

2022

McKnight Brain Research Foundation Report 2022



University of Florida

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December 17, 2022

RE: MBRF Annual Report

Dear Trustees of the McKnight Brain Research Foundation,

This was another year of tremendous scientific accomplishments by the UF Center for Cognitive Aging and Memory: Clinical Translational Research (CAM). These accomplishments were achieved during a year in which there was considerable transition associated with the departure of Dr. Todd Golde from the University. While the faculty regret Dr. Golde's departure from the directorship of the MBI and the leadership and vision he provided, the progress and productivity of the center with respect to the trajectory of the science and the output of publications, trainees, and extramural funding secured continue to consistently exceed expectations. The funding portfolio of CAM investigators continues to grow at an impressive rate. The addition of new faculty and collaborations continues to expand the impact of the CAM at and beyond our institution. The 2022 annual report reflects impressive growth and serves as a great measure of the success of the CAM and the investigators supported by the MBRF gift.

The scientific accomplishments of the center continue to fulfill its original mission, consistent with the intent of the gift agreement of the MBRF to the University of Florida. Specifically, the CAM consists of a dynamic, collaborative group of investigators entwined into the fabric of the larger UF research community that is conducting world-class basic, translational, and clinical research on brain aging. Not only are the senior investigators thriving, largely because of their esprit de corps, but they have created an outstanding training environment for undergraduates, graduate students, and postdocs. As one example, in the past year, CAM Associate Director Dr. Burke was recently awarded an NIH/NIA R25 grant to support research opportunities for diverse undergraduate students. Further, UF is now attracting outstanding and diverse early career investigators into the cognitive aging field. Moreover, Dr. Bizon, in her position as the Chair of the Department of Neuroscience, will certainly attract more researchers and faculty into the cognitive and brain aging field. In addition, Dr. Woods' new position as Associate Dean of Research for the College of Public Health and Health Professions will serve to facilitate multidisciplinary efforts across multiple relevant departments and cross-college collaborations between COM and PHHP in



the domains of cognitive aging and dementia prevention research. In short, numerous CAM faculty are regarded as the next generation of leadership within the UF Health Science Center and will no doubt influence faculty recruitment and relevant resources over the coming years.

The success of CAM investigators and the larger neuroscience and neuromedicine research programs under the MBI “umbrella” continues to be a team effort, one that is strongly supported by me and the leadership of the University. Neuroscience, and particularly research directed at cognitive and brain aging are extremely important foundations of UF’s research portfolio. Trainees and CAM investigators have received national and international attention and have been recruited to major universities around the country. Research leadership has provided highly competitive retention packages, which ensures that these vital members of our brain aging research community stay and advance their careers here at UF. Success is not without its challenges. The growth of CAM and our larger neuroscience research community is straining our infrastructure. Fortunately, we recently received 3200 square feet of space to house the labs of Drs. Woods, Cohen, Porges, Indahlstari and Gullett in the Communicore. This new space was provided by my office to Dr. Woods and the CAM faculty as part of a recent retention package to provide needed space to house the 35 people central to these labs. This is the first time in seven years where the labs and personnel of our human clinical translational labs have been housed under one roof. The Bizon, Setlow, Burke and Maurer labs are also moving to consolidated space within the MBI that recognizes their growing programs and will facilitate collaborative efforts. In summary, I am working closely with the CAM directors to make sure that the infrastructure needs of CAM investigators will be met so that this priority research can continue to blossom.

Two initiatives that will have major implications going forward include: 1) expansion and development of the UF College of Medicine Jacksonville campus as a CAM research site; and 2) the Scripps Florida acquisition. The UF Jacksonville initiative is essential to increasing the populations of older adults available for research studies by the CAM. Major strides have already been made by Dr. Woods to initiate recruitment and cognitive aging clinical trial operations at UF Jacksonville through two new NIH R01s, with an early career CAM faculty member now located at UF Jax in the Department of Neurology and access to 1000 square feet of shared personnel and research space in downtown Jacksonville. This effort will accelerate our ability to carry out large cognitive aging trials in the University of Florida system. This expansion will also facilitate rapid deployment and completion of promising early phase intervention studies for remediating cognitive aging in older adults. The UF Scripps initiative offers tremendous opportunities to extend preclinical research in cognitive and brain aging, in neuroscience research and therapeutic discovery, and may also eventually provide access to additional participant populations in South Florida. Efforts by the CAM team to deploy cognitive aging trials and build partnerships between our neuroscience communities will play an important role in facilitating the ongoing integration process. I am sure that these efforts across the state of Florida will further enhance interest, awareness, and therapeutic capabilities in the domains of cognitive and brain aging research. Please reach out to me if there are questions about this process, and I will relay what I know. I imagine that there will be some challenges, but that in the long run this will further strengthen our neuroscience research.

I would like to personally thank the board for pushing us to integrate our basic, translational and clinical research supported by MBRF into a single center. Thanks to the efforts of Drs. Bizon, Cohen, Woods and

Burke, this “reintegration” has really helped to achieve the translational integration that the MBRF has long desired. It also helps us strategically within the University, as it shows the strength and trajectory of the cognitive and brain aging programs and their scientific and institutional impacts across multiple colleges and departments at the University of Florida. I hope the trustees find the rest of the document as informative and impressive as a I do.

Sincerely yours,

A handwritten signature in blue ink, appearing to be 'DR Nelson', written in a cursive style.

David R. Nelson, MD

Senior Vice President for Health Affairs, UF

President, UF Health

January 13, 2023

Dear Trustees of the McKnight Brain Research Foundation:

We are pleased to provide this report on the activities and financial status of the Center for Cognitive Aging and Memory Clinical Translational Research (the “CAM Center”) for the year ending December 31, 2022. The mission of the CAM Center is to conduct multidisciplinary research focused on brain aging and cognition as well as translate leading-edge discoveries about brain aging into interventions that will preserve cognitive function and improve the quality of lives for older adults. Additionally, the CAM Center continues to serve as a world-class training ground for graduate students, postdoctoral scholars, and junior faculty interested in preclinical or translational research careers focused on preventing, alleviating, or reversing age-related cognitive decline and memory loss. The leadership of the CAM Center continues to meet bi-weekly and has been dedicated to laying a solid foundation to support a successful world-class program on cognitive aging that spans preclinical to clinical translational research.

As detailed in the full report, CAM faculty and trainees were very productive this past year with significant accomplishments pursuant to the center’s research and academic missions. We also celebrated the retirement of our distinguished colleague and CAM faculty member, Dr. Russell Bauer. In his 42 years of service, Dr. Bauer’s legacy includes over 125 published papers and 40 mentored graduate students. Through collaboration and training, he has made immeasurable contributions to the CAM Center.

Several new leadership roles for CAM members recognize the continued success of our members and have increased visibility for our Center’s mission within the UF Health Science Center. Dr. Woods was appointed Associate Dean of Research for the College of Public Health and Health Professions (PHHP) and will serve to facilitate multidisciplinary efforts across multiple relevant departments and cross-college collaborations between the College of Medicine (COM) and PHHP in the domains of cognitive aging and dementia prevention research. Dr. Woods also received the UF Foundation Term Professorship, which is an honor only extended to two faculty across the entire University each year. Dr. Burke has also transitioned into a new role as Vice Chair for Faculty Affairs in the Department of Neuroscience. In this role, she will facilitate the recruitment, mentoring, and retention of outstanding and diverse early investigators into the cognitive aging field. Notably, Dr. Burke was recognized in the College of Medicine this year for her outstanding research and mentorship as the inaugural recipient of the Dr. Mavis Agbandje-McKenna Award for Distinguished research mentoring. This award was established in honor of Dr. Agbandje-McKenna, a highly accomplished researcher and dedicated mentor who passed away in March 2021 of amyotrophic lateral sclerosis. Through their new roles, Drs. Woods and Burke and other members of the CAM Center continue to work closely with the Senior Vice President for Health Affairs and college leadership to plan research infrastructure at the Villages, UF Jacksonville, and collaborations with the UF Scripps Institute that can be leveraged to advance the CAM mission.

Listed below are the primary objectives of the CAM Center as outlined in the MOU with the McKnight Brain Research Foundation. We have highlighted under each objective the activities in the past year that collectively have advanced our mission to uncover the fundamental mechanisms of brain aging that underlie cognitive decline and develop interventions and preventative strategies that promote positive functional outcomes in the process of normal aging.

OBJECTIVE 1: Maintain and grow the research infrastructure for conducting preclinical and clinical translational cutting-edge cognitive aging research.

Space: Over the past several years, the marked growth of CAM Center and our larger neuroscience research community has strained our physical infrastructure. Fortunately, these needs have been recognized and addressed in this past year. Dr. Nelson's Office of the Senior Vice President for Health Affairs recently provided 3200 square feet of space to house the labs of Drs. Woods, Cohen, Porges, Indahlastari and Gullett in the Communicore building, which is adjacent to the Evelyn F. and William L. McKnight Brain Institute. This new space enables personnel supporting our human clinical translational labs to be fully housed under the same roof for the first time in seven years. In recognition of their growing programs and to facilitate even stronger collaborative efforts, the Bizon, Setlow, Burke, and Maurer labs are also moving to consolidated space within the MBI.

In addition to space on the main UF campus, UF's expansion to other campuses offers additional opportunities for the CAM Center. Specifically, our mission is benefiting from: 1) expansion and development of the UF College of Medicine Jacksonville campus into a CAM research site; and 2) the UF Scripps Institute acquisition. The UF Jacksonville initiative is essential to increasing the populations of older adults available for research studies by the CAM. To this end, major strides have already been made by Dr. Woods working in concert with an early career CAM faculty member, Dr. Stacy Alvarez-Alvarado. Through several new NIH R01s, they are now establishing cognitive aging clinical trial operations at UF Jax in the Department of Neurology where Dr. Alvarez-Alvarado is a new Assistant Professor. She has access to 1000 square feet of shared personnel and research space in downtown Jacksonville which will accelerate the ability to carry out large cognitive aging trials in the University of Florida system. This expansion will also facilitate rapid deployment and completion of promising early phase intervention studies for remediating cognitive aging in older adults. The UF Scripps initiative provides an exciting opportunity to extend preclinical research in cognitive and brain aging and facilitate therapeutic discovery in neuroscience. Dr. Bizon and others have visited UF Scripps and have begun laying a foundation for scientific collaboration which will be built upon in the upcoming year. Through partnerships between UF-Gainesville, UF-Scripps and UF-Jacksonville communities, we will be better positioned to build interest, awareness, and therapeutic capabilities for cognitive and brain aging research in the state of Florida.

Facilities: The CAM Center has been an essential partner to the Department of Neuroscience and McKnight Brain Institute in establishing a core resource for microscopy to facilitate state-of-the-art research. Dr. Burke is the co-director of the microscopy co-op which was created to better serve CAM Center faculty across the UF Health Science Center. The CAM Center's financial support helps to defer annual service contracts, software licensing, operating costs, and to provide increased technical expertise for microscopes that are used by affiliated faculty and their laboratories. A major advantage of this arrangement is that laboratories of primary CAM Center faculty now have free access to numerous state-of-the-art instruments (not only those in their laboratories), which can be leveraged for new discoveries in the cognitive aging.


In this past year, the co-op acquired 4 instruments, raised funds to support annual service contracts and software licensing for all instruments, and hired Dr. Jason Coleman, an expert in multi-photon, super resolution, and confocal microscopy. We have also acquired Imaris software for image analysis, which enables the motion, cellular, spot and surface analysis of 2D, 3D and 4D images, and renewed the Micro Brightfield StereoInvestigator software license for conducting unbiased stereology. Additionally, we supported a training session from Zeiss for research staff and trainees in the CAM Center. Through collaboration with Dr. Matthew Burns, a CAM Center member in the Department of Neurology, we have also created a tissue clearing core. Central to this core is the purchase of a SmartBatch+ system from Life Canvas Technologies which combines active tissue clearing and immunolabeling into one high-throughput device.

Research Initiatives and Discoveries: CAM Center researchers have been exceptionally productive in 2022, publishing over 79 peer-reviewed manuscripts, advancing their research programs, and securing approximately \$10 million in new awards. Details regarding the impressive accomplishments of individual CAM Center investigators are summarized in the body of this report and in the chairs' letters of Drs. Foster and Cohen.

OBJECTIVE 2: Recruit, train, and retain high-caliber scientists interested in neural mechanisms for cognitive aging.

We continue to make strides towards the CAM Center becoming a premiere research training destination for those interested in building a research career in the cognitive aging field. Our core faculty are highly sought out to serve as primary mentor/advisor for graduate students in the Departments of Clinical and Health Psychology and Neuroscience. As a result, we are very selective and can recruit outstanding trainees. The faculty currently mentor 41 graduate students and 15 postdoctoral scholars who are conducting research related to cognitive aging in human and animal models. In the past year, several students successfully defended their qualifying exams, Master's theses, and doctoral dissertations. Additionally, 3 CAM graduate students (Wonn Pyon, Sabrina Zequeira, and Tara Cooper) were awarded the Bryan Robinson Endowment scholarship given to graduate students in the state of Florida who show exceptional research potential. Additionally, Ms. Zequeira won the "3-minute Thesis" competition at the University of Florida for her talk on the effects of cannabis on cognition in aging and is now advancing to the Southeast regional competition this spring. The CAM Center further supported two CAM Graduate scholars (Samm Smith and Johleen Seedansingh). Ms. Smith submitted an F31 graduate fellowship last year that aimed to examine the role of hippocampal-striatal interactions in behavioral strategy use across the lifespan. While not funded, this grant was competitively scored and will be resubmitted this year. Ms. Seedansingh made exceptional progress in her first year of graduate study. She is researching the physiological and cognitive effects of vagus nerve stimulation and testing whether this intervention increases cognitive resilience in advanced age. We continue to have multiple students funded by T32s across the CAM faculty labs. The list of awards to our students far exceed the space allotted in this letter but can be found in the main body of the report.

Currently, CAM faculty play a major role on three NIH-funded T32 grants that support training relevant to cognitive aging. These include T32 programs focusing on aging and neuromodulation (Marsiske, Woods, MPIs) NeuroHIV (Cook, PI, Cohen) and Alzheimer's and related dementias (Lewis, Bizon, Chakrabarty MPIs). Further, Dr. Burke, along with Dr. McIntyre and Abisambra, (MPIs) were recently awarded a new R25 grant from the NIH entitled, "**Networking and Expanding Undergraduate Research On the Neurobiology of Aging to Advance Diversity (NEURON-Aging).**" The major goal of this new award is to expand the pool of underrepresented researchers interested in biomedical, behavioral, and clinical aspects of brain aging and Alzheimer's disease



and related dementias (ADRDs) through undergraduate research activities that enhance diversity. This program will support undergraduates as well as postbaccalaureate students from diverse backgrounds to conduct research at UF and receive support and salary. The CAM Center has continued to support 4 undergraduate summer scholars that participate in the UF Summer Neuroscience Internship Program (SNIP). Every summer the Department of Neuroscience, in conjunction with the Evelyn F. and William L. McKnight Brain Institute, hosts a 10-week internship to undergraduate students interested in pursuing a Ph.D. in neuroscience. SNIP places paid interns in active neuroscience research labs to obtain hands-on laboratory and research experience, personalized guidance on graduate school admissions and professional development and career planning.

The CAM Center also continues to support to junior faculty to facilitate their research career and building of independent research programs relevant to cognitive aging. As detailed in the full report, CAM Center funds supported the following faculty in the past year: Drs. Stacey Alvarez-Alvarado, Breton Asken, Matthew Burns, Aprinda Indahlastari, and Dr. Shellie Anne Levy. Notably, Dr. Levy is also a co-I on the NEURON-Aging R25 and will be creating a summer series on minority health disparities in cognitive aging. Dr. Burns led a proposal that was awarded and that has expanded our microscopy resource. Dr. Alvarez-Alvarado is working with Dr. Woods to lead our expansion in UF-Jacksonville. It is further notable that numerous faculty members previously supported by the CAM Center are now core members of our faculty and leadership and have become nationally recognized scholars in the field. In recognition of their success, several CAM faculty members received tenure and promotions over the past year. Specifically, Drs. Fang and Williamson were both promoted to Associate Professor with tenure in June 2022. In the current year, we have several more promotions pending. Dr. Porges' tenure and promotion to Associate Professor has received support from his home department and college. Drs. Burke and Woods have received support from their respective departments and colleges for their promotions to Full Professor. We look forward to congratulating all of these faculty on their successful promotions later next Fall.

OBJECTIVE 3: Expand the scientific community at UF pursuing research relevant to age-related cognitive decline and memory loss.

We have continued to make progress in expanding our community at UF. Beyond those faculty and trainees mentioned within this report (who received funding from the CAM Center), we have many more UF faculty who affiliate with the CAM Center and conduct research on related topics. A full list of these affiliate faculty can be found on our website: <https://cam.mbi.ufl.edu/faculty/>. Emerging from the tight pandemic restrictions of the past several years, we have held multiple community events in 2022. These include several socials to bolster interactions between trainees and faculty of the CAM Center, as well as holding an inaugural CAM Research Day. The latter event, held on May 9, 2022, targeted the full UF community of researchers and included four symposia that featured short talks from CAM Center faculty on the following topics: 1) Lifestyle Interventions for Treating Cognitive Aging, 2) AI Approaches for Researching Cognitive Aging, 3) Neuromodulation as an Intervention for Age-related Cognitive Decline, and 4) Risk Factors and Co-morbidities of Cognitive Aging. We also had a poster session for trainees and ended the day with a reception at First Magnitude Brewery. We received much positive feedback regarding the event and envision this will become an annual event.

One key activity that locally raises visibility for the mission of the CAM Center is the annual William G. Luttge Lectureship that was established and is supported by a generous endowment provided by the McKnight Brain Research Foundation almost ten years ago. We are delighted that we are finally able to resume this lectureship following several years hiatus due to the pandemic. On

February 23rd, we will host the 8th Annual William G. Luttge Lectureship in Neuroscience, with **Dr. Joshua A. Gordon, MD, PhD** as our invited speaker. Dr. Gordon is the Director of the National Institute of Mental Health (NIMH), the lead federal agency for research on mental disorders. He oversees an extensive research portfolio of basic and clinical research that seeks to transform the understanding and treatment of mental illnesses, paving the way for prevention, recovery, and cure. Dr. Gordon's won research is focused on the neural activity of mice with genetic mutations that are related to psychiatric diseases. He uses a variety of techniques, such as *in vivo* imaging, behavioral recordings, and optogenetics to understand how these mutations cause behavioral changes related to schizophrenia, anxiety disorders, and depression. Because mental well-being is a strong predictor of cognitive outcomes in advanced age, this seminar will be of broad interest to the CAM Center faculty. With the agreement of the MBRF trustees, we have also continued to sponsor other speakers on topics relevant to cognitive aging as part two existing seminar series: either the joint MBI-Department of Neuroscience series or as part of a cognitive neuroscience series that is held in the Clinical Health Psychology department. This past year, Dr. Bizon began hosting dinners at her home for speakers and CAM Center trainees and faculty after their seminars. These events have been well-attended and appreciated by our community as they have provided networking opportunities for our trainees and junior faculty.

2022 CAM-Sponsored Seminar Speakers.



Dr. Alexis Stranahan (Associate Professor, Department of Neuroscience & Regenerative Medicine, Lead Scientific Contact & Training Coordinator - DNRM Light Sheet Facility) was the CAM Center sponsored speaker on January 13, 2022. Dr. Stranahan's main research work is focused on understanding the regulation of synaptic plasticity and cognition by metabolic stress at the behavioral, electrophysiological, and cellular levels. The long-term goal of the Stranahan lab is to understand how neurons, glia and cerebrovascular cells sense and respond to homeostatic challenges.



