UNIVERSITY OF MIAMI
MILLER SCHOOL OF MEDICINE
EVELYN F. McKNIGHT
BRAIN INSTITUTE

2021 ANNUAL REPORT

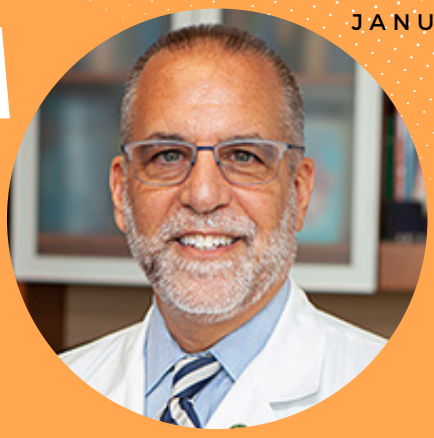
SUBMITTED BY
The University of Miami

REPORT PERIOD
Jan 1 - Dec 31, 2021

1 TABLE OF CONTENTS

JANUARY 13, 2022

LETTER FROM EXECUTIVE DIRECTOR



Dear Trustees:

Please find enclosed the University of Miami Evelyn F. McKnight Brain Institute Annual report. As I reflect on 2021, I am proud of many things that demonstrate the maturing and expansion of our EMBI. If you visit our website at https://mbi-umiami.org/ you will understand that our EMBI serves as an umbrella institute for cognitive clinical and translational research of all divisions in the Department of Neurology and the brain health and cognitive programs of the University of Miami Miller School of Medicine.

In 2021, the Department of Neurology at the University of Miami was ranked #35 in the US News and World Report in the Neurology and Neurosurgery specialty and, even more impressive, #15 in NIH funding. Our EMBI continues to develop scientific programs according to our recently developed strategic plan and continues to offer a broad range of clinical and research training opportunities to clinical and translational trainees and researchers. Led by Dr. Rundek as the scientific director and the Evelyn F. McKnight Chair for Learning and Memory in Aging, our EMBI focuses and offers a wealth of knowledge in clinical translational research, education, and mentorship, and provides neurocognitive research opportunities, which are detailed in the report. We continue to work on the integrative and collaborative programs with our Cognitive Division and UM Memory Programs led by interim director Dr. Bernard Baumel and with the Center for Neurocognitive Sciences and Aging led by Dr. David Loewenstein in the Department of Psychiatry. In late October 2021, we opened the Comprehensive Center for Brain Health (CCBH) in Boca Raton that is led by our new faculty, Dr. James Galvin, who is a world-renowned cognitive neurologist and researcher. Our EMBI has already made plans to work together with CCBH on clinical research and research mentoring and training in cognitive aging and brain health. We are looking forward to these exciting new collaborative programs.

Early in 2021, we were designated the only ADRC in Miami since we are a major clinical recruitment site for the 1FLADRC and Dr. Rundek is the main PI for education. She co-directs the 1FL ADRC AlzSTARS (Alzheimer's Disease Science Training to Advance Research Success) program together with Dr. Glenn Smith at UF.

EMBI EXECUTIVE DIRECTOR

Dr. Ralph Sacco

BACK TO TABLE OF CONTENTS

In April, with your support, and not wanting to let another year pass without the ability for all EMBIs to meet and exchange ideas, we successfully led the 12th Annual MBRF Interinstitutional meeting virtually with the theme 'Power of Collaboration and Team Science.' It was a successful meeting with about 120 participants, and it was obvious that our interinstitutional collaborations continued, despite Covid-19. We have contributed to the success of the UA PAN (Precision Aging Network) NIA award led by Dr. Barnes, and were awarded an MBRF pilot award with UAB, led by Drs. Lazar and Rundek.

Challenges however remain, while Covid has allowed us to reach many patients and research participants without Miami travel issues, the in-person portion of some studies has been limited. Together with Dr. Baumel, we continued to grow a strong team of clinical cognitive neurologists. This team has provided virtual care for more than 2,000 patients last year. Our plan is to 1) further grow our Cognitive Division, which will be significantly advanced by the establishment of the Evelyn F. McKnight Neurocognitive Clinical Scholar in Brain Health and Aging postdoctoral training program, approved by the Trustees in October 2021 and 2) by advancing our clinical research and training leadership through the multidisciplinary members of the EMBI including a named recipient of the Schoninger Chair in Memory Disorders that we are hoping to award in 2022.

In 2022, we will continue our leadership in research, training and mentorship of the next generation of successful cognitive physician-scientists by recruiting another post-doctoral EMBI clinical scholar. With Drs. Rundek, Sun, Baumel and Galvin, along with all existing EMBI faculty and EMBI advisory board members, the University of Miami EMBI and the Department of Neurology will continue its unique cognitive aging and memory clinical translational program and continue to advance research in age-related memory loss and cognitive decline and brain health through new programs, grants and other multi-disciplinary collaborations and partnerships.

Thank you for your continued support and collaboration in our efforts.
Warmest regards,

Ralph L. Sacco MD, MS, FAHA, FMN
Chairman Department of Neurology
Olemberg Family Chair in Neurological Disorders
Executive Director, Evelyn F. McKnight Brain Institute
Director, Clinical and Translational Science Institute
Senior Associate Dean for Clinical and Translational Science
Miller Professor of Neurology, Public Health Sciences, Human Genetics and Neurosurgery
Leonard M. Miller School of Medicine
Editor, **Stroke**

EMBI
EXECUTIVE DIRECTOR

Dr. Ralph Sacco

BACK TO TABLE OF CONTENTS

JANUARY 13, 2022

LETTER FROM SCIENTIFIC DIRECTOR

Dear Trustees:

As I reflect on 2021, I am proud of my 4th year co-leadership of the EMBI at the University of Miami Department of Neurology. We have streamlined and standardized our EMBI operations with weekly administrative and research meetings, monthly seminars, clinical and research training and education, community outreach with social media and educational events, a formal Scientific Advisory Board that meets 4 times a year, continued expansion of our membership, collaborators and partners across the Institution and beyond, and the roll-out of our 5-year Strategic Plan.

