK2 phosphorylates novel tau epitopes and promotes tauopathy. Acta Neuropathol. 126(6):809-27. doi: 10.1007/s00401-013-1188-4. Epub 2013 Oct 11. PMID: 24113872

Hamm M, Bailey R, Shaw G, Yen SH, Lewis J, Giasson BI. (2015) Physiologically relevant factors influence tau phosphorylation by leucine-rich repeat kinase 2. J Neurosci Res. 93(10):1567-80. doi: 10.1002/jnr.23614. Epub 2015 Jun 30. PMID: 26123245

Hamm M, Ladd TB, Levites Y, Golde TE, Giasson BI, Lewis J. (2018) Designing antibodies against LRRK2-targeted tau epitopes. PLoS One. 13(9):e0204367. doi: 10.1371/journal.pone.0204367. eCollection 2018. PMID: 30261006

Bardai FH, Ordonez DG, Bailey RM, Hamm M, Lewis J, Feany MB. (2018) Lrrk promotes tau neurotoxicity through dysregulation of actin and mitochondrial dynamics. PLoS biology. 2018; 16(12):e2006265. PMID: 30571694 PMCID: PMC6319772

D. Additional Information: Research Support and/or Scholastic Performance

Active Support

Agency & Project #	**NIH/NIA 1 RF1 AG064914**
Title	Elucidating factors that modulate tauopathy and cellular degeneration to guide therapeutic development
Project Dates	7/2019-6/2024
Your Role and % effort on project	MPI (contact)

Agency & Project #	**NIH/NIA 1 RF1 AG064942**
Title	Immunotherapy targeting the HPA axis in Alzheimer's disease
Project Dates	7/2019-6/2024
Your Role and % effort on project	MPI

Agency & Project #	**NIH/NIA T32AG061892**
Title	Clinical and Translational Pre-doctoral training in Alzheimer's Disease and Related Dementias
Project Dates	9/1/2018-8/31/2023
Your Role and % effort on project	MPI (contact)

Agency & Project #	**NIH/NIA R01AG057933 / AWD04252 /**
Title	APOE as a modifier of prion-like spread in dementia
Project Dates	06/01/2018-03/31/2023
Your Role and % effort on project	Co-I

Agency & Project #	**NIH/NIA R01 AG055798 / AWD01579 / P0035946**
Title	Towards understanding the role of immune regulation of Apolipoprotein E function in Alzheimer's disease proteostasis
Project Dates	03/15/2017- 02/28/2022
Your Role and % effort on project	Co-I

Agency & Project #	**NIH/NINDS 1 R61 NS115178**
Title	Developing new conditional models to study tauopathy, amyloidosis, and their interaction
Project Dates	9/2019-8/2021
Your Role and % effort on project	MPI (contact)

Agency & Project #	**Ed and Ethel Moore (FL Dept Health)**
Title	Two Faces of Hypoxia in Alzheimer's Disease
Project Dates	2/2019-1/2021
Your Role and % effort on project	Co-Investigator

Agency & Project #	**NIH/NIA P50 AG047266 / 00093349 / P0052823**
Title	University of Florida – Mt Sinai Medical Center AD Research Center Project 3
Project Dates	08/15/2015-07/31/2020
Your Role and % effort on project	Investigator

Agency & Project #	**NIH/NIA R01 AG049456 / 00092862 / 00114386**
Title	Proteostasis and secondary proteinopathy in AD and FTD
Project Dates	05/01/2015-04/30/2020
Your Role and % effort on project	MPI

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.

Follow this format for each person. DO NOT EXCEED FIVE PAGES.

NAME: MAURER, ANDREW

eRA COMMONS USER NAME (agency login): DREWMAURER

POSITION TITLE: Assistant Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
University of Pittsburgh, Pittsburgh, PA	BS	12/2003	Neuroscience
University of Arizona, Tucson, AZ	PHD	12/2009	Neuroscience
University of Arizona, Tucson, AZ	Postdoctoral Fellow	06/2014	Neurobiology of Aging

A. PERSONAL STATEMENT

Throughout my scientific career, I have been focused on trying to understand the role of oscillations in shaping higher-cognitive processes. As a graduate student, I worked with Dr. Bruce McNaughton, acquiring skills in the acquisition and analysis of high-density single-unit electrophysiological recordings from awake-behaving rats. Much of my research focus was on combining neuron spiking data with local-field potentials in order to determine how spike timing is altered as a consequence of both location and time (i.e., theta phase precession). This research track was extended under the supervision of Dr. Carol A. Barnes, in which I continued to develop and implement high-level analyses to reveal novel computations of the CA1 subregion of the hippocampus (ref 1). This expertise will be applied to the analysis of oscillatory data in the current proposal.

After relocating to the University of Florida, I have developed a research program, investigating how excitatory-inhibitory interactions across large networks of neurons give way to organized patterns that support cognition. Previously, we have found that there is a decrease in putative monosynaptic interactions in the temporal lobe between pyramidal cells and interneurons in aged-animals (ref 2). Furthermore, we have implemented higher-order spectral analyses on continuous time-series data (ref 3), demonstrating that cross-frequency coupling increases as a function of velocity and theoretically, increased excitation into the hippocampus (ref 4).

The current proposal seeks to test two contrasting hypotheses, which to our knowledge, have only have has a single direct comparison (Pernía-Andrade and Jonas, 2014). Uniquely, I have been an author on a paper that has supported the spectral fingerprinting hypothesis (Fernández-Ruiz, Oliva, Nagy, Maurer, Berényi, and Buzsáki, 2017) as well as others that support the energy cascade hypothesis (Sheremet, Qin, Kennedy, Zhou, Maurer, 2019). Strangely, the contrasting aspects of these hypotheses have not been thoroughly explored despite having a direct consequence. Therefore, by exploring these two theories, it will be possible to make a significant impact in understanding the temporal dynamics of normal cognition and opening up therapeutic avenues in the treatment of mental health disorders.

Partway through my post-doctoral training, in 2009, I fell chronically ill with an eventual diagnosis of lymphocyte-predominant Hodgkin lymphoma (2010). Laboratory blood work led to a simultaneous diagnosis of Hashimoto's thyroiditis accounting for the additional symptoms of anxiety and depression (PMID: 24211158). While I have made a complete recovery, the simultaneous combination of these two events kept me out of the laboratory for an extended period of time, effectively delaying my research progress. While I could not manage to push my own projects forward during this time, I did remain active in research and data analysis, co-authoring multiple manuscripts.

1. **Maurer AP**, Lester AW, Burke SN, Ferng JJ, Barnes CA. Back to the future: preserved hippocampal network activity during reverse ambulation. J Neurosci. 2014 Nov 5;34(45):15022-31. PubMed PMID: 25378167; PubMed Central PMCID: PMC4220031.

2. **Maurer AP**, Burke SN, Diba K, Barnes CA. Attenuated Activity across Multiple Cell Types and Reduced Monosynaptic Connectivity in the Aged Perirhinal Cortex. J Neurosci. 2017 Sep 13;37(37):8965-8974. doi: 10.1523/JNEUROSCI.0531-17.2017. Epub 2017 Aug 11. PMID: 28821661; PMCID: In progress
3. Sheremet A, Burke SN, **Maurer AP**. Movement Enhances the Nonlinearity of Hippocampal Theta. J Neurosci. 2016 Apr 13;36(15):4218-30. doi: 10.1523/JNEUROSCI.3564-15.2016. PMID: 27076421 PMCID: PMC4829647
4. Sheremet A, Kennedy JP, Qin Y, Zhou Y, Lovett SD, Burke SN, **Maurer AP**. Theta-gamma cascades and running speed. J Neurophysiol. 2019 Feb 1;121(2):444-458. doi: 10.1152/jn.00636.2018. Epub 2018 Dec 5. PMID: 30517044

B. POSITIONS AND HONORS

Positions and Employment

2002 – 2004	Undergraduate Research Assistant, Dr. Bill Yates' Vestibular Research laboratory (U of Pitt), Pittsburgh, PA
2004 – 2008	Graduate Research Associate , Dr. Bruce McNaughton's Neural Systems, Memory and Aging Laboratory (U of Arizona), Tucson, AZ
2005 – 2006	Graduate Teaching Assistant, Course- "Memory mechanisms & Neural Computation", Tucson, AZ
2009 – 2014	Postdoctoral Research Fellow, Evelyn F. McKnight Brain Institute with Dr. Carol Barnes, Tucson, AZ
2014 -	Affiliate faculty member, Department of Biomedical Engineering, University of Florida, Gainesville, FL
2014 -	Assistant Professor, Department of Neuroscience, University of Florida, Gainesville , FL

Other Experience and Professional Memberships

2002 -	Member, Society for Neuroscience
2014 -	North Central Florida Chapter of the Society for Neuroscience

Honors

2003	Cum Laude, Unviersity of Pittsburgh
2007	Recipient of Conference Travel Award , Society for Neuroscience
2008	Recipient of the D.B. Marquis Behavioral Neuroscience Award, Behavioral Neuroscience Journal
2011	Recipient of the Ruth L. Kirschstein National Research Service Award, National Institute of Health

C. Contribution to Science

1. Prior to my thesis research, only two studies investigated hippocampal dynamics in the posterior/ventral region of the hippocampus. Therefore, I sought out to determine the firing rate characteristics of neurons in the intermediate portion of the hippocampus compared to the dorsal. We found that place field size was larger in more posterior regions, associated with a decreased rate of phase precession and a decreased sensitivity to velocity. The examination of hippocampal activity patterns across the long axis of the hippocampus is a central component of the current proposal.
   a. Maurer AP, Vanrhoads SR, Sutherland GR, Lipa P, McNaughton BL. Self-motion and the origin of differential spatial scaling along the septo-temporal axis of the hippocampus. Hippocampus. 2005;15(7):841-52. PubMed PMID: 16145692.
   b. Maurer AP, Cowen SL, Burke SN, Barnes CA, McNaughton BL. Organization of hippocampal cell assemblies based on theta phase precession. Hippocampus. 2006;16(9):785-94. PubMed PMID: 16921501.

c. Maurer AP, Cowen SL, Burke SN, Barnes CA, McNaughton BL. Phase precession in hippocampal interneurons showing strong functional coupling to individual pyramidal cells. J Neurosci. 2006 Dec 27;26(52):13485-92. PubMed PMID: 17192431.

2. Theta phase precession has long been thought to be a mechanism by which the brain temporally organizes events in order to facilitate learning and memory. The basic neuronal mechanisms, from ion channels to network dynamics governing this phenomenon, however, are not well understood. In order to elaborate and test the models of theta phase precession, I designed an experiment in which we trained rats to ambulate backwards, thereby, dissociating self-motion from head direction. These data support a view that head-direction input in not critical for theta phase precession.
   a. Maurer AP, McNaughton BL. Network and intrinsic cellular mechanisms underlying theta phase precession of hippocampal neurons. Trends Neurosci. 2007 Jul;30(7):325-33. PubMed PMID: 17532482.
   b. Maurer AP, Lester AW, Burke SN, Ferng JJ, Barnes CA. Back to the future: preserved hippocampal network activity during reverse ambulation. J Neurosci. 2014 Nov 5;34(45):15022-31. PubMed PMID: 25378167; PubMed Central PMCID: PMC4220031.

3. One of the prominent characteristics of hippocampal pyramidal cell activity is their firing correlates with short-term predictions of future locations. Of course ambulatory characteristics will modulate both the future location and the distance covered. We have determined how ambulation alters firing patterns as well as tested models of hippocampal updating by training rodents to walk backwards on a linear track and found that when rodents walk backwards, hippocampal activity patterns continue to predict future locations regardless of head direction.
   a. Maurer AP, Burke SN, Lipa P, Skaggs WE, Barnes CA. Greater running speeds result in altered hippocampal phase sequence dynamics. Hippocampus. 2012 Apr;22(4):737-47. PubMed PMID: 21538659; PubMed Central PMCID: PMC3367321.
   b. Maurer AP, Lester AW, Burke SN, Ferng JJ, Barnes CA. Back to the future: preserved hippocampal network activity during reverse ambulation. J Neurosci. 2014 Nov 5;34(45):15022-31. PubMed PMID: 25378167; PubMed Central PMCID: PMC4220031.
4. While the size of hippocampal spatial receptive fields increases along the dorsal to ventral longitudinal axis, we asked the additional question on whether non-spatial factors could influence the firing rate charachteristics. By placing objects on the track, we showed that the spatial metric of hippocampal receptive fields can be reduced. This work produced new insights regarding the impact of sensory information along the hippocampal longitudinal axis and highlights the productive collaborative efforts of Dr. Burke and myself.
   a. Burke SN, Maurer AP, Nematollahi S, Uprety AR, Wallace JL, et al. The influence of objects on place field expression and size in distal hippocampal CA1. Hippocampus. 2011 Jul;21(7):783-801. PubMed PMID: 21365714; PubMed Central PMCID: PMC3314262.
   b. Burke SN, Maurer AP, Hartzell AL, Nematollahi S, Uprety A, et al. Representation of three-dimensional objects by the rat perirhinal cortex. Hippocampus. 2012 Oct;22(10):2032-44. PubMed PMID: 22987680; PubMed Central PMCID: PMC3447635.
   c. Burke SN, Maurer AP, Nematollahi S, Uprety A, Wallace JL, et al. Advanced age dissociates dual functions of the perirhinal cortex. J Neurosci. 2014 Jan 8;34(2):467-80. PubMed PMID: 24403147; PubMed Central PMCID: PMC3870932.
5. Interneurons have been hypothesized to provide the "scaffold" by which neuronal activity is structured within neural networks. In this sense, they can both govern the rate that information propagates through neural circuits as well as perform computational operations on the information. In light of these theories, we were enthusiastic to discover that putative basket cells exhibted theta phase precession, plausibly inherited from afferent pyramidal cell activity.
   a. Maurer AP, Cowen SL, Burke SN, Barnes CA, McNaughton BL. Phase precession in hippocampal interneurons showing strong functional coupling to individual pyramidal cells. J Neurosci. 2006 Dec 27;26(52):13485-92. PubMed PMID: 17192431.