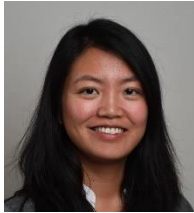
Dr. Perla Moreno Castilla (Postdoctoral Fellow in the Neurocognitive Aging Section, NIA) was the "rising star" Luttge speaker on February 24, 2022. Dr. Moreno-Castilla is currently a postdoctoral researcher in the laboratory of Dr. Peter Rapp. Her research projects aim to understand inter-individual differences in hippocampal circuit engagement and elucidate the role of extracellular vesicles containing the synaptic protein Arc in the successful neuroadaptation in aging. She earned a degree in Chemistry and a Ph.D. in Neuroscience, both from the National University of Mexico (UNAM) in Mexico City, under the mentorship of Dr. Federico Bermudez-Rattoni. Her thesis work described a causal link between the amyloid beta-induced dopaminergic dysfunction with impaired synaptic plasticity and memory in animal models of Alzheimer's disease.



Dr. Dan Nicholson (Associate Professor, Neurological Sciences, Rush University) was the CAM Center sponsored speaker on March 3, 2022. The laboratory of Dr. Nicholson is interested in the neurobiology of cognitive aging, Alzheimer's disease and epilepsy. His research utilizes numerous techniques to unveil the events and pathogens that ultimately lead to brain failure, including electron microscopy, patch-clamp physiology, immunofluorescence array tomography, immunoprecipitation assays and mass spectrometry. Dr. Nicholson's research has been instrumental in our understanding of how aging impacts the structure and function of hippocampal synapses in the context of behavioral deficits.



Dr. Kirk Erickson (Professor, Department of Psychology, University of Pittsburgh) was the CAM Center sponsored speaker on March 31, 2022. His research focuses on understanding the changes in various aspects of cognition across the lifespan and the associated brain structures that are involved with these changes. He has found that participation in moderate amounts of physical activity can significantly improve cognition and brain function in older adults. In short, older brains are still “plastic,” in that age-related patterns of deterioration can be reversed through interventions such as exercise.



Dr. Psyche Loui (Associate Professor, Creativity and Creative Practice, Department of Music) was the CAM Center sponsored speaker on October 13, 2022. Research in the Loui lab aims to understand the networks of brain structures and the neural functions that enable musical processes: auditory and multisensory perception, learning and memory of sound structure, sound production, and the human aesthetic and emotional response to sensory stimuli. Tools for this research include electrophysiology, structural and functional neuroimaging, noninvasive brain stimulation, and psychophysical and cognitive experiments.

OBJECTIVE 4: Increase visibility of the research and develop messaging at local, national, and international levels.

Increasing visibility of the CAM Center’s research and affiliated faculty is an important goal and we have continued to grow in this area. We actively update our website (<https://cam.mbi.ufl.edu/>) and have a communications plan that involves engagement with social media and the press. We have improved the tracking of our current and former trainees through LinkedIn, and several CAM Center faculty maintain accounts on this platform. We also have an active Twitter account (@UF_CAMcenter), which has grown to have 450 followers over the past year. Posts related to the research accomplishments of CAM Center faculty and trainees are made regularly and this is an important platform for amplifying our visibility. We continue to work with other McKnight Institutes and the MBRF Communications Working Group to coordinate our efforts and ensure we use our account to also amplify research accomplishments from our McKnight partners.

This past year, a CAM Center trainee also started a podcast (<https://cam.mbi.ufl.edu/2022/08/24/using-podcasts-to-learn-neuroscience-20-minutes-at-a-time/>). Cristina Besosa is a second-year graduate student working in the laboratories of Drs. Burke and Maurer. She hosts a post cast, called “In Your Brain.” The podcast takes various topics of neuroscience and presents them in digestible 20-min episodes that people can listen whenever is convenient. An episode has featured the CAM Center faculty Dr. Barry Setlow and Dr. Burke will be featured in an upcoming episode. In Your Brain is available on Spotify, Apple Podcasts, and Amazon and the 20-min episodes are accessible to a lay audience.

CAM Center faculty have also received enhanced visibility and media coverage this past year. Some highlights include: Dr. Stephen DeKosky reaching an H-index of 141, with over 100,000 citations according to Google Scholar. He continues to be cited over 6,000 times each year with no sign of this slowing (<https://scholar.google.com/citations?hl=en&user=Jbl0lNsAAAAJ>); Dr. Karina Alviña was quoted in a National Geographic article on the importance of exercise for a healthy brain; Drs. Barry Setlow and Jen Bizon were interviewed for a news article on the therapeutic potential for cannabis use in *The Physiologist* magazine <https://cam.mbi.ufl.edu/2022/01/18/drs-bizon-and-setlow-discuss-cannabis-and-the-aging-brain->

[in-physiology-magazine/](#)). Drs. Woods and Fang have been interviewed regarding their ongoing Artificial Intelligence and precision medicine approach to cognitive aging and dementia prevention by TV20, News4Jax and others (e.g., <https://www.news4jax.com/tech/2022/01/21/could-ai-prevent-dementia-in-the-future/>). In addition, Dr. Alvarez-Alvarado was interviewed by News4Jax for World Alzheimer's Month as a part of their coverage of the ongoing CAM-supported, NIA funded PACT trial and advice for the Jacksonville population for dementia prevention (<https://www.news4jax.com/video/morning-show/2022/09/25/world-alzheimers-month/>).

OBJECTIVE 5: Increase interactions and cohesion within the CAM Center, other UF Centers and industry partners to facilitate bidirectional (discovery to translation) cognitive aging and memory research at UF.

A major goal of the CAM Center is to increase cohesion between our discovery and translational research programs. Community building efforts that had been hindered by the COVID-19 pandemic are now underway. These include the Research Day, CAM Center Socials, and the return of the Luttge Seminar. Additionally, we are working with the MBI, COM, and PHHP leadership to ensure that our Center is fully integrated with larger initiatives in the broad neuroscience community and takes full advantage of new opportunities provided by the UF AI initiative and the expansions to UF Jacksonville and the UF Scripps Institute. Although the new director of the MBI has not yet been identified, we are confident that we will continue to have a productive partnership with the MBI.

OBJECTIVE 6: Increase interactions with the other McKnight Brain Institutes and increase visibility of ARML and CTRP Core Programs.

In addition to long-standing projects that extend across McKnight Institutes, we also describe in this year's report a number of new inter-institutional collaborations. For example, an MBRF pilot award given to Dr. Hernandez at UAB was able to facilitate a successful collaboration between this institution and the Burke and Bizon labs at the UF CAM Center. This generated pilot data that was instrumental in Dr. Hernandez receiving a K99/R00 from the NIA and 5 published papers just within the past year.

One of the primary CAM inter-institute initiatives continues to be the MBAR study, for a final database now exists. Several manuscripts have been published or are accepted for publication, while eight are in preparation. All of these manuscripts involve collaboration among the four MBIs. The other inter-institute CAM activity has been on the MBRF pilot study program. For example, Drs. Williamson and Alexander are currently completing their tVNS study of neuromodulation effects in older adults.

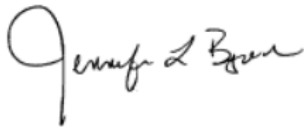
In addition, the ongoing NIA-funded REVITALIZE trial, led by Drs. Bowers (UF), Woods (UF) and Alexander (UA), continues to enroll participants at the University of Florida and University of Arizona as part of a Phase II non-invasive near infrared photobiomodulation trial seeking to remediate cognitive aging. As you might recall, this collaboration was seeded by one of the Cognitive Aging and Memory Intervention Core projects and leveraged the ACT trials infrastructure.

Towards increased visibility of our core programs, Dr. Woods and his lab are playing a central role in two seminal trials currently underway or recently funded by NIA. The Preventing Alzheimer's through Cognitive Training (PACT) trial is currently enrolling 7600 older adults into a trial that serves as a definitive evaluation of whether cognitive training vs. a matched placebo condition results in decreased Mild Cognitive Impairment and Dementia conversion rates at a 3-

year timepoint. Dr. Woods has established trial sites at both UF Gainesville and UF Jacksonville. In addition, his team will be responsible for over 2200 participants in this sample by the end of the primary study phase. Only 500 participants remain to be enrolled in this UF sample. This trial is the largest of its type and will have far reaching impact on the cognitive aging field upon completion, not to mention the high potential for long-term follow-up of this unique cohort. The study involves sites at University of South Florida, Duke University, Clemson University, University of North Florida (to be discontinued in Summer of 2023), and University of Florida. A newly funded trial, ACTIVE MIND, will leverage the infrastructure from the aforementioned trial to enroll a cohort of ~2000 older adults with Mild Cognitive Impairment (~300 at UF GNV and JAX) to query which of four cognitive training types vs. a matched placebo control produce significant preservation of functional abilities in patients with MCI – best reducing the incidence of dementia conversion. Each of these trials serve as seminal studies of cognitive training and its potential for remediating cognitive aging and reduction of dementia prevalence. Our role in these trials serves as a key example of our expanding footprint in the cognitive aging intervention community.

We are proud of our many accomplishments during this past year and 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,



Jennifer L Bizon, PhD
Co-Director, CAM Center
Professor and Chair, Department of Neuroscience



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

January 3, 2023

Dear Trustees of the McKnight Brain Research Foundation:

This is a summary of my activities as the Evelyn F. McKnight Chair for Clinical Translational Research in Cognitive Aging and as the Director of Clinical Translational Research within the Center for Cognitive Aging and Memory: Clinical Translational Research (CAM-CTRP) for the year ending December 31, 2022. I am happy to report that we have continued to be highly productive over the past year, meeting our planned research objectives, with multiple achievements consistent with the Center's mission. My publications over the past year are presented in other sections of the report.

With respect to my own research, multiple funded R01 projects continue with significant progress on several fronts. The ACT study (Woods, Cohen, Marsiske, MPis) was completed this year with targeted enrollment met and minimal attrition. We have published a number of manuscripts based on analyses of the baseline data, and are continuing with analysis of the longitudinal outcomes, as the study blind is now broken. While we found significant improvements in cognitive function associated with cognitive training compared to a control condition, unfortunately thus far we are not finding significant improvements in cognitive function secondary to the tDCS intervention. We are in the process of examining changes in the neuroimaging indices associated with the intervention, and we will report on this in the future. Improvements in emotional status, particularly with respect to reduced anxiety were found, and while not a primary outcome of the study, this is an interesting finding that will likely be the focus of future manuscripts and grant submissions.

The WISE bariatric R01 has now also been completed. We have several manuscripts in press that examine changes in functional brain response on resting state fMRI and also cerebral metabolic changes on MRS occurring post-surgery, which are associated with weight loss, A1c reduction, and cognitive improvements. The findings of this study are quite compelling and consistent with our a priori hypotheses. Obesity and diabetes are both associated with baseline cognitive deficits and abnormalities in cerebral metabolic state (MRS) and functional brain response (fMRI). Reduced BMI and A1c post-surgery are associated with improved cognitive and neural functioning, suggesting that significant weight loss among severely obese adults has beneficial effects on brain health. We are currently examining age-associated effects in the context of bariatric surgery. A submission of an R01 proposal for renewal of the WISE study received an excellent score in NIDDK. We are waiting to hear whether it will be funded, or whether a revision is necessary. This renewal project will examine long-term effects of bariatric surgery on cognition and the brain, but also will focus specifically on the effects of vagotomy and also transcranial vagus nerve stimulation on outcomes, with Drs. Porges and Williamson of the CAM joining me as MPis.

The McKnight Brain Aging Registry (MBAR) cognitive and behavioral data is now fully entered into REDCAP. The database has gone through extensive quality control reliability review. The neuroimaging data is housed in the HiPerGator. Analyses of the various neuroimaging modalities are underway with responsibility for analysis of specific modalities distributed across MBI sites. Blood samples from participants are stored in the CAM freezer in our phlebotomy lab

in the MBI. We are completing cytokine analyses. For investigators interested in epigenetic analyses, proposals to the MBAR inter-institute scientific advisory committee can be submitted and will be reviewed rapidly for approval. We have published fMRI findings and have several manuscripts submitted for review that focus on other neuroimaging metrics. These manuscripts are in addition to the original series of papers published in the *Frontiers in Aging Neuroscience* special edition on neuroimaging approaches in the study of older adults. We are currently generating a manuscript that characterizes cognitive function in the oldest old, examined from several different perspectives. Contrasts of absolute performance based on raw scores, standardized performance using oldest available norms, and performance relative to norms for 70 years old adults for determination of cognitive “super-agers” will be presented. Normative cognitive and behavioral data for the MBAR cohort will be presented in this manuscript, though we also plan to post summary results on the MBRF website once the manuscript is accepted for publication. Overall, the MBAR participants, adults over the age of 85 years had relatively preserved cognitive functioning, though this varied to some extent across cognitive domains. Individuals in the cohort were highly active in physical activities including aerobic and strength exercise.

Multiple R01 projects are in progress or nearing completion that address the interactions of HIV, substance use and aging. The NIA funded ROGUE study focuses on gut-brain axis and the impact of the microbiome on cognitive and brain functioning in the context of aging among people living with HIV (PLWH). Findings to date demonstrate that gut microbiome impacts cognitive function among PLWH with effects varying as function of age. The P01 and U24 studies supported by NIAAA are now underway with Dr. Eric Porges (CAM faculty) leading the research component examining the effects of vagus nerve stimulation and supplementation with probiotics among PLWH who consume large quantities of alcohol. Findings from the NIDA-funded MAPLE study of HIV and cannabis use and from the 30-Day Challenge an NIAAA-funded study of cognitive and neuroimaging benefits from alcohol abstinence have been published, with a number of manuscripts submitted or in preparation. In analyses of aging in the MAPLE cohort, we have found that the prevalence of cognitive deficits was greater than expected, as over 40% of participants over the age of 65 met criteria for MCI based on criteria used in Alzheimer’s research.

NIA supported R01 studies were funded at Tufts University and Brown University on which I am a co-investigator are now in the data collection phase. The Tufts study (Roberts, PI) examines the cognitive benefits of nutritional supplementation with flavanol in older adults. The Brown study (Salmoirago-Blotcher, PI) examines the effects of mindfulness training on cognitive functioning in older adults. Preliminary findings were published in a manuscript “Exploring Effects of Aerobic Exercise and Mindfulness Training on Cognitive Function in Older Adults at Risk of Dementia: A Feasibility, Proof-of-Concept Study”, and a second paper is now under review. These lines of research are important as they examine the potential benefit of these nutritional/behavioral approaches for enhancing functioning in older adults.

At this stage of my career, efforts to train and mentor the next generation of researchers for the study of cognitive and brain aging is a major emphasis of mine, along with working to maintain continued growth and productivity going forward. The CAM has flourished since my arrival at UF in 2012 at which time the clinical translational focus within MBI was nascent. Over the past 11 years, the center has flourished, as evidenced by the success of our faculty and the graduate students who have played key roles and made major contributions. I have summarized their

achievements in prior reports to the MBRF. I have taken steps to have the CAM faculty take on operational responsibilities and leadership roles in the center. I am particularly grateful to Dr. Adam Woods for his efforts in this regard and the outstanding work he has done as the Associate Director of the Center. He has led efforts to expand the research operation into the Jacksonville area to increase our available cohorts (including with respect to diversity) for our research studies. In conjunction with Dr. Williamson, I have been involved over the past year in writing the renewal application for the Brain Rehabilitation Research Center of the VAMC. Aging and associated comorbidities and risk factors are areas of emphasis in this renewal. Overall, the productivity of CAM-CTRP together with the pre-clinical neuroscience research group led by Dr. Bizon have been truly outstanding and continues to grow. I am proud to have led these efforts, and I am confident that the faculty and trainees of the CAM will continue to make important scientific contributions in the study of cognitive and brain aging.

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,

A handwritten signature in black ink, appearing to read 'R. Cohen', with a stylized, cursive script.

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

I am pleased to present the 2022 Annual Report of the Evelyn F. McKnight Chair for Research on Cognitive Aging and Memory. First, I would like to thank the McKnight Brain Research Foundation (MBRF) Board of Trustees for their support.

One of the goals of the MBRF is the promotion of collaborative efforts among research scientists, institutions, and organizations engaged in research in the field of age-related memory loss. I have been active as a catalyst in developing liaison, communication and collaboration, with individuals, units, centers and other entities within the University pursuing research in learning and memory. Below are examples of ongoing collaborations that emphasize the breath of collaborations across departments. I provide expertise on age-related cognitive decline and deliver cutting edge and innovative techniques for characterizing gene expression and epigenetic modifications. Several of my collaborations provide examples of the translational potential of discoveries and epigenetic techniques developed in my lab.

Promoting Collaboration within the University of Florida

Ongoing collaborations:

Epigenetic techniques from my lab are employed to develop biomarkers to be used as diagnostic and prognostic indicators. In an ongoing collaboration with Dr. Yenisel Cruz-Almeida, from the College of Dentistry, we examine DNA methylation in the blood of older humans and we currently have a grant (Cruz-Almeida PI) that characterizes DNA methylation in blood as epigenetic biomarker that describes biological age, and predicts cognition function, and the intensity of chronic pain. Five papers have been published this past year indicating an association of biological age, determined by DNA methylation, and measures of cognition and pain (Cruz-Almeida, Johnson et al. 2022, Montesino-Goicolea, Meng et al. 2022, Peterson, Meng et al. 2022, Peterson, Strath et al. 2022, Strath, Meng et al. 2022). Two more manuscripts have recently been submitted.

Sepsis is a common, expensive, and inadequately managed syndrome and has been labeled ‘a disease of the aged,’ as 60% of septic patients are older than 65 years. Improved in hospital mortality has yielded a rapidly expanding population of sepsis survivors who develop cognitive impairments. Thus, decreased memory and impaired cognition is common in sepsis survivors. An ongoing collaboration has been established with the Department of Surgery, including Dr. Philip Efron (Director), Dr. Lyle Moldawer, and, Dr. Frederick Moore and Dr. Michael Kladde (Department of Biochemistry and Molecular Biology), to examine age and sex differences in response to sepsis as a step toward personalized medicine. Manuscripts have been published that document our collaboration (Efron, Darden et al. 2022, Rani, Barter et al. 2022), including work which examines the epigenetic profile (microRNA) in the brain, that may underlie age and sex differences in response and recovery from sepsis. In addition, several grant proposals examining age and sex differences in the response and recovery of sepsis have been submitted and one has been funded on Sepsis and the Systemic Cytokine Storm in Aging and Alzheimer Disease Models.

New Collaborations:

Senolytic drugs selectively remove senescent cells that chronically release stress signals (e.g. cytokines) and we have been examining the role of senescent cells in brain aging, chemotherapy induced cognitive impairment, and the influence of senescence on sex differences in the trajectory of cognitive decline.

Unfortunately, my collaborator, Dr Daohong Zhou, just moved to Texas. We currently have two papers that are in preparation, and I have submitted a grant related to this work.

Two collaborations have been initiated this past year. Dr. Gemma Casadeus (Department of Pharmacology and Therapeutics) and I have initiated a collaboration to examine the role of sex hormones in mediating the trajectory of cognitive decline and response to inflammation. In addition, my lab has just initiated a new collaboration with Dr. Zhongwu Guo from the Department of Chemistry to examine the brain glycolipids as biomarkers and possible mechanisms contributing to a decline in learning and memory during aging.

Collaborative Projects Outside of the University of Florida:

A collaboration with Vinay Parikh, PhD, Associate Professor, Psychology and Neuroscience Program, and Head, of the Neurochemistry and Cognition Laboratory at Temple University, Philadelphia, PA resulted in the publication of a review on the role of exosomes in contributing to age-related cognitive decline and as a possible source for treatments (Duggan, Lu et al. 2022).

I am a member of an NIH Work Group on Reserve and Resilience and recently published a manuscript examining the genetic mechanisms for cognitive reserve and resilience (Yegla and Foster 2022).

Promoting interest in research on age-related memory decline

In my role as a scientific advisor, I provide extensive appraisals of information and professional opinion to various cross-functional working groups to support interest and progress on research directed at age-related cognitive decline. In particular, I provide expertise on age-related cognitive decline and as the Evelyn F. McKnight Chair; I bring legitimacy to proposals and programs addressing cognitive changes associated with aging. Therefore, I have taken an active and visible role in promoting research on age-related cognitive decline.

As noted above, I am a member of an NIH Reserve and Resilience Collaboratory Working Group. The goal of the Collaboratory is to come to a consensus across the research community on operational definitions to further a cohesive research goal encompassing age-related and disease related cognitive decline.