Despite the barriers posed by Covid, we advanced almost all our four strategic goals for 2021, which are to: (1) Continue development of our scientific programs directly related to our EMBI and the McKnight Brain Research Foundation mission. Our new NIH grants and establishment of the Comprehensive Center for Brain Health (CCBH) led by Jim Galvin represents new expansion of our research programs and demonstrates the scientific progress; (2) Continue clinical translational education and mentorship. Drs. Christian Agudelo, Sarah Getz and Anita Saporta are advancing this goal together with Taylor Ariko, our new PhD student in medical bioengineering, who will advance machine learning algorithms for the assessment of neuroimaging and cognitive phenotypes; (3) Promote communications and collaborations. We have significantly advanced our EMBI branding, established our EMBI logo and participated in several collaborative inter-institutional projects; and (4) Develop community outreach. We have been very active in social media outreach and leading virtual events. We plan to continue with this major focus in 2022. I am also extremely proud of our EMBI research administrative team, Stacy Merritt, Susan Fox Rosellini and Marti Flothmann, who were instrumental in the success of our virtual 12th MBRF Inter-institutional meeting. It went extremely well and without glitches!

In 2021, I personally have taken on the presidency of the Intersocietal Accreditation Commission (IAC) Vascular Testing Board of Directors, the largest national accreditation body that accredits clinical nuclear/PET, MRI, CT, ultrasound, cardiac echo, and carotid stenting programs. Vascular disease is the most common cause of age-related memory decline. Over the next 2 years of my IAC presidency, I will have a great opportunity to work with many talented physicians from different specialties on increasing the number of accredited vascular testing facilities, particularly in neurovascular testing services, and on improvement of care for patients with vascular cognitive impairment (VCI). We have just published a seminal IAC paper on the revised criteria for carotid stenosis that will change clinical practice for patients with carotid atherosclerotic disease, stroke and VCI.

EMBI
SCIENTIFIC DIRECTOR

Dr. Tatjana Rundek

BACK TO TABLE OF CONTENTS

IThis year was full of achievements, but also had many challenges. The challenges were primarily health, Covid-related issues among our EMBI team members, their families, our patients and study participants, and in our communities. Despite these health-related issues, our programs continued, and our members were not discouraged, but helped each other and stayed together during these difficult times.

In 2022, I am committed to continue guiding the execution of our strategic plan, advance our scientific and education mission, and advance our training and mentorship. In addition, I will continue to advance the Research Educational Core for the 1FL ADRC AlzSTARS (Alzheimer's Disease Science Training to Advance Research Success) program, which now has 6 trainees; 2 of which are from our EMBI, Magda Tolea and Regina Vontell. In our collaborative and successful NIA award Precision Aging Network (PAN) led by Dr. Barnes, I have taken a co-lead role of the PAN2 clinical project with Dr. Lee Ryan. I will also guide and train the PAN site sonographers in ultrasound protocols that will establish subclinical vascular disease as a novel sonographic marker of brain health. To further advance our strategic programmatic development, I will continue to develop collaborations with other Centers and Institutes at UM as well as other EMBIs and other Institutions. This includes strong collaborations with the Cognitive Division and Memory Clinic (Dr. Baumel), Comprehensive Center for Brain Health (Dr. Galvin), Center for Neurocognitive Sciences and Aging (Dr. Loewenstein), Hussman Institute for Human Genomics (Drs. Pericak-Vance and Blanton), Clinical Translational Science Institute (Dr. Sacco) for which I serve as a Director of KL2 and of MS in Clinical Translational Investigation, Center for AIDS Research (Dr. Pahwa) for which I co-lead Scientific Working Group on Aging in HIV, as well with other institutions such as Columbia University, Einstein Aging Project in the Bronx, U Arizona, UF, UAB, Johns Hopkins, and others. I will also chair the search committee to recruit a cognitive Division Chief and the Schoninger Chair. I will also closely work with our Education Director Dr. Sun on recruiting the best candidate for the newly established and approved scholarship by the Trustees- Evelyn F. McKnight Neurocognitive Clinical Scholar in Brain Health and Aging.

Finally, our EMBI will delve into several new and exciting research projects including, Neighborhood Greenness and Cognitive Performance in the Northern Manhattan Study, a newly funded NINDS project for which I serve as a MPI, Sleep in Neurocognitive Aging and Alzheimer's Research (SANAR) led by Dr. Alberto Ramos, U Arizona PAN, a pilot with UAB led by Dr. Lazar, and six other federal grant research projects awarded to Dr. Galvin, along with other grants and projects, with details provided in our annual report.

I am looking forward to another exciting and productive year for our EMBI.

Warmest regards,

Tatjana Rundek, M.D., Ph.D.
Professor and Scientific Director
Evelyn F. McKnight Chair for Learning and Memory in Aging

EMBI
SCIENTIFIC DIRECTOR

Dr. Tatjana Rundek

BACK TO TABLE OF CONTENTS

JANUARY 13, 2022

LETTER FROM EDUCATION DIRECTOR

Dear Trustees:

On behalf of the Evelyn F. McKnight Brain Institute (EMBI) Education Program at the University of Miami Miller School of Medicine, I am pleased to present a summary of the education activities organized at our institute in 2021.

Under the leadership of Dr. Sacco and Dr. Rundek, our EMBI educational program continues to thrive, even with the emergence of the Coronavirus Pandemic in 2021.