Complete List of Published Work in My Bibliography:
http://www.ncbi.nlm.nih.gov/myncbi/andrew.maurer.1/bibliography/43942059/public/?sort=date&direction=ascending

D. RESEARCH SUPPORT

2016/01/01-2020/11/31
1**R01**AG049722, NIH - National Institute on Aging
Burke, Sara (PI), **Maurer, Andrew** (Co-I)
Contribution of Declines in Functional Connectivity to Cognitive Aging.
The major goal of this proposal is to interrogate prefrontal-medial temporal lobe interactions in order to determine how alterations in systems-level neural coordination in old animals produce cognitive impairments.
[No Overlap]
10% effort

2016/09/01-2020/8/31
1**R01**MH109548, NIH- National Institute of Mental Health
Maurer, Andrew (PI)
Testing and forecasting hippocampal theta wave propagation in learning and memory.
The goal of this proposal is to determine the biological underpinnings of the hippocampal traveling theta wave as well as develop a mathematical description that can anticipate ("forecast") the physiology in ventral locations using dorsal physiology.
[No Overlap]
24% effort

04/01/2017 - 03/31/2022
1**R01**AG055544, NIH - National Institute on Aging
Maurer, Andrew (PI)
Age-associated changes in hippocampal circuits and cognitive function.
The proposed research is relevant to public health because it provides an innovative approach for determining if age-related changes in the hippocampal circuit reflect adaptive plasticity or synaptic senescence. This will be achieved by linking local changes to overall synaptic function of hippocampal circuits. By understanding how local impairments alter systems-level network function, it will be possible to promote the development of interventions that broadly improve cognition in normal aging and Alzheimer's disease and meet a mission of the NIA to advance our understanding of age-related cognitive decline.
[No Overlap]
13% effort

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Cohen, Ronald

eRA COMMONS USER NAME (credential, e.g., agency login): rcohen1

POSITION TITLE: Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Tulane University	BS	05/1976	Psychology
Louisiana State University	PHD	12/1982	Clinical Psychology,Neuropsychology
UCLA Neuropsychiatric Institute, Westwood, CA	Resident	07/1982	Clinical Psychology Internship
University of Florida, Gainesville, FL	Post Doc Fellow	09/1983	Neurosychology

A. PERSONAL STATEMENT

Dr. Cohen is director of the University of Florida Center for Cognitive Aging and Memory Clinical Translational Research (CAM). He is a professor of Clinical and Health Psychology with joint appointments in the departments of Clinical and Health Psychology Neurology, Psychiatry. Dr. Cohen also is the Evelyn McKnight Chair for Cognitive and Memory Clinical Translational Research at UF. The CAM is a multidisciplinary research program focused on factors that influence cognitive aging that will integrate neurocognitive, neuroimaging, and laboratory biomarker methods. A primary goal of this center is clinical translational in nature with a focus on translating neuroscience findings from the laboratory to clinical application for both improvement assessment and intervention. He has extensive background in neuroimaging and the neuroscience of attention-executive functions, and strong record of research involving the use of functional and structural neuroimaging methods in studies of age-associated brain disorders and neurodegenerative brain disorders. He has published over 250 peer-reviewed articles, and numerous book chapters on topics of relevance to this project. Besides co-editing several books on topics related to areas of clinical neuropsychological research, Dr. Cohen authored “Neuropsychology of Attention” in 1993 which was the first book on this topic in the field, which was recently updated and published as a second edition this year. He authored a book “Brain Imaging in Behavioral Medicine and Clinical Neuroscience”, which will be the first to address the use of neuroimaging methods for studying various problems in clinical neuroscience and to lead the current project. Specifically, Dr. Cohen’s CAM laboratory has been conducting human studies employing multimodal neuroimaging in conjunction with MRS to examine pathophysiological changes occurring in normal and pathological brain aging, and also secondary to risk factors including obesity, diabetes, heart disease, viral infections (e.g., HIV), and

neurodegenerative disease such as AD. He has assembled an outstanding team of researchers with specific areas of expertise that will enable the success of the CAM.

B. POSITIONS AND HONORS

a. Positions and Employment

1983 - 1990	Assistant Professor, Department of Neurology, University of Massachusetts Medical School
1990 - 1993	Associate Professor, Department of Neurology, University of Massachusetts Medical School
1993 - 1996	Assistant Professor, Department of Psychiatry-Human Behavior, Brown University
1993 - 2008	Director of Neuropsychology, The Miriam Hospital, Warren Alpert School of Medicine, Brown University
2004 - 2012	Professor, Department of Psychiatry - Human Behavior, Brown University
2004 - 2012	Professor, Brain Sciences Program, Brown University
2012 – 2016	Professor, Departments of Aging, Neurology and Psychiatry, University of Florida
2016 -	Professor, Departments of Clinical and Health Psychology, Neurology and Psychiatry, University of Florida
2012 -	Director, Center for Cognitive Aging and Memory, University of Florida

b. Other Experience and Professional Memberships

1983 -	Member, International Neuropsychological Society

c. Honors

2012	Endowment in Support of the Center for Cognitive Aging and Memory, McKnight Brain Research Foundation
2015	Evelyn McKnight Chair, Cognitive Aging and Memory

C. Contribution to Science

1. My research was an outgrowth of interest and expertise in neuropsychology and cognitive neuroscience. My early research focused on attentional influences on cognitive functions, including studies of the effects of particular neurological brain disorders and psychiatric disturbances on effort and attentional control. This led to a number of publications focusing on the cingulate cortex, intentional behavior and also emotional processing, with much of this work culminating in the publication of his book “Neuropsychology of Attention. These studies present major contributions to neuropsychology and cognitive neuroscience. A few examples of these studies are listed above.

My early clinical research focused on neurodegenerative disease in the elderly (AD). This evolved into investigations focusing on vascular dementia, as shown in a sample of my publications below, which employed neuroimaging methods to examine white matter abnormalities (FLAIR), cortical and subcortical morphometry, and functional imaging.

a. Cohen RA, O'Donnell BF, Meadows ME, Moonis M, Stone WF, Drachman DA. ERP indices and neuropsychological performance as predictors of functional outcome in dementia. J Geriatr Psychiatry Neurol. 1995 Oct;8(4):217-25. PubMed PMID: 8561835.

b. Cohen RA, Paul RH, Zawacki TM, Sethi M, Ott BR, Moser DJ, Stone W, Noto R, Gordon N. Single photon emission computed tomography, magnetic resonance imaging hyperintensity, and cognitive impairments in patients with vascular dementia. J Neuroimaging. 2001 Jul;11(3):253-60. PubMed PMID: 11462291.

c. Cohen RA, Paul RH, Ott BR, Moser DJ, Zawacki TM, Stone W, Gordon N. The relationship of subcortical MRI hyperintensities and brain volume to cognitive function in vascular dementia. J Int Neuropsychol Soc. 2002 Sep;8(6):743-52. PubMed PMID: 12240738.

d. Sweet LH, Paul RH, Cohen RA, Moser D, Ott BR, Gordon N, Browndyke JN, Shah P, Garrett KD. Neuroimaging correlates of dementia rating scale performance at baseline and 12-month follow-up among patients with vascular dementia. J Geriatr Psychiatry Neurol. 2003 Dec;16(4):240-4. PubMed PMID: 14653434.

2. As my work on VaD progressed, it became clear that it was necessary to examine patients with vascular disease and risk factors before they developed dementia. This led to R01 funded studies focusing on cognitive and neuroimaging abnormalities associated with cardiovascular disease, including heart failure. This work incorporated systemic vascular indices in conjunction with structural and functional measures.

We also began to exam vessel and blood-barrier disturbances that might linked vascular factors with AD (Stopa et al.). To address these questions my research began to employ other neuroimaging methods, including ASL to assess CBF disturbances in relationship to FMRI alterations in HF and vascular cognitive impairment. My laboratory made significant contributions to characterizing the interaction between systolic problems linked to cardiac output and microvascular disease in the brain causing hemodynamic dysregulation and vulnerability to neuronal and white matter injury.

a. Haley AP, Sweet LH, Gunstad J, Forman DE, Poppas A, Paul RH, Tate DF, Cohen RA. Verbal working memory and atherosclerosis in patients with cardiovascular disease: an fMRI study. J Neuroimaging. 2007 Jul;17(3):227-33. PubMed PMID: 17608908.
b. Jefferson AL, Tate DF, Poppas A, Brickman AM, Paul RH, Gunstad J, Cohen RA. Lower cardiac output is associated with greater white matter hyperintensities in older adults with cardiovascular disease. J Am Geriatr Soc. 2007 Jul;55(7):1044-8. PubMed PMID: 17608877; PubMed Central PMCID: PMC2721459.
c. Stopa EG, Butala P, Salloway S, Johanson CE, Gonzalez L, Tavares R, Hovanesian V, Hulette CM, Vitek MP, Cohen RA. Cerebral cortical arteriolar angiopathy, vascular beta-amyloid, smooth muscle actin, Braak stage, and APOE genotype. Stroke. 2008 Mar;39(3):814-21. PubMed PMID: 18258839.
d. Cohen RA, Poppas A, Forman DE, Hoth KF, Haley AP, Gunstad J, Jefferson AL, Tate DF, Paul RH, Sweet LH, Ono M, Jerskey BA, Gerhard-Herman M. Vascular and cognitive functions associated with cardiovascular disease in the elderly. J Clin Exp Neuropsychol. 2009 Jan;31(1):96-110. PubMed PMID: 18608677; PubMed Central PMCID: PMC2739675.

3. My research on vascular and metabolic factors affecting the aging brain led to R01 funding focusing on HIV. I was a co-PI of HIV Neuroimaging Initiative to investigated longitudinal changes in brain function, structure and cerebral metabolite abnormalities. This work employed MRS, DTI, and more recently FMRI. Subsequent R01 grants awarded to me examined HIV and aging, and HIV in the context of alcohol and other drug use. Neuroimaging methods continue to play a major role in this area of my research, with current funded projects employing FMRI to examine functional connectivity in relationship to white matter connectivity and regional cerebral metabolite disturbance.

a. Paul RH, Ernst T, Brickman AM, Yiannoutsos CT, Tate DF, Cohen RA, Navia BA. Relative sensitivity of magnetic resonance spectroscopy and quantitative magnetic resonance imaging to cognitive function among nondemented individuals infected with HIV. J Int Neuropsychol Soc. 2008 Sep;14(5):725-33. PubMed PMID: 18764968.
b. Bunea F, She Y, Ombao H, Gongvatana A, Devlin K, Cohen R. Penalized least squares regression methods and applications to neuroimaging. Neuroimage. 2011 Apr 15;55(4):1519-27. PubMed PMID: 21167288.
c. Gongvatana A, Harezlak J, Buchthal S, Daar E, Schifitto G, Campbell T, Taylor M, Singer E, Algers J, Zhong J, Brown M, McMahon D, So YT, Mi D, Heaton R, Robertson K, Yiannoutsos C, Cohen RA, Navia B. Progressive cerebral injury in the setting of chronic HIV infection and antiretroviral therapy. J Neurovirol. 2013 Jun;19(3):209-18. PubMed PMID: 23613008; PubMed Central PMCID: PMC3740160.
d. Caldwell JZ, Gongvatana A, Navia BA, Sweet LH, Tashima K, Ding M, Cohen RA. Neural dysregulation during a working memory task in human immunodeficiency virus-seropositive and hepatitis C coinfected individuals. J Neurovirol. 2014 Aug;20(4):398-411. PubMed PMID: 24867610; PubMed Central PMCID: PMC4351737.

4. In addition, to these specific areas of clinical focus, my laboratory continues to conduct studies that address more basic cognitive and behavioral neuroscience questions using neuroimaging as a core component. Some examples are listed below. Studies with Wing, McCaffery, Sweet and me focused on the role of brain reward and inhibitory control systems in obesity. This related to other work on obesity and metabolic effects on the brain and recent R01 funding to use use neuroimaging to study bariatric surgery and weight loss effects on the brain. We continue to also conduct studies to better understand the neural bases of functional neuroimaging responses, including the temporal dynamics of the BOLD response of specific tasks (e.g., Paskavitz et al). I also continue to conduct studies that examine older adults with and with out evidence of cognitive decline. For example, Ott et al. showed the relationship between ventricular volume increases and CSF biomarkers in AD, MCI and healthy controls. This represents a small sample of the areas of research that my center continues to explore.

a. McCaffery JM, Haley AP, Sweet LH, Phelan S, Raynor HA, Del Parigi A, Cohen R, Wing RR. Differential functional magnetic resonance imaging response to food pictures in successful weight-loss

maintainers relative to normal-weight and obese controls. Am J Clin Nutr. 2009 Oct;90(4):928-34. PubMed PMID: 19675107; PubMed Central PMCID: PMC2744621.

b. Ott BR, Cohen RA, Gongvatana A, Okonkwo OC, Johanson CE, Stopa EG, Donahue JE, Silverberg GD, Alzheimer's Disease Neuroimaging Initiative. Brain ventricular volume and cerebrospinal fluid biomarkers of Alzheimer's disease. J Alzheimers Dis. 2010;20(2):647-57. PubMed PMID: 20182051; PubMed Central PMCID: PMC3078034.

c. Paskavitz JF, Sweet LH, Wellen J, Helmer KG, Rao SM, Cohen RA. Recruitment and stabilization of brain activation within a working memory task; an FMRI study. Brain Imaging Behav. 2010 Mar;4(1):5-21. PubMed PMID: 20503110.

d. Daiello LA, Gongvatana A, Dunsiger S, Cohen RA, Ott BR. Association of fish oil supplement use with preservation of brain volume and cognitive function. Alzheimers Dement. 2015 Feb;11(2):226-35. PubMed PMID: 24954371.

5. A major emphasis on my work over the past decade has been clinical translational research focused at factors that affect the brain and cognition in in the context of normal aging. We have been conducting studies within the the CAM-CTRP of the UF Institute on Aging directed at the influence of systemic and neuroinflammation, endocrine changes, and other factors occurring with aging that may accelerate cognitive decline as people reach advance age.

a. Woods AJ, Cohen RA, Pahor M. Cognitive frailty: frontiers and challenges. J Nutr Health Aging. 2013 Sep;17(9):741-3. PubMed PMID: 24154645; PubMed Central PMCID: PMC4471842.

b. Szabo AJ, Alosco ML, Miller LA, McGeary JE, Poppas A, Cohen RA, Gunstad J. Brain-derived neurotrophic factor Val66Met polymorphism and cognitive function in persons with cardiovascular disease. Psychogeriatrics. 2013 Dec;13(4):206-12. PubMed PMID: 24289461; PubMed Central PMCID: PMC3847660.

c. Cohen RA, Seider TR, Navia B. HIV effects on age-associated neurocognitive dysfunction: premature cognitive aging or neurodegenerative disease?. Alzheimers Res Ther. 2015;7(1):37. PubMed PMID: 25848401; PubMed Central PMCID: PMC4386102.

d. Hawkins MA, Alosco ML, Spitznagel MB, Strain G, Devlin M, Cohen R, Crosby RD, Mitchell JE, Gunstad J. The Association Between Reduced Inflammation and Cognitive Gains After Bariatric Surgery. Psychosom Med. 2015 Jul-Aug;77(6):688-96. PubMed PMID: 25478707; PubMed Central PMCID: PMC4456339.

Relevant publications in the past year

[1] Cohen RA, Gullett JM, Porges EC, Woods AJ, Lamb DG, Bryant VE, et al. Heavy Alcohol Use and Age Effects on HIV-Associated Neurocognitive Function. Alcohol Clin Exp Res. 2019;43:147-57.

[2] Cohen RA, Gullett JM, Woods AJ, Porges EC, Starkweather A, Jackson-Cook CK, et al. Cytokine-associated fatigue prior to, during, and post-chemotherapy for breast cancer. J Neuroimmunol. 2019;334:577001.

[3] Cruz-Almeida Y, Fillingim RB, Riley JL, 3rd, Woods AJ, Porges E, Cohen R, et al. Chronic pain is associated with a brain aging biomarker in community-dwelling older adults. Pain. 2019;160:1119-30.