I am a Member of the Institute of Aging advisory committee, and I am involved in decisions on future research and planning for the renewal of the Older Americans Independence Center, Pepper Center Grant. As such, I am in discussions with all the major stake holders. In particular, I have promoted studies in humans and animal models, directed at examining the role of altered circadian rhythms as a biomarker and mechanism for functional decline during aging. In collaboration with Dr Karyn Essor (Department of Physiology and Functional Genomics), we have previously document altered circadian rhythms in predicting the trajectory of cognitive decline.

I am on the Scientific Committee for the Winter Conference on Neural Plasticity, where I promote scientific sessions related to cognitive aging.

I am a member of the Brain Ageing Classification Working Group. The aim of this international group is to gain global officiation via the WHO International Classification of Diseases (ICD) for new disease and disorder classifications which are more accurate and clinically useful, and address gaps in disease classification and staging. The current ICD constitute mainly late stage and extrinsically caused processes, or those considered in some way separate to 'normal ageing', which may not be accurate or ideal for preventative, reversal and earliest detection approaches. The goal is to form consensus for the range of brain ageing classifications that are required, and to write this up as a 'brain ageing classification consensus paper' from which detailed and specific papers and ICD submissions should follow.

Alcohol use is one of the main factors that load for dementia and the aged brain is more sensitive to ethanol. However, previous research has focused on neurodevelopmental effects of ethanol. It is becoming increasingly clear that it is important to understand how ethanol use interacts with advancing age to influence the brain and cognition. Therefore, in collaboration with Katherine Keyes (Columbia University) and Vijay Ramchandani (NIAAA) and Doug Matthews (University of Wisconsin), I have been asked to write a review article focused on how the CNS, particularly the limbic region among others, changes during the aging process, which will serve as a resource for alcohol researchers laboring to learn how aging impacts the CNS. This review was published in a special issue on Alcohol and Aging (Foster 2022).

Finally, I am actively involved in promoting aging research as a mentor and educator. In addition, to my own students interested in aging and cognition, I am a mentor for Dr. Monika Patel from JAX-ASCENT in Jacksonville, FL, providing expertise on the use of DNA methylation and the methylation clock to examine biological age and possible contributors to biological age (e.g., smoking, drug use, income, education). In addition, I am providing lectures to clinical psychology students on Animal Models of Memory Loss, and I am involved in the Institute for Learning at Oak Hammock supporting students' scholarly investigation and research on issues related to older adults and the aging process.

Again, I would like to thank the MBRF Board of Trustees for their support of my efforts. If there is any other information that I can provide, please feel free to contact me.

Sincerely,



Thomas C. Foster, Ph.D.

Professor in the Department of Neuroscience and Genetics and Genomics Program and Evelyn F. McKnight Chair for Research on Cognitive Aging and Memory University of Florida, Evelyn F. and William L. McKnight Brain Institute

Cruz-Almeida, Y., A. Johnson, L. Meng, P. Sinha, A. Rani, S. Yoder, Z. Huo, T. C. Foster and R. B. Fillingim (2022). "Epigenetic age predictors in community-dwelling adults with high impact knee pain." Mol Pain **18**: 17448069221118004. **PMC9380216**

Duggan, M. R., A. Lu, T. C. Foster, M. Wimmer and V. Parikh (2022). "Exosomes in Age-Related Cognitive Decline: Mechanistic Insights and Improving Outcomes." Front Aging Neurosci **14**: 834775. **PMC8921862**

Efron, P. A., D. B. Darden, E. C. Li, J. Munley, L. Kelly, B. Fenner, D. C. Nacionales, R. F. Ungaro, M. L. Dirain, J. Rincon, R. T. Mankowski, C. Leeuwenburgh, F. A. Moore, S. C. Brakenridge, T. C. Foster, O. Laitano, G. Casadesus, L. L. Moldawer, A. M. Mohr and R. M. Thomas (2022). "Sex differences associate with late microbiome alterations after murine surgical sepsis." J Trauma Acute Care Surg **93**(2): 137-146. **PMC9323556**

Foster, T. C. (2022). "Animal Models for Studies of Alcohol effects on the Trajectory of Age-Related Cognitive Decline." Alcohol.

Montesino-Goicolea, S., L. Meng, A. Rani, Z. Huo, T. C. Foster, R. B. Fillingim and Y. Cruz-Almeida (2022). "Enrichment of genomic pathways based on differential DNA methylation profiles associated with knee osteoarthritis pain." Neurobiol Pain **12**: 100107. **PMC9755025**

Peterson, J. A., L. Meng, A. Rani, P. Sinha, A. J. Johnson, Z. Huo, T. C. Foster, R. B. Fillingim and Y. CruzAlmeida (2022). "Epigenetic aging, knee pain and physical performance in community-dwelling middle-toolder age adults." Exp Gerontol **166**: 111861.

Peterson, J. A., L. J. Strath, C. L. Nodarse, A. Rani, Z. Huo, L. Meng, S. Yoder, J. H. Cole, T. C. Foster, R. B. Fillingim and Y. Cruz-Almeida (2022). "Epigenetic Aging Mediates the Association between Pain Impact and Brain Aging in Middle to Older Age Individuals with Knee Pain." Epigenetics: 1-10.

Rani, A., J. Barter, A. Kumar, J. A. Stortz, M. Hollen, D. Nacionales, L. L. Moldawer, P. A. Efron and T. C. Foster (2022). "Influence of age and sex on microRNA response and recovery in the hippocampus following sepsis." Aging (Albany NY) **14**(2): 728-746. **PMC8833110**

Strath, L. J., L. Meng, A. Rani, P. Sinha, A. J. Johnson, Z. Huo, T. C. Foster, J. D. Edburg, R. B. Fillingim and Y. Cruz-Almeida (2022). "Accelerated Epigenetic Aging Mediates the Association between Vitamin D Levels and Knee Pain in Community-Dwelling Individuals." J Nutr Health Aging **26**(4): 318-323.

Yegla, B. and T. C. Foster (2022). "Operationally defining cognitive reserve genes." Neurobiol Aging **110**: 96105.

2022 at a Glance

Summary of Major Scientific Accomplishments



Jen Bizon, PhD
Professor and Chair
Department of Neuroscience
Co-Director, CAM center

I am pleased to report several significant accomplishments from the Bizon laboratory during the 2022 year. Last year, we reported securing 5 million in new research funding that included two new five-year R01 awards from National Institute on Aging and a grant from the Florida Department of Health. One of these new awards is built upon promising new findings from our

laboratory showing vagus nerve stimulation can enhance forms of cognition that decline in preclinical rat models of aging. The second new NIA grant stems from our ongoing collaboration with Dr. Barry Setlow and expands upon preliminary data showing that acute and long-term cannabis use can improve cognition in aged, but not young, rats. We believe these studies are of critical importance given that older adults represent the demographic in which the largest increase of cannabis use has been observed in the past five years. Almost no studies, however, have evaluated effects of this drug in aging. The Florida Department of Health grant will also test effects of extended cannabis use on pathology associated with Alzheimer's disease. This year, we have focused on making progress on these awards and on continuing our work on age-related changes in decision making and how inhibitory signaling dysfunction impacts cognitive function in aging. Work conducted under our major grants has led to several compelling discoveries. Specifically, our recent findings show that both acute and chronic cannabis administration can *enhance* some forms of memory in aged, but not young, subjects. We have replicated this finding across sexes and with multiple routes of drug administration. This work is in its final stages of preparation and will be submitted in early 2023. Of note, our Ph.D. student who is leading our projects on cannabis in aging (Sabrina Zequeira) recently won UF's "three-minute thesis" competition for her oral presentation of this work. She will be competing in a state competition in Spring. We have also concluded data collection for several projects investigating age-related changes in decision making. One publication in *Neuropharmacology* (Hernandez et al., 2022) demonstrated how age differences in inhibitory signaling in the basolateral amygdala and prefrontal cortex contribute to altered cost-benefit decision making. A second manuscript in *eNeuro* (Orsini, Pyon et al., *in press*) shows that aged rats are more risk averse compared to young adults. We are also in final stages of preparation for several additional studies regarding decision making and aging and are currently planning our competitive renewal for our grant investigating changes in decision making which will be submitted in the upcoming year.

We continue to disseminate our work, having published 6 manuscripts during the past year, with two more currently under review. Notably, three of these manuscripts were a collaborative effort with our MBRF colleagues at the University of Alabama, Birmingham. Our collaboration was focused on bridging the fields of geroscience and neuroscience to better understand and develop therapies for brain aging. Beyond publications, my lab also presented numerous posters at the International Behavioral Neuroscience Meeting (IBNS) in Scotland, the American College of Neuropsychopharmacology conference (ACNP) and the annual Society for Neuroscience meeting. I also personally gave invited presentations at the IBNS meeting and in several other venues, including grand rounds at Johns Hopkins School of Medicine. In the next few months, I will also be giving invited talks at the Winter Conference for Brain Research (January) and the Irvine Conference on Learning and Memory (April). For the past year, I have also been very active in mentoring and training individuals in the area of cognitive aging. Currently, I co-

mentor 5 students: 3 PhD (Wonn Pyon, Sabrina Zequeira, Katherine Gonzalez) and 1 MS (Emily Gazarov) student with Dr. Barry Setlow and 1 PhD student (Johleen Seedansingh) with Dr. Sara Burke. I am further a primary mentor of an MD/PhD Fellow, Dr. Matt Burns, who holds a K08 award from the National institution on Aging and recently began a tenure-track assistant professor position in the Department of Neurology. I also mentored a CAM Summer Scholar in my lab from our SNIP program. All my trainees are actively working on questions pertinent to cognitive aging and are making exceptional contributions to our work.



Ron Cohen, PhD
Evelyn McKnight Chair of Clinical Translation in Cognitive Aging and Memory
Professor, Clinical and Health Psychology
Co-Director, CAM center

The ACT study was completed and has yielded multiple publications on cognition and brain function in older adults (findings that are outlined in detail by Dr. Woods. The WISE bariatric surgery R01 study was completed this year. Several manuscripts have been published or are in press that examine changes in functional brain response on fMRI and also cerebral metabolic changes on MRS occurring post-surgery, which are associated with weight loss, A1c reduction, and cognitive improvements. Findings are compelling and support our a priori hypotheses as severe obesity and diabetes are both associated with baseline cognitive deficits and abnormalities in cerebral metabolic state (MRS) and functional brain response (fMRI). Reduced BMI and A1c post-surgery were associated with improved cognitive and neural functioning, suggesting that significant weight loss among severely obese adults has beneficial effects on brain health. We are currently examining age-associated effects in the context of bariatric surgery. A submission of a WISE R01 renewal study, if funded, will examine long-term effects of weight loss and A1c reductions following ariatric surgery on cognition and the brain, and the effects of vagotomy and also transcranial vagus nerve stimulation on outcomes. The McKnight Brain Aging Registry (MBAR) cognitive and behavioral data is now fully entered into REDCAP following extensive quality control steps to insure reliability, with neuroimaging data housed in the HiPerGator. Analyses of the various neuroimaging modalities has occurred. Blood samples are stored in our phlebotomy lab in the MBI, on which we are completing cytokine analyses. We have published fMRI findings and have several manuscripts submitted for review that focus on other neuroimaging metrics. These manuscripts are in addition to the original series of papers published in the Frontiers in Aging Neuroscience special edition on neuroimaging approaches in the study of older adults. We are currently generating a manuscript that characterizes cognitive function in the oldest old, examined from several different perspectives. Overall, the MBAR participants, adults over the age of 85 years had relatively preserved cognitive functioning, though this varied to some extent across cognitive domains. Individuals in the cohort were highly active in physical activities including aerobic and strength exercise. Multiple R01 projects are in progress or nearing completion that address the interactions of HIV, substance use and aging. The NIA funded ROGUE study focuses on gut-brain axis and the impact of the microbiome on cognitive and brain functioning in the context of aging among people living with HIV (PLWH). Findings to date demonstrate that gut microbiome impacts cognitive function among PLWH with effects varying as function of age. The P01 and U24 studies supported by NIAAA are now underway with Dr. Eric Porges (CAM faculty) leading the research component examining the effects of vagus nerve stimulation and supplementation with probiotics among PLWH who are consume large quantities of alcohol. Findings from the NIDA-funded MAPLE study of HIV and cannabis use and from the 30-Day Challenge an NIAAA-funded study of cognitive and neuroimaging benefits from alcohol abstinence have been published, with a number of manuscripts submitted or in preparation. In analyses of aging in the MAPLE cohort, we have found that the prevalence of cognitive deficits was greater than expected, as over 40% of participants over the age of 65 met criteria for MCI based on criteria used in Alzheimer's research. NIA supported R01 studies were funded at Tufts University and Brown University on which I am a co-investigator are now in the data collection phase. The Tufts study (Roberts, PI)

examines the cognitive benefits of nutritional supplementation with flavanol in older adults. The Brown study (Salmoirago-Blotcher, PI) examines the effects of mindfulness training on cognitive functioning in older adults. Preliminary findings were published in a manuscript “Exploring Effects of Aerobic Exercise and Mindfulness Training on Cognitive Function in Older Adults at Risk of Dementia: A Feasibility, Proof-of-Concept Study”, and a second paper is now under review. These lines of research are important as they examine the potential benefit of these nutritional/behavioral approaches for enhancing functioning in older adults.



Sara Burke, PhD
Associate Professor, Department of Neuroscience
Associate Director, CAM center

2022 was marked by several scientific achievements for the Burke laboratory. Our research program continues to focus on understanding the systems-level mechanisms of age-related cognitive decline as well as developing and testing diet-based interventions for improving cognitive outcomes in old age. My NIH/NIA R01/RF1, entitled “The Contribution of Declines in Functional Connectivity to Cognitive Aging,” entered the second year of funding. With the support of this award, we have continued to develop novel analytical tools to bridge levels of analysis from single to global brain dynamics. In collaboration with engineers at MIT’s Lincoln Laboratory, we are implementing machine learning approaches to co-register 3-dimensional light sheet microscopy images that contain single-cell resolution with MRI datasets. It is our goal to use this method of bridging levels of analysis to enhance the translational potential of discovery science for understanding that treating human cognitive aging. Integral to the research mission of both my lab and the CAM is the training of graduate and undergraduate students. My graduate student, Samm Smith, advanced to candidacy last June. Additionally, she submitted an NRSA F31 fellowship to the NIH/NIA that received an impact score of 46. While not fundable, the comments from reviewed were favorable and constructive. We plan to resubmit this grant in April 2023. I also continue to serve on the Neuroscience Graduate program admissions committee. In this role, I will continue to facilitate the recruitment of talented students that are interested in cognitive aging and want to pursue research in understanding the mechanisms and developing novel treatments for enhancing brain resilience in older adults. I am also delighted that through the efforts of myself and my colleagues to support undergraduate research opportunities, we were recently awarded a new R25 training grant from the NIH/NIA, entitled “Networking and Expanding Undergraduate Research on the Neurobiology of Aging to Advance Diversity (NEURON-Aging).” Along with Drs. Jeremy McIntyre and Jose Abisambra, we will be able to provide enhanced research opportunities for underrepresented students both from UF and other colleges/universities starting this January. We are already recruited 6 talented first- and second-year undergraduate students that will be beginning research in labs that investigate cognitive aging at the start of next year. We have also continued to disseminate our research findings regarding mechanisms of cognitive aging both with research publications and with formal seminars and research symposia. This past year, my laboratory has published 12 papers on the topic of cognitive aging. Additionally, Dr. Abbi Hernandez and I are co-editing a special issue of the journal *Nutrients* on the topic of Nutrition and Diet Intervention: The Prevention and Early Treatment of Cognitive Dysfunction. This highlights the ongoing and productive collaboration between the Evelyn F. McKnight Brain Institutes at UF and UAB. I gave 2 invited seminars (UAB and UT-San Antonio) and my trainees presented at the annual meeting of the Florida Consortium on the Neurobiology of Cognition and the Society for Neuroscience meeting. Additionally, I was recently invited to be a plenary speaker at the 2023 International Meeting of the Neurobiology of Learning and Memory.



Adam J. Woods, PhD

Associate Dean of Research, College of Public Health and Health Professions

Associate Professor, Department of Clinical Health Psychology

Associate Director, CAM center

Dr. Woods' Neuromodulation Lab continues to experience growth in our portfolio of cognitive aging intervention research. Dr. Woods was awarded 1 new R01 in the past year, bringing the lab to 5 concurrently funded NIA R01s specifically focused on remediating age-related declines in cognitive function and the prevention of dementia. Over the past year, Dr. Woods was awarded the UF Foundation Term Professorship, an award only given to two faculty per year at the University of Florida. This award is in recognition of a UF faculty members exceptional contribution to the overall mission of UF. In addition, Dr. Woods was also nominated for the Blavatnik Award in the Life Sciences category. Only 300 faculty across the US are nominated for this award each year and Dr. Woods serves as the UF candidate in the area of neuroscience/life sciences. Dr. Woods published 16 first author papers on cognitive aging and neuromodulation interventions in top tier journals, such as GeroScience, NeuroImage, Brain Stimulation, etc. To date, Dr. Woods has been awarded over 30 million dollars in active NIH funding at the University of Florida for interventions to remediate age-related declines in cognitive function: the central mission of McKnight gift. He continues to expand his clinical trial operations at UF College of Medicine Jacksonville, with one new Center faculty member located in COM Jax Neurology and two R01s collecting data through the new UF COM Jax trial site on two of his R01s. Dr. Woods is currently up for promotion to Full Professor in the College of Public Health and Health Professions. Notification of promotion will occur in June of 2024. Finally, Dr. Woods was recently appointed as the Associate Dean for Research in the College of Public Health and Health Professions. In accepting this position, his focus will remain primarily on his research activities in his lab and the center (75%) and separately on serving to facilitate the research mission of the overall college (25%).



Tom C. Foster, PhD

**Evelyn F. McKnight Chair for Research on Cognitive Aging and Memory
Professor, Department of Neuroscience**

Training Achievement: Graduated a student, Vivekananda Budamagunta, dissertation title "THE UNCHARTED AVENUES OF CELLULAR SENESCENCE". The completed studies concern the role of peripheral senescence in regulating the rate/trajectory of cognitive aging. In addition, these studies employed different senolytic treatments. Programmatic Achievements: Collaborations involve examination of epigenetic regulation of aging. Epigenetic studies, including four published studies of epigenetic markers (DNA methylation) of biological age in understanding functional decline (Cruz-Almeida et al., 2022; Peterson et al., 2022a; Peterson et al., 2022b; Strath et al., 2022). We published a study of epigenetic (microRNA) regulation of transcription (Rani et al., 2022), and another study on the microbiome (Efron et al., 2022), as mechanisms for sex differences in aging and response to systemic inflammation. As a member of the steering committee for the Winter Conference on Neural Plasticity, I continue to support scientific sessions on brain aging. Scientific Achievements: Published two review papers, one on Animal Models for Studies of Alcohol effects on the Trajectory of Age-Related Cognitive Decline (Foster, 2022) and another on Exosomes in Age-Related Cognitive Decline: Mechanistic Insights and Improving Outcomes (Duggan et al., 2022).



Karina Alvina, PhD
Assistant Professor
Department of Neuroscience
Member, CAM center

My lab investigates the effects of irisin and other exercise-derived factors on cellular function in the hippocampus and memory. We are particularly interested in whether such factors could serve as mimetics to counteract the effects of stress and deleterious effects of aging. In the past year, we have continued our funded work from the Florida Department of Health which is focused on investigating how irisin influences Alzheimer's disease-like pathology and I have begun to collaborate with CAM members to expand this work into models of cognitive aging. My lab actively trains students, from undergrad to graduate, in research and outreach and I serve as co-Director of the Summer Neuroscience Internship Program (SNIP) for which the CAM Center sponsors four students. I am also a co-Investigator on the new R25 awarded to Dr. Burke which will expand our early career training in aging by creating a post-baccalaureate program. I and my lab participated in several recruitment efforts at several national conferences to support these programs and to foment the increase in diversity in the pool of trainees.