- **Scientific Education**
  - We offered a diverse range of research seminars, journal clubs and research progress updates to faculty, EMBI staff, neurology fellows and residents.
- **Training Program**
  - We have focused on obtaining training grants and enhancing fellow training and neurology resident education in cognitive neurology. Our EMBI faculty serve as educators and mentors on an R25 in Neurology/Neurosurgery, a T32 in cerebrovascular disease and minority health as well as the 1 Florida Alzheimer's Research Center in collaboration with the University of Florida and the Center for Neuroscience and Aging. Our trainees are actively applying for F and K awards as well as other foundation awards (e.g. American Heart Association, American Academy of Neurology, National Science Foundation and others).
- **Community Outreach**
  - We continued our community outreach education program in 2021 virtually with the goal of keeping our seniors apprised of best practices for healthy brain aging during a Pandemic. We reached an ethnically diverse group of attendees who were both English and Spanish speaking. We worked with our current aging organization partners and continued to make new partnerships. We organized an 'Aging and the Brain' Lecture Series for the third year with the Miami-Dade Public Library System which were extremely well attended (with over 200 attendees) and received overwhelmingly positive feedback with many requests for more series like this.

EMBI
EDUCATION DIRECTOR

Dr. Xiaoyan Sun

BACK TO TABLE OF CONTENTS

In 2022, we will continue improving our EMBI education program. For scientific education, we will resume brain cutting sessions and EMBI grand rounds, which we had to stop due to the Coronavirus Pandemic. We will continue to organize a seminar series to exchange scientific ideas and learn from each other and plan journal clubs to discuss the most current scientific advances in age-related cognitive disorders. Our training program will focus on the professional development of the fellow in the field of cognitive neurology. The search for the best Evelyn F. McKnight Neurocognitive Clinical Scholar in Brain Health and Aging will be front and center, with the position beginning in 2022.

Finally, our educational outreach to the aging community will continue with our current partnerships but will be expanded by working to build new relationships with additional senior living and recreation centers. I will work at the Comprehensive Center for Brain Health with Dr. Galvin on new seminars for his existing and new Palm Beach County community partners. Our outreach and education program has grown each year. We now have a following of over 150 interested seniors from the community who follow us on social media, attend our events regularly and serve as brain health and healthy aging ambassadors for our EMBI in the community.

Thank you for your continued support and collaboration in our efforts.

Warmest regards.

Xiaoyan Sun MD, PhD
Associate Professor
Education Director of the Evelyn F. McKnight Brain Institute
Clinical Director Brain Endowment Bank

EMBI
EDUCATION DIRECTOR

Dr. Xiaoyan Sun

BACK TO TABLE OF CONTENTS

4 INSTITUTE FY21 AT A GLANCE

A SCIENTIFIC ACHIEVEMENTS

B PROGRAMMATIC ACHIEVEMENTS

C TRAINING, EDUCATION AND OUTREACH ACHIEVEMENTS

D MOST IMPORTANT RELEVANT SCIENTIFIC ACHIEVEMENTS

E CURRENT BUDGET AND ENDOWMENT INVESTMENT REPORT

BRIEF SUMMARY OF OUR ACHIEVEMENTS THIS YEAR

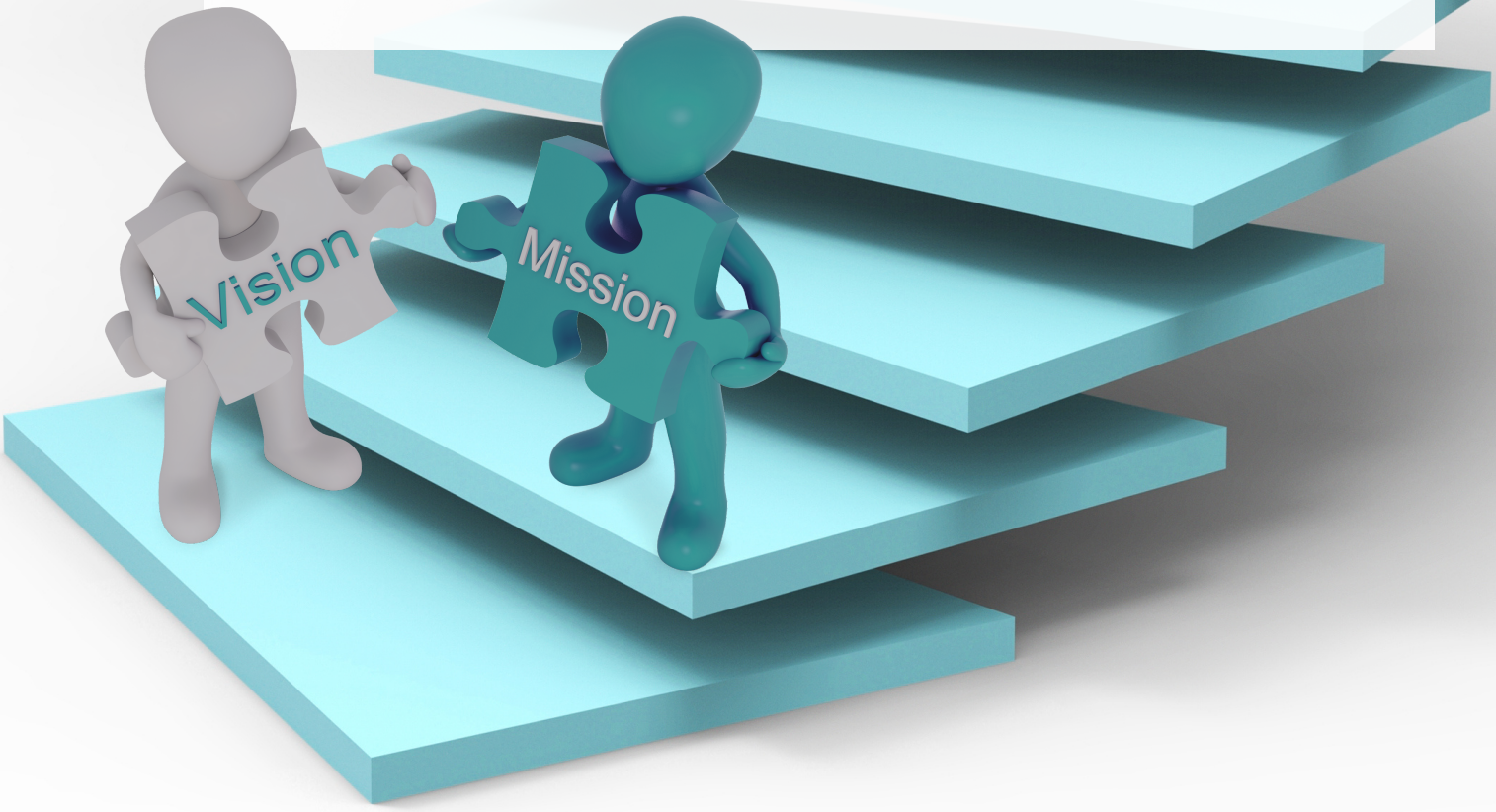
In 2021, the EMBI at the Department of Neurology at the University of Miami had several important scientific, programmatic, educational and community outreach achievements. We advanced our research on the causes of age-related memory loss and cognitive decline and promoted brain health by obtaining NIH grants, forming and maintaining multi-disciplinary collaborations and partnerships and conducting outreach in the community. In all, we received 17 grants/awards which are listed in the grants and awards section in the report and performed over 25 outreach events. Lastly, the Scientific Advisory Board (SAB) with Dr. Galvin as our newest member, reviewed and approved the EMBI Strategic Plan which was and continues to be the driver of our EMBI achievements.