[4] Gullett JM, Cohen RA, Yang GS, Menzies VS, Fieo RA, Kelly DL, et al. Relationship of fatigue with cognitive performance in women with early-stage breast cancer over 2 years. Psychooncology. 2019;28:997-1003.

[5] Monnig MA, Cohen R, Ramratnam B, McAdams M, Tashima K, Monti PM. HIV Infection, HCV Coinfection, and Alcohol Use: Associations with Microbial Translocation and Immune Activation. Alcohol Clin Exp Res. 2019;43:1126-34.

[6] Monnig MA, Woods AJ, Walsh E, Martone CM, Blumenthal J, Monti PM, et al. Cerebral Metabolites on the Descending Limb of Acute Alcohol: A Preliminary 1H MRS Study. Alcohol Alcohol. 2019;54:487-96.

[7] Nir TM, Jahanshad N, Ching CRK, Cohen RA, Harezlak J, Schifitto G, et al. Progressive brain atrophy in chronically infected and treated HIV+ individuals. J Neurovirol. 2019;25:342-53.

[8] Nissim NR, O'Shea A, Indahlastari A, Telles R, Richards L, Porges E, et al. Effects of in-Scanner Bilateral Frontal tDCS on Functional Connectivity of the Working Memory Network in Older Adults. Front Aging Neurosci. 2019;11:51.

[9] Okafor CN, Plankey MW, Li M, Chen X, Surkan PJ, Shoptaw S, et al. Association of Marijuana Use with Changes in Cognitive Processing Speed and Flexibility for 17 Years in HIV-Seropositive and HIV-Seronegative Men. Subst Use Misuse. 2019;54:525-37.

[10] Szymkowicz SM, Woods AJ, Dotson VM, Porges EC, Nissim NR, O'Shea A, et al. Associations between subclinical depressive symptoms and reduced brain volume in middle-aged to older adults. Aging Ment Health. 2019;23:819-30.
[11] Cohen, RA, Smith, M, Marsiske, M. Neuropsychology of Aging. In Handbook of Geriatric Neurology. (DeKosky, ed.), (2019).
[12] Cohen, R. A., Gullett, J.M., Porges, E. (2019). Neuroimaging of the aging brain, In: Kenneth M. Heilman & Stephen Nadeau (Eds.), *Cognitive changes and the Aging Brain*. Cambridge University Press, Cambridge, UK.
[13] Cohen, R.A. & Gullett, J.M. (2019 onlineion). Neuroimaging: In Adam J. Woods (Ed.), *Encyclopedia of Gerontology and Population Aging.* Springer Nature, New Delhi, India.

Total peer reviewed publications = 323

D. Additional Information: Research Support and/or Scholastic Performance

1R01AG054077-01 (Woods/Cohen, PI's) 09/1/2016-04/30/2021
National Institute of Health
Augmenting Cognitive Training in Older Adults – The ACT Grant
This randomized clinical trial examines the effect of augmenting cognitive training with transcranial direct current stimulation to maximize cognitive and functional outcomes older adults experiencing age-related cognitive decline. Change in well-validated measures of everyday abilities and neurocognitive function will serve as outcome measures. Functional and structural neuroimaging biomarkers of neural plasticity and learning (fMRI, GABA MRS, etc.) will measure intervention-associated alterations in specific brain regions impacted by cognitive aging.

1R01DK09933401A1 (Ronald Cohen, PI) 06/25/2014 – 05/31/2020
National Institute of Health NIDDK
Obesity and Type-2 Diabetes: Bariatric Surgery Effects on Brain Function
The study will delineate mechanism underlying the effects of chronic obesity on brain functioning and determine if cognitive benefits of bariatric surgery and weight loss contribute to enhanced cerebral metabolic or hemodynamic function assessed using multimodal neuroimaging methods.

2 P01 AA019072 (Monti, PI) 09/01/2015-05/31/2020
National Institute of Health NIAAA
Alcohol and HIV: Biobehavioral Interactions and Intervention
The goals of this program project are to study the effects of alcohol use on HIV disease progression, the effects of interventions to reduce alcohol use in HIV-infected populations, and the effects of alcohol on sexual decision making. The project also fosters multidisciplinary collaborations and training in research on alcohol and HIV and dissemination of research findings to clinicians treating addictions and HIV. Research Component 1 (Cohen, PI) is a continuation of the study being conducted in the parent ARCH, but will now examine the effects of reducing alcohol consumption via a motivational interviewing approach in HIV-infected heavy drinkers, with a specific focus on changes in cognitive performance, functional brain response on FMRI, and cerebral metabolite abnormalities (MRS).

R01DA042069 (Cook, PI) 08/15/2017 – 03/31/2022
National Institute of Health NIDA
Health outcomes and cognitive effects of marijuana use in people living with HIV/AIDS. The overarching goals of this study are to obtain evidence regarding the influence of marijuana on major health outcomes and behavior in PLWH in order to help guide clinical recommendations and identify risk factors for consequences.

R01DA042069 (Cook, PI) 04/12/2019 – 03/31/2020
National Institute of Health NIDA
Examining the relationship between the microbiome and cognitive function in HIV infected, cannabis users.

U01AA020797 (Cook, Cohen, MPIs) 09/01/2016 – 06/30/2021
National Institute of Health NIAAA
Effects of experimentally-induced reduction alcohol use on cognitive and brain function in HIV-infected adults. This project examines the effects of reduced alcohol consumption on cognition and brain functioning among HIV infected people who are heavy drinkers. A contingency management approach is employed by which participants are given financial incentive in an escalating fashion the longer they go without drinking. Participants undergo cognitive and neuroimaging assessments at baseline (Pre-CM) and then at 30 days of CM and after completion of CM at 90 days. Follow up assessments are conducted one year post baseline.

R21AG054876 – (Williamson, PI) 09/01/2017 – 05/31/2020
National Institute of Health NIA
Treatment of mild cognitive impairment with transcutaneous vagal nerve stimulation. This study examines whether cognitive and brain functioning in MCI can be improved via vagal stimulation applied in conjunction with cognitive training.

U01AA026225 – (Barve, Cohen, Cook PI's) 09/01/2018 – 08/31/2020
National Institute of Health NIAAA
This study examines the impact of abnormalities in the gut microbiome associated with HIV and heavy ETOH use. These biomarkers are examined relative to cognitive, neuroimaging, and clinical measures collected at three time points.

1R211HL140492-01 (Salmoirago-Blotcher, PI) 05/25/2018 – 04/30/2020
NHLBI
Exploring the Role of Mindfulness Training In the Promotion of Medication Adherence In Heart Failure Outpatients. The goal of this project is to study the feasibility and possible mechanism of mindfulness training for the promotion of medication adherence in heart failure outpatients.

R011AG061065 (Barve, Cohen,Cook PI's) 10/01/2018 – 09/30/2023
NIA: Microbiome study of HIV and aging
The Role of Gut Microbial Dysbiosis and Aging on HIV- associated neurcogitive and brain dysfunction
The project examines of the microbiome on the interaction of age and HIV infection. The methods are similar to those employed in the 30-80 day study (longitudinal neuroimaging, cognitive assessment, biospecimens), but with a different cohort in which ETOH is not the basis for recruitment.

R21NR017749 (Kelly, PI) 09/27/2018 – 07/31/2020
National Institute of Health NINR
Developing the Biobehavioral Foundation for Self-Management of Psychoneurological Symptoms in Hematopoietic Cell Transplant (HCT) Survivors
This research will study biobehavioral factors associated with PN symptoms to gain knowledge needed to provide a foundation for considering the development of a targeted dietary self-management interventions to mitigate PN symptoms of HCT and provide a basis for obtaining and maintaining optimal quality of life for HCT recipients.

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Joseph M. Gullett

eRA COMMONS USER NAME (credential, e.g., agency login): gullettj

POSITION TITLE: Research Assistant Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of Florida	B.S.	05/2008	Psychology
University of Florida	M.S.	05/2013	Clinical Psychology
West Los Angeles VAMC	-	08/2017	APA Internship in Clinical Psychology
University of Florida	Ph.D.	08/2017	Clinical Psychology
University of Florida	Postdoctoral	08/2019	Neuropsychology

A. Personal Statement

I am a Research Assistant Professor with the University of Florida Center for Cognitive Aging and Memory. I received my Ph.D. in clinical psychology from the University of Florida in August of 2017 after completing a one-year clinical internship in psychology at the West Los Angeles VA Medical Center. I previously earned a Master of Science degree in clinical psychology from the University of Florida in 2013, and a Bachelor of Science degree in psychology (Cum Laude) from the University of Florida in 2008. During the time since my undergraduate studies, I have presented numerous independent research projects at international conferences, written several first-author publications, a first-author book chapter, as well as contributed to a number of other peer-reviewed publications and book chapters. My early research focused on the use of diffusion tensor imaging methods to study brain injured veterans with co-morbid PTSD at the Malcom Randall VA. During my postdoctoral fellowship, I began to apply these methods to the study of other clinical populations and formed my clinical expertise in neurodegenerative disease with a research interest in Alzheimer's disease interventions. After becoming involved with the 1Florida Alzheimer's Disease Research Center (ADRC), I was the sole awardee of their 2019 Pilot Grant to investigate the ability of baseline neuroimaging to predict worsening cognition in several hundred healthy, mild cognitive impairment, and Alzheimer's disease patients. This independent funding led to my current position as a Research Assistant Professor, where I also serve as co-investigator on an NIH-funded U-01 intervention grant and the attending neuropsychologist on weekly clinical services through UF-Health Psychology Specialties' neuropsychology clinics.

B. Positions and Honors

Positions and Employment

2019-	Research Assistant Professor, Department of Clinical & Health Psychology, Gainesville, FL
2018-2019	T32 Postdoctoral Fellow, Center for Cognitive Aging & Memory, Gainesville, FL
2017-2018	Postdoctoral Clinical-Research Associate, Center for Cognitive Aging and Memory, Gainesville, FL
2016-2017	Psychology Intern, West Los Angeles VA Medical Center, Los Angeles, CA
2011-2016	Graduate Assistant, Department of Clinical & Health Psychology, Gainesville, FL
2008-2011	Clinical Psychometrist, UF Neuropsychology Clinic, Gainesville, FL

Other Experience and Professional Memberships

2019- Licensed Clinical Psychologist (PY10534)

2019- Ad Hoc Reviewer, Journal of Pain and Symptom Management
2019- Ad Hoc Reviewer, Brain Imaging & Behavior
2019- Ad Hoc Reviewer, Human Brain Mapping
2018- Ad Hoc Reviewer, Neuropsychology Review
2016- Ad Hoc Reviewer, The Clinical Neuropsychologist

2019- Member, The International Neuropsychological Society
2012-2017 Student Member, APA Division 40 (neuropsychology)

C. Contributions to Science

Over the past two years as postdoctoral fellow and since starting my assistant professorship with the Center for Cognitive Aging and Memory, my scientific work has been focused on neuroimaging, clinical, and neuropsychological correlates of normal aging as well as HIV, morbid obesity, and cancer.

1. **J. M. Gullett**, R. A. Cohen, G. S. Yang, V. S. Menzies, R. A. Fieo, D. L. Kelly, A. R. Starkweather, C. K. Jackson-Cook, and D. E. Lyon. "Relationship of fatigue with cognitive performance in women with early-stage breast cancer over 2 years," *Psychooncology.*, 2019.
2. R. A. Cohen, **J. M. Gullett**, E. C. Porges, A. J. Woods, D. G. Lamb, V. E. Bryant, M. McAdams, K. Tashima, R. Cook, K. Bryant, M. Monnig, C. W. Kahler, and P. M. Monti. "Heavy Alcohol Use and Age Effects on HIV-Associated Neurocognitive Function," *Alcohol. Clin. Exp. Res.*, 2019.
3. H. J. Fernando, R. A. Cohen, **J. M. Gullett**, J. Friedman, A. Ayzengart, E. Porges, A. J. Woods, J. Gunstad, C. M. Ochoa, K. Cusi, R. Gonzalez-Louis, and W. T. Donahoo. "Neurocognitive Deficits in a Cohort With Class 2 and Class 3 Obesity: Contributions of Type 2 Diabetes and Other Comorbidities," *Obesity*, 2019.
4. R. A. Cohen, **J. M. Gullett**, A. J. Woods, E. C. Porges, A. Starkweather, C. K. Jackson-Cook, D. L. Lynch-Kelly, and D. E. Lyon. "Cytokine-associated fatigue prior to, during, and post-chemotherapy for breast cancer," *J. Neuroimmunol.*, 2019.
5. T. Kuhn, Y. Jin, C. Huang, Y. Kim, T. M. Nir, **J. M. Gullett**, J. D. Jones, P. Sayegh, C. Chung, B. H. Dang, E. J. Singer, D. W. Shattuck, N. Jahanshad, S. Y. Bookheimer, C. H. Hinkin, H. Zhu, P. M. Thompson, and A. D. Thames. "The joint effect of aging and HIV infection on microstructure of white matter bundles," *Hum. Brain Mapp.*, 2019.
6. **J. M. Gullett**, D. G. Lamb, E. Porges, A. J. Woods, J. Rieke, P. Thompson, N. Jahanshad, T. Nir, K. Tashima, and R. A. Cohen. "The Impact of Alcohol Use on Frontal White Matter in HIV," *Alcohol. Clin. Exp. Res.*, vol. 42, no. 9, pp. 1640–1649, 2018.
7. T. Kuhn, **J. M. Gullett**, A. E. Boutzoukas, A. Bohsali, T. H. Mareci, D. B. FitzGerald, P. R. Carney, and R. M. Bauer. "Temporal lobe epilepsy affects spatial organization of entorhinal cortex connectivity," *Epilepsy Behav.*, vol. 88, pp 87-95, 2018.
8. R. A. Cohen, S. Siegel, **J. M. Gullett**, E. Porges, A. J. Woods, H. Huang, Y. Zhu, K. Tashima, and M. Z. Ding. "Neural response to working memory demand predicts neurocognitive deficits in HIV," *Journal of NeuroVirology*, 2018.
9. R. A. Cohen, **J.M. Gullett,** E.C. Porges. "Neuroimaging of the aging brain" In K.M. Heilman & Stephen Nadeau (Eds.), *Cognitive changes and the Aging Brain*. Cambridge University Press, Cambridge, UK. *In Press* (2020 expected).
10. **J.M. Gullett.** "Neuroinflammation" In Adam J. Woods (Ed.), Encyclopedia of Gerontology and Population Aging. Springer Nature, New Delhi, India. *In Press* (2020 expected).
11. R.A. Cohen & **J.M. Gullett.** "Neuroimaging" In Adam J. Woods (Ed.), Encyclopedia of Gerontology and Population Aging. Springer Nature, New Delhi, India. *In Press* (2020 expected).

In my early undergraduate and graduate career, I focused my research endeavors on the use of diffusion tensor imaging and structural neuroimaging to investigate clinical phenomena within populations with TBI, PTSD, temporal lobe epilepsy, as well as structural connectivity of language centers in healthy populations.