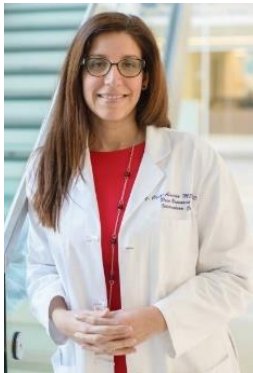
Matt Burns, MD, PhD
Assistant Professor
Department of Neurology
Member, CAM center

I am a board-certified in neurology by the American Board of Psychiatry and Neurology and my research interests broadly include aging, deep brain stimulation, neurodegenerative disorders, and bodily coordination. The long-term goal of my research is to determine the role of ageing in cellular and network dysfunction in synucleinopathies, and to develop disease-modifying therapies for patients with these diseases. In the past year, my lab has made significant progress on my K08 which is funded from the National Institute on Aging. This proposal is focused on determining the differential molecular, network, and cognitive changes in a young versus old synuclein rat model and the therapeutic effects of disease-modifying non-invasive network modulation. I have successfully recruited to my lab both a full-time lab technician with significant experience in high field MRI imaging, animal behavior, and immunohistochemistry, as well as a neuroscience master's student with significant wet lab experience. These two key hires have been instrumental in advancing our projects focusing on the role of noninvasive neuromodulatory therapy in improving cognition in aging. I also successfully led a grant which secured equipment funds to enhance the microscopy infrastructure for CAM Center researchers. Specifically, our grant enabled the purchase of a SmartBatch+ system from Life Canvas Technologies which combines active tissue clearing and immunolabeling into one high-throughput device. In addition to this equipment benefiting my own work, it will be accessible and facilitate the imaging capabilities of all CAM Center members.



Russell Bauer, PhD
Professor Emeritus
Department of Clinical and Health Psychology
Member, CAM center

Dr. Russell Bauer retired from the UF Department of Clinical and Health Psychology after 42 years of influential and impactful science, service, patient care, and mentorship. Family, friends, colleagues, and mentees gathered in person and online to celebrate Dr. Bauer's incredible career on July 16th at the Harrell Medical Education Building. Dr. Bauer finished his research career with over 125 professional papers and having mentored over 40 graduate students.



Yenisel Cruz-Almeida, PhD
Associate Professor
Department of Dentistry
Member, CAM center

I am currently a tenured Associate Professor in the Department of Community Dentistry and Behavioral Sciences, as well as affiliate faculty in the Departments of Epidemiology and Neuroscience. I serve as Associate Director of the UF Pain Research & Intervention Center of Excellence and a core leader on the UF Pepper Center. This past year has been a remarkably productive one for my laboratory. In total we published 16 papers. Highlights include our finding that there is a significant relationship between pain and both epigenetic factors and brain aging. Our findings suggest that chronic pain may contribute to accelerated brain aging through epigenetic changes and highlights the critical need to effectively treat chronic pain among older adults. I also have been active in training and mentored a CAM Scholar as part of the Summer Neuroscience Internship Program (SNIP) and will serve as a mentor on the newly awarded R25 (Burke, McIntyre, and Abisambra, PIs).



Natalie Ebner, PhD
Professor
Department of Psychology
Member, CAM center

I am a Professor in the Department of Psychology in the College of Liberal Arts and Sciences at University of Florida (UF). This has been a particularly productive year for my laboratory. We have continued to publish our research on social cognitive and affective aging in top-tier peer reviewed scientific journals (12 papers published in this reporting period). Highlights include a research paper published in *Philosophical Transactions of the Royal Society* that described the neural mechanisms by which oxytocin influences emotional processing and cognition in older adults and a paper published in *NeuroImage* in which we report effects of oxytocin on the salience network in older adults. We also obtained several new grants, including fellowships and diversity supplements for our trainees. Finally, we presented our work at several conferences, and I will be leading a session at the upcoming Winter Conference on Brain Research in Snowbird, Utah focused on interventions for neurocognitive decline in aging.



Ruogu Fang, PhD
Associate Professor
J. Crayton Pruitt Family Department of Biomedical Engineering
College of Engineering
Member, CAM center

My research spans data, brain, and health. My lab aims to develop innovative computation models to understand, diagnose and treat brain disorders in big and complex data. In the past year, my laboratory was exceptionally productive. With respect to our work relevant to uncovering novel mechanisms of cognitive decline and resilience, highlights include a new collaborative paper entitled "Association of Longitudinal Cognitive Decline with Diffusion MRI in Gray Matter, Amyloid, and Tau Deposition" which has been accepted for publication in *Neurobiology of Aging*. I also gave an invited talk at a Gordon Conference (GRC) Image Science, Emerging Imaging Techniques at the Intersection of Physics and Data Science and my student presented a poster at the Society for Neuroscience meeting. With respect to my personal advancement, I was awarded tenure and promoted to Associate Professor. I was also honored to receive the Herbert Wertheim College of Engineering 2022 Faculty Award for Excellence in Innovation and to be appointed as the Associate Director in the UF Intelligent Critical Care Center (IC3). In May, I was interviewed by ABC WCJB TV Tech Tuesday regarding my research using artificial intelligence (AI) to detect Alzheimer's Disease.



Joseph Gullett, PhD
Research Assistant Professor
Department of Clinical Health Psychology
Member, CAM center

My research uses artificial intelligence (AI) methods combining structural, functional, and diffusion neuroimaging methods to study disease of aging as well as response to intervention. I am clinically involved in the neuropsychological assessment of various adult populations on a weekly outpatient clinic, and collaborate as a licensed neuropsychologist on a number of NIH-funded U-01, P-01, and R-01 grants. I was recently hired in March 2022 as a tenure-track faculty member through the AI initiative in the department of Clinical & Health Psychology. Over the past calendar year, I have had a first author publication of an AI manuscript predicting dementia conversion using baseline MRI, two additional co-author publications, as well as two additional first-author publications in preparation and seven co-author publications in various stages of press/review/preparation. I continue to co-mentor Brian Ho as he begins to prepare his PhD qualifying examination product and am seeking out a graduate student to admit in the coming fall semester. Lastly, I received a fundable impact score on my K23 with the NIA, which is expected to be funded in the January 2023 council meeting.



Aprinda Indahlastari, PhD
Research Assistant Professor
Department of Clinical Health Psychology
Member, CAM center

I published one first author paper, and one co-author paper. Another co-author paper is under review. I submitted KL2 grant (December 2021) and K25 NIH grant (June 2022). I was not selected for KL2, but advanced to the top 5 finalists. My K25 was discussed at NIA study section and received a score a couple points away from the funding line. I am in the process of resubmitting the K25. I teach a brand-new AI Foundation course for undergrad in PPHP college as part of the new AI certificate in public health and healthcare (35 enrolled students). I organized a new AI Session in healthcare for the undergraduate healthcare conference, partnering with the UF Career Connection on campus. I received UF CTSI Spring 2022 Pilot fund \$20k award this past October, for funding up to 18 months post IRB approval. The pilot study is to collect initial data (N=20) on mechanistic study for acute application of tDCS in MCI versus healthy older adults. I also presented in two scientific conferences The International Brain Stimulation Conference (December 2021) and The NYC Neuromodulation Conference (August 2022). I received the Best Poster Award at the Intl Brain Stimulation Conference in Dec 2021 and was selected to give oral highlight for poster presentation (top 10%) at the NYC Neuromodulation conference.



Ashok Kumar, PhD
Research Associate Professor
Department of Neuroscience
Member, CAM center

Over the past two decades, my research has been focused on delineating the mechanisms contributing to age-related cognitive impairment. Toward this goal, a central focus of this research involves the role of various interventions such as environmental enrichment, exercise, viral vector, and anti-inflammatory compounds in restoring/reversing age-associated impaired cognition, synaptic plasticity, and cell excitability. During 2022, I have published a manuscript and I have also had the privilege of mentoring trainees at all levels. These include Dr. Linda Bean (postdoc), two undergraduate students, and Vevekananda Budamagunta, a graduate student whose committee I serve on. I served as an associate editor for *Frontier's in Neuroscience*, *Frontier's in Aging Neuroscience* and *Frontier's in Pharmacology*. In addition, I have served as an Ad hoc reviewer for a number of publications related to the neurobiology of aging.



Damon Lamb PhD
Assistant Professor
Department of Psychiatry
Member, CAM center

My research is interested in the complex interaction of autonomic, emotional function, and cognition. I currently conduct clinical-translational research and education in human neuroimaging of psychiatric and related disorders in relation to cognitive aging using advanced computational methods. Our research project investigating a putative treatment for age-related memory loss, evaluated in an amnesic mild cognitive impairment cohort, was published this year. In outreach and training, I taught Neuroscience Artificial Intelligence/Machine Learning and submitted a proposed new graduate data science/statistics course for the neuroscience department, presented new magnetic resonance spectroscopy work at the ISMRM conference, and started several new research projects funded by the VA, DOD, and JDRF.



Carolina Maciel, MD
Clinical Assistant Professor of Neurology and Neurosurgery; Director of Research, Division of Neurocritical Care
Member, CAM center

I am a neurointensivist with dedicated training in EEG monitoring in critically ill patients. I received my medical degree with honors from Universidade Federal Fluminense in Brazil and completed a Neurology residency at Weill Cornell Medical College and Memorial Sloan Kettering Cancer Center. I subsequently moved to New Haven, where I underwent Neurocritical Care and ICU EEG fellowship training at Yale-New Haven Hospital. I then obtained a Master of Science in Clinical Research at Medical University of South Carolina. In 2022, I have continued to be involved with a successful virtual shadowing program (Medi-Gators) for UF pre-health undergraduates (now on its 4th iteration with nearly 2000 students enrolled in this semester) due to the void in such opportunities caused by the pandemic. I also published 17 papers and continued to enroll study participants in our pilot study of post-anoxic status epilepticus.



Andrew Maurer, PhD
Associate Professor
Department of Neuroscience
Member, CAM center

My research program continues to focus on understanding how activity moves across the brain to support cognition and how this process changes with age. In 2022, we have managed to make progress on multiple fronts and returned to our pre-pandemic levels of productivity. Notably, I have graduated two students: Drs. Nicholas DiCola (neuroscience), and Jack Kennedy (neuroscience). Dr. DiCola recently left the lab to begin a postdoctoral position at the National Institute on Aging in the laboratory of Dr. Peter Rapp. I am also serving as co-I on the R25 training grant, “Networking and Expanding Undergraduate Research on the Neurobiology of Aging to Advance Diversity (NEURON-Aging)” with Drs. Burke, McIntyre and Abisambra, which recently recruited its first cohort of students. In terms of disseminating research, I have a seminar at UT-San Antonio and members of my research group presented at the 2022 FCNC and

SfN conferences this past year. We have published 6 papers, have 3 more at various states of preparation, and are continuing to explore different avenues by which to understand how the brain organizes and propagates activity "at the speed of thought".



Eric Porges, PhD
Assistant Professor
Department of Clinical Health Psychology
Member, CAM center

In the past year, we have continued our work in cognitive aging and accelerated aging. Participant enrollment and data collection have begun in our NIH-funded exploration of the cognitive, neurophysiological, and systemic inflammatory impact of both non-invasive transcutaneous vagus nerve stimulation (taVNS) and microbiome interventions in adults and older adults who are vulnerable to accelerated cognitive aging (e.g., people living with HIV and high-risk alcohol drinkers). Additionally, the McKnight Brain

Research Foundation supported collection of data in a normal aging cohort to complement our NIH/NIA-funded study of older adults with mild cognitive impairment. This study explores the acute cognitive and neurophysiological impacts of taVNS in older adults. Data acquisition for the investigation, led in part by Graduate Student Destin Shortell, is expected to be completed in the Spring. Data collection has begun on an NIH-funded project in collaboration with Johns Hopkins University. Our team's aim is to characterize the trajectory of the macromolecular spectrum during normal aging via Magnetic Resonance Spectroscopy (MRS). Our first manuscript from this project has already been published and is the first to report that the macromolecular spectrum is stable across the lifespan. Furthermore, McKnight Brain Aging Registry data on adults 85+ has been used to extend our previous characterization of lifespan trajectory changes to frontal cortical GABA (the principal inhibitory neurotransmitter) to include this important advanced-age population. This work has been led by Graduate Student Mark Britton and is currently distributed to co-authors in preparation for submission for publication. Finally, our lab has been covered by the New York Times (2022, June 2) "This Nerve Influences Nearly Every Internal Organ. Can It Improve Our Mental State, Too?" and the science publication Inverse (2022, August 15) "This Lifestyle "Hack" Claims to Alleviate Anxiety. But Does it Actually Work?".



Barry Setlow, PhD
Professor
Department of Psychology
Member, CAM center

There has been considerable progress in the past year on a number of fronts related to our cognitive aging research program. The lab continued work under three R01 grants from NIA, focused on a) neural mechanisms of age-related changes in decision making, b) the application of vagus nerve stimulation to remediating cognitive decline in aging, and c) the effects of cannabis on age-related cognitive decline,

as well as work under a grant from the Florida Department of Health to investigate effects of cannabinoids on age-related cognitive decline and Alzheimer's disease-like pathology. The lab published 6 peer-reviewed papers in the past year. Only one of these was specifically focused on cognitive aging, but others lay the groundwork for future projects focused on

aging. Lab trainees presented their research at local, state, national, and international meetings. In addition, I gave two invited presentations, including one in Europe. In terms of training, one undergraduate in the lab completed a senior Honors Thesis on preclinical aging research, and another received a University Scholars Program award to conduct research on neural mechanisms of decision making in aging. Two PhD students in the lab (Wonn Pyon and Sabrina Zequeira) continued on the T32 training grant on Alzheimer's disease and related dementias, and a new PhD student (Katherine Gonzalez) joined the lab and will continue work on age-related changes in decision making.

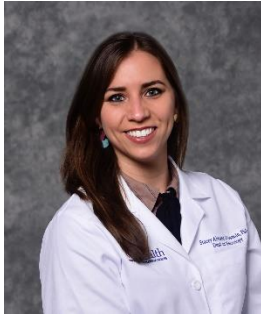


John Williamson, PhD
Associate Professor
Department of Psychiatry
Member, CAM center

Programmatic lines of research on transcutaneous vagus nerve stimulation (tVNS), and TBI mechanisms associated with subphenotypic behavioral outcomes were advanced. We completed enrollment on our NIH R21 supported tVNS mechanisms study in older adults with mild cognitive impairment (n = 60). tVNS is a compelling technology for several conditions relevant to brain aging due to multi-system effects including afferent path connectivity to the locus coeruleus, the brain's primary source of norepinephrine, and data demonstrating systemic inflammation reduction associated with stimulation.

This cross-over design study includes steady state comparison of tVNS versus sham stimulation effects on neuropsychological performance in the context of multi-modal neuroimaging (fMRI, MRS, volumetrics). We recently published (in press; Murphy et al, 2023 [likely actual date of publication]) the first tVNS study in patients with amnesic mild cognitive impairment. The results are quite interesting with during tVNS differences in functional connectivity (fMRI) in semantic networks as well as hippocampally connected networks, suggesting relevant functional neuroanatomical effect of the technology. The cognitive results are currently being analyzed. We have four active longitudinal studies with tVNS including paired tVNS with exposure and response prevention therapy in obsessive compulsive disorder), paired tVNS with mindfulness in subclinical anxiety in students (an out-home proof of concept trial), paired tVNS with cognitive training in older adults (McKnight supported) and a newly funded P01 tracking inflammation and brain changes in patients with HIV and alcohol abuse histories. In our TBI work, we have a study in aging with TBI designed to understand the effects of TBI in older adults on blood biomarkers associated with inflammation, immune, and vascular response and relationships to multi-modal neuroimaging indications of central inflammation, metabolic milieu, structural (e.g., white matter) and functional changes in the recovery trajectory from TBI. This is DOD funded and we will begin enrollment of participants early in 2023. We enrolled two new graduate students and recruited one new postdoctoral fellow, all of whom started in the Fall of 2022. These students will work within the funded projects associated with CAM, COARD, and the BRRC.

New CAM Center Members



Stacey Alvarez-Alvarado, PhD
Assistant Professor
Department of Neurology - Jacksonville
Member, CAM center

Dr. Stacey Alvarez-Alvarado is an assistant professor in the College of Medicine-Jacksonville. She obtained her BS in 2012 from the University of Puerto Rico-Mayaguez and completed her MS in 2014 and PhD in 2019, both from the Florida State University. She then pursued her Postdoctoral Associate training in the Department of Clinical and Health Psychology from 2019-2022 at the University of Florida, supported by a Diversity Supplement to the National Institute of Aging Parent Grant: Revitalize Cognition in Older Adults at Risk for Alzheimer’s Disease with Near-Infrared Photobiomodulation. In the past reporting period, Dr. Alvarez-Alvarado became the site-investigator (Jacksonville) for the awarded National Institute on Aging, PACT trial and has now begun a tenure-track faculty position in the Department of Neurology, College of Medicine-Jacksonville. Dr. Alvarez-Alvarado is devoted to delaying age-associated cognitive and physical declines via novel non-pharmaceutical interventions. Her primary area of interest is developing and evaluating novel interventions to reduce the impact of dementia and cognitive impairment, particularly among Hispanic populations.

The past reporting period included successfully transitioning from my postdoctoral associate responsibilities in the Department of Clinical and Health Psychology (UF Gainesville) to a new assistant professor position in the Department of Neurology, College of Medicine- Jacksonville. During the first 6-7 months of the year, I was engaged in data collection, participant visits, and neuroimaging management/processing as part of the NIA Diversity Supplement to the parent trial Revitalize Cognition in Older Adults at Risk for Alzheimer’s Disease with Near-Infrared Photobiomodulation (REVITALIZE). This project provided critical groundwork to apply for, interview, and accept an assistant professor position to continue my research career examining the structural and functional brain mechanisms underlying cognitive symptoms of Alzheimer’s disease. Transitioning to my new tenure-track faculty position in Jacksonville provided the unique opportunity to play an active role in setting-up the new PACT study site in the UF College of Medicine-Jacksonville. Examples of creating community ties and outreach programs to promote the incoming study include appearances in local Jacksonville news (news4Jax Sunday morning news), providing quotes for local newspaper publications in collaboration with the University of North Florida (UNF; Florida Times Union), working first-hand with internal UF media promotions (Academic Matters, Alzheimer’s Awareness), attending interviews with Spanish-speaking local TV segments (Aquí en tu comunidad), and presenting/ creating ties with the National Association for the Advancement of Colored People (NAACP). Collectively, these efforts and my current position will allow me to submit future K applications and develop cutting-edge neuroimaging research, informing specialized treatments to delay and counteract the risk for Alzheimer’s disease. These efforts will be especially focused on minority recruitment and retention within our current clinical trial infrastructure.



Breton Asken, PhD, ATC
Assistant Professor
Department of Clinical and Health Psychology
Member, CAM center


Dr. Asken is a neuropsychologist and tenure-track Assistant Professor in the Department of Clinical and Health Psychology and a Fixel Institute for Neurological Diseases Scholar. He obtained his PhD in Clinical Psychology (neuropsychology emphasis) in 2019 after finishing his graduate training at the University of Florida and his clinical internship in Neuropsychology at Brown University. He then completed a postdoctoral neuropsychology fellowship at the UCSF Memory and Aging Center. Dr. Asken's research broadly focuses on how lifetime head trauma exposure relates to clinical and neuropathological variability among patients with Alzheimer's disease and related causes of dementia. He is also an active clinical neuropsychologist and specializes in evaluation of older adult patients with suspected neurodegenerative disease. Dr. Asken has ongoing research support through the 1Florida Alzheimer's Disease Research Center to explore novel blood-based biomarkers for the long-term neurological effects of repetitive head trauma.

The past reporting period was one of significant productivity for my research focused on how lifetime head trauma exposure relates to clinical and neuropathological variability among patients with Alzheimer's disease and related causes of dementia. My work involves using a combination of neuropsychological testing, fluid-based biomarkers (blood, CSF), neuroimaging, and neuropathology to address the links between head trauma and dementia. I am especially interested in how biomarkers and cognitive testing can help improve diagnosis, prognosis, and treatment of mixed etiology dementia, or progressive cognitive/behavioral decline in later life due to multiple co-existing neurodegenerative diseases. We have now successfully established active collaborations with investigators across UF as well as multiple institutions around the country. My research is now funded research through the 1Florida ADRC Development Grant mechanism. In the past year, we further authored several publications advancing our understanding of multimodal biomarkers in the assessment of Alzheimer's disease and related causes of dementia.