BACK TO TABLE OF CONTENTS

OUR

MISSION & VISION

Our EMBI **Mission** is to accelerate discoveries of the causes and treatments of age-related memory loss and cognitive decline and to promote brain health through multi-disciplinary collaborations and partnerships; and to train new generations of skilled clinical and translational scientists specializing in age-related memory loss, cognitive decline and promotion of brain health. And our **Vision** is to become a leading center for clinical and translational research into the causes, treatments and prevention of age-related cognitive disorders and promotion of brain health. We continue to fulfill our mission and vision despite challenges around us.



BACK TO TABLE OF CONTENTS

To carry out our mission and vision, we place an emphasis on the strengths of our clinical team. Therefore, we enhanced our integration with the Clinical Cognitive Division by having weekly research meetings, monthly division meetings, cross-training of research staff, educational and clinical training of residents, fellows and junior faculty and sharing of space and resources. We continued our strong collaborations with the Center for Cognitive Neuroscience and Aging (CNSA) led by Dr. David Loewenstein and other Institutes and Centers at UM (e.g., Hussman Institute for Human Genomics, Center for AIDS Research, Clinical and Translational Science Institute), other EMBIs, with UA through NIA award on Precision Aging Network - (PAN); UF through 1FL ADRC, and UAB through a MBRF pilot, and made plans to establish collaborations with the Comprehensive Center for Brain Health (CCBH), recently established in Boca Raton under Dr. Galvin's leadership.

In 2021, the Department of Neurology at the University of Miami was ranked #35 in the US News and World Report in the Neurology and Neurosurgery specialty and #15 in NIH funding in Neurology.