12. T. Kuhn, **J. M. Gullett**, P. Nguyen, A. E. Boutzoukas, A. Ford, L. M. Colon-Perez, W. Triplett, P. R. Carney, T. H. Mareci, C. C. Price, and R. M. Bauer. "Test-retest reliability of high angular resolution diffusion imaging acquisition within medial temporal lobe connections assessed via tract based spatial statistics, probabilistic tractography and a novel graph theory metric," *Brain Imaging Behav.*, vol. 10, issue 2, pp. 533-547, 2016.
13. M.J. Sullan, A.A. Bohsali, **J.M. Gullett,** J. Goldstein, R.M. Bauer, T.H. Mareci, & D.B. Fitzgerald. "The Relationship Between Locus Coeruleus Volume and Measures of Sleep and Attentional Control in Veterans with Mild TBI." *The Clinical Neuropsychologist* 29(3), 324-325, 2015.
14. A. A. Bohsali, W. Triplett, A. Sudhyadhom, **J. M. Gullett**, K. McGregor, D. B. FitzGerald, T. Mareci, K. White, and B. Crosson, "Broca's area - Thalamic connectivity," *Brain Lang.*, vol. 141, pp. 80-88, 2015.
15. M.J. Sullan, A.A. Bohsali, **J. M. Gullett,** J. Goldstein, R. M. Bauer, T.H. Mareci, and D.B. FitzGerald. "The Locus Coeruleus and Sleep-Wake Disturbances in Veterans with mTBI." *J Sleep Med Disord*, 1(1): pg. 1004, 2014.
16. **J. M. Gullett**, C. C. Price, P. Nguyen, M. S. Okun, R. M. Bauer, and D. Bowers. "Reliability of three benton judgment of line orientation short forms in idiopathic parkinsons disease" *The Clin. Neuropsychol.*, vol. 27, issue 7, pp. 1167-1178, 2013. DOI: 10.1080/13854046.2013.827744
17. A. Ford, L. Colon-Perez, W. T. Triplett, **J. M. Gullett**, T. H. Mareci, and D. B. FitzGerald. "Imaging white matter in human brainstem," *Front. Hum. Neurosci.*, vol. 7. 2013. doi: 10.3389/fnhum.2013.00400
18. A. A. Ford, W. Triplett, A. Sudhyadhom, **J. Gullett**, K. McGregor, D. B. FitzGerald, T. Mareci, K. White, and B. Crosson. "Broca's area and its striatal and thalamic connections: A diffusion-MRI tractography study," *Front. Neuroanat.*, vol. 7, issue 8, pp. 1-12. 2013.
19. D. B. FitzGerald, **J. M. Gullett**, C. E. Levy, and B. A. Crosson, "Delayed Diagnosis of Intracerebral Foreign Body From the Vietnam War," *Mil. Med.*, vol. 176, issue 2, pp. 228-231. 2011.

Complete list of published work in my NCBI bibliography:
https://www.ncbi.nlm.nih.gov/sites/myncbi/1Z3WHMZO4VfQQ/bibliography/53788754/public/?sort=date&direction=ascending

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

AG047266 (Gullett) 09/20/2019 – 09/19/2020
1Florida Alzheimer's Disease Center
"Machine Learning Diagnostic Prediction using Multi-modal Neuroimaging, Cognitive Performance, and Disease Progression Information"
The goal of the project is to provide highly accurate diagnostic prediction of stable versus progressive mild cognitive impairment using structural and functional MRI in combination with cognitive performance data.
Role: PI

5 U01-AA020797-09 (PI: Cook) 09/25/2011 – 06/30/2021
NIH/NIAAA
"Effects of Experimentally-Induced Reductions in Alcohol Consumption on Brain Cognitive, and Clinical Outcomes and Motivation for Changing Drinking in Older Persons with HIV Infection."
The goal of this study is to build on our past findings to determine the extent to which marked reductions in alcohol consumption over 4-weeks via contingency management (CM) improves cognitive performance, brain functions and pathophysiology, and HIV-associated health outcomes.
Role: Co-investigator

Completed Research Support

NIAAA T32-AA25877 (PI: Cook) 09/01/2018-08/31/2019
"Translational Science Training to Reduce the Impact of Alcohol on HIV Infection"
The goal of this T32 project is to provide research training and expertise related to alcohol and HIV infection.
Role: Postdoctoral fellow

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. DO NOT EXCEED FIVE PAGES.

NAME: Lamb, Damon

eRA COMMONS USER NAME (credential, e.g., agency login): dglamb

POSITION TITLE: Assistant Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	END DATE MM/YYYY	FIELD OF STUDY
University of Maryland, College Park, MD	BS	05/2003	Mathematics
University of Maryland, College Park, MD	BS	12/2003	Computer Engineering
University of Chicago, Chicago, IL	MS	12/2005	Computer Science
Marine Biological Laboratory, Woods Hole, MA	N/A	07/2009	Neural Systems & Behavior
Emory University, Atlanta, GA	PHD	08/2013	Neuroscience

A. Personal Statement

My long-term goal is to bridge cutting edge basic science and clinical/treatment focused research. The goal of this research proposal is to improve our understanding of autonomic function and modulations of learning and memory. In particular, I am investigating transcutaneous vagal nerve stimulation (tVNS) as a novel treatment for amnestic mild cognitive impairment (aMCI) to enhance cognition both in healthy individuals as well as amnestic mild cognitive impairment. tVNS is an exciting approach based on our understanding of the neurophysiological basis of memory and cognitive function, as well as pilot data. I look forward to extending our knowledge of this mechanistic impact of this innovative tool, laying a foundation for future clinical applications. I also have DARPA funding to further elucidate the neural circuit impacted by vagal nerve stimulation, providing complementary animal model data for the development of this approach. Apropos the mission of the Cognitive Aging and Memory Clinical Translational Research Program, my funded work on novel potential preventative treatments for aMCI (i.e., prodromal Alzheimer's) continues to show translational promise.

B. Positions and Honors

Positions and Employment

2001 - 2001 Product Engineer, Hughes Network Systems
2001 - 2004 Research Software Developer, University of Iowa
2002 - 2004 Research Assistant, Institute for Research in Electronics and Applied Physics, University of Maryland, College Park
2003 - 2004 Acoustic Modeling Software Developer, Acoustic Design Ahnert
2004 - 2007 Data Analyst, Brain-Body Center, University of Illinois, Chicago
2007 - 2013 Graduate Student, Emory University
2013 - 2017 Research Health Science Specialist, Brain Rehabilitation Research Center, Malcom Randall VAMC
2013 - 2018 Assistant Professor, University of Florida Departments of Neurology, Aging & Geriatrics, Clinical and Health Psychology
2017 - Research Health Scientist, Brain Rehabilitation Research Center, Malcom Randal VAMC
2018 - Assistant Professor, University of Florida Department of Psychiatry

Other Experience and Professional Memberships

- Member, Society for Neuroscience
- Member, American Association for the Advancement of Science

Honors

2005	Faculty Commendation, University of Chicago Department of Computer Science
2007 - 2009	NSF IGERT: Hybrid Neural Microsystems Fellow, Georgia Tech & Emory University
2009	MBL Neural Systems and Behavior Fellow, Frank R. Lillie Fellowship and Scholarship
2009	Scholar, Burroughs Wellcome Fund
2011 - 2013	Research Partners Fellow, Howard Hughes Medical Institute

C. Contribution to Science

1. Vagus nerve stimulation modulation of central nervous system function: While vagus nerve stimulation is best known as a treatment of certain forms of epilepsy, there is a growing appreciation for vagus stimulation as a tool for manipulation of central nervous system plasticity and of autonomic function. We are developing our understanding of how to apply vagus nerve stimulation to modulate neuroplasticity and to ameliorate complex disorders such as PTSD across multiple large scale research efforts funded by the VA, NIH and DARPA. A portion of this work has been patented by the University of Florida.

    a. Lamb DG, Porges EC, Lewis GF, Williamson JB. Non-invasive vagal nerve stimulation effects on hyperarousal and autonomic state in patients with posttraumatic stress disorder and history of mild traumatic brain injury: preliminary evidence. Frontiers in medicine. 2017 Jul 31;4:124.
    b. JB Williamson, DG Lamb, ESC Porges. System and method for monitoring and controlling nervous system behavior using autonomic features - US Patent App. 15/535,965, 2017

2. Computational modeling of neuronal networks demonstrating complex, unexpected relationships: Neurons can have widely differing intrinsic membrane properties, in particular the density of specific conductances (or resistance to ionic flow through ion channels), but how these contribute to characteristic neuronal activity or pattern formation is not well understood. My biophysical modeling work on small neuronal networks investigated how these ionic conductances contribute to coordinated motor output. Previous work had elucidated relationships between pairs of conductances, but they were generally required to be similar in their time courses, although of opposing polarity. My work showed that much more complex relationships contribute to the output of neuronal networks, as well as providing an explanation of the basis for these relationships. Outside of the novel modeling approaches and the combination of algorithmic optimization approaches, computational tools, and biological data I used, this work has implications for the variability of individual response to psychoactive medication, and follow-up studies are ongoing.

    a. Günay C, Doloc-Mihu A, Lamb DG, Calabrese RL. Synaptic Strengths Dominate Phasing of Motor Circuit: Intrinsic Conductances of Neuron Types Need Not Vary across Animals. eNeuro. 2019 Jul 18;6(4):ENEURO.0417-18.2019. doi: 10.1523/ENEURO.0417-18.2019. PMID: 31270128; PMCID: PMC6709225.
    b. Lamb DG, Calabrese RL. Correlated conductance parameters in leech heart motor neurons contribute to motor pattern formation. PLoS One. 2013;8(11):e79267. PubMed PMID: 24260181; PubMed Central PMCID: PMC3832487.
    c. Lamb DG, Calabrese RL. Small is beautiful: models of small neuronal networks. Curr Opin Neurobiol. 2012 Aug;22(4):670-5. PubMed PMID: 22364687; PubMed Central PMCID: PMC3817830.
    d. Lamb DG, Calabrese RL. Neural circuits controlling behavior and autonomic functions in medicinal leeches. Neural Syst Circuits. 2011 Sep 28;1(1):13. PubMed PMID: 22329853; PubMed Central PMCID: PMC3278399.

3. Experimental and data analysis software & hardware: Throughout my scientific career I have applied my technical skills to the design, development, and deployment of computer software and hardware to enable my own and other investigators' research. An example of the data processing tools I have developed is CardioEdit/CardioBatch, which allows efficient raw data processing and analysis of electrocardiogram signals for the extraction of heart rate variability measures, which are an index of autonomic nervous system function. I used these tools to conduct collaborative research with both animal and human biological psychology researchers, but they were also made freely available to the research community. As a testament to the utility of this software, over 65 papers cite using my software to process and analyze

their data. In 2000, I developed a multi-center data collection and aggregation tool that enabled distributed, offline collection of child abuse and maltreatment information collected by social workers, police, and researchers. This tool has been a critical tool for at least 18 papers, and the ideas enabling flexible aggregation of multi-site data have led to subsequent tools developed by other scientific programmers. More applicable to the proposed investigation, I also programmed and built the initial hardware for the Dynamic Affect Recognition Experiment, a test of receptive emotional perception.

a. Bal E, Harden E, Lamb D, Van Hecke AV, Denver JW, Porges SW. Emotion recognition in children with autism spectrum disorders: relations to eye gaze and autonomic state. J Autism Dev Disord. 2010 Mar;40(3):358-70. PubMed PMID: 19885725.
b. Vaughan Van Hecke A, Lebow J, Bal E, Lamb D, Harden E, Kramer A, Denver J, Bazhenova O, Porges SW. Electroencephalogram and heart rate regulation to familiar and unfamiliar people in children with autism spectrum disorders. Child Dev. 2009 Jul-Aug;80(4):1118-33. PubMed PMID: 19630897.
c. Grippo AJ, Lamb DG, Carter CS, Porges SW. Social isolation disrupts autonomic regulation of the heart and influences negative affective behaviors. Biol Psychiatry. 2007 Nov 15;62(10):1162-70. PubMed PMID: 17658486; PubMed Central PMCID: PMC2144909.
d. Grippo AJ, Lamb DG, Carter CS, Porges SW. Cardiac regulation in the socially monogamous prairie vole. Physiol Behav. 2007 Feb 28;90(2-3):386-93. PubMed PMID: 17107695; PubMed Central PMCID: PMC1839927.

4. Time-resolved particle-beam emittance: Early in my research career, I gathered the first time-resolved particle-beam emittance data. This experiment looked into how a 100ns charged particle beam varied along its length. Such a measurement was technically challenging at many levels, and the success of this experiment relied on two key control systems I programmed: one controlling the electro-magnetic focusing and bending optics, and the other an adaptive control system for the beam-measurement apparatus. The data and the functional measurement system that resulted from this work directly contributed to journal papers and referred conference papers, and enabled other researchers to investigate otherwise inaccessible research questions.

a. Walter M, Quinn B, Lamb D, Bernal S, Godlove T, Haber I, Holloway M, Kishek RA, Li H, O'Shea PG, Reiser M. Experimental tests of the injection Y on the University of Maryland Electron Ring. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment. 2005 May 21; 544(1-2):374-377.
b. Bernal S, Beaudoin B, Cui Y, Glanzer M, Godlove TF, Harris J, Holloway M, Haber I, Kishek RA, Lee W, Lamb D, Quinn B, Quirus M, Reiser M, Valfells A, Walter M, Wilson M, Yun R, Zou Y, O'Shea PG. Intense beam transport experiments in a multi-bend system at the University of Maryland Electron Ring. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment. 2004 February 21; 519(1-2):380-387.
c. Walter M, Lamb D, Bernal S, Haber I, Kishek R, Li H, Quinn B, Snowel M, Valfells A, Reiser M, O'Shea P. Time resolved emittance measurement in the University of Maryland Electron Ring. Proceedings of the 2003 Particle Accelerator Conference. Particle Accelerator Conference; 2003; c2003.
d. Walter M, Quinn B, Lamb D, Bernal S, Godlove T, Haber I, Holloway M, Kishek R, Li H, O'Shea P, Reiser M. Experimental tests of the injection Y on the University of Maryland Electron Ring. Proceedings of the 2003 Particle Accelerator Conference. Particle Accelerator Conference; 2003; c2003.