Most Important Research Achievements 2022

Jen Bizon, PhD

This is the first year since the pandemic that I can report we are unequivocally generating data at a "pre-pandemic" pace. To that end, we have spent the year completing data acquisition on multiple projects that were significantly delayed due to pandemic restrictions and set-backs. These efforts have led to the completion of a number of studies that will come to fruition over the next year as we finalize manuscripts for submission. Specifically, we will submit shortly two comprehensive papers on cannabis effects in aged subjects which we believe will significantly add to the available knowledge regarding the use of the drug in older adults. Beyond the cannabis work, we have a large backlog of papers on decision making and aging which we will published in the next year. As described above, we published two papers on this topic in 2022: one in *Neuropharmacology* and another in *eNeuro*. One of these studies demonstrates aged rats are more risk averse than young, providing an animal model that recapitulates well-described behavioral patterns in older adults. Both studies also add to our growing knowledge regarding the molecular and circuit adaptations that contribute to such age-related changes in decision making. Importantly, we have



no fewer than five additional studies related to this work for which we have either finalized data collection or it is in its final stages. Our priority is the publication of these findings which will lay the groundwork for submission of a renewal application to continue this work (to be submitted this spring). As usual, we are also proud of our trainee's accomplishments in this past year. A few highlights include: Wonn Pyon and Sabrina Zequeira receiving funding on an NIA T32 training grant; Katherine Gonzales receiving first place for her poster presentation at the International Behavioral Neuroscience meeting in Glasgow; Sabrina Zequeira winning the "three-minute" thesis competition for her work on cannabis effects on the aged brain and cognition. I should also note that my new student (co-mentored by Sara Burke) Johleen Seedansingh has made exceptional progress conducting the initial studies under our newly awarded grant focused on vagus nerve stimulation in aging. It is notable that the technical challenges of these studies are significant, particularly with respect to developing the approaches that enable long-term implantation of vagus cuffs in aged rats. Our success to date in this project has been possible due to fruitful collaboration with numerous others, including those within CAM (Drs. Barry Setlow, Sara Burke, Damon Lamb) and outside of CAM (Drs. Erica Dale and Jeremy McIntyre).

Ronald Cohen, PhD


As outlined above my scientific contributions are in several lines of research. With respect to normal cognitive and brain aging, our findings with respect to preservation of semantic neural network connectivity is particularly noteworthy (*Frontiers in Aging Neuroscience*). Important findings regarding the impact of obesity and diabetes on the brain and cognition and benefits of reductions in these risk factors illustrates the importance of these modifiable risk factors on brain function, of particular relevance in the context of aging. A number of findings related to HIV effects on the brain and cognition in the context of aging and also substance abuse has been a significant contribution to the literature, providing evidence the viral infection in older adults is a concern, with alcohol use exacerbating these effects.

Sara Burke, PhD

Over this past year, an important research achievement has been to link the gut microbiome to both diet and cognitive function. In collaboration with Drs. Abbi Hernandez, Tom Buford, and Christy Carter at UAB we published 2 papers showing that diet interventions can modify the gut microbiome. In the first publication, we reported that both time-restricted feeding (also known as intermittent fasting) and a ketogenic diet significantly altered the gut microbiome in aged rats. Moreover, functional analysis indicated significant differences in several pathways, including those involved in the tricarboxylic acid (TCA) cycle, carbohydrate metabolism and neurodegenerative disease. In a subsequent study middle-aged rats were fed with a time-restricted regimen with either a standard or a ketogenic diet or allowed ad libitum access to food. Regardless of dietary composition, time-restricted-fed rats had better cognitive performance than ad libitum-fed rats. This observation could not be accounted for by differences in motivation, procedural or sensorimotor impairments. Additionally, there were significant differences in gut microbiome diversity and composition between all diet conditions. *Allobaculum* abundance was associated with cognitive task performance, indicating a link between gut health and cognitive outcomes in aged subjects.

Adam J. Woods, PhD

With research efforts across five active R01s, it is hard to select one achievement. At the completion of data collection on the ACT trial, we discovered that while participants trended toward improvement on the trial's primary cognitive outcome measure, the trial ultimately failed to deliver clinically meaningful impact on cognition. However, with every failure comes an opportunity for discovery. As part of the planned secondary analyses for the ACT trial, we discovered that combined cognitive



training and tDCS (transcranial direct current stimulation) produced a large and clinically significant reduction in moderate to high anxiety in older adults as well as a significant decrease in depression. These secondary findings are currently in prep for publication but hold significant promise for future studies investigating improvement in mental health in later life – a factor that significantly impacts cognitive health. Dr. Woods is currently planning a follow-up trial to directly investigate these findings.

Tom C. Foster, PhD

We published work describing methods for identifying cognitive reserve mechanisms (Yegla and Foster, 2022). Variability in cognitive decline is related to the environment, lifestyle factors, and individual differences in biological aging, including cognitive reserve, plastic properties of the brain, which account for better-than-expected cognition for a given level of brain aging or pathology. We developed methods for identifying brain aging (failed brain maintenance) and cognitive reserve genes, which predict better-than-expected cognition for a given level of brain aging. The results suggest that, for some individuals, transcriptional plasticity processes provide resilience mechanisms, counteracting the effects of aging stressors that impair cognition. Another series of studies employed senolytic drug treatments. The results indicate that senolytic treatments decreased peripheral senescence and senescence-associated secretory phenotype (SASP) markers, including, plasma level of several cytokines, rescued memory, and hippocampal synaptic transmission, and prevented the age-related increase in blood-brain barrier permeability. Treatment groups exhibited morphological evidence of microglial activation intermediated between aged and young and decreased expression of inflammation genes in the dentate gyrus (DG). Across treatment groups, differences in DG gene expression for oxidative stress, cellular senescence, and microglial activation were consistent with antioxidant properties of quercetin and differences in access of dasatinib and ABT-263 to the brain. The results indicate that peripheral senescence, through elevation of plasma SASP factors, is a major contributor to brain aging.

Stacey Alvarez Alvarado, PhD


Interviewing and accepting an assistant professor position in the Department of Neurology, College of Medicine-Jacksonville is the most important scientific achievement this past year. This achievement is especially important due to the indirect impact. This position provides the base to succeed in establishing a new research site in Jacksonville as part of the PACT trial and other incoming R01s. This new site is a gateway to stronger ties between UF Gainesville and UF Jacksonville, as well as an opportunity to perform cognitive aging clinical trials that are inclusive and accessible in a city of nearly 1 million people. The expansion of the PACT study to Jacksonville increases the expected study enrollment from 500 to 838 participants over the next two years. This will ensure that populations that have often not had access to these cutting-edge intervention trials are included, specifically African Americans and Hispanics.

Karina Alvina, PhD

We completed a series of experiments to document the release of the myokine Irisin in response to acute exercise. We observed a short-lived increase in blood immediately following exercise. How irisin is released has been controversial in the field and our results will challenge the current understanding of this protein, and its potential for influencing brain health, after exercise.

Breton Asken, PhD

Dementia research has rapidly accelerated due to the identification of reliable, accurate, and cost-effective methods for diagnosing Alzheimer's disease with high sensitivity and specificity. Blood-based measurement of phosphorylated tau reflecting Alzheimer's disease pathology now rivals more advanced,



but often cost-prohibitive, tests like PET imaging. This has substantial ramifications for clinical trial enrollment, disease tracking, feasible and scalable testing in clinics for early disease identification and furthering our understanding of the many ways that Alzheimer's disease manifests symptomatically. As our appreciation grows for the high frequency of mixed neuropathology in the brains of patients experiencing cognitive decline, early and accurate detection of not only Alzheimer's disease but other neurodegenerative pathologies has become paramount. These advances have far-reaching implications including for my own research studying how lifetime head trauma relates to later development of neurodegenerative conditions, which often "mimic" the symptoms of Alzheimer's disease but ultimately are driven by a different neurodegenerative condition. The ability to say with confidence whether someone's progressive decline is (or is not) due to underlying Alzheimer's disease, based only on a blood test, is immensely exciting.

Matthew Burns, MD, PhD

Non-invasive neuromodulation through exposure to 40-Hz flicking light and sound has been shown to be beneficial for cellular function and behavior in Alzheimer's disease. We have recent observations and established the efficacy of noninvasive neuromodulation in improving age-related declines in working memory.

Yenisel Cruz-Almeida, PhD

This past year, my laboratory published 16 papers. Among these we showed that there was a significant relationship between pain and both epigenetic factors and brain aging. Thus, epigenetic aging may mediate the effect of pain on brain aging. These findings suggest that chronic pain may contribute to accelerated brain aging through epigenetic changes. This highlights a critical need to effectively treat chronic pain.

Natalie Ebner, PhD

We have obtained extramural funding from the NIH (R01 for 5 years) in support of our work on the characterization and modulation of the neurocognitive mechanisms of learning to trust and distrust in aging as well as from the FDOH to build a consortium (4 years) on research of psychological factors underlying deception detection in aging. This work started during this past year and uses advanced neuroimaging and computational modeling as well as behavioral assessment techniques to define susceptibility profiles among older adults towards design of effective fraud deception intervention. These grants will allow us to extend our previous work on deception in aging into most vulnerable populations (including those from underrepresented backgrounds; with cognitive impairment; with chronic pain).

Ruogu Fang, PhD

I received tenure and was promoted to Associate Professor. I was funded as UF PI for a new multisite P01 (\$10.7 M) Award from NIH NIAID. Among our 10 publications from last year, we published in *Science Reports* our results that use retinal imaging as a screening tool for Alzheimer's disease. The goal of this research was to evaluate the use of the retina, specifically the retinal vasculature, as a screening tool for dementia caused by Alzheimer's disease. We used data from the UK Biobank and machine learning techniques to create a pipeline for this purpose, which achieved an average classification accuracy of 82.44%. We also conducted a saliency analysis, which showed that small vessels in retinal images were particularly important for diagnosing Alzheimer's disease, which aligns with previous research.

Joseph Gullett, PhD

The most important scientific achievement of the past year in my lab relates to the fundable impact score received on an NIA K23 Clinical Trial which will likely be funded in the January 2023 council meeting. This project has been IRB-approved and we will run a trial participant prior to receipt of funding from NIA to ensure a smooth start to the project. Relatedly, I also developed a randomized clinical trial for the investigation of ultrasound effectiveness at increasing functional and structural connectivity as well as cognitive function in patients with mild Alzheimer's disease. This project has now received FDA IDE (investigational device exemption) approval and is under development from an IRB perspective as we await receipt of the ultrasound device from Soterix. In combination with the results of the K23 project, this trial will provide the necessary data to propose my first R01 around 2027. Lastly, I was named co-investigator and site PI of a multi-site R01 using iPad based neuropsychological evaluation to determine neurocognitive associations of various clinical populations among nearly 10,000 collected patients (National Neuropsychology Network).

Aprinda Indahlastari, PhD

My most important scientific achievements would be the first time teaching the AI course, which is relevant and timely with the current AI initiative at UF, as well as submitting my first NIH grant (K25 - Mentored Quantitative Career Development Award). I also consider receiving my first pilot grant from UF CTSI as a major milestone as well.

Ashok Kumar, PhD

Our most recent results demonstrate that prefrontal SR upregulation in middle-aged rats can improve learning of task contingencies of visual discrimination and increase glutamatergic synaptic transmission, including NMDAR activity. These data suggest that NMDA receptor activity may improve initial rule learning.

Damon Lamb, PhD

We found evidence of a functional magnetic resonance imaging impact of vagus nerve stimulation on semantic and hippocampal networks in the context of amnesic mild cognitive impairment. Across multiple animal and human studies, we are developing new nerve interfaces, refining stimulus, and dosing, and evaluating functional impacts of this putative treatment method for memory and cognitive decline.

Carolina Maciel, MD

We published a standardized scale to grade diffuse cerebral dysfunction on EEG, which is the steppingstone to address significant inter-rater variability in the assessment of grades of encephalopathy.

Andrew Maurer, PhD

What is the neurophysiological signature of two brain regions communicating? As we dig into this issue, it looks like activity 'comes in waves' with the biggest oscillations being the hallmark of region-to-region communication. This past year, I published several papers that document how oscillations facilitate coordination between different brain regions. Contrary to current notions that the high frequency gamma rhythm promotes inter-regional coherence, we have found that the slower and higher amplitude theta rhythm is the primary oscillation that shows high coordination between different brain areas that are critical for memory. We have also shown that theta in the hippocampus is altered in advanced age and these data will prove useful in understanding age-related cognitive deficits.

Eric Porges, PhD

Our two most significant achievements were 1) We received the 2022 “Dean’s Citation Paper Award” from the College of Public Health and Health Professions at the University of Florida for our meta-analysis characterizing the trajectory of cortical GABA (the principal inhibitory neurotransmitter in the brain) across the lifespan. In this manuscript, aggregated individual participant datasets integrated into a Markov chain Monte Carlo (MCMC) analysis revealed a steep early life increase of cortical GABA., stability during midlife, and a gradual reduction during aging 2) We have published the first report of the macromolecular spectrum being stable during normal aging. This finding will enable further characterization of changes that occur in neurometabolites during normal aging and their relationship to cognitive and neurophysiological function. These neurometabolites (which include neurotransmitters as well as markers of neuronal integrity and inflammation) are analytically difficult to resolve from the “background” macromolecular signal. Understanding the stability of the macromolecular contribution allows for changes in neurometabolites to be more confidently assessed during aging.

Barry Setlow, PhD

Under the R01 and Florida Department of Health grant that support our work on cannabinoids and aging, we have been using rats to assess the effects of chronic daily oral consumption of THC on multiple forms of cognitive function in young adult and aged rats of both sexes. In a test of working memory that depends on the integrity of the prefrontal cortex, daily THC has no effect on task accuracy in young adult rats but enhances accuracy in aged rats (who are otherwise impaired relative to young adults). In contrast, in the Morris water maze test, which assesses spatial memory and depends on the integrity of the hippocampus, daily THC has no effect in either young adult or aged rats. Additional data from this project show that daily oral THC consumption tends to reduce expression of pro-inflammatory cytokines, which are elevated in aged compared to young rats. The data from the oral THC consumption model are significant for several reasons. First, they shown that THC (the primary psychoactive component of cannabis) can enhance at least one aspect of cognitive performance in aged rats. Second, this cognitively enhancing effect is evident at a dose that is well-tolerated; the dose employed (1.0 mg/kg) produced minimal if any adverse effects, as the rats consumed it voluntarily across multiple weeks. Finally, as older adults are the fastest-growing group of cannabis users, it is important to understand how this drug affects cognitive performance in this age group. A manuscript describing this work will be submitted in the next few months.

John Williamson, PhD

We recently published (in press; Murphy et al, 2023 [likely actual date of publication]) the first tVNS study in patients with amnesic mild cognitive impairment. The results are quite interesting with during tVNS differences in functional connectivity (fMRI) in semantic networks as well as hippocampally connected networks, suggesting relevant functional neuroanatomical effect of the technology. Further, we demonstrated relationships between brain metabolites (measures with MRS) and functional connectivity within resting state networks with differences associated with n-acetyl aspartate and cholinergic containing compounds in patients with amnesic mild cognitive impairment (results presented recently and manuscript under development). These results demonstrate mechanistic associations of indicators of neural inflammation (cho) and neural integrity (naa) and brain function.

Financial Summary

Evelyn F. McKnight Cognitive Aging and Memory Research Fund University of Florida Foundation Endowment Account

Financial Summary January 1 to December 31, 2022

*04/28/2000 - Initial Donation	\$ 12,856,687
05/05/2000 - Additional Donation	\$ 110,995
11/07/2002 - 03/23/2004 UF Match Portion	\$ 12,999,999
Additional contributions to the fund from various benefactors	\$ 100
As of 09/30/2022	
Book Value	\$ 25,967,781
**12/31/2022 - Market Value projected	\$ 33,634,751
**12/31/2022 - Return on Investment Projected	\$ 4,966,571
**12/31/2022 - Endowment Income Transferred to UF Side Spendable Projected	\$ 1,295,695

There are no outstanding matching funds.

*Back on April 28, 2000 there was a stock gift of \$12,889,003.60. There was a loss on the sale of the stock of \$32,316.65

Includes **projected amounts for the Fiscal Year 2023 second quarter (October 2022 - December 2022).
Fiscal Year 2023, Quarter 2 Financials have not been closed.

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 Investment Officer who reports to a volunteer Board of Directors and President of the University of Florida

**Evelyn F. McKnight Cognitive Aging and Memory Research Fund
University of Florida Spendable Accounts**

**Financial Summary
January 1 to December 31, 2022**

<u>The Age Related Memory Loss Program</u>		
Beginning balance, January 1, 2022		\$ 314,024
Cumulative Carryforward		\$ 419,569
Endowment income transferred to the UF Side for Age Related Memory Loss Program_Revenue Calendar Year 2022		
	January 2022	\$ 161,962
	April 2022	\$ 161,962
	July 2022	\$ 161,962
	October 2022	\$ 161,962
Total endowment income transferred into Spendable for the Age Related Memory Loss Program		\$ 647,848
Expenditures		
Faculty, Research Staff, Staff Earnings, Graduate Assistant & Post Doctoral	\$ 316,650	
Research equipment, supplies, and services	\$ 8,700	
Tuition Waivers/Assistance	\$ 11,390	
Research Support Funding	\$ 167,875	
Travel	\$ 1,984	
Total Expenditures		\$ 506,599
Ending balance December 31, 2022		\$ 874,841
<u>The Cognitive Aging and Memory Clinical Translational Research Program</u>		
Beginning balance, January 1, 2022		\$ 67,460
Cumulative Carryforward		\$ 1,641,345
Endowment income transferred to the UF Side for the Clinical Translational Research Program_Revenue Calendar Year 2022		
	January 2022	\$ 161,962
	April 2022	\$ 161,962
	July 2022	\$ 161,962
	October 2022	\$ 161,962
Total endowment income transferred into Spendable for the Clinical Translational Research Program		\$ 647,848
Expenditures		
Faculty, Research Staff, Staff Earnings, Graduate Assistant & Post Doctoral	\$ 300,730	
Research equipment, supplies, and services	\$ 70,616	
Tuition Waivers/Assistance	\$ 25,392	
Publications	\$ 8,723	
Office Infrastructure	\$ 18,563	
Travel	\$ 1,675	
Total Expenditures		\$ 425,698
Ending Balance December 31, 2022		\$ 1,930,954
NET ENDING BALANCE ON THE UF SIDE for the Cognitive Aging and Memory Research Fund		\$ 2,805,796

McKnight Endowed Chair for Brain Research in Memory Loss

Tom Foster, PhD

Financial Summary

January 1 to December 31, 2022

UNIVERSITY OF FLORIDA FOUNDATION ENDOWMENT ACCOUNT	
12/15/1999 & 12/31/1999 - Donations made prior to the Gift Agreement and subsequently included.	\$ 275,000
04/28/2000 - Initial Donation	\$ 1,725,001
05/31/2020 - UF Match	\$ 2,000,001
As of 09/30/2022	
Book Value	\$ 3,995,677
**12/31/2022 - Market Value projected	\$ 4,524,235
**12/31/2022 - Return on Investment Projected	\$ 676,432
**12/31/2022 - Endowment Income Transferred to UF Side Spendable Projected	\$ 173,973
There are no outstanding matching funds.	
**Includes <i>projected</i> amounts for the Fiscal Year 2023 second quarter (October 2022 - December 2022). Fiscal Year 2023, Quarter 2 Financials have not been closed.	
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 Investment Officer who reports to a volunteer Board of Directors and President of the University of Florida	

UNIVERSITY OF FLORIDA FOUNDATION SPENDABLE ACCOUNT	
<u>McKnight Endowed Chair for Brain Research in Memory Loss</u>	
Beginning balance, January 1, 2022	\$ 93,664
Unexpended funds returned to the account	\$ 189,730
Endowment income transferred to the UF Side for the McKnight Endowed Chair for Brain Research in Memory Loss	
	January 2022 \$ 43,493
	April 2022 \$ 43,493
	July 2022 \$ 43,493
	October 2022 \$ 43,493
Total endowment income transferred into the Spendable for the McKnight Endowed Chair for Brain Research in Memory Loss	\$ 173,973
Expenditures	
Faculty Compensation	\$ 143,776
Lab Supplies	\$ 845
Lab Services	\$ 721
Travel	\$ 430
Total Expenditures	\$ 145,773
Ending balance December 31, 2022	\$ 311,594

McKnight Endowed Chair for Clinical Translational Research in Cognitive Aging

Ron Cohen, PhD

Financial Summary

January 1 to December 31, 2022

UNIVERSITY OF FLORIDA FOUNDATION ENDOWMENT ACCOUNT

11/01/2015 - Initial Transfer of Funds	\$ 4,000,000
3 Million earnings from the McKnight Brain Research Foundation Endowment	
1 Million earnings from the McKnight Endowed Chair for Brain Research In Memory Loss	
As of 09/30/2022	
Book Value	\$ 4,000,000
**12/31/2022 - Market Value projected	\$ 4,516,138
**12/31/2022 - Return on Investment Projected	\$ 666,573
**12/31/2022 - Endowment Income Transferred to UF Side Spendable Projected	\$ 173,898

There are no outstanding matching funds.