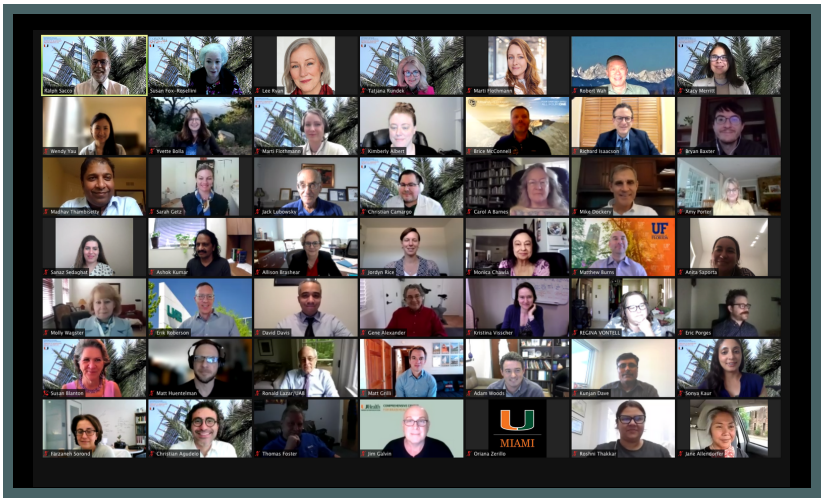
BACK TO TABLE OF CONTENTS

INTER-INSTITUTIONAL MEETING

VIDEOS

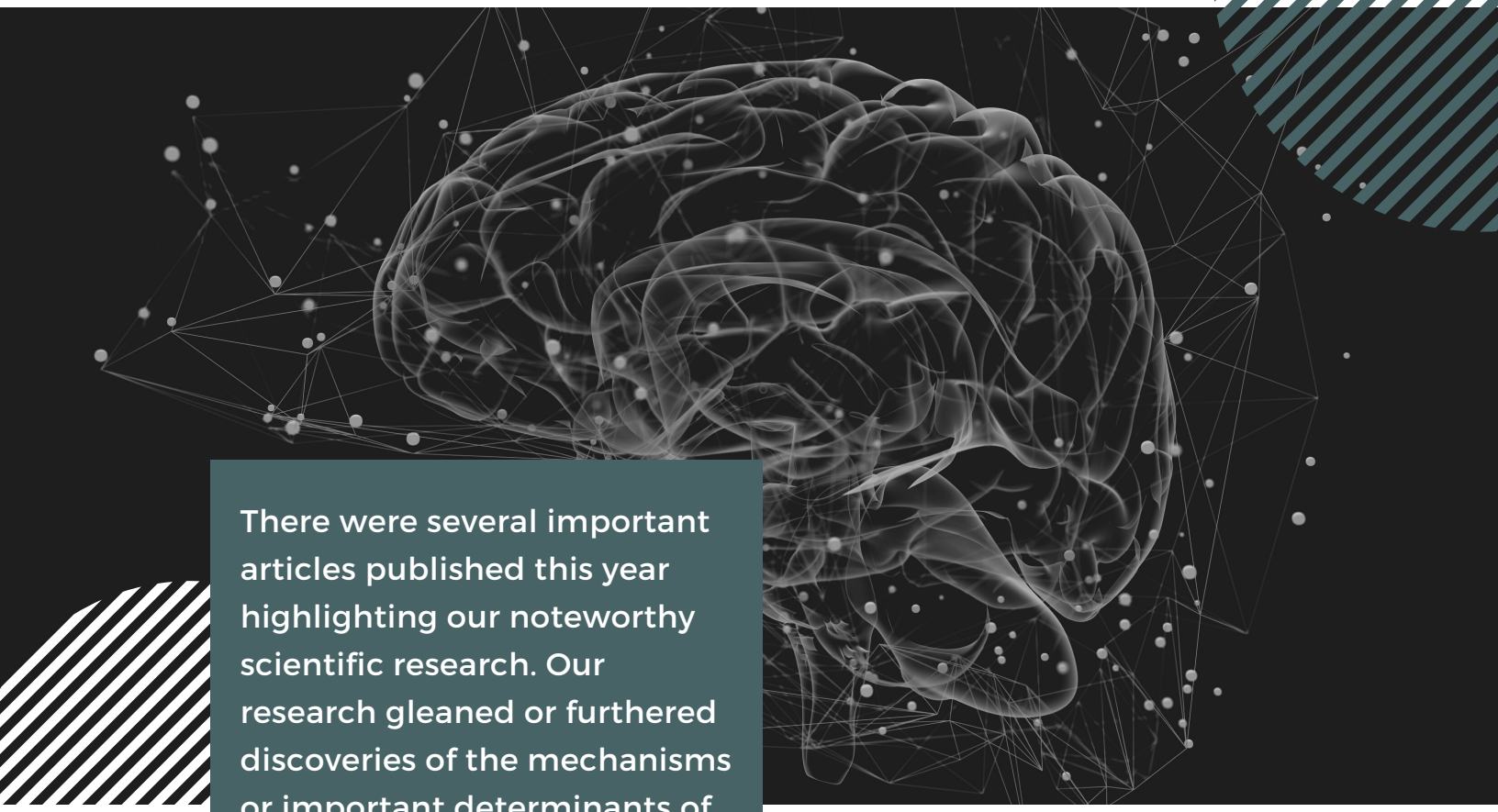
VIRTUAL MEETING 2021

We successfully hosted the first virtual Inter-Institutional meeting with the theme 'Power of Collaboration and Team Science' with ~120 people in attendance from all EMBIs.



BACK TO TABLE OF CONTENTS

A SCIENTIFIC ACHIEVEMENTS



There were several important articles published this year highlighting our noteworthy scientific research. Our research gleaned or furthered discoveries of the mechanisms or important determinants of age-related cognitive performance or decline.

HOW WE DID IT

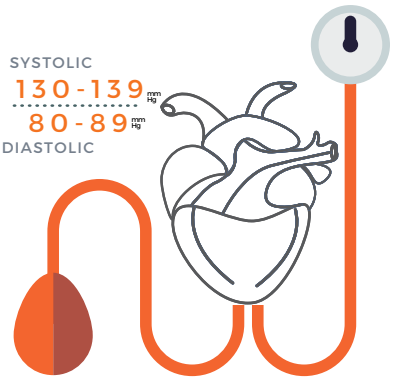
- Systematically discussed advances in vascular cognitive impairment and dementia in a large review article
- Advanced machine learning using high dimensional neuroimaging datasets to estimate and predict domain-specific cognitive performance
- Reported on age-related vestibular loss and associated cognitive deficits
- Reported on retinal vessel density and cognitive impairment
- Advanced the findings on physical activity, mode of exercise and cognition

BACK TO TABLE OF CONTENTS

IMPORTANT

PAPERS

Sun X, Dong C, **Levin B**, Caunca M, Zeki Al Hazzouri A, DeRosa JT, Stern Y, Cheung YK, Elkind MSV, **Rundek T,** Wright CB, **Sacco RL**. Systolic Blood Pressure and Cognition in the Elderly: The Northern Manhattan Study. J Alzheimers Dis, 2021 May 28.



We found an ssociation with systolic blood pressure, supporting the treatment of stage 1 systolic hypertension to prevent cognitive decline in the elderly.

The research indicates a cross-sectional association of systolic blood pressure (SBP) with word fluency/semantic memory, executive function, and processing speed/visual motor integration (VMI) function. It concludes that SBP is negatively associated with cognition cross-sectionally and longitudinally in the elderly.

Rundek T, Roy S, Hornig M, Cheung YK, Gardener H, DeRosa J, **Levin B**, Wright CB, Del Brutto VJ, Elkind MS, **Sacco RL**. Gut permeability and cognitive decline: A pilot investigation in the Northern Manhattan Study. Brain Behav Immun Health, 2021 Mar;12.