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

IK2RX002490, Veterans Health Administration – Rehabilitation Research and Development
Lamb, Damon (PI)
03/01/18-02/28/23
Brain changed underlying emotional and executive alterations in TBI

Role: PI

I50RX003000, Veterans Health Administration – Rehabilitation Research and Development
Bauer, Rus (Director)
10/01/19-9/3/24
Brain Rehabilitation Research Center
Role: Center Investigator

R21AG054876, NIA
Williamson, John (PI)
08/31/17-5/31/19 (NCE)
Treatment of mild cognitive impairment with C
Role: Co-I

0217BRRC-04, Brain Rehabilitation Research Center - Veterans Health Administration
Lamb, Damon (PI)
01/01/18-7/01/19
tVNS impacts on sleep architecture and autonomic features
Role: MPI

12179085, DARPA
Otto, Kevin (Contact PI)
01/01/17-12/31/19
Targeted Neuroplasticity Training
Role: Co-PI

Completed Research Support

Veterans Health Administration – Rehabilitation Research and Development
Daly, Janis (Director)
10/01/13-9/3/19
Brain Rehabilitation Research Center
Role: Center Investigator

1R56HL127175, NIH-NHLBI
Williamson, John (PI)
09/08/15-08/31/16
Brain and cognition effects of cardio-resynchronization therapy in heart failure
Role: Co-Investigator

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Maraganore, Demetrius M.

eRA COMMONS USER NAME (credential, e.g., agency login): DMMaraganore

POSITION TITLE: BJ & Eve Wilder Professor, Department of Neurology, University of Florida, Gainesville, FL

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Northwestern University, Evanston, IL	B.S.	1983	Medicine
Northwestern University Medical School, Chicago, IL	M.D.	1985	Medicine
Mayo Clinic, Rochester, MN	Residency	1989	Neurology
National Hospital for Neurol/Neurosurg, London, UK	Fellow	1990	Movement Disorders

A. Personal Statement

I am the Principal Investigator (PI) of the Agency for Healthcare Research and Quality grant R01HS024057 entitled “Quality Improvement and Practice Based Research in Neurology Using the EMR”. This was awarded on July 1, 2015. I supervised the building of structured clinical documentation support (SCDS) and clinical decision support (CDS) toolkits within the electronic medical record (EMR), for the evaluation and management of patients with 11 different neurological indications including Alzheimer’s disease and related disorders (ADRD); and also for brain health (primary prevention of ADRD). The EMR toolkits are being shared with 15+ academic departments across the nation, and in return the participating sites are sharing deidentified electronically captured data into a Neurology Practice Based Research Network registry, with the aims of quality improvement and practice-based research in neurology using the EMR. One of the projects includes an EMR-based pragmatic trial comparing the effectiveness of three nootropic drugs in mild cognitive impairment. I am the Principal Investigator (PI) of the Florida Health Ed and Ethel Moore Alzheimer’s Disease Research Program grant entitled “Utilizing Data from the Electronic Medical Record to Predict Alzheimer’s and Dementia Risk”. This was awarded on December 13, 2018. That grant aims to develop a model that predicts ADRD using data routinely captured by the University of Florida (UF) EMR, to replicate the model using EMR data shared by the statewide OneFlorida Clinical Research Consortium, to implement the replicated model into the UF EMR using clinical decision support (CDS) tools, and to share the replicated ADRD prediction model and CDS tools with OneFlorida Clinical Research Consortium sites. The long-term goal is to create a Florida statewide, EMR-based ADRD prediction and prevention initiative. I am the PI of the UF Moonshot grant entitled “Understanding Resistance, Resilience and Repair in the Health Span: The Over 90 Moonshot”. This was awarded on March 1, 2019. We aim to identify informatics-based computable phenotypes that enable identification of individuals over the age of 90 who have successfully aged by mining medical and social determinants of health information available within OneFlorida Data Trust; to then directly assess both the resources needed to re-contact individuals within the over 90 cohort and the participation rate of those contacted; and to also conduct a pilot study to inform on the feasibility of using computable phenotypes form the OneFlorida Data trust to identify a cohort of elderly individuals for an intervention aimed at maintaining resilience and independence of older adults. Finally, at UF I am building and leading a multi-collegiate, multi-departmental, multidisciplinary Brain Health Program. We provide outpatient consultations that included risk assessments (of genetic and modifiable factors), personalized interventions (lifestyle, behavioral, and medical), and annual surveillance (early disease detection). We will leverage the EMR-based ADRD prediction model

and CDS tools to target patients for referral, and also utilize the SCDS and CDS toolkit for Brain Health to standardize care to Best Practices, and to electronically capture data for outcomes studies.

B. Positions and Honors

Positions

1985-1986	Medical Intern, Mayo Graduate School of Medicine, Rochester, MN
1986-1989	Neurology Resident, Mayo Graduate School of Medicine, Rochester, MN
1989-1990	Honorary Clinical Fellow to Professor C.D. Marsden in Movement Disorders, Institute of Neurology, National Hospital, Queen Square, London (United Kingdom)
1990-1993	Senior Associate Consultant, Mayo Clinic and Associated Hospitals, Rochester, MN
1993-2009	Consultant, Mayo Clinic and Associated Hospitals, Rochester, MN
1997-2002	Associate Professor of Neurology, Mayo Medical School, Rochester, MN
2002-2009	Professor of Neurology, Mayo Medical School, Rochester, MN
2009-2009	Chair, Movement Disorders Division, Mayo Clinic (Arizona, Florida, and Minnesota)
2009-2018	Chairman, Department of Neurology, NorthShore University HealthSystem, Evanston, IL
2010-2018	Medical Director, Neurological Institute, NorthShore University HealthSystem, Evanston, IL
2018-	Professor, Department of Neurology, University of Florida, Gainesville, FL

Honors

1979-1985	Honors Program in Medical Education, Northwestern University, Evanston, IL
1989-1990	Mayo Foundation Scholarship
1997-2002	Member, Medical Advisory Board, Society for Progressive Supranuclear Palsy
2001-2004	Chair, Bylaws Committee, Movement Disorders Society
2002-2006	Editorial Board, *Movement Disorders*
2006-2010	Member, Neurological, Aging, Musculoskeletal Epidemiology (NAME) study section, NIH
2006-2010	International Executive Committee, Movement Disorders Society (elected member at large)
2007	Paul M. Silverstein Community Service Award, from the Methodist Hospital and Struthers Parkinson Center, Golden Valley, MN
2009-2010	Visiting Professor Faculty Appointment, University of Milano-Bicocca
2009-2018	Ruth Cain Ruggles Endowed Chair, NorthShore University HealthSystem
2010-2018	Clinical Professor of Neurology, University of Chicago
2012-2015	Editorial Board, *Parkinsonism and Related Disorders*
2014-2016	Member, Registry Committee, American Academy of Neurology
2015-	Fellow, American Academy of Neurology, by Board of Directors election
2018-	BJ and Eve Wilder Professorship in Alzheimer's Disease (Endowed Chair), University of Florida
2019	Program Builder Award, Norman Fixel Institute for Neurological Diseases, University of Florida
2019-	Chair, Florida State Health Improvement Plan (Priority Area 9, Alzheimer's and Related Disorders), subcommittee on creating awareness of modifiable risk factors that reduce the likelihood of developing ADRD and creating public awareness of health disparities between populations.

C. Contributions to Science

Performed the first high-resolution whole-genome association study of any neurological disorder

Parkinson's disease (PD) is a common age-related progressive neurodegenerative disorder. Over the last 15 years, advances have been made in our understanding of the etiology of the disease with the greatest insights perhaps coming from genetic studies, including our genome-wide association approaches. These large-scale studies allow the identification of genomic regions harboring common variants associated to disease risk. The first genome-wide association study on sporadic PD (or of any neurological disorder) was performed by my group in 2005 (see citations below).

1. **Maraganore DM**, de Andrade M, Lesnick TG, Strain KJ, Farrer MJ, Rocca WA, Pant PV, Frazer KA, Cox DR, Ballinger DG. High-resolution whole-genome association study of Parkinson disease. Am J Hum Genet. 2005 Nov;77(5):685-93. Epub 2005 Sep 9. PubMed PMID: 16252231; PubMed Central PMCID: PMC1271381.
2. Evangelou E, **Maraganore DM**, Ioannidis JP. Meta-analysis in genome-wide association datasets: strategies and application in Parkinson disease. PLoS One. 2007 Feb 7;2(2):e196. PubMed PMID: 17332845; PubMed Central PMCID: PMC1805816.
3. Lesnick TG, Papapetropoulos S, Mash DC, Ffrench-Mullen J, Shehadeh L, de Andrade M, Henley JR, Rocca WA, Ahlskog JE, **Maraganore DM**. A genomic pathway approach to a complex disease: axon guidance and Parkinson disease. PLoS Genet. 2007 Jun;3(6):e98. PubMed PMID: 17571925; PubMed Central PMCID: PMC1904362.

Founder and multi-year principal investigator of the Genetic Epidemiology of Parkinson Disease (GEO-PD) Consortium.

The GEO-PD Consortium was launched in 2004 through the Edmond J. Safra Global Genetics Consortia initiative and with funding from the Michael J. Fox Foundation. The goal was to form a collaborative team of investigators to tackle critical questions in the PD genetics field. The Consortium members collaborate and share findings to advance the understanding of the genetics and epidemiology of PD. The GEO-PD includes 60 sites from 30 countries and six continents. We share DNA and data for 41,988 PD cases and 41,505 control subjects. Many sites also conduct family studies, leading to the discovery of genes that cause familial PD. The main goal of GEO-PD is to perform large-scale genetic association studies and serve as a replication engine to test the significance of discoveries in the PD genetics research field. 25+ papers have been published by the group (4 recent listed below).

1. Wang L, Heckman MG, Aasly JO, Annesi G, Bozi M, Chung SJ, Clarke C, Crosiers D, Eckstein G, Garraux G, Hadjigeorgiou GM, Hattori N, Jeon B, Kim YJ, Kubo M, Lesage S, Lin JJ, Lynch T, Lichtner P, Mellick GD, Mok V, Morrison KE, Quattrone A, Satake W, Silburn PA, Stefanis L, Stockton JD, Tan EK, Toda T, Brice A, Van Broeckhoven C, Uitti RJ, Wirdefeldt K, Wszolek Z, Xiromerisiou G, **Maraganore DM**, Gasser T, Krüger R, Farrer MJ, Ross OA, Sharma M; GEOPD Consortium. Evaluation of the interaction between LRRK2 and PARK16 loci in determining risk of Parkinson's disease: analysis of a large multicenter study. Neurobiol Aging. 2017 Jan;49:217.e1-217.e4. doi: 10.1016/j.neurobiolaging.2016.09.022. Epub 2016 Oct 6. PubMed PMID: 27814993; PubMed Central PMCID: PMC5154911.
2. Wang L, Aasly JO, Annesi G, Bardien S, Bozi M, Brice A, Carr J, Chung SJ, Clarke C, Crosiers D, Deutschländer A, Eckstein G, Farrer MJ, Goldwurm S, Garraux G, Hadjigeorgiou GM, Hicks AA, Hattori N, Klein C, Jeon B, Kim YJ, Lesage S, Lin JJ, Lynch T, Lichtner P, Lang AE, Mok V, Jasinska-Myga B, Mellick GD, Morrison KE, Opala G, Pihlstrøm L, Pramstaller PP, Park SS, Quattrone A, Rogaeva E, Ross OA, Stefanis L, Stockton JD, Silburn PA, Theuns J, Tan EK, Tomiyama H, Toft M, Van Broeckhoven C, Uitti RJ, Wirdefeldt K, Wszolek Z, Xiromerisiou G, Yueh KC, Zhao Y, Gasser T, **Maraganore DM**, Krüger R, Sharma M; GEO-PD Consortium. Large-scale assessment of polyglutamine repeat expansions in Parkinson disease. Neurology. 2015 Oct 13;85(15):1283-92. doi: 10.1212/WNL.0000000000002016. Epub 2015 Sep 9. PubMed PMID: 26354989; PubMed Central PMCID: PMC4617164.
3. Theuns J, Verstraeten A, Sleegers K, Wauters E, Gijselinck I, Smolders S, Crosiers D, Corsmit E, Elinck E, Sharma M, Krüger R, Lesage S, Brice A, Chung SJ, Kim MJ, Kim YJ, Ross OA, Wszolek ZK, Rogaeva E, Xi Z, Lang AE, Klein C, Weissbach A, Mellick GD, Silburn PA, Hadjigeorgiou GM, Dardiotis E, Hattori N, Ogaki K, Tan EK, Zhao Y, Aasly J, Valente EM, Petrucci S, Annesi G, Quattrone A, Ferrarese C, Brighina L, Deutschländer A, Puschmann A, Nilsson C, Garraux G, LeDoux MS, Pfeiffer RF, Boczarska-Jedynak M, Opala G, **Maraganore DM**, Engelborghs S, De Deyn PP, Cras P, Cruts M, Van Broeckhoven C; GEO-PD Consortium.. Global investigation and meta-analysis of the C9orf72 (G4C2)n repeat in Parkinson disease. Neurology. 2014 Nov 18;83(21):1906-13. doi: 10.1212/WNL.0000000000001012. Epub 2014 Oct 17. PubMed PMID: 25326098; PubMed Central PMCID: PMC4248456.
4. Heckman MG, Elbaz A, Soto-Ortolaza AI, Serie DJ, Aasly JO, Annesi G, Auburger G, Bacon JA, Boczarska-Jedynak M, Bozi M, Brighina L, Chartier-Harlin MC, Dardiotis E, Destée A, Ferrarese C, Ferraris A, Fiske B, Gispert S, Hadjigeorgiou GM, Hattori N, Ioannidis JP, Jasinska-Myga B, Jeon BS, Kim YJ, Klein C, Kruger R, Kyratzi E, Lin CH, Lohmann K, Loriot MA, Lynch T, Mellick GD, Mutez E, Opala G, Park SS, Petrucci S, Quattrone A, Sharma M, Silburn PA, Sohn YH, Stefanis L, Tadic V, Tomiyama H, Uitti RJ, Valente EM, Vassilatis DK, Vilariño-Güell C, White LR, Wirdefeldt K, Wszolek ZK, Wu RM, Xiromerisiou G, **Maraganore DM**, Farrer MJ, Ross OA; Genetic Epidemiology Of Parkinson's Disease (GEO-PD) Consortium. Protective effect of LRRK2 p.R1398H on risk of Parkinson's disease is independent of MAPT and SNCA variants. Neurobiol Aging. 2014 Jan;35(1):266.e5-14. doi:10.1016/j.neurobiolaging.2013.07.013. Epub 2013 Aug 17. PubMed PMID: 23962496; PubMed Central PMCID: PMC3829604.

First to identify α-synuclein gene (SNCA) promotor polymorphisms as risk factor for PD worldwide.

In 1997, the PD field was transformed by the discovery that a point mutation in the *SNCA* gene is a cause of familial parkinsonism. While the mutation discovered was very rare, within weeks it was discovered that alpha-synuclein is a principle protein component of Lewy bodies, the pathological hallmark of PD. Our group subsequently demonstrated that while the *SNCA* point mutations or multiplication mutations that cause familial parkinsonism are very rare, that common variations in the *SNCA* gene are reproducibly associated with susceptibility to PD in populations worldwide (reference 1 below). Specifically, we demonstrated that short,

intermediate, and long allele length variations in the dinucleotide repeat sequence REP1, within the core 5′ promoter of the *SNCA* gene, occurred with different frequencies in PD cases versus controls. Genotypes defined by short alleles were associated with a reduced risk for PD, while genotypes defined by long alleles were associated with an increased risk for PD. Indeed, there was a two-fold difference in PD susceptibility between persons homozygous for short alleles versus persons homozygous for long alleles.