**Includes *projected* amounts for the Fiscal Year 2023 second quarter (October 2022 - December 2022).
Fiscal Year 2023, Quarter 2 Financials have not been closed.

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 Investment Officer who reports to a volunteer Board of Directors and President of the University of Florida

UNIVERSITY OF FLORIDA FOUNDATION SPENDABLE ACCOUNT

McKnight Endowed Chair for Brain Research in Memory Loss

Beginning balance, January 1, 2022	\$ 36,674
Endowment income transferred to the UF Side for the McKnight Endowed Chair for Clinical Translational Research in Cognitive Aging	
January 2022	\$ 43,474
April 2022	\$ 43,474
July 2022	\$ 43,474
October 2022	\$ 43,474
Total endowment income transferred into the Spendable for the McKnight Endowed Chair for Clinical Translational Research in Cognitive Aging	\$ 173,898
Expenditures	
Faculty Compensation	\$123,403
Total Expenditures	\$123,403
Ending balance December 31, 2022	\$ 87,169

Dr. William G. Luttge Lectureship in Neuroscience

Financial Summary

January 1 to December 31, 2022

UNIVERSITY OF FLORIDA FOUNDATION ENDOWMENT ACCOUNT		
06/01/2012 - Initial Donation	\$	250,000
Additional contributions to the fund from various benefactors	\$	350
Book Value as of 09/30/2022	\$	250,350
**12/31/2022 Market Value projected	\$	311,075
**12/31/2022 Return on Investment projected	\$	45,934
**12/31/2022 Endowment Income to UF Side Spendable Projected	\$	11,983
There are no outstanding matching funds.		
**Includes <i>projected</i> amounts for the Fiscal Year 2023 second quarter (October 2022 - December 2022). Fiscal Year 2023, Quarter 2 Financials have not been closed.		
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 Investment Officer who reports to a volunteer Board of Directors and President of the University of Florida		

UNIVERSITY OF FLORIDA SPENDABLE ACCOUNT		
<u>Dr. William G. Luttge Lectureship in Neuroscience</u>		
Beginning balance, January 1, 2022		\$89,903
Endowment income transferred to the UF Side for Age Related Memory Loss Program		
	January 2022	\$2,996
	April 2022	\$2,996
	July 2022	\$2,995
	October 2022	\$2,996
Total endowment income transferred in to Spendable for the Age Related Memory Loss Program		\$11,983
Expenditures		
Lecture Series Expenditures	\$2,957	
Total Expenditures		\$2,957
Ending balance December 31, 2022		\$98,928

**McKnight Brain Research Foundation
Age Related Memory Loss Program
Budget - Fiscal Year 2023**

Faculty, Research Staff, Staff Earnings, Graduate Assistant & Post Doctoral	\$	320,000	
Research equipment, supplies, and services	\$	9,000	
Tuition Waivers/Assistance	\$	20,000	
Pilot Projects/Development Funds	\$	289,111	
Total Budget			\$ 638,111

**McKnight Brain Research Foundation
Clinical Translational Research Program
Budget - Fiscal Year 2023**

Faculty, Research Staff, Staff Earnings, Graduate Assistant & Post Doctoral	\$	350,000	
Research equipment, supplies, and services	\$	75,000	
Tuition Waivers/Assistance	\$	25,000	
Publications	\$	10,000	
Office Infrastructure	\$	120,000	
Travel	\$	1,000	
Pilot Projects/Development Funds	\$	57,111	
Total Budget			\$ 638,111

Grand Total Budgeted for McKnight Brain Research Foundation Funds **\$ 1,276,222**

The budget amount for the fiscal year is based on the actual funds transfers from the UF Foundation to the McKnight Brain Research Foundation Fund in the McKnight Brain Institute at the University of Florida from the previous fiscal year. The total amount of funds transferred in Fiscal Year 2022 was \$1,276,222. Those funds are equally divided between the Age Related Memory Loss Program and the Clinical Translational Research Program.



FUND IMPACT REPORT

McKnight Brain Research Foundation Evelyn F. McKnight Cognitive Aging and Memory Research Fund Spensible Fund Transfers since endowment inception

FY 2022/2023 To Date	\$ 323,924
FY 2021/2022	\$ 1,295,695
FY 2020/2021	\$ 1,145,191
FY 2019/2020	\$ 1,067,240
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
	\$ 21,909,618



FUND IMPACT REPORT

McKnight Brain Research Foundation Evelyn F. McKnight Chair for Brain Research in Memory Loss Spendable Fund Transfers since endowment inception

FY 2022/2023 To Date	\$ 43,493
FY 2021/2022	\$ 173,973
FY 2020/2021	\$ 153,765
FY 2019/2020	\$ 143,298
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
	\$ 3,237,546



FUND IMPACT REPORT

McKnight Brain Research Foundation
Evelyn F. McKnight Chair for Clinical Translational Research
in Cognitive Aging
Spendable Fund Transfers since endowment inception

FY 2022/2023 To Date	\$ 43,474
FY 2021/2022	\$ 173,898
FY 2020/2021	\$ 153,698
FY 2019/2020	\$ 143,236
FY 2018/2019	\$ 140,460
FY 2017/2018	\$ 139,854
FY 2016/2017	\$ 139,754
FY 2015/2016	\$ 143,861
	\$ 1,078,235



FUND IMPACT REPORT

McKnight Brain Research Foundation William G. Luttge Lectureship in Neuroscience Spendable Fund Transfers since endowment inception

FY 2022/2023 To Date	\$ 2,996
FY 2021/2022	\$ 11,983
FY 2020/2021	\$ 10,591
FY 2019/2020	\$ 9,869
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
	\$ 99,495

Collaborative Programs

Inter-Institutional McKnight Collaborations

UF-UAB Collaborations:

Throughout 2021 and 2022, Drs. Bizon and Burke have been working with Drs. Hernandez, Burford, and Carter (UAB) on a collaborative project to examine the impact of peripheral interventions (that is, vagus nerve stimulation and the ketogenic diet) on cognitive and peripheral health. Although Dr. Carter has relocated to the NIA, this collaboration has continued and has been facilitated by a K99/R00 that was awarded to Dr. Hernandez this past spring. A key principle of this collaboration is the reciprocal nature of peripheral and brain health. As such, it is critical to integrate geroscience and the neurobiology of aging in order to improve overall health and behavioral outcomes of older adults. Importantly, both vagus nerve stimulation and the ketogenic diet modify metabolism and alter the expression of genes in the brain that modulate the balance between excitation and inhibition (E/I). Disruptions in this E/I balance are a key feature of cognitive aging that have been linked to deficits in memory and executive functions. This collaborative project resulted in the submission of a MBRF Cognitive Aging and Memory Intervention Core Inter-Institutional Pilot grant entitled, *"Reuniting the Brain and Body to Understand Cognitive Aging: The Nexus of Geroscience and Neuroscience."* This grant, which was awarded at the start of 2021, aims to examine how interventions that may improve cognitive aging alter the gut-brain axis and the expression of genes that are critical for synaptic transmission as well as E/I balance. Importantly, this collaboration has nurtured the career development of Dr. Hernandez, a talented young scientist that has been trained with support of the MBRF since the beginning of her PhD at UF in 2014.

Dr. Woods continues to collaborate with NIA funded PROACT trial teams across UF and UAB, leading non-invasive brain stimulation efforts on an R37 funded trial investigating the effects of tDCS and mindfulness meditation on chronic knee pain in older adults.

UF-UA Collaborations:

Dr. Natalie Ebner is collaborating with members of the University of Arizona and University of Miami to develop novel paradigms for understanding decision-making and susceptibility to scamming in older adults. In addition to publishing several collaborative studies, Dr. Ebner and her collaborators have received a R01 to the National Institute on Aging on this topic. Supported by an MBRF pilot grant, Dr. John Williamson is collaborating with Dr. Gene Alexander at the University of Arizona to conduct a cross-institution study investigating vagus nerve stimulation in older adults.

Dr. Woods continues his long-standing collaboration with the University of Arizona in the context of 3 ongoing NIA funded clinical trials.

ACT trial: Dr. Woods is leading the NIA funded 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.

REVITALIZE trial: Dr. Woods, along with Drs. Alexander and Bowers are leading the NIA funded Phase II multisite trial for near-infrared photobiomodulation at the University of Florida and University of Arizona.

PACT Trial: The NIA funded PACT trial for cognitive training, led by Dr. Woods, involves collaboration across University of South Florida, Clemson University, University of North Florida, University of Arizona/Banner, Duke University, and University of Florida.

UF-UA-UAB-UM Collaborations:

The McKnight Brain Aging Registry (MBAR) study has completed all recruitment and assessments with over 200 participants who are over 85 years. Extensive quality control and validation of the database has occurred with one manuscript under review, three others to be submitted soon, **and multiple** others in

the works. MBAR cognitive, neuroimaging and biomarker data are available upon request to the MBAR Scientific Advisory Committee. The request form will be hosted on the CAM center website. The extent to which many cognitive functions are preserved in MBAR participants is noteworthy, and over 60% continue to engage in physical exercise (aerobic and/or strength exercises). We have been asked to do another special edition for *Frontiers in Aging Neuroscience* focusing on findings from this study.

Collaborations Beyond McKnight Institutes

Dr. Woods has ongoing collaborations in his areas of expertise in tDCS and other non-invasive brain stimulation methods as well as neuroimaging and cognitive aging at Duke University, Clemson University, 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, University of Arkansas for Medical Sciences (UAMS), Imperial College London, Istanbul University, Leibniz Research Center (Germany), and Catholic University of Korea. In addition, Dr. Woods continues to collaborate with a large number of investigators at the University of Florida outside the MBI, including Alex Parker (UF Jax), Fern Webb (UF Jax), David Clark (VA Merit grant), Mingzhou Ding (BME), Christiaan Leeuwenburgh (IOA), Roger Fillingim (Dentistry), etc.

Drs. Burke and Maurer and have ongoing collaborations with investigators at the University of Michigan and Rice University (Diba and Kamere) to examine aging impacts the organization of hippocampal neuronal activity in awake and sleep states. Dr. Burke and Diba were recently awarded a grant supplement from the NIA to examine the impact of Tau on sleep/wake cycles in aged animals. Drs. Burke, Lamb and Bizon collaborate with MIT Lincoln laboratory to develop machine learning approaches for quantifying neuron activity in large 3-D brain images obtained with light sheet microscopy through the CAM-supported shared microscope facility. Together, Drs. Burke and Bizon collaborate with Dr. Rapp at the NIH to examine the impact of aging of Tau pathology. Finally, Dr. Burke is also collaborating with researchers in the Institute of Aging (Anton) and UF ADC (Smith) to develop dietary interventions to improve cognition in older adults with metabolic dysfunction. They recently received a fundable impact score on an R21 grant that measure whether intermittent fasting in older adults can improve cognitive function.



Inter-Institutional meetings often require Zoom.

Honors

Faculty Awards and Recognitions

Jen Bizon, PhD

- Invited keynote speaker for Florida Consortium of Neurobiology of Cognition

Sara Burke, PhD

- Inaugural recipient of The Dr. Mavis Agbandje-McKenna Distinguished Research Mentoring Award, 2022

Adam J. Woods, PhD

- UF Foundation Term Professorship Award, University of Florida
- Appointed College of Public Health and Health Professions Associate Dean for Research

Karina Alvina, PhD

- Invited to serve as a reviewer for the NIH study section titled NIMH Biobehavioral Research Awards for Innovative New Scientists (NIMH BRAINS)

Breton Asken, PhD, ATC

- Emerging Scholar for Black Men's Brain Health Organization
- Scholar for the Fixel Institute for Neurological Diseases

Russell Bauer, PhD

- Professor Emeritus in the Department of Clinical and Health Psychology

Matt Burns, MD, PhD

- MBI Special Equipment Award, 2022

Ruogu Fang, PhD

- Tenure and Promotion to Associate Professor, University of Florida, 2022
- The University of Florida Herbert Wertheim College of Engineering 2022 Faculty Award for Excellence in Innovation, 2022
- Skylar E. Stolte: Best Paper Presentation Award Runner Up, Women IN MICCAI (WiM), International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), 2022

Aprinda Indahlastari, PhD

- The 4th International Brain Stimulation Conference Best Poster Award

Carolina Maciel, MD

- Fellow of American Academy of Neurology

Eric Porges, PhD

- 2022 Dean's Citation Paper Award, College of Public Health and Health Professions, University of Florida

Barry Setlow, PhD

- Elected Vice President of the Florida Consortium on the Neurobiology of Cognition

John Williamson, PhD

- Tenure and Promotion to Associate Professor, University of Florida, 2022

Trainee Awards and Recognitions

Alejandro Albizu (Predoctoral Fellow, Woods Lab)

- Received the 47th Annual Medical Guild Advancement to Candidacy Award.
- Awarded UF College of Medicine Student Travel Award.

Tara Cooper (Predoctoral Fellow, Burke Lab)

- Received 2022 B.W. Robinson Memorial Endowment for the Neuroscience Award from the Tallahassee Memorial Foundation.

Jason DeFelice (Predoctoral Fellow, Porges Lab)

- Awarded a Presentation Award at the Center for Cognitive Aging and Memory Research Day.

Nicole Evangelista (Predoctoral Fellow, Woods Lab)

- Received the Alzheimer's Association International Conference (AAIC) 2022 Diversity and Disparities Professional Interest Area (PIA) Best Student Poster Award.
- Received 2nd place for Abstract & Speeded Presentation at the University of Florida's College of Public Health and Health Professions 34th Annual Research Day.
- Received a Graduate Student Council Travel Award.
- Received the 2022 Department of Clinical and Health Psychology Jenny Sivinski Memorial Award.

Katherine Gonzalez (Predoctoral Fellow, Bizon/Setlow Lab)

- First place, poster presentation, International Behavioral Neuroscience Meeting

Hanna Hausman (Predoctoral Fellow, Woods Lab)

- Received the Leighton E. Cluff Aging Research Award
- Received the Molly Harrower Memorial Award

Jessica Kraft (Predoctoral Fellow, Woods Lab)

- Presentation Award at the Center for Cognitive Aging and Memory Research Day.
- Received a Graduate Student Council Travel Award.
- Received a McKnight Brain Institute Trainee Opportunity Enhancement Award.

Wonn Pyon (Predoctoral Fellow, Bizon/Setlow Lab)

Florida Department of Health Ed and Ethel Moore Alzheimer's Disease Research Program - 22A12
\$742,833 (Ebner: \$210,869) 04/01/2022-03/31/2026

Florida Consortium to Reduce Misinformation and Exploitation in AD
MPIs: **Ebner** (co-PI), Lighthall, Levin

Florida Department of Health Ed & Ethel Moore Alzheimer's Disease Research Program - 22A10
\$100,000 04/01/2022-03/31/2024

Novel Behavioral and Neural Markers of Alzheimer's Disease Progression: A Case of Visual Orienting
Co-Mentor: **Ebner** (PI: Barnas)

NIH/NIA - R01AG072658 \$3,164,331 03/01/2022-04/30/2027

Characterizing and Modulating Neurocognitive Processes of Learning to Trust and Distrust in Aging
MPIs: **Ebner** (PI), Lighthall, Wilson

NIH/NIDA - K01DA052673 \$884,335 01/01/2022-12/31/2026

Opioid-Sparing and Pain-Reducing Properties of Syntocinon: A Dose-Effect Determination
Primary Mentor: **Ebner** (PI: Berry)

NIH/NIAID -P01AI165380 \$10.7M (\$1.95M to UF) 2022-2027.

"P01: Multi-Scale Evaluation and Mitigation of Toxicities Following Internal Radionuclide Contamination". G25. Oracle Research Award,
PI: **Fang**, Co-I: Woloschak

NIH/NIAAA - U24AA029959 \$3,019,461.00 12/01/2021 – 11/30/2026

Southern HIV and Alcohol Research Consortium Biomedical Data Repository
PI: Cooke, WU, Co-I: **Gullett**

UF CTSI Spring 2022 Pilot RFA \$20,000 10/03/22

A Mechanistic Study to Investigate tDCS Response of Cognition in MCI Population
PI: **Indahlstari**

DOD/CDMRP W81XWH-22-1-1089 \$61,074 1 0/1/2022 – 8/31/2026

Gap-Based Milieu Biomarkers for Traumatic Brain Injury (GAMBIT-TBI)
PI: Rubenstein, Site-PI: **Lamb**

JDRF \$500,000 07/2022 – 06/2025

Deep Learning-based Analyses of Pancreatic Islet Beta-Cell Heterogeneity and MRI Pancreas Volume as Biomarkers to Improve Understanding of Type 1 Diabetes Progression
PI: Kim, Co-I: **Lamb**

VA RR&D \$230,000 04/2022-03/2025

Design and testing of a novel circumesophageal cuff for chronic bilateral subdiaphragmatic vagal nerve stimulation (svNS)

PI: Schiefer, Co-I: **Lamb**

NIH/NIAAA - 1P01AA029543-01 \$6,645,672 2021-2026
Overall Interventions to improve alcohol-related comorbidities along the gut-brain axis in persons with HIV infection.
MPIs Cook, **Porges**

NIH/NIBIB - R01EB023963-05 \$3,157,326 2021-2025
Simultaneous Hadamard editing of GABA and Glutathione
PI: Edden, Site-PI: **Porges**

NIH/NIMH - R21MH127377 \$190,625 02/2022-01/2024
Role of dopamine receptor-expressing cortical projection circuits in cognitive flexibility
PI: Urs, Co-I: **Setlow**

Consortium for Medical Marijuana Clinical Outcomes Research 07/2022-06/2023
Translational animal model to study neurobehavioral consequences of THC and oxycodone polysubstance use.
PI: Knackstedt, Co-I: **Setlow**

NIH/NICHD - R01HD107722 \$477,998 07/2022-06/2027
Mechanisms and blood-based biomarkers of intergenerational neurobehavioral effects of general anesthetics
PI: Martynyuk, Co-I: **Setlow**

VA SPIRE \$300,000 2022-2024
Innovative multimodal and attention training to improve emotion communication in Veterans with TBI and PTSD
PI: Ebbs, Co-I **Williamson**

NIH/NIA - R01AG076438 \$754,306 05/2022-04/2027
Targeting cognitive function and interoceptive awareness to improve self-management in patients with co-morbid heart failure and cognitive impairment.
PI: Salmoirago-Blotcher, Co-I: **Cohen**

Technology Transfer

Eric S. Carter Porges, Damon Lamb, Martha Campbell-Thomason, and Richard Edden. “Non-invasive diagnostic biomarker for pancreatic islet populations” US Patent 11.389.106, issued July 19, 2022

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

NO

Do we recommend any modification to the Purpose or mandates in the Gift Agreement?

NO

Did all activities during the report period further the Purpose?

YES

Additional Comments (items that are not covered elsewhere in the report, including any negative events, loss of full-time employees (FTEs), impending departures, space, or budget that could have an impact on carrying out the Gift Agreement.)