Gut dysbiosis products including plasma lipopolysaccharide and soluble CD14 led to systemic and neuro inflammation, and subsequently cognitive decline.

MIND YOUR GUT

Elevated sCD14 was associated with high levels of IL-1 pathway activation, whereas in samples where only those molecules within the IL-17 and TNF pathways were increased, LPS and sCD14 levels were not elevated. LPS was associated with decline in global cognitive performance over 2-3 assessments. The association between sCD14 and cognitive decline was marginal. These preliminary data support the hypothesis that gut dysbiosis leads to systemic and neuro-inflammation, and subsequently cognitive decline.

BACK TO TABLE OF CONTENTS

Agudelo C, Tarraf W, Wu B, Wallace DM, Patel SR, Redline S, **Kaur S**, Daviglus M, Zee PC, Simonelli G, Mossavar-Rahmani Y, **Ramos AR**. Actigraphic sleep patterns and cognitive decline in the Hispanic Community Health Study/Study of Latinos. Alzheimer's & Dementia, 17(6), pp.959-968. 2021.

Sleep quality, insomnia, and actigraphy-derived sleep-onset latency predicted 7-year cognitive change, suggesting that sleep parameters may serve as targets for sleep interventions of cognitive decline as well as neuroimaging markers of neurodegeneration.

Actigraphy-derived sleep patterns led to 7-year cognitive decline in middle-aged to older Hispanic/Latino adults. Results show that longer sleep-onset latency is associated with declines in global cognitive function, verbal learning and verbal memory. Longer sleep-onset latency is also cross-sectionally associated with verbal learning, verbal memory and word fluency.

Gardener H, **Levin B**, DeRosa J, **Rundek T**, Wright CB, Elkind MSV, **Sacco RL.** Social Connectivity is Related to Mild Cognitive Impairment and Dementia. J Alzheimers Dis, 2021 Oct 29. PMID: 34719491.

This study raised the possibility that social connections confer some protection for cognitive health in the face of adversity and supports potential opportunities for community social interventions for improving cognition in disadvantaged populations. The importance of social connectivity in preventing cognitive dysfunction is discussed.

Liu C, **Lee SH**, **Loewenstein DA**, **Galvin JE**, **Camargo CJ**, **Alperin N**. Poor sleep accelerates hippocampal and posterior cingulate volume loss in cognitively normal healthy older adults. Sleep Res, 2021 Dec 19;e13538. doi: 10.1111/jsr.13538. Online ahead of print.

This longitudinal imaging study aimed to determine the acceleration in the rates of tissue loss in cognitively critical brain regions due to poor sleep in healthy elderly individuals. These findings demonstrate that self-reported sleep quality explains inter-individual differences in the rates of volume loss in cognitively-critical brain regions in healthy older adults and provides a strong impetus to offer sleep interventions to cognitively normal older adults who are poor sleepers.

BACK TO TABLE OF CONTENTS

Lobo JD, **Goodman ZT**, Shmaus J, Uddin LQ, **McIntosh RC**. Association of Cardiometabolic Health Factors with Age-Related Executive Function and Episodic Memory. Aging, Neuropsychology and Cognition, 2021. GO TO ARTICLE»

Possible contributors to the decline of cognitive abilities in late life are cardiometabolic risk factors associated with cerebrovascular dysfunction. The few unifying health-cognition models confound exactly how these risk factors mediate age-related changes in executive function and episodic memory. This study investigates the indirect effect of age on these cognitive abilities via cardiometabolic risk factors using a structural equation modeling approach. Results support the "Executive Decline Hypothesis" of age-related episodic memory decline and specifically implicate lower blood pressure control and cognitive flexibility in these changes.

Rundek T, **Tolea M**, **Ariko T**, Fagerli EA, **Camargo CJ**. Vascular Cognitive Impairment (VCI). Neurotherapeutics, 2021. GO TO ARTICLE»

This review presents recent developments in age-related vascular cognitive impairment (VCI), its mechanisms, diagnostic criteria, neuroimaging correlates, vascular risk determinants and current intervention strategies for prevention and treatment. VCI is predominately caused by vascular risk factors and cerebrovascular disease. The most common underlying mechanism is chronic age-related dysregulation of cerebral blood flow. Control of vascular risk factors including multi-modality strategies with an inclusion of lifestyle modification is the most promising strategy for treatment and prevention of VCI.

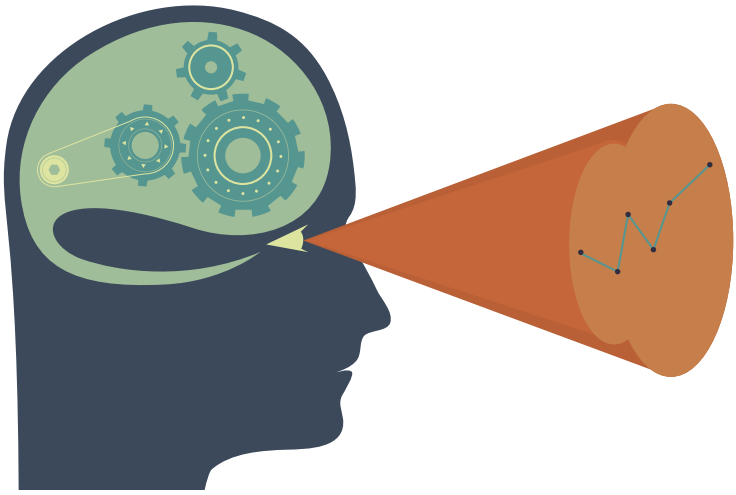
Coto J, Alvarez CL, Cejas I, Colbert BM, **Levin BE**, Huppert J, **Rundek T**, Balaban C, **Blanton SH**, Lee DJ, **Loewenstein D**, Hoffer M, & Liu XZ. Peripheral vestibular system: Age-related vestibular loss and associated deficits. Journal of otology, 16(4), 258–265, 2021. GO TO ARTICLE»

This team science review addresses impairments associated with age-related vestibular loss (ARVL), specifically the associations between ARVL and vision, cognition, and psychological factors. Preliminary data has shown that understudied ARVLs such as psychological functioning shows an association between fear, depression and anxiety. Recognition of ARVL as part of a multi-faceted complex aging process will help guide the development of integrated interventions for patients who remain at risk for decline.