1. **Maraganore DM**, de Andrade M, Elbaz A, Farrer MJ, Ioannidis JP, Krüger R, Rocca WA, Schneider NK, Lesnick TG, Lincoln SJ, Hulihan MM, Aasly JO, Ashizawa T, Chartier-Harlin MC, Checkoway H, Ferrarese C, Hadjigeorgiou G, Hattori N, Kawakami H, Lambert JC, Lynch T, Mellick GD, Papapetropoulos S, Parsian A, Quattrone A, Riess O, Tan EK, Van Broeckhoven C; Genetic Epidemiology of Parkinson's Disease (GEO-PD) Consortium. Collaborative analysis of alpha-synuclein gene promoter variability and Parkinson disease. JAMA. 2006 Aug 9;296(6):661-70. PubMed PMID: 16896109.
2. Singleton AB, Farrer M, Johnson J, Singleton A, Hague S, Kachergus J, Hulihan M, Peuralinna T, Dutra A, Nussbaum R, Lincoln S, Crawley A, Hanson M, **Maraganore D**, Adler C, Cookson MR, Muenter M, Baptista M, Miller D, Blancato J, Hardy J, Gwinn-Hardy K. Alpha-Synuclein locus triplication causes Parkinson's disease. Science. 2003 Oct 31;302(5646):841. PMID: 14593171

Principal investigator of "The DodoNA Project: DNA Prediction to Improve Neurological Health"

"DodoNA" is a metaphor. Dodona was an oracle of ancient Greece, where priestesses interpreted the rustling leaves of a sacred oak tree to predict the future and to guide actions to improve fate. Just as at Dodona, we can interpret subtle variations in DNA, the "tree of life," to improve neurological health. Specifically, with intramural funding support, at the Department of Neurology at NorthShore University HealthSystem (where I was the Chair) we developed medical informatics tools to capture standardized data via routine office visits that measure the progression and outcomes of patients with the following neurological disorders: brain tumors, epilepsy, memory disorders, migraine, mild traumatic brain injury, multiple sclerosis, neuropathy, PD, restless legs syndrome and stroke. We also studied persons who are neurologically healthy but at increased risk for Alzheimer's disease and related brain disorders (brain health). Although DodoNA was a clinical practice initiative (note-writing and workflow efficiencies) and a quality initiative (best practices), it was also a research initiative. We enrolled up to 1,000 subjects for each of the 11 projects (11,000 subjects total) to provide, via informed consent, a blood sample for DNA extraction and storage. We then associated information in their blood with information in their medical record (to develop molecular prognostics and therapeutics). The DodoNA Project is ongoing.

The specific goals of the DodoNA project are to:

- Identify DNA fingerprints that predict outcomes in patients with neurological disorders
- Identify DNA fingerprints that predict therapeutic responses in patients with neurological disorders
- Identify DNA targets for the development of new disease modifying therapies.

Founder and principal investigator of the Neurology Practice Based Research Network (NPBRN).

The NPBRN was launched in 2013 with the goal to advance quality improvement and practice-based research in neurology using the EMR. There are few EMR tools available to standardize neurology office visits according to Best Practices, to provide alerts when neurological care is deviating from American Academy of Neurology (AAN) guidelines, to capture data regarding adherence to AAN or other quality parameters, to measure the effects of compliance with guidelines on outcomes, or to share longitudinal data and to compare effectiveness of care across neurological practices. The Department of Neurology at NorthShore University HealthSystem (NorthShore) built into its commercial EMR "Epic" structured clinical documentation support (SCDS) and clinical decision support (CDS) tools that standardize care, write progress notes, and capture up to 1,000 discrete and cascading fields of neurological data per office visit. With funding from the Agency for Healthcare Research and Quality (AHRQ) in 2015, we are sharing SCDS and CDS tools for 10 common neurological disorders (brain tumors, epilepsy, migraine, mild cognitive impairment, mild traumatic brain injury, multiple sclerosis, neuropathy, PD, restless legs syndrome, and stroke) and for brain health (primary prevention of Alzheimer's disease) with 15 Departments of Neurology that also use the Epic EMR platform. We are also conducting at the NorthShore site pragmatic trials to demonstrate the feasibility of subgroup based adaptive assignment of treatments, electronic consenting, and outcomes data capture at the point of care using the EMR. We will identify the most effective treatments for common neurological disorders and seek replication by the NPBRN. 10+ papers are published (with the 5 most relevant ones to brain health and cognitive aging and memory cited below).

1. Simon KC, Yucus C, Castle J, Chesis R, Lai R, Hillman L, Tideman S, Garduno L, Meyers S, Frigerio R, **Maraganore DM**. Building of EMR Tools to Support Quality and Research in a Memory Disorders Clinic. Front Neurol. 2019 Mar 7;10:161. doi: 10.3389/fneur.2019.00161. eCollection 2019. PMID: 30899241
2. Simon KC, Tideman S, Hillman L, Lai R, Jathar R, Ji Y, Bergman-Bock S, Castle J, Franada T, Freedom T, Marcus R, Mark A, Meyers S, Rubin S, Semenov I, Yucus C, Pham A, Garduno L, Szela M, Frigerio R, **Maraganore DM**. Design and implementation of pragmatic clinical trials using the electronic medical record and an adaptive design. JAMIA Open. 2018 Jul;1(1):99-106. doi: 10.1093/jamiaopen/ooy017. Epub 2018 Jun 11. PMID: 30386852
3. Use of an Electronic Medical Record to Track Adherence to the Mediterranean Diet in a US Neurology Clinical Practice. Rasmussen E, Fosnacht Morgan AM, Munson R, Ong A, Patel S, Yucus C, Pham A, Patel V, Frigerio R, Lai R, Hillman L, Tideman S, Wang C, Simon KC, Martínez-González MÁ, **Maraganore DM**. Mayo Clin Proc Innov Qual Outcomes. 2018 Feb 1;2(1):49-59. doi: 10.1016/j.mayocpiqo.2017.12.003. eCollection 2018 Mar. PMID: 30225432
4. From Brain Disease to Brain Health: Primary Prevention of Alzheimer's Disease and Related Disorders in a Health System Using an Electronic Medical Record-Based Approach. Fosnacht AM, Patel S, Yucus C, Pham A, Rasmussen E, Frigerio R, Walters S, **Maraganore D**. J Prev Alzheimers Dis. 2017;4(3):157-164. doi: 10.14283/jpad.2017.3. PMID: 28856120

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

Agency for Healthcare Research and Quality (AHRQ); Maraganore (PI); 05/01/15-04/30/20
Quality Improvement and Practice Based Research in Neurology Using the EMR
Aim 1: We will create a national network for quality improvement and practice based patient-centered outcomes research in Neurology using the electronic medical record (EMR) to make health care safer and to improve healthcare efficiency, in keeping with the mission and priority areas of the Agency for Healthcare Research and Quality. Aim 2: We will conduct pragmatic trials using the EMR and subgroup-based adaptive design tools that determine which treatments are most effective for specific patients, individualizing medicine at the point of care.

Florida Health Ed and Ethel Moore Grant; Maraganore (PI); 12/14/18-12/14/20
Utilizing Data from the Electronic Medical Record to Predict Alzheimer's and Dementia Risk
Aim 1: We will utilize data captured by the EMR at UF, to develop a cognitive impairment/dementia/AD prediction model (UF AD prediction model). Aim 2: We will replicate the model using historical data captured by the EMRs at OneFlorida Clinical Research Consortium sites (http://onefloridaconsortium.org). Aim 3: If the model is replicated, we will integrate it into the UF EMR and build CDS tools that identify patients at highest risk for cognitive disorders and guide referral by PCPs to brain health specialists. Aim 4: We will share the model and CDS tools with other OneFlorida sites.

University of Florida Moonshot grant; Maraganore (PI); 3/1/19-2/28/21.
Understanding Resistance, Resilience and Repair in the Health Span: The Over 90 Moonshot
Aim 1: to identify informatics-based computable phenotypes that enable identification of individuals over the age of 90 who have successfully aged by mining medical and social determinants of health information available within OneFlorida Data Trust. Aim 2: to directly assess both the resources needed to re-contact individuals within the over 90 cohort and the participation rate of those contacted. Aim 3: to conduct a pilot study to inform on the feasibility of using computable phenotypes form the OneFlorida Data trust to identify a cohort of elderly individuals for an intervention aimed at maintaining resilience and independence of older adults.

Completed Research Support (past three years):
Not applicable

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. DO NOT EXCEED FIVE PAGES.

NAME: Porges, Eric

eRA COMMONS USER NAME (credential, e.g., agency login): eporges

POSITION TITLE: Assistant Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	END DATE MM/YYYY	FIELD OF STUDY
Hampshire College, Amherst, MA	BA	01/2004	Cognitive Science
University of Chicago, Chicago, IL	MA	09/2012	Neuroscience
University of Chicago, Chicago, Illinois	PHD	08/2013	Neuroscience
University of Florida, Gainesville, FL	Postdoctoral Fellow	12/2015	Neuroscience of Alcohol & HIV

A. Personal Statement

Dr. Porges is currently an Assistant Professor in the Department of Clinical and Health Psychology at the University of Florida, a member of the Center for Cognitive Aging and Memory, an investigator on many ongoing studies of cognitive aging, and PI of an NIH K01 grant exploring cognitive and neurophysiological consequences of heavy drinking in people living with HIV. He has collaborated with Drs. Williamson and Lamb for over 5 years on a program of research employing transcutaneous vagal nerve stimulation (tVNS) in the context of PTSD and other anxiety spectrum disorders. He has expertise in the collection, analysis and interpretation of autonomic psychophysiological data in both laboratory and ecological ambulatory environments. He uses these methods to explore individual differences in central and peripheral response to stressors, with an emphasis on the ANS as a modulator of these responses. He has been integral in the development and implementation of transcutaneous vagal nerve stimulation (tVNS) at the University of Florida. He has been awarded an NIH/NIA R21 with Drs. Williamson (PI) and Lamb for the development of tVNS methodology in a mild cognitive impairment cohort, and recently was notified that a Veterans Administration Merit (R01 equivariant) would be funded supporting further application of tVNS in PTSD (Williamson PI). He has extensive experience in the design, collection, analysis and interpretation of Magnetic Resonance Imaging data, specifically fMRI, MRI, GABA MRS & DTI. For three years, he has served on the planning committee for the International Symposium on MR Spectroscopy of GABA and has hosted subsections, including those focused on GABA MRS in specific populations (e.g. aging). His doctoral training was in the field of Integrative Neuroscience, and was completed at the University of Chicago under the mentorship of Dr. Jean Decety.

He is collaborating on an ongoing pharmacological intervention for cognitive enhancement in older adults. In this project, he has been responsible of the deployment of at-home ambulatory autonomic biosensors for 24-hour monitoring periods. Prior to his current academic appointment, Dr. Porges consulted for market research company Lightwave.io, where he provided expertise in the design, implementation and interpretation of consumer research using wearable autonomic biosensor devices. Client projects he consulted on included Proctor & Gamble, and Jaguar Motorcars.

1. Porges EC, Woods AJ, Lamb DG, Williamson JB, Cohen RA, Edden RAE, Harris AD. Impact of tissue correction strategy on GABA-edited MRS findings. Neuroimage. 2017 Nov 15;162:249-256. PubMed PMID: 28882635; PubMed Central PMCID: PMC5705271.
2. Porges EC, Woods AJ, Edden RA, Puts NA, Harris AD, Chen H, Garcia AM, Seider TR, Lamb DG, Williamson JB, Cohen RA. Frontal Gamma-Aminobutyric Acid Concentrations Are Associated With Cognitive Performance in Older Adults. Biol Psychiatry Cogn Neurosci Neuroimaging. 2017 Jan;2(1):38-44. PubMed PMID: 28217759; PubMed Central PMCID: PMC5312683.
3. Woods AJ, Porges EC, Bryant VE, Seider T, Gongvatana A, Kahler CW, de la Monte S, Monti PM, Cohen RA. Current Heavy Alcohol Consumption is Associated with Greater Cognitive Impairment in

Older Adults. Alcohol Clin Exp Res. 2016 Nov;40(11):2435-2444. PubMed PMID: 27658235; PubMed Central PMCID: PMC5113749.

4. Carter CS, Porges EC. Parenthood, stress, and the brain. Biol Psychiatry. 2011 Nov 1;70(9):804-5. PubMed PMID: 21986092.

B. Positions and Honors

Positions and Employment

1999 - 2002	Emergency Medical Technician, Hampshire College Emergency Medical Services, Amherst, MA
2001 - 2002	Director of Hampshire College Emergency Medical Services, Hampshire College Emergency Medical Services, Amherst, MA
2002 - 2002	Project Manager, Greenleaf Medical, Palo Alto, CA
2003 - 2003	Intern, Beckman Institute for Advanced Science and Technology, University of Illinois at Urbana-Champaign, Urbana, IL
2004 - 2005	Research Coordinator , University of Illinois at Chicago, Chicago, IL
2006 - 2008	Lab Manager, Social Cognitive Neuroscience Lab, University of Chicago, Chicago, IL
2008 - 2013	Graduate Student, Integrative Neuroscience program, Department of Psychology, University of Chicago, Chicago, IL
2013 - 2015	Postdoctoral Associate, Center for Cognitive Aging and Memory, Institute on Aging, Department of Aging and Geriatric Research, University of Florida, Gainesville, FL
2016 -	Assistant Professor, Center for Cognitive Aging and Memory, Department of Clinical and Health Psychology, College of Public Health and Health Professions, University of Florida, Gainesville, FL

Other Experience and Professional Memberships

2010 -	Member, Society for Neuroscience
2011 -	Member, Society for Social Neuroscience
2011 -	Ad Hoc Reviewer, International Journal Psychophysiology
2012 -	Member, Cognitive Neuroscience Society
2012 -	Member, Society for Psychophysiological Research
2012 -	Social Neuroscience, Ad Hoc Reviewer
2013 -	Ad Hoc Reviewer, Developmental Review
2014 -	Review Editorial Board, Frontiers in Psychology; Emotion Science
2015 -	Review Editorial Board, Frontiers in Psychology, section Psychology for Clinical Settings
2015 -	Ad Hoc Reviewer, Experimental Gerontology

Honors

2010	Norman Henry Anderson Award, Department of Psychology at the University of Chicago
2011	Research Award, University of Chicago Psychology graduate student organization
2011	Norman Henry Anderson Award, Department of Psychology at the University of Chicago
2012	Student Poster Award, Society for Psychophysiological Research
2012	Travel Award, University of Chicago Psychology graduate student organization
2012	Norman Henry Anderson Award, Department of Psychology at the University of Chicago
2016	CTSA Institutional K Scholar, University of Florida

C. Contribution to Science

1. Neurocognitive aging: Neurochemical and anatomical changes that are protected by social behaviors are associated with changes in GABA concentrations and accelerated by physiological challenges such as HIV. My research has developed a theoretical framework to explain and predict these associated changes. Below are examples of recent work that investigates cognitive aging in a healthy aging cohort and an HIV+ population.

a. Porges EC, Woods AJ, Lamb DG, Williamson JB, Cohen RA, Edden RAE, Harris AD. Impact of tissue correction strategy on GABA-edited MRS findings. Neuroimage. 2017 Nov 15;162:249-256. PubMed PMID: 28882635; PubMed Central PMCID: PMC5705271.

b. Porges EC, Woods AJ, Edden RA, Puts NA, Harris AD, Chen H, Garcia AM, Seider TR, Lamb DG, Williamson JB, Cohen RA. Frontal Gamma-Aminobutyric Acid Concentrations Are Associated With Cognitive Performance in Older Adults. Biol Psychiatry Cogn Neurosci Neuroimaging. 2017 Jan;2(1):38-44. PubMed PMID: 28217759; PubMed Central PMCID: PMC5312683.

c. Seider TR, Gongvatana A, Woods AJ, Chen H, Porges EC, Cummings T, Correia S, Tashima K, Cohen RA. Age exacerbates HIV-associated white matter abnormalities. J Neurovirol. 2016 Apr;22(2):201-12. PubMed PMID: 26446690; PubMed Central PMCID: PMC4783252.

d. Seider TR, Fieo RA, O'Shea A, Porges EC, Woods AJ, Cohen RA. Cognitively Engaging Activity Is Associated with Greater Cortical and Subcortical Volumes. Front Aging Neurosci. 2016;8:94. PubMed PMID: 27199740; PubMed Central PMCID: PMC4852201.