NO

Submitted by:

**Kathleen McIntyre
Administrative Specialist
Center for Cognitive Aging and Memory
University of Florida**



Dr. Sara Burke is awarded the first ever Dr. Agbade-McKenna Distinguished Mentoring Award.

Appendix 1

CAM Center Affiliate Members and Trainees

A. Affiliate Faculty

Joe Abisambra, PhD – Associate Professor – Department of Neuroscience
Kyle D. Allen, PhD – Associate Professor – Department of Biomedical Engineering
Mingzhou Ding, PhD – Professor – Department of Biomedical Engineering
Matthew Farrer, PhD – Professor – Department of Neurology
Marcelo Febo, PhD – Associate Professor – Department of Psychiatry
Charles Frazier, PhD – Associate Professor – Department of Pharmacodynamics
Shellie-Anne Levy, PhD – Clinical Assistant Professor – Department of Clinical and Health Psychology
Jada Lewis, PhD – Professor – Department of Neuroscience
Michael Marsiske, PhD – Professor – Department of Clinical and Health Psychology
Gordon Mitchell, PhD – Professor – Department of Physical Therapy
Catherine Price, PhD – Associate Professor – Department of Clinical and Health Psychology
Malú Gamez Tansey, PhD – Professor – Department of Neuroscience
Steven M. Weisberg, PhD – Assistant Professor – Department of Psychology

B. Post-Doctoral

(Bizon/Setlow) Mojdeh Faraji, PhD
(Burke) Carly Logan, PhD
(Burke) Nicholas DiCola, PhD
(Woods) Joshua Crow, PhD
(Foster) Puja Sinha, PhD
(Cruz-Almeida) Soamy Montesino Goicolea, PhD
(Cruz-Almeida) Jessica Peterson, PhD
(Cruz-Almeida) Larissa Strath, PhD
(Ebner) Adam Barnas, PhD
(Lamb) Clayton Swanson, PhD
(Lamb) Abigail Waters, PhD
(Maciel) Bakhtawar, PhD
(Mauer) Ben Zhao, PhD
(Williamson) Erin Trifilio, PhD
(Williamson) Abigail Waters, PhD

C. Pre-Doctoral

(Bizon/Setlow) Wonn Pyon. PhD student, Biomedical Sciences Program, *T32 ARDC funded*
(Bizon/Setlow) Sabrina Zequeira, PhD student, Biomedical Sciences Program, *T32 ARDC funded*

(Bizon/Setlow) Katherine Gonzalez, PhD student, Biomedical Sciences Program
(Bizon/Burke) Johleen Seedansingh, PhD student, Biomedical Sciences Program, *CAM scholar*
(Bizon/Setlow) Emily Gazorav, Master's Student, Neuroscience
(Cohen/Porges) Mark Britton, PhD student, Clinical Health Psychology, *CTRP Funded*
(Cohen/Porges) Jason DeFelice, PhD student, Clinical Health Psychology, *T32 EPI funded*
(Cohen/Gullett) Brian Ho, PhD student, Clinical Health Psychology, *T32 ARDC funded*
(Cohen/Woods) Kailey Langer, PhD student, Clinical Health Psychology, *T32 CHP funded*
(Cohen/Williamson) Alexandria O'Neal, PhD student, Clinical Health Psychology
(Burke) Aleyna Ross, PhD student, Biomedical Sciences Program
(Burke) Samantha Smith, PhD student, Biomedical Sciences Program, *CAM scholar*
(Burke) Tara Cooper, PhD student, Biomedical Sciences Program
(Burke) Cristina Besosa, PhD student, Biomedical Sciences Program
(Woods) Alejandro Albizu, PhD student, Biomedical Sciences Program, *NSF GRFP funded*
(Woods) Emanuel M. Boutzoukas, PhD student, Clinical Health Psychology, *T32 PT funded*
(Woods) Nicole Evangelista, PhD student, Clinical Health Psychology, *T32 CHP funded*
(Woods) Cheshire Hardcastle, MS, PhD student, Clinical Health Psychology
(Woods) Jessica Kraft, PhD student, Biomedical Sciences Program
(Woods) Hanna Hausman, PhD student, Clinical Health Psychology
(Woods) Jori Waner, PhD student, Clinical Health Psychology
(Foster) Vivekananda Bedamagunta, PhD student, Genetics and Genomics Program
(Alvina) Jonah Juergensmeyer, Master's student, Neuroscience
(Asken) Jessica Bove, PhD student, Clinical Health Psychology
(Asken) Emily Matusz, PhD student, Clinical Health Psychology
(Burns) Hannah Phelps, Master's student, Neuroscience
(Ebner) Kylie Wright, PhD student, Psychology
(Ebner) Alayna Shoenfelt, PhD student, Psychology
(Fang) Seowung Lee, PhD student, Biomedical Engineering
(Fang) Chaoyue Sun, PhD student, Electrical & Computer Engineering
(Fang) Charlie Tran, PhD student, Electrical & Computer Engineering
(Fang) Ziqian Huang, PhD student, Electrical & Computer Engineering
(Fang) Joseph Cox, PhD student, Biomedical Engineering
(Lamb) Robert Claar, PhD student, Clinical Health Psychology
(Lamb) Binh Nguyen, MD/PhD student, Department of Psychology
(Porges) Brittany Rohl, PhD student, Clinical Health Psychology
(Porges) Destin Shorell, PhD student, Clinical Health Psychology
(Williamson) Sarah Ann Bottari, PhD student, Clinical Health Psychology
(Williamson) Aaron Colverson, PhD student, School of Music

(Williamson) Alexandria O’Neal, PhD student, Clinical Health Psychology, T32 ARDC funded

(Williamson) Laura Jones, PhD student, Clinical Health Psychology

D. Undergraduate

Every summer CAM sponsors four students in the Summer Neuroscience Internship Program (SNIP). SNIP places paid summer interns in active neuroscience research labs to obtain hands-on laboratory and research experience, personalized guidance on graduate school admissions and professional development and career planning.

(Burke) Kiani Cruz, University of Hawaii at Manoa

(Alvina) Jillian Murray, College of Wooster

(Cruz-Almeida) Ali Petrisek, Nova Southeastern University

(Setlow) Karelys Montanez, Washington & Jefferson University



E. New Faculty

In 2022, CAM welcomed two new faculty members to the center. **Dr. Stacey Alavarez-Alvarado**, a former postdoctoral fellow in **Dr. Adam Woods** lab, has joined the Department of Neurology at our Jacksonville site. **Dr. Breton Asken** has joined the Department of Clinical and Health Psychology. We are excited to welcome them both and look forward to their continued contributions to aging research. (NIH Biosketches included below).

OMB No. 0925-0001 and 0925-0002 (Rev. 10/2021 Approved Through 09/30/2024)

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: Alvarez-Alvarado, Stacey

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

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)	Completion Date MM/YYYY	FIELD OF STUDY
University of Puerto Rico, Mayagüez, Puerto Rico	B.S.	06/2012	Physical Education
Florida State University, Tallahassee, FL	M.S.	12/2014	Exercise Physiology
Florida State University, Tallahassee, FL	Ph.D.	08/2019	Exercise Psychology
University of Florida, Gainesville, FL	Postdoctoral	09/2022	Cognitive Aging

A. Personal Statement

I am an Assistant Professor in the Department of Neurology, College of Medicine- Jacksonville at the University of Florida. My entire scientific career has been devoted towards delaying the age-related cognitive and motor declines in older adults through non-conventional interventions, as well as understanding the underpinning psychological mechanisms that affect effort adherence. Specifically, my past research has focused on a variety of age-associated comorbidities including vascular and hemodynamic dysfunction, the effects of obesity and metabolic disturbances on the aging muscle, and perceptual-cognitive-affective factors that contribute to effort regulation. Together, I have been involved in over 15 studies, worked and coordinated 2 different laboratories (cardiovascular exercise physiology and exercise psychology) with multiple collaborations, produced 18 publications with 1 in review, and 2 in preparation, attended and presented in multiple conferences, and learned a variety of non-invasive vascular and metabolic techniques (e.g., vascular ultrasound, arterial tonometry). Recently, I completed the awarded Diversity Supplement to the National Institute of Aging Parent Grant: R01AG064587- Revitalize Cognition in Older Adults at Risk for Alzheimer’s Disease with Near-Infrared Photobiomodulation. I employed multimodal neuroimaging methods, including magnetic resonance imaging (MRI) data collection, processing, and analysis, and high-resolution hippocampal sub-region imaging analyses to investigate the implications of the aging brain. This project provided critical groundwork to apply for, interview, and accept an Assistant Professor position to continue my research career examining the structural and functional brain mechanisms underlying cognitive symptoms of Alzheimer’s disease. I also serve as co-I on two NIH funded grants focused on cognitive training and Alzheimer’s disease prevention. Collectively, my current position will allow me to submit future K01 and R applications and develop cutting-edge neuroimaging research, informing specialized treatments to delay and counteract the risk for Alzheimer’s disease.

Ongoing and recently completed projects that I would like to highlight include:

NIA 3R01AG06587-02S1

Woods, Alexander, Bowers (MPIs); Role: PI Diversity Supplement

07/01/2020 – 09/05/2022

“Revitalizing Cognition in Older Adults at Risk for Alzheimer’s Disease with Near-Infrared Photobiomodulation”

NIA R01AG070349

Edwards (PI); Role: Co-I

02/01/2021-01/31/2026

“Preventing Alzheimer’s Disease through Cognitive Training (the PACT trial)”

NIA R01AG075014

Edwards (PI); Role: Co-I

09/01/2022-08/31/2027

“Planning an Adaptive Clinical Trial of Cognitive Training to Improve Function and Delay Dementia”

B. Positions, Scientific Appointments, and Honors

Positions and Employment

2022- Assistant Professor, Department of Neurology, College of Medicine, University of Florida, Jacksonville, FL.

2019-2022 Postdoctoral Associate, Department of Clinical and Health Psychology, Center for Cognitive Aging and Memory, University of Florida, Gainesville, FL.

2017-2019 Graduate Teaching Assistant, Introduction to Exercise Psychology, Florida State University, Tallahassee, FL.

2017 Graduate Teaching Assistant, Trend Analysis and Forecasting, Department of Retail, Merchandising and Product Development, Florida State University, Tallahassee, FL.

2016-2017 Florida State University Beach Volleyball Student Manager, Tallahassee, FL.

2016-2019 Student-Athlete Mentor, Department of Student-Athlete Academic Services, Florida State University, Tallahassee, FL.

2012-2016 Graduate Teaching Assistant, Anatomy & Physiology Laboratory Instructor, Florida State University, Tallahassee, FL.

2015 Graduate Teaching Assistant, History of Dress, Florida State University, Tallahassee, FL.

2012 Physical Education High School Teacher, Hostos High School, Mayagüez, PR.

2008-2012 Applied Biomechanics Research Assistant, Track and Field, University of Puerto Rico, Mayagüez, PR.

2008 Teaching Instructor CAAMP Abilities, Summer Camp for Visually Disabled Children, University of Puerto Rico, Mayagüez, PR.

Honors

2019 Undergraduate Research Opportunity (UROP) Materials Grant recipient and mentor, FSU

2018 Dr. Linda J. Smith Endowed Scholarship for Lifelong Learning recipient, FSU

2018 Hazel Royall Stephens O'Connor Dillmeier Endowed Fellow-Sport recipient, FSU

2018 Congress of Graduate Students Travel Grant, Association for Applied Sport Psychology Annual Conference 2018 Workshop presentation (Toronto, CN)

2018 College of Education Travel Scholarship, Association for Applied Sport Psychology Annual Conference 2018 Workshop presentation (Toronto, CN)

2017 College of Education Travel Scholarship, American College of Sports Medicine Annual Conference 2017 poster presentation (Denver, CO)

2016 FASEB MARC Travel Award, American College of Sports Medicine Annual Conference 2016 poster presentation (Boston, MA)

2016 Research and Creativity Day 2016 Poster Presentation Award Winner, FSU, Tallahassee, FL

2015	FASEB MARC Travel Award, American College of Sports Medicine Annual Conference 2015 poster presentation (San Diego, CA)
2013-2016	Kappa Omicron Nu Honor Society, College of Human Sciences, Tallahassee, FL
2013-2019	Seminole Torchbearers Member, FSU
2012	Latin American and Caribbean Scholarship recipient, FSU
2012	Magna Cum Laude recipient, UPRM
2012	Student-Athlete Excellence Award recipient, UPRM

C. Contributions to Science

Cardiovascular Disease Interventions: My early research focused on determining the effects of nonpharmaceutical interventions in preventing cardiovascular events and decreasing vascular risk factors. Vascular dysfunction precedes cardiovascular events. This work employed non-traditional exercise modalities (e.g., whole-body vibration and low-intensity resistance exercise training) and supplementation (e.g., L-citrulline, tart cherry) to attenuate the magnitude of hemodynamic, cardiac autonomic function, and vascular responses to stress in high cardiovascular disease risk individuals (e.g., postmenopausal women, obesity, hypertension). Collectively, this work provided a strong foundation in the design, implementation, and interpretation of clinical trials.

- a. Figueroa A, **Alvarez-Alvarado S**, Ormsbee MJ, Madzima TA, Campbell JC, Wong A. (2015). Impact of L- citrulline supplementation and whole-body vibration training on arterial stiffness and leg muscle function in obese postmenopausal women with high blood pressure. *Experimental Gerontology*, 63, 35-40.
- b. Figueroa A, **Alvarez-Alvarado S**, Jaime S, Kalfon R. (2016). L-citrulline supplementation attenuates hemodynamic and arterial stiffness responses to metaboreflex and cold stress in overweight men. *British Journal of Nutrition*, 1, 1-7.
- c. Wong A, **Alvarez-Alvarado S**, Jaime S, Kinsey A, Spicer M, Madzima T, Figueroa A. (2016). Combined whole-body vibration training and L-citrulline supplementation improves pressure wave reflection in obese postmenopausal women. *Appl Physiol Nutr Metab*, 41, 292-297.
- d. **Alvarez-Alvarado S**, Jaime S, Ormsbee M, Campbell J, Post J, Pacilio J, Figueroa A. (2017). Benefits of whole-body vibration on arterial function and muscle strength in young overweight/obese women. *Hypertension Research*, 40, 487-492.

2. **Sarcopenia-Vascular Dysfunction:** In addition to the contributions described above, I investigated the impact of maintaining skeletal muscle integrity (strength and mass) in the context of reducing adverse cardiovascular disease risk associated with aging and obesity. This research was focused on: a) examining the relationship between muscle and arterial responses, and b) potential countermeasures for co-occurrence of sarcopenia and arterial dysfunction. These studies emphasized the significance of considering skeletal muscle performance in the aging process and chronic disease prevention.

- a. Figueroa A, Jaime S, Johnson S, **Alvarez-Alvarado S**, Campbell J, Feresin R, Elam M, Arjmandi B. (2015). Impact of age on aortic wave reflection responses to metaboreflex activation and its relationship with leg lean mass in postmenopausal women. *Experimental Gerontology*, 70, 119124.

- b. Kalfon R, Campbell J, **Alvarez-Alvarado S**, Figueroa A. (2015). Aortic hemodynamics and arterial stiffness responses to muscle metaboreflex activation with concurrent cold pressor test. *American Journal of Hypertension*, 11, 1332-1338.
- c. Figueroa A, **Alvarez-Alvarado S**, Jaime S, Johnson S, Campbell J, Feresin R, Elam M, Negin N, Pourafshar S, Arjmandi B. (2016). Influence of low and normal appendicular lean mass on central blood pressure and wave reflection responses to muscle metaboreflex activation in postmenopausal women. *Clinical and Experimental Pharmacology and Physiology*, 43.
- d. Figueroa A, Jaime S, **Alvarez-Alvarado S**. (2016). Whole body vibration as a potential countermeasure for dynapenia and arterial stiffness. *Integrative Medicine Research*, 5(3), 204-211.

3. **Physical Effort Adherence:** As my doctoral work progressed, it became clear that factors affecting adherence to interventions warranted additional consideration, especially those regulating effort during physical function. I developed a theoretical framework that tested the multidimensionality measures of effort during incremental workloads. This body of work generated additional research questions involving the underlying neural correlates of cognitive processes in the aging brain.

- a. **Alvarez-Alvarado S**, Chow G, Gabana N, Hickner R, Tenenbaum G. (2019). Interplay between workload and functional perceptual-cognitive-affective responses: an inclusive model. *Journal of Sport and Exercise Psychology*, 41(2), 107-118.
- b. **Alvarez-Alvarado S** & Tenenbaum G. (2021). Cognitive-perceptual-affective-motivational dynamics during incremental workload accounting for exertion tolerance. *Journal of Sport Exercise Psychology*. 43(2), 178-190.

4. **Cognitive Aging Interventions.** Much of my current work focuses on evaluating not only the cognitive and functional consequences of aging and disorders, but also improvement in these processes following intervention. This work facilitates the acquisition of the neuroimaging skills and techniques necessary to develop future research integrating key structural and functional neuroimaging components (e.g., high resolution hippocampal segmentation). Additionally, this line of my research attempts to identify novel markers (e.g., neurotransmitter concentrations) and methods for prevention of age/disease-related cognitive decline (e.g., Alzheimer's Disease).

- a. Indahlastari A, Hardcastle C, Albizu A, **Alvarez-Alvarado S**, Boutzoukas EM, Evangelista ND, Hausman S, Kraft JN, Langer KG, Woods AJ. (2021). A systematic review and meta-analysis of transcranial direct current stimulation to remediate age-related cognitive decline in healthy older adults. *Neuropsychiatric Disease and Treatment*, 17, 971-990.
- b. **Alvarez-Alvarado S**, Boutzoukas EM, Kraft JN, O'Shea A, Indahlastari A, Albizu A, Nissim NR, Evangelista ND, Cohen R, Porges EC, Woods AJ. (2021). Impact of transcranial direct current stimulation and cognitive training on frontal lobe neurotransmitter concentrations. *Frontiers in Aging Neuroscience*, 13, 761348.

Complete List of Published Work in My Bibliography:

<https://www.ncbi.nlm.nih.gov/myncbi/staceyalvarezalvarado/bibliography/public/>

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: ASKEN, Breton Michael

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

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)	Completion Date MM/YYYY	FIELD OF STUDY
University of North Carolina, Chapel Hill, NC	B.A.	05/2013	Exercise & Sport Science
University of North Carolina, Chapel Hill, NC	B.A.	05/2013	Psychology
University of Florida, Gainesville, FL	M.S.	05/2015	Clinical Psychology
University of Florida, Gainesville, FL	Ph.D.	08/2019	Clinical Psychology
Brown University, Providence, RI	Internship	07/2019	Clinical Psychology
University of California, San Francisco, CA	Postdoctoral Fellow	08/2022	Neuropsychology

A. Personal Statement

My research focuses on the contributions of lifetime head trauma exposure to clinical and biological correlates of Alzheimer’s disease and related causes of dementia (ADRD) in humans. I have direct research experience with using multimodal fluid biomarkers, neuroimaging, and neuropsychological measures to study *both* brain injury and the spectrum of ADRD. My current clinical and research efforts involve Alzheimer’s disease, including early-onset patients and patients with mixed etiology dementia (e.g., comorbid Lewy body disease), and frontotemporal dementia (FTD) spectrum disorders (e.g. primary progressive aphasia, behavioral variant FTD, corticobasal syndrome, Richardson’s syndrome). These efforts focus on better understanding the contributions of lifetime head trauma exposure to neuropathological heterogeneity in patients with dementia, and improving both the biological and clinical classifications of different neurodegenerative conditions through detailed cognitive testing and integration of multimodal biomarker assessment.

Recent and ongoing research support I wish to highlight:

1Florida ADRC Development Grant (PI: Asken)

08/2022 – 07/2024

Novel Plasma Markers of Neuronal, Glial, and Inflammatory Dysfunction in Traumatic Encephalopathy Syndrome Patients With and Without Alzheimer’s Disease Pathology

This study will analyze over 3,000 plasma-based proteins to identify novel biomarkers of head trauma-related neurodegenerative changes and pathophysiological variability among patients with ADRD with and without prior head trauma. Role: PI

R21 NS120629-01 (MPI: Alosco & Rabinovici)
01/2021 – 12/2022

In Vivo Detection of Chronic Traumatic Encephalopathy with 18F-MK-6240 Tau PET (FIND-CTE)

This study will evaluate a second-generation tau PET radiotracer in a population at high risk for harboring CTE neurodegenerative pathology to determine the utility for improving CTE diagnosis during life.