BACK TO TABLE OF CONTENTS

Fang M, Strand K, Zhang J, Totillo M, Signorile JF, **Galvin JE**, **Wang J, Jiang H**. Retinal vessel density correlated with cognitive function in older adults. Exp Gerontol, 152:111433, 2021.

Research was done on the associations between retinal microvascular density, cognition and physical fitness in healthy older adults with no reported cognitive decline. The densities of retinal vessels were measured



in older people as well as cognitive function. The vessel density was correlated with the cognitive function measured with the MoCA. This is the first study to reveal the association between retinal vessel density and cognition as measured with MoCA in healthy older adults with no reported cognitive decline.

Tolea MI, Heo J, Chrisphonte S, **Galvin JE**. The Cognitive & Leisure Activity Scale (CLAS): A New Measure to Quantify Cognitive Activities in Older Adults with and without Cognitive Impairment J Alzheimer Dis, 82:1755-1768, 2021 (PMCID: 8483620).

The Cognitive & Leisure Activity Scale (CLAS) is a brief inventory to estimate dosage of participation in cognitive activities. CLAS scores are correlated with gold standard measures of cognition, function, physical functionality, behavior and caregiver burden. CLAS scores were positively correlated with other resilience factors (eg, diet, physical activity) and negatively correlated with vulnerability factors (eg, older age, frailty). In conclusion, the CLAS could be used in clinical care to enhance cognitive activity or in research to estimate dosage of activities prior to an intervention.

Elkind MSV, Moon M, **Rundek T**, Wright CB, Cheung K, **Sacco RL**, Hornig M. Immune markers are associated with cognitive performance in a multiethnic cohort: The Northern Manhattan Study. Brain Behav Immun 2021 Jul 25;S0889-1591(21)00275-0. PMID: 34320382; PMCID: PMC8453105

Association of inflammatory markers found, including C-C Motif Chemokine Ligand 11 (CCL 11, eotaxin), C-X-C Motif Chemokine Ligand 9, hepatocyte growth factor, and serpin E1 (plasminogen activator inhibitor-1). Immune marker effects were comparable to conventional risk factors: for executive function, each standard deviation increase in CCL11 was associated with an effect equivalent to aging three years; for memory,

BACK TO TABLE OF CONTENTS

B PROGRAMMATIC ACHIEVEMENTS

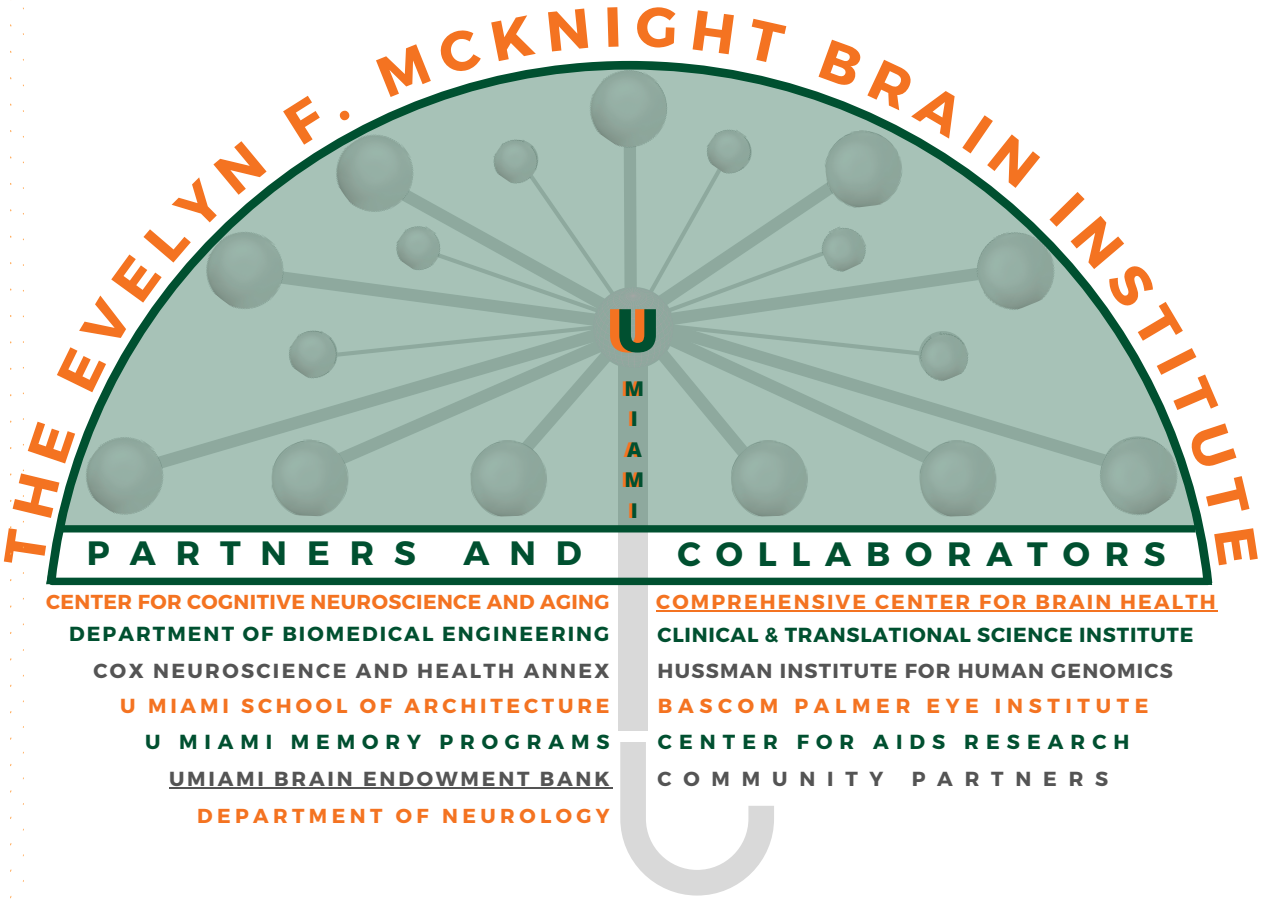
Our EMBI leadership structure consists of an Executive Director, Scientific Director and an Education Director. Additionally, we have a Research Director, Marketing Director and a research recruitment and design coordinator.