2. Autonomic Nervous System (ANS) research (including skin conductance), design, implementation, analysis and interpretation: Dr. Porges has extensive research expertise and experience utilizing ANS measures to characterize and predict individual differences in ANS response to cognitive and social challenges as well as in the context of endocrine response (Cortisol and Testosterone), genetics, pathology, and pharmacological intervention. Study a) written with Co-Is Williamson and Lamb, articulates a theoretical framework for modulating the ANS to improve PTSD outcomes. Study b) utilized ANS activity to predict salivary endocrine (cortisol and testosterone) response to a social stressor (observed violence). Study c) written with Co-I Beaversdorf, employed a propranolol intervention in Autism Spectrum Disorder and explored alterations in ANS function in the context of social behavior. Study d) written with Co-Is Williamson and Lamb, employed tVNS to impact ANS function and PTSD symptoms.

a. Lamb DG, Porges EC, Lewis GF, Williamson JB. Non-invasive Vagal Nerve Stimulation Effects on Hyperarousal and Autonomic State in Patients with Posttraumatic Stress Disorder and History of Mild Traumatic Brain Injury: Preliminary Evidence. Front Med (Lausanne). 2017;4:124. PubMed PMID: 28824913; PubMed Central PMCID: PMC5534856.

b. Zamzow RM, Ferguson BJ, Stichter JP, Porges EC, Ragsdale AS, Lewis ML, Beversdorf DQ. Effects of propranolol on conversational reciprocity in autism spectrum disorder: a pilot, double-blind, single-dose psychopharmacological challenge study. Psychopharmacology (Berl). 2016 Apr;233(7):1171-8. PubMed PMID: 26762378.

c. Porges EC, Smith KE, Decety J. Individual differences in vagal regulation are related to testosterone responses to observed violence. Front Psychol. 2015;6:19. PubMed PMID: 25759673; PubMed Central PMCID: PMC4338751.

d. Williamson JB, Porges EC, Lamb DG, Porges SW. Maladaptive autonomic regulation in PTSD accelerates physiological aging. Front Psychol. 2014;5:1571. PubMed PMID: 25653631; PubMed Central PMCID: PMC4300857.

3. Neuroendocrine function: Neuroendocrine (including salivary Cortisol) functions related to individual variability in response to high intensity social stimuli can impact the quality of interpersonal relationships and health outcomes. At the extremes, these differences can be associated with resiliency and health. I have had a long-term interest in exploring central and peripheral physiological predictors (e.g., parasympathetic activity) of individual differences in response to high-intensity social stimuli (e.g., violence and parental interaction). Note: Smith and Porges are co-first authors on "Oxytocin receptor gene variation predicts empathic concern and autonomic arousal while perceiving harm to others."

a. Ebner NC, Chen H, Porges E, Lin T, Fischer H, Feifel D, Cohen RA. Oxytocin's effect on resting-state functional connectivity varies by age and sex. Psychoneuroendocrinology. 2016 Jul;69:50-9. PubMed PMID: 27032063; PubMed Central PMCID: PMC4942126.

b. Porges EC, Smith KE, Decety J. Individual differences in vagal regulation are related to testosterone responses to observed violence. Front Psychol. 2015;6:19. PubMed PMID: 25759673; PubMed Central PMCID: PMC4338751.

c. Smith KE, Porges EC, Norman GJ, Connelly JJ, Decety J. Oxytocin receptor gene variation predicts empathic concern and autonomic arousal while perceiving harm to others. Soc Neurosci. 2014 Feb;9(1):1-9. PubMed PMID: 24295535; PubMed Central PMCID: PMC3923324.

d. Carter CS, Porges EC. Parenthood, stress, and the brain. Biol Psychiatry. 2011 Nov 1;70(9):804-5. PubMed PMID: 21986092.

4. Individual differences in central and peripheral nervous system response to violent stimuli: Violence is a salient stimulus and an important environmental signal with survival consequences, conveying information about potential threats to personal health and safety. This research employed a multilevel approach to identify features that contribute to individual differences in peripheral and central physiological responses to observed violence. Studies (a) and (b) employed behavioral manipulations that altered the within-subject relationship to violent stimuli. Study (c) employed functional connectivity analyses of brain imaging data and demonstrated that the modulation of neurophysiological recruitment of specific brain areas was related to individual differences in subjective appraisals. Study (d) employed measures of peripheral physiology to demonstrate an inverse relationship between parasympathetic tone and testosterone release to observed violence, demonstrating the influence of autonomic regulation on physiological response to external stimuli. The work presented here demonstrates across different methods that individual responses to observed violence can be predicted by preexisting traits and manipulated by altering a participant's relationship to the stimuli.

   a. Porges EC, Smith KE, Decety J. Individual differences in vagal regulation are related to testosterone responses to observed violence. Front Psychol. 2015;6:19. PubMed PMID: 25759673; PubMed Central PMCID: PMC4338751.

   b. Porges EC, Decety J. Violence as a source of pleasure or displeasure is associated with specific functional connectivity with the nucleus accumbens. Front Hum Neurosci. 2013;7:447. PubMed PMID: 23964226; PubMed Central PMCID: PMC3741555.

   c. Decety J, Porges EC. Imagining being the agent of actions that carry different moral consequences: an fMRI study. Neuropsychologia. 2011 Sep;49(11):2994-3001. PubMed PMID: 21762712.

   d. Lamm C, Porges EC, Cacioppo JT, Decety J. Perspective taking is associated with specific facial responses during empathy for pain. Brain Res. 2008 Aug 28;1227:153-61. PubMed PMID: 18619426.

5. Traumatic brain injury (TBI): Patients with TBI often develop Post-Traumatic Stress Disorder (PTSD). This syndrome, defined and diagnosed by psychological and behavioral features, is associated with symptoms such as anxiety, anger, increased arousal, and vigilance, as well as flashbacks and nightmares. Several of the symptoms observed in PTSD may be in part the result of altered autonomic nervous system (ANS) activity in response to psychological and physical challenges. Brain imaging has documented that TBI often induces white matter damage to pathways associated with the anterior limb of the internal capsule and uncinate fasciculus. Since these white matter structures link neocortical networks with subcortical and limbic structures that regulate autonomic control centers, injury to these pathways may induce a loss of inhibitory control of the ANS. Our work suggests that TBI-induced damage to networks that regulate the ANS increase vulnerability to PTSD. This provides the possibility that vulnerability to PTSD can be measured in patients with TBI.

   a. Lamb DG, Porges EC, Lewis GF, Williamson JB. Non-invasive Vagal Nerve Stimulation Effects on Hyperarousal and Autonomic State in Patients with Posttraumatic Stress Disorder and History of Mild Traumatic Brain Injury: Preliminary Evidence. Front Med (Lausanne). 2017;4:124. PubMed PMID: 28824913; PubMed Central PMCID: PMC5534856.

   b. Falchook AD, Porges EC, Nadeau SE, Leon SA, Williamson JB, Heilman KM. Cognitive-motor dysfunction after severe traumatic brain injury: A cerebral interhemispheric disconnection syndrome. J Clin Exp Neuropsychol. 2015;37(10):1062-73. PubMed PMID: 26340588.

   c. Williamson JB, Porges EC, Lamb DG, Porges SW. Maladaptive autonomic regulation in PTSD accelerates physiological aging. Front Psychol. 2014;5:1571. PubMed PMID: 25653631; PubMed Central PMCID: PMC4300857.

d. Williamson JB, Heilman KM, Porges EC, Lamb DG, Porges SW. A possible mechanism for PTSD symptoms in patients with traumatic brain injury: central autonomic network disruption. Front Neuroeng. 2013 Dec 19;6:13. PubMed PMID: 24391583; PubMed Central PMCID: PMC3867662.

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

K01 AA025306-01A1, NIH/NIAAA
2017-2022
Cognitive and functional deficits associated with reduced cortical GABA in HIV-infected heavy drinkers. This project will investigate important hypotheses regarding the relationship between regional cerebral GABA concentrations and cognitive flexibility in HIV+ heavy drinkers.
Role: PI

R01AG054077-04, NIH/NIA
2016-2021
This randomized clinical trial examines the effect of augmenting cognitive training with transcranial direct current stimulation to maximize cognitive and functional outcomes older adults experiencing age-related cognitive decline. Change in well-validated measures of everyday abilities and neurocognitive function will serve as outcome measures. Functional and structural neuroimaging biomarkers of neural plasticity and learning (fMRI, GABA MRS, etc.) will measure intervention-associated alterations in specific brain regions impacted by cognitive aging.
Role: CO-I

R21AG054876, NIH/NIA
2017-2019
Treatment of mild cognitive impairment with transcutaneous vagal nerve stimulation. The goal of this funding is to determine if tVNS can enhance cognitive performance during stimulation in patients with amnestic mild cognitive impairment and whether structural changes in brain regions relevant for memory encoding (e.g., hippocampus) predict response.
Role: CO-I

Center for Cognitive Aging and Memory Pilot
2019-2019
Exploration of alterations of cortical excitability induced by non-invasive vagal nerve stimulation. The goal of this funding is to provide pilot data for the effect of transcutaneous vagal nerve stimulation on transcranial magnetic stimulation (TMS)-induced motor evoked potentials.
Role: PI

R01DK099334, NIH/NIDDK
2014-2019
Obesity and type-2 diabetes: bariatric surgery effects on brain function.
Role: CO-I

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. DO NOT EXCEED FIVE PAGES.

NAME: Woods, Adam

eRA COMMONS USER NAME (credential, e.g., agency login): ajwoods

POSITION TITLE: Associate Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	END DATE MM/YYYY	FIELD OF STUDY
University of Alabama at Birmingham, Birmingham, AL	BS	05/2003	Psychology
George Washington University, Washington, DC	PHD	05/2010	Cognitive Neuroscience
University of Pennsylvania, Philadelphia, PA	Postdoctoral Fellow	06/2013	Cognitive Neuroscience

A. Personal Statement

Dr. Woods is Associate Director of the Center for Cognitive Aging and Memory (CAM) in the McKnight Brain Institute at UF. Dr. Woods is also an Associate Professor in the Department of Clinical and Health Psychology at UF, with a joint appointment to Neuroscience. He is a cognitive neuroscientist with expertise in non-invasive brain stimulation, neuroimaging, and cognitive training for working memory and speed of processing/attention. He is a national leader in the field of neuromodulation, leading the largest transcranial electrical stimulation (tES) and near infrared photobiomodulation trials to date, multiple cognitive training trials, publishing the first comprehensive textbook in the field of tES, and multiple field standards papers. Dr. Woods' research specifically focuses on discovery and application of novel non-invasive interventions for enhancing cognitive function in adults with and without neurodegenerative disease. Dr. Woods has expertise in multi-disciplinary cognitive neuroscience methodologies (MRI/fMRI, electrophysiology, non-invasive brain stimulation), extensive experience with aging-related cognitive disorders, cognitive training applications, and past research with neurological diseases. Over the past five years, Dr. Woods has established one of the largest and most well-funded neuromodulation laboratories in the United States. He is PI of the first and largest phase III RCT for tES using transcranial direct current stimulation (tDCS) and cognitive training, the ACT study (R01AG054077, n=360), the largest phase II near infrared photobiomodulation trial (R01AG064587, n=168), one of the largest phase II tES trials, the Stimulated Brain Study (K01AG054077, n=80), as well as an R21 and U01 investigating the effects of neuromodulation on the aging brain (R21MH112206, U01AG062368). He also serves as co-I on multiple other NIH funded grants focused on neuromodulation of cognitive aging, chronic pain, and mobility using transcranial electrical stimulation (RF1MH114290, R37AG033906, R21AG053736). Each of these studies attempts to enhance cognitive and brain function to improve through neuromodulation.

a. Nissim N, O'Shea A, Indahlastari A, Telles R, Richards L, Porges E, Cohen R, Woods AJ. Effects of in-scanner bilateral frontal tDCS on functional connectivity of the working memory network in older adults. Front Aging Neurosci. 2019 Mar 15;11: 51. PubMed PMID: 30930766; PubMed Central PMCID: PMC6428720

b. Woods AJ, Cohen R, Marsiske M, Alexander GE, Czaja SJ, Wu S. Augmenting cognitive training in older adults (The ACT Study): Design and Methods of a Phase III tDCS and cognitive training trial. Contemp Clin Trials. 2017 Dec 5;65:19-32. PubMed PMID: 29313802.

c. Nissim N, Nissim N, O'Shea A, Indahlastari A, Telles R, Richards L, Porges E, Cohen R, Woods AJ. Effects of in-scanner bilateral frontal tDCS on functional connectivity of the working memory network in older adults. Front Aging Neurosci. 2019 in press. PubMed PMID: pending.

d. Woods AJ, Antal A, Bikson M, Boggio PS, Brunoni AR, Celnik P, Cohen LG, Fregni F, Herrmann CS, Kappenman ES, Knotkova H, Liebetanz D, Miniussi C, Miranda PC, Paulus W, Priori A, Reato D, Stagg C, Wenderoth N, Nitsche MA. A technical guide to tDCS, and related non-invasive brain stimulation tools. Clin Neurophysiol. 2016 Feb;127(2):1031-1048. PubMed PMID: 26652115; PubMed Central PMCID: PMC4747791.