Role: Key Study Personnel

UCSF Hillblom Foundation Kickstarter Pilot Grant (PI: Asken)
12/2020 – 12/2021

Too Little, but not too LATE – Preliminary Investigation of Plasma TDP-43 Biomarkers for Limbic-Predominant Age-Related TDP-43 Encephalopathy (LATE-NC).

This study evaluated the validity of a commercially-available assay for identifying pathological TDP-43 in living patients with semantic variant primary progressive aphasia and autopsy-confirmed patients with TDP-43 spectrum neurodegenerative diseases. Role: PI

B. Positions, Scientific Appointments, and Honors

Employment and Academic Designations

2022 – Licensed Clinical Psychologist
2022 – Fixel Scholar, University of Florida Fixel Institute for Neurological Diseases
2022 – Assistant Professor, University of Florida Dept. of Clinical and Health Psychology
2019 – 2022 Postdoctoral Fellow in Neuropsychology, UCSF Memory & Aging Center, San Francisco, CA
2018 – 2019 Resident in Psychology (Neuropsychology), Brown University

Honors

12/2021 Emerging Scholar, Black Men’s Brain Health program
10/2021 Tau Consortium Fellowship (nominated by Joel Kramer)
12/2019 National Athletic Trainers’ Association David H. Perrin Doctoral Dissertation Award
11/2017 Robert and Phyllis Levitt Neuropsychology Research Award, University of Florida
11/2017 Department of Clinical and Health Psychology Student Research Award, University of Florida
06/2017 Clint Thompson Award for Clinical Practice Advancement, *Journal of Athletic Training*
05/2017 Dean’s Citation Award, Department of Clinical and Health Psychology, University of Florida

C. Contributions to Science

H-Index=20. i-10 index=34. List of published work in MyBibliography – 56 publications (29 as first/co-first author) + 9 book chapters (7 first author; not PubMed/MEDLINE indexed): <https://www.ncbi.nlm.nih.gov/myncbi/1-UgBaBMg9v5q/bibliography/public>

A major focus of my current research has been studying clinico-pathological variability in patients with dementia, especially the contributions of head trauma exposure to mixed neuropathology. My research has used multimodal structural and PET neuroimaging, fluid biomarkers, neuropathological data, and neuropsychological testing, while successfully leveraging multidisciplinary collaborations between neuropsychologists, neurologists, and neuropathologists. This work has led to original research, invited commentaries, and review articles on head trauma and dementia.

- a. **Asken BM**, Tanner JA, VandeVrede L, Casaletto KB, Staffaroni AM, Mundada N, Fonseca C, Iaccarino L, Joie R, Tsuei T, Mladinov M, Grant H, Shankar R, Wang KKW, Xu H, Cobigo Y, Rosen H, Gardner RC, Perry DC, Miller BL, Spina S, Seeley WW, Kramer JH, Grinberg LT, Rabinovici GD (2022). Multi-Modal Biomarkers of Repetitive Head Impacts and Traumatic Encephalopathy Syndrome: A Clinicopathological Case Series. *Journal of Neurotrauma*. Epub ahead of print. PMID: 35481808
- b. **Asken BM**, Tanner JA, VandeVrede L, Mantyh WG, Casaletto KB, Staffaroni AM, La Joie R, Iaccarino L, Soleimani-Meigooni D, Rojas JC, Gardner RC, Miller BL, Grinberg LT, Boxer AL, Kramer JH, Rabinovici GD (2022). Plasma P-tau181 and P-tau217 in Patients With Traumatic Encephalopathy Syndrome With and Without Evidence of Alzheimer Disease Pathology. *Neurology*. Epub ahead of print. PMID: 35577574.
- c. **Asken BM** & Rabinovici GD (2021). Identifying degenerative effects of repetitive head trauma with neuroimaging: a clinically-oriented review. *Acta neuropathologica communications*, 9(1), 96.
- d. **Asken BM**, Sullan MJ, DeKosky ST, Jaffee MS, Bauer RM (2017). Research Gaps and Controversies in Chronic Traumatic Encephalopathy (CTE). *JAMA Neurology*; 74(10): 1255-1262. PMID: 28975240

Other recent research endeavors have focused on multimodal biomarkers of aging and Alzheimer's disease irrespective of the role of head trauma. These efforts reflected my expanding interests and specialized training beyond brain injury, providing an essential foundation for my current clinical research program in dementia. Key findings include the PET neuroimaging correlates of cognition in patients with early- and late-onset Alzheimer's disease, the influence of disease severity on the relationship between plasma GFAP and amyloid-PET among patients with AD, cognitive and brain volume correlates of plasma GFAP, and medical comorbidity confounds impacting the measurement of blood-based neurodegenerative disease proteins.

- a. Tanner, J. A., Iaccarino, L., Edwards, L., **Asken, B. M.**, Gorno-Tempini, M. L., Kramer, J. H., Pham, J., Perry, D. C., Possin, K., Malpetti, M., Mellinger, T., Miller, B. L., Miller, Z., Mundada, N. S., Rosen, H. J., Soleimani-Meigooni, D. N., Strom, A., La Joie, R., & Rabinovici, G. D. (2022). Amyloid, tau and metabolic PET correlates of cognition in early and late-onset Alzheimer's disease. *Brain*. Advance online publication.
- b. **Asken BM**, Elahi FM, La Joie R, Strom A, Staffaroni AM, Lindbergh CA, Apple AC, You M, Weiner-Light S, Brathaban N, Fernandes N, Karydas A, Wang P, Rojas JC, Boxer AL, Miller BL, Rabinovici GD, Kramer JH, Casaletto KB. Plasma Glial Fibrillary Acidic Protein Levels Differ Along the Spectra of Amyloid Burden and Clinical Disease Stage.

J Alzheimers Dis. 2020 Sep 19. doi: 10.3233/JAD-200755. Epub ahead of print. PMID: 32986672.

- c. Berry, K., **Asken, B. M.**, Grab, J. D., Chan, B., Lario Lago, A., Wong, R., Seetharaman, S., LaHue, S. C., Possin, K. L., Rojas, J. C., Kramer, J. H., Boxer, A. L., Lai, J. C., & VandeVrede, L. (2022). Hepatic and renal function impact concentrations of plasma biomarkers of neuropathology. *Alzheimer's & dementia (Amsterdam, Netherlands)*, 14(1), e12321.
- d. **Asken, B. M.**, VandeVrede, L., Rojas, J. C., Fonseca, C., Staffaroni, A. M., Elahi, F. M., Lindbergh, C. A., Apple, A. C., You, M., Weiner-Light, S., Brathaban, N., Fernandes, N., Boxer, A. L., Miller, B. L., Rosen, H. J., Kramer, J. H., & Casaletto, K. B. (2022). Lower White Matter Volume and Worse Executive Functioning Reflected in Higher Levels of Plasma GFAP among Older Adults with and Without Cognitive Impairment. *Journal of the International Neuropsychological Society*, 28(6), 588–599.

Prior to focusing my research on head trauma and dementia, I led multiple projects evaluating clinical and biological correlates of concussion in active collegiate athletes. Our work contributed to the understanding that certain plasma-based proteins elevate shortly after a concussion. Many of the blood biomarkers I gained early experience with are now regularly incorporated into aging and dementia studies, including my own as referenced above. Our results identifying the detrimental effects of “playing through” a concussion on clinical recovery **are referenced directly in position statements and best practices documents, and have garnered 350+ citations in the last 5 years.**

- a. **Asken BM**, Bauer RM, DeKosky ST, Hromas G, Svingos AM, Boone JK...Clugston JR (2018). Concussion BASICS III: Serum Biomarker Changes Following Sport-Related Concussion. *Neurology*; 91(23):e2133-2143. PMID: 30404786
- b. **Asken, B. M.**, Yang, Z., Xu, H., Weber, A. G., Hayes, R. L., Bauer, R. M., DeKosky, S. T., Jaffee, M. S., Wang, K., & Clugston, J. R. (2020). Acute Effects of Sport-Related Concussion on Serum Glial Fibrillary Acidic Protein, Ubiquitin C-Terminal Hydrolase L1, Total Tau, and Neurofilament Light Measured by a Multiplex Assay. *Journal of neurotrauma*, 37(13), 1537–1545.
- c. **Asken BM**, McCrea MA, Clugston JR, Snyder AR, Houck ZM, Bauer RM (2016). “Playing Through It”: Delayed Reporting and Removal From Athletic Activity After Concussion Predicts Prolonged Recovery. *Journal of athletic training*; 51(4):329-335. PMID: PMC4874376
- d. **Asken BM**, Bauer RM, Guskiewicz KM, McCrea MA, Schmidt JD, Giza CC...Clugston, JR, and CARE Consortium Investigators (2018). Immediate Removal from Activity After Sport-Related Concussion Associated with Shorter Clinical Recovery and Less Severe Symptoms in Collegiate Student-Athletes. *American Journal of Sports Medicine*; 46(6):1465-1474. PMID: 29558195

Appendix 2

Top 20 Publications from 2022

- Rani, A., Barter, J., **Kumar, A.**, Stortz, J.A., Hollen, M., Nacionales, D., Moldawer, L.L., Efron, P.A., **Foster, T.C.**, 2022. Influence of age and sex on microRNA response and recovery in the hippocampus following sepsis. *Aging* 14(2), 728-746.
- Yegla, B., **Foster, T.C.**, 2022. Operationally defining cognitive reserve genes. *Neurobiology of Aging* 110, 96-105.
- Hernandez, C.M., McQuail, J.A., Ten Eyck, T.W., Wheeler, A-R., Labiste, C.C., **Setlow, B.**, & **Bizon, J.L.** (2022). GABA(B) receptors in prelimbic cortex and basolateral amygdala differentially influence intertemporal decision making and decline with age. *Neuropharmacology*. 209, 109001.
- Dhakar, M.B., Sheikh, Z.B., Desai, M., Desai, R.A., Sternberg, E.J., Popescu, C., Baron-Lee, J., Rampal, N., Hirsch, L.J., Gilmore, E.J., **Maciel, C.B.** (2022) Developing a Standardized Approach to Grading the Level of Brain Dysfunction on EEG. *J Clin Neurophysiol*.
- Stolte, S.E., Volle, K., **Indahlastari, A.**, Albizu, A., **Woods, A.J.**, Brink, K., Hale, M., **Fang, R.** "DOMINO: Domain-Aware Model Calibration in Medical Image Segmentation." International Conference on Medical Image Computing and Computer-Assisted Intervention. Springer, Cham, 2022.
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Appendix 3

Top 10 Presentations at Scientific or Public Meetings

Bizon, J.L. Neurobiological mechanisms of age-associated cognitive decline. Grand Rounds, Department of Psychiatry, Johns Hopkins School of Medicine, Baltimore, Maryland, October 2022.

Cohen, R.A. Cognitive and brain dysfunction associated with brain infection: Florida Neurological Society. September 2022.

Burke, S.N. A Systems-level Approach to Understanding the Neurobiology of Cognitive Aging. University of Texas, San Antonio, Neuroscience Seminar, Feb 17, 2022

Woods, A.J. Leveraging individual variability and artificial intelligence to determine dosing for tDCS. International Conference for Clinical Neurophysiology, Geneva, Switzerland, September 7, 2022.

Asken, B.M. Clinical and Biological Correlates of RHI Across Alzheimer's Disease and Related Causes of Dementia. Boston University Alzheimer's Disease Center CTE Conference, October 2022.

Ebner, N. C. Understanding and promoting social-cognitive and affective aging. Department of Psychological and Brain Sciences Colloquium, Washington University St. Louis, St. Louis, MO, USA, December 2022.

Ebner, N. C. Aging online: Rethinking adulthood and aging in an unsafe digital era. Talk in the York University CARE Aging in the City Seminar, Toronto, Canada, April 2022.

Stolte S.E., Volle K., **Indahlastari A.**, Albizu A., **Woods A.J.**, Brink K., Hale M., **Fang R.** DOMINO: Domain-Aware Model Calibration in Medical Image Segmentation. In International Conference on Medical Image Computing and Computer-Assisted Intervention 2022 (pp. 454-463). Springer, Cham. (Best Paper Presentation Award Runner Up, Women in MICCAI. Oral Presentation (rate=2.3%), Early Acceptance (rate=13%), Student Travel Award)

Maurer, A.P. A Pragmatic Approach to Understanding the Role of Neural Oscillations in Organizing Behavior. University of Texas, San Antonio, Neuroscience Seminar, Feb 17, 2022.

Setlow, B. Sex, drugs, and getting old; influences on decision making and executive functions (invited seminar speaker), Center for the Neurobiology of Learning and Memory, UC Irvine, February 1, 2022.



Sabrina Zequeira, graduate student in Dr. Bizon's lab, was the First Place Winner in the College of Medicine's in the 3-Minute Thesis Competition.

Appendix 4

Communications

Website Development

Website: <https://cam.mbi.ufl.edu/>

The number of visits to the CAM website for 2022 was 5,725 – which is over 3X as the previous year. Our most trafficked month was August. This traffic coincided with an original article written to announce a podcast created by one of our trainees. This shows us that original content reaches the widest audience. We plan to offer more originally created news and content to the website in the upcoming year.

Social Media: The CAM Center’s Twitter accounts (@UF_CAMcenter) gained 168 followers over the course of 2022. Our biggest spike in followers, tweet impressions, and profile visits was in March when we had a concentrated effort of posting original content every day of Brain Awareness Week (March 14-20, 2022) as well as collaborated with various other UF centers affiliated with the McKnight Brain Institute to participate in the National Neurotrauma’s 2nd annual 5K fun run/walk.



CAM center participated with BRAIN center in the National Neurotrauma Society 5K Fun Run/Walk.

Media Coverage

11-22-22 – University of Florida Teams Up with University of North Florida to Expand Dementia Prevention Research in Jacksonville. <https://mcknightbrain.org/university-of-florida-teams-with-university-of-north-florida-to-expand-dementia-prevention-research-in-jacksonville/>

11-18-22 – **Adam Woods** quoted in mycbs4 news stories about cognitive benefits in playing video games. <https://mycbs4.com/news/local/study-video-gaming-may-have-some-cognitive-benefits-for-kids>

10-25-22 – **Adam Woods** announced as associate dean of research for PHHP. <https://phhp.ufl.edu/2022/10/25/adam-woods-appointed-phhp-associate-dean-for-research/>

10-12-22 – Congratulations to eight @UF research teams awarded new MBI grants. The combined \$744K in grants will support research projects and equipment for teams conducting neuroscience and neuromedicine research here at UF. **Burns**. <https://mbi.ufl.edu/2022/10/12/eight-uf-research-teams-awarded-mbi-grant-funding/>

9-22-22 – **Stacey Alavarez-Alvarado** was featured on News4Jax, along with Dr. Ramon Bautista, to discuss the PACT trial and what benefits the trial holds for an aging population.

<https://www.news4jax.com/video/morning-show/2022/09/25/world-alzheimers-month/>

9-20-22 – Congratulations to CAM associate director **Adam Woods** named to UF Foundation Ter Professorship. <https://phhp.ufl.edu/2022/09/20/adams-woods-named-to-uf-foundation-term-professorship/>

9-15-22 – UF, NVIDIA partner to speed brain research using AI. **Woods, Fang, Indahlastari.**

<https://phhp.ufl.edu/2022/02/02/uf-nvidia-partner-to-speed-brain-research-using-ai/>

8-29-22 – Is there something to that TikTok trend of “hacking” the vagus nerve to alleviate anxiety? Dr. **Eric Porges** weighs in for this article in @inversedotcom. <https://www.inverse.com/mind-body/vagus-nerve-stimulation>

8-24-22 – CAM trainee, **Cristina Besosa**, creates podcasts to help others learn neuroscience 20 minutes at a time. @_in_your_brain_. <https://cam.mbi.ufl.edu/2022/08/24/using-podcasts-to-learn-neuroscience-20-minutes-at-a-time/>

8-24-22 – Want to learn more about promoting lifelong brain health? CAM’s very own Dr. **Shellie-Anne Levy** presents her expert steps to brain health Saturday, August 27 @ 1:00 P.M. <https://levy.chp.phhp.ufl.edu/2022/12/05/steps-to-brain-health-lab-members-host-a-health-seminar-at-a-local-church/>

8-4-22 - @UF neuroscientists Bryan Alava and Dr. **Adam Woods** discuss their Alzheimer’s research #AAIC22 blog and video feature by @alzcnfl. <https://alzmindfl.org/2022/08/02/aaic22day3/>

7-5-22 – Neuroscience department fosters passion for research and solutions for brain health: Collegiality and collaboration spur success under the leadership of **Jennifer Bizon**, Ph.D.

<https://news.drgator.ufl.edu/2022/07/05/neuroscience-department-fosters-passion-for-research-and-solutions-for-brain-health/>

6-23-22 – Are seniors more likely to fall for fake news? According to a UF & UCF study, frequent news consumers aged 70+ paid less attention to the details of news articles. For other groups, analytical reasoning played a larger role in spotting fake news than age. <https://news.ufl.edu/2022/05/aging-adults-fake-news/>. **Ebner.**

6-15-22 – Check out a new @NatGeoMag article from @UF @UFMBI neuroscientist **Karina Alvina** and others about why exercise can help keep the brain healthy.

<https://www.nationalgeographic.com/magazine/article/new-clues-are-revealing-why-exercise-can-keep-the-brain-healthy>

5-25-22 – Congratulations to MBI deputy director Dr. **Steven DeKosky**, whose research papers have been cited over 100,000 times according to Google Scholar, putting him in an elite group of researchers to reach this mark. <https://mbi.ufl.edu/2022/05/25/mbi-deputy-director-surpasses-100k-citations/>

5-4-22 – Dr. **Ruogu Fang** shares her work on #AI for Alzheimer’s Disease and other neurodegenerative diseases detection! Aired on @WCJB20 Tech Tuesday at 5:30 P.M. yesterday.

<https://www.wcjb.com/2022/05/04/tech-tuesday-modular-ad/>

4-13-22 – Congratulations to @UF neuroscientist Dr. **Sara Burke**, who received the inaugural Dr. Mavis Agbandje-McKenna Distinguished Research Mentoring Award at @UFMedicine Research Day.

<https://mbi.ufl.edu/2022/04/13/uf-neuroscientist-honored-with-first-dr-mavis-agbandje-mckenna-award/>

3-3-22 – UF neuroscientist Dr. **Karina Alvina** was featured in @Verywell article about the relationship between the gut & the brain. <https://www.verywellhealth.com/depression-gut-microbiome-5219491>

2-7-22 – UF Researchers have found that a form of Artificial Intelligence combined with MRI scans of the brain has the potential to predict whether people with a type of early memory loss will go on to develop a form of dementia or Alzheimer’s. **Woods, Gullett, Fang.**

https://innovate.research.ufl.edu/2021/12/07/uf-ai-predict-dementia/?utm_source=twitter&utm_medium=social_otl&utm_term=&utm_content=&utm_campaign=news_brief

1-31-22 – February 1 @ 11 A.M. Virtual colloquium presented by Dr. **Barry Setlow**: “Sex, drugs, and getting old; influences on decision making and executive function.” <https://cnlm.uci.edu/scientific-activities/colloquium-series/>

1-18-22 - As people with HIV age, about half will develop cognitive issues. Now, UF researchers will evaluate three promising treatments designed to improve brain health in people with #HIV who consume alcohol. **Cohen, Porges, Fang, Gullett, Lamb, Williamson.** <https://ufhealth.org/news/2022/uf-health-team-receives-66-million-study-treatments-boost-cognition-those-hiv>

1-7-22 – Ivanhoe Broadcast News highlights research led by Drs. **Adam Woods** and **Ruogu Fang** using artificial intelligence to determine precision dosing for transcranial direct current stimulation, a potential treatment designed to prevent dementia. https://www.youtube.com/watch?v=iaHaYP0h_rY



CAM motto: Teamwork makes the dream work – both in and out of the lab.