B. Positions and Honors

Positions and Employment

2010 - 2013	Post-doctoral Fellow, University of Pennsylvania, Philadelphia, PA
2013 -	Assistant Professor, University of Florida, Gainesville, FL
2014 -	Assistant Director, Center for Cognitive Aging and Memory, Gainesville, FL

Other Experience and Professional Memberships

2005 -	Member, Association for Psychological Science
2005 -	Member, International Neuropsychological Society
2010 -	Member, Society for Neuroscience
2014 -	Junior Fellow, World Academy of Arts and Sciences
2015 -	Ad Hoc Reviewer, US Veteran's Administration
2016 -	Ad Hoc Reviewer, National Institutes of Health
2016 -	Member, American Psychological Association

Honors

2006 - 2009	Graduate Research Fellowship , National Science Foundation
2008 - 2008	Research Enhancement Fund , George Washington University
2009 - 2010	Thelma Hunt Research Fellowship, George Washington University
2010 - 2013	Post-doctoral Fellowship, Intellectual and Developmental Disabilities Research Center, Children's Hospital of Philadelphia
2014 - 2016	KL2 Scholar, University of Florida Clinical Translational Science Institute
2015 - 2015	Young Investigator Award in Neuromodulation, NYC Neuromodulation 2015

C. Contribution to Science

Transcranial Electrical Stimulation. Over the past eight years, I have focused my research on the technical and basic science application of non-invasive electrical brain stimulation techniques as novel interventions for enhancement of cognitive function. This work includes both transcranial direct current stimulation and transcranial magnetic stimulation. To further the field, I co-founding a CME certified practical training course in tES that has trained over 950 researchers and students to safely and consistently apply this method of non-invasive brain stimulation. I have published numerous field standards papers aimed at enhancing replicability and safety for the method and the first textbook in the field, in addition to exploring its impact on a variety of cognitive functions in the brain. I was awarded the 2015 NYC Neuromodulation Young Investigator Award for my scientific and educational contributions to the field. Furthermore, I am also PI of the first Phase III tDCS randomized clinical trial, as well as the largest tDCS study to date. Collectively, this work provides me with a strong foundation in the technical elements and application standards of tES.

a. McLaren ME, Nissim NR, Woods AJ. The effects of medication use in transcranial direct current stimulation: A brief review. Brain Stimul. 2018 Jan - Feb;11(1):52-58. PubMed PMID: 29066167; PubMed Central PMCID: PMC5729094.

b. Szymkowicz SM, McLaren ME, Suryadevara U, Woods AJ. Transcranial Direct Current Stimulation Use in the Treatment of Neuropsychiatric Disorders: A Brief Review. Psychiatr Ann. 2016 Nov;46(11):642-646. PubMed PMID: 27885309; PubMed Central PMCID: PMC5117191.

c. Bikson M, Grossman P, Thomas C, Zannou AL, Jiang J, Adnan T, Mourdoukoutas AP, Kronberg G, Truong D, Boggio P, Brunoni AR, Charvet L, Fregni F, Fritsch B, Gillick B, Hamilton RH, Hampstead BM, Jankord R, Kirton A, Knotkova H, Liebetanz D, Liu A, Loo C, Nitsche MA, Reis J, Richardson JD, Rotenberg A, Turkeltaub PE, Woods AJ. Safety of Transcranial Direct Current Stimulation: Evidence Based Update 2016. Brain Stimul. 2016 Sep-Oct;9(5):641-61. PubMed PMID: 27372845; PubMed Central PMCID: PMC5007190.

d. Kessler SK, Minhas P, Woods AJ, Rosen A, Gorman C, Bikson M. Dosage considerations for transcranial direct current stimulation in children: a computational modeling study. PLoS One. 2013;8(9):e76112. PubMed PMID: 24086698; PubMed Central PMCID: PMC3785412.

Neuroimaging and Magnetic Resonance Spectroscopy. My work in neuroimaging and spectroscopy has focused on understanding the brain networks and neurometabolites that underlie cognitive processes and how these processes are altered by age and medical disorders exacerbating aging of the human brain. This work has primarily used structural and functional magnetic resonance imaging and diffusion weighted imaging, but now includes magnetic resonance spectroscopy. Through multimodal neuroimaging, this work aims to identify markers predictive of cognitive decline in older adults, as well as markers of intervention effectiveness. This work has been central to identification of neural intervention targets for tES.

a. Porges EC, Woods AJ, Lamb DG, Williamson JB, Cohen RA, Edden RAE, Harris AD. Impact of tissue correction strategy on GABA-edited MRS findings. Neuroimage. 2017 Nov 15;162:249-256. PubMed PMID: 28882635; PubMed Central PMCID: PMC5705271.
b. O'Shea A, Cohen RA, Porges EC, Nissim NR, Woods AJ. Cognitive Aging and the Hippocampus in Older Adults. Front Aging Neurosci. 2016;8:298. PubMed PMID: 28008314; PubMed Central PMCID: PMC5143675.
c. Porges EC, Woods AJ, Edden RA, Puts NA, Harris AD, Chen H, Garcia AM, Seider TR, Lamb DG, Williamson JB, Cohen RA. Frontal Gamma-Aminobutyric Acid Concentrations Are Associated With Cognitive Performance in Older Adults. Biol Psychiatry Cogn Neurosci Neuroimaging. 2017 Jan;2(1):38-44. PubMed PMID: 28217759; PubMed Central PMCID: PMC5312683.
d. Woods AJ, Hamilton RH, Kranjec A, Minhaus P, Bikson M, Yu J, Chatterjee A. Space, time, and causality in the human brain. Neuroimage. 2014 May 15;92:285-97. PubMed PMID: 24561228; PubMed Central PMCID: PMC4008651.

Working Memory/Executive Function. One area of my work investigates the impact of aging and stroke on working memory and executive function. My recent work in age-related change in working memory/executive function includes both behavioral and neuroimaging based identification of therapeutic neural targets for tES. This work spans investigation of early development (age 2-18 years) to effects in later life (ages 60+) and following focal lesions to frontal and parietal brain systems.

a. Nissim NR, O'Shea AM, Bryant V, Porges EC, Cohen R, Woods AJ. Frontal Structural Neural Correlates of Working Memory Performance in Older Adults. Front Aging Neurosci. 2016;8:328. PubMed PMID: 28101053; PubMed Central PMCID: PMC5210770.
b. Woods AJ, Göksun T, Chatterjee A, Zelonis S, Mehta A, Smith SE. The development of organized visual search. Acta Psychol (Amst). 2013 Jun;143(2):191-9. PubMed PMID: 23584560; PubMed Central PMCID: PMC3651801.
c. Woods AJ, Mark VW. Convergent validity of executive organization measures on cancellation. J Clin Exp Neuropsychol. 2007 Oct;29(7):719-23. PubMed PMID: 17896197.
d. Mark VW, Woods AJ, Ball KK, Roth DL, Mennemeier MS. Disorganized search is not a consequence of neglect. Neurology. 2004; 63(1):78-84.

Attention. Over the past ten years, I have studied attentional processes in the brain using a variety of tES and attention research methods in spatial neglect following stroke and health cognitive populations to understand the relative contributions of frontal and parietal systems in attention.

a. Woods AJ, Lehet M, Chatterjee A. Context modulates the contribution of time and space in causal inference. Front Psychol. 2012;3:371. PubMed PMID: 23162484; PubMed Central PMCID: PMC3498891.
b. Woods AJ, Mennemeier M, Garcia-Rill E, Huitt T, Chelette KC, McCullough G, Munn T, Brown G, Kiser TS. Improvement in arousal, visual neglect, and perception of stimulus intensity following cold pressor stimulation. Neurocase. 2012;18(2):115-22. PubMed PMID: 22013983; PubMed Central PMCID: PMC3266979.
c. Woods AJ, Mennemeier M, Garcia-Rill E, Meythaler J, Mark VW, Jewel GR, Murphy H. Bias in magnitude estimation following left hemisphere injury. Neuropsychologia. 2006;44(8):1406-12. PubMed PMID: 16434066; PubMed Central PMCID: PMC4420160.
d. Mennemeier M, Pierce CA, Chatterjee A, Anderson B, Jewell G, Dowler R, Woods AJ, Glenn T, Mark VW. Biases in attentional orientation and magnitude estimation explain crossover: neglect is a disorder of both. J Cogn Neurosci. 2005 Aug;17(8):1194-211. PubMed PMID: 16197678; PubMed Central PMCID: PMC4442679.

Cognitive Aging Interventions. Much of my current and past work focuses on successful cognitive aging interventions, in a variety of populations. This work has evaluated not only the cognitive and functional consequences of aging and various disorders, but also improvement in these processes following intervention. This line of my research attempts to identify novel markers (e.g., neuroimaging, etc.) and methods for prevention (e.g,. tES, anti-inflammatory intervention) of age and disease related cognitive.

a. Anton SD, Woods AJ, Ashizawa T, Barb D, Buford TW, Carter CS, Clark DJ, Cohen RA, Corbett DB, Cruz-Almeida Y, Dotson V, Ebner N, Efron PA, Fillingim RB, Foster TC, Gundermann DM, Joseph AM, Karabetian C, Leeuwenburgh C, Manini TM, Marsiske M, Mankowski RT, Mutchie HL, Perri MG, Ranka S, Rashidi P, Sandesara B, Scarpace PJ, Sibille KT, Solberg LM, Someya S, Uphold C, Wohlgemuth S, Wu SS, Pahor M. Successful aging: Advancing the science of physical independence in older adults. Ageing Res Rev. 2015 Nov;24(Pt B):304-27. PubMed PMID: 26462882; PubMed Central PMCID: PMC4661112.
b. Woods AJ, Cohen RA, Pahor M. Cognitive frailty: frontiers and challenges. J Nutr Health Aging. 2013 Sep;17(9):741-3. PubMed PMID: 24154645; PubMed Central PMCID: PMC4471842.
c. Woods AJ, Mark VW, Pitts AC, Mennemeier M. Pervasive cognitive impairment in acute rehabilitation inpatients without brain injury. PM R. 2011 May;3(5):426-32; quiz 432. PubMed PMID: 21570030; PubMed Central PMCID: PMC3275913.
d. Mark VW, Woods AJ, Mennemeier M, Abbas S, Taub E. Cognitive assessment for CI therapy in the outpatient clinic. NeuroRehabilitation. 2006;21(2):139-46. PubMed PMID: 16917160.

Complete List of Published Work in My Bibliography:
https://www.ncbi.nlm.nih.gov/myncbi/adam.woods.1/bibliography/45511051/public/

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

NIA R01AG064587 (Woods, Adam; Bowers, Dawn; Alexander, Gene; MPIs) 08/01/19-04/31/24
National Institutes of Health
Revitalizing Cognition in Older Adults at Risk for Alzheimer's Disease with Near-Infrared Photobiomodulation
This five-year R01 multisite Phase II randomized clinical trial will investigate the impact of near-infrared (NIR) photobiomodulation on cognition and mitochondrial function in older adults at risk for Alzheimer's disease. University of Florida (parent site) and the University of Arizona will perform a six-week intervention using NIR and assess changes in cognition, functional brain response and mitochondrial function (31P magnetic resonance spectroscopy) in a population of 168 older adults.
Role: MPI

NIA R01AG054077 (Woods, Adam; Cohen, Ronald; Marsiske, Michael; MPIs) 09/01/16-08/31/21
National Institutes of Health
Augmenting Cognitive Training in Older Adults (ACT)
This study is a Phase III definitive multi-site randomized clinical trial with an adaptive design that will establish the benefit of delivering adjunctive transcranial direct current stimulation (tDCS) with cognitive training in older adults to combat cognitive aging. This trial measures both trial success and intervention mechanisms using multimodal neuroimaging and magnetic resonance spectroscopy, as well as comprehensive neurocognitive and functional assessment.
Role: MPI

NIA U01AG062368 (Edwards, Jerri; PI) 09/30/18-05/31/20
National Institutes of Health
Planning an adaptive clinical trial of cognitive training to improve function and delay dementia
This two-year U01 project will develop the infrastructure for a large Phase II/III clinical trial investigating the impact of various forms of cognitive training on functional abilities and dementia conversation in patients with mild cognitive impairment. I will lead the UF site on this trial and will also lead the neuroimaging and data management for the pilot trial and in the subsequent full trial submission. This grant involves sites at University of South Florida (parent site), University of California San Francisco and the University of Florida.
Role: Site PI

NIA K01AG050707-A1 (Woods, Adam; PI) 09/30/16-05/31/21
National Institutes of Health
Neuromodulation of Cognition in Older Adults
The goal of this study will be to investigate the ability of transcranial direct current stimulation to enhance the effectiveness of cognitive training targeting attention, speed of processing, and working memory function in older adults. Training will focus on cognitive aging interventions and advanced magnetic resonance imaging and spectroscopy methods.
Role: PI

NIA R37AG033906 (Fillingim, Roger; PI) 06/01/19-04/31/24
National Institutes of Health
Understanding Pain and Limitations in Osteoarthritic Disease
The goal of this project is to evaluate transcranial direct current stimulation and mindfulness based stress reduction, alone and in combination, as treatments of chronic osteoarthritic knee pain in a 2 site phase II trial.
Role: Co-I

NIMH R21MH112206 (Woods, Adam; Ding, Mingzhou; MPIs) 01/15/18-/12/31/19

National Institutes of Health
Stimulating Theta Oscillations to Enhance Working Memory
This project will the impact of transcranial alternating current stimulation (tACS) on working memory network synchrony in the theta band of EEG using electrophysiology and functional magnetic resonance imaging.
Role: MPI

NIMH RF1MH114290-01 (Sadlier, Rosalind; PI) 07/19/17-07/18/21
National Institutes of Health
Mechanism and dosimetry exploration in transcranial electrical stimulation using magnetic resonance current mapping methods
The goal of this project is to pioneer an objective measure of current flow in the brain using state of the art magnetic resonance imaging methods combined with in scanner application of tDCS and tACS. This project will also assess the relationship between activation in working memory related regions from an NBACK fMRI task and correspondence of change following F3-F4 in scanner tDCS.
Role: Co-I

VA Merit Review (Clark, David; PI) 08/01/19-07/31/23
Cerebral networks of locomotor learning and retention in older adults
This four-year Merit application extends the ongoing collaborative work in R21AG053736 to investigate the impact of tDCS paired with complex walking as an intervention for mobility decline in older adults to a larger Phase II trial with increased mechanistic insight through multimodal neuroimaging. I will lead all aspects of tDCS clinical trial implementation in the trial.
Role: Co-I

NIA R01AG061065 (Barve/Cohen; MPIs) 09/01/*18*-05/31/21
National Institutes of Health
Role of Gut Microbial Dysbiosis and Aging on HIV-associated neurocognitive and brain dysfunction
The goal of this project is to investigate the relationship between gut microbiota and neurocognitive function in older adults with HIV. The project uses multimodal imaging with 31P phosphorous MRS, functional MRI, and structural MRI to investigate brain-based mechanisms.
Role: Co-I

McKnight Brain Research Foundation (Woods/Bowers, MPIs) 05/1/18-04/31/20
Near infrared brain stimulation in older adults.
The goal of this funding is to use near infrared brain stimulation to improve cognition, 31P MRS markers of ATP, and functional neuroimaging biomarkers of cognitive and metabolic decline in healthy aging in a 2-site phase II pilot trial.
Role: MPI

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