With this shared leadership structure and our support staff, we operate cohesively to accomplish the mission of the MBRF. Our EMBI strength and success is also attributed to our 10 members (those who receive EMBI funding toward their research) and our 25 close collaborators from 16 centers, institutes and departments. These multiple institutional collaborations have accelerated our ability to be involved in cutting edge research and to train a core of upcoming aging professionals. Lastly, our patients, caregivers and community partners spanning from Monroe County in the south to Palm Beach County in the north, bring our EMBI success full-circle as we share our clinical and research knowledge with them. Together, all of this lends to our success which we describe below in the report. This umbrella diagram below includes the centers, institutes and departments we partner with that serve to strengthen our EMBI, our community and academic presence.

BACK TO TABLE OF CONTENTS

CLINICAL RESEARCH TEAMS

COLLABORATION



COGNITIVE DIVISION IN THE DEPARTMENT OF NEUROLOGY

Our clinical training and educational program in aging and age-related cognitive impairment of our EMBI is housed in the Cognitive Division. The Cognitive Division is led by **Dr. Baumel**, interim Director of the Cognitive Division and UM Memory Program, and his team of cognitive clinicians including **Dr. Sun**, our EMBI Education Director and co-Director of the Brain Endowment Bank, **Dr. Camargo**, who is an AAN/MBRF scholar and **Dr. Marrero**, who completed a clinical neurology cognitive fellowship supported by our EMBI, all who are major faculty in our EMBI. With the recent addition of **Dr. Galvin** to the Cognitive Division, and his Comprehensive Center for Brain Health (CCBH) in Boca Raton, our emphasis on cognitive aging and memory results in an interconnected and effective collaboration across south Florida.

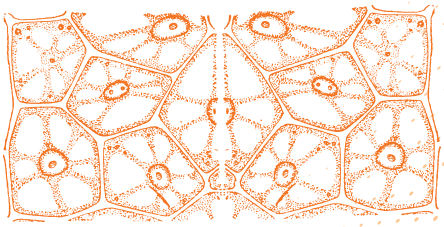
BACK TO TABLE OF CONTENTS

Under the mentorship of **Drs. Sacco** and **Rundek**, **Dr. Baumel**, **Dr. Sun**, and now **Dr. Galvin**, our EMBI expanded its clinical training and research opportunities in 2021. We have created a clinical, mentoring, training and research pipeline between our Cognitive Division, EMBI and other Centers and Institutes including the Center for Neuroscience and Aging (CNSA), Comprehensive Center for Brain Health (CCBH), Center for AIDS Research (CFAR), Hussman Institute for Human Genomics (HIHG) and Clinical Translational Science Institute (CTSI).

MEMORY PROGRAM

The Cognitive Division's Memory Program takes a comprehensive approach to assessing, diagnosing and managing memory disorders and related illnesses. Drawing on one of the country's leading academic medical centers, their team of specialists includes neurologists, geriatric psychiatrists, neuropsychologists and other experts in the field. The team interacts with patients, family members and caregivers using an interdisciplinary approach to conduct the evaluation process, plan clinical services, enroll in clinical trials and disseminate the latest research about memory loss due to the normal aging process, and pathological issues.

Dr. Baumel and **Dr. Pinto** concluded their 4-year research collaboration on the project **Mesenchymal Stem Cells as potential therapeutic agents for Alzheimer's disease**. Focusing on an intervention easily translatable into clinical practice, they administered allogeneic bone marrow-derived MSCs intravenously in a mouse model of AD (3xTg-AD). The findings showed how different timing and frequency of MSC injections can affect and modulate several aspects of the AD-like neuropathology in the 3xTg-AD mouse model, strengthening the concept of fine tuning MSC therapy for Alzheimer's disease. They also published a book chapter on this research.



BACK TO TABLE OF CONTENTS

Dr. Sun's successful R01 submission for the research project **Regionally selective synaptic dysfunction**, **microglial activation and clinical phenotypes in Alzheimer's disease** was an important accomplishment in 2021. Dr. Sun also formed a partnership with the Frost School of Music. This will foster significant collaborations with the arts and aging. She is currently mentoring a student who is conducting a research project on the relationship of music therapy and cognition.

THE SCHONINGER NEUROPSYCHOLOGY PROGRAM

Led by **Dr. Levin**, the Schoninger Neuropsychology Program provides a full range of interventions designed to mitigate age-related memory loss and other cognitive changes associated with the aging process. Used in conjunction with neuropsychological testing to identify areas of cognitive weakness, patients are offered a uniquely tailored program to address their specific needs in areas that offer potential for intervention. This precision-based delivery of services focuses on developing realistic goals and practical, accessible plans of action. A major strength of this new program is that nearly all of the interventions can be administered on either a virtual platform or face-to-face meeting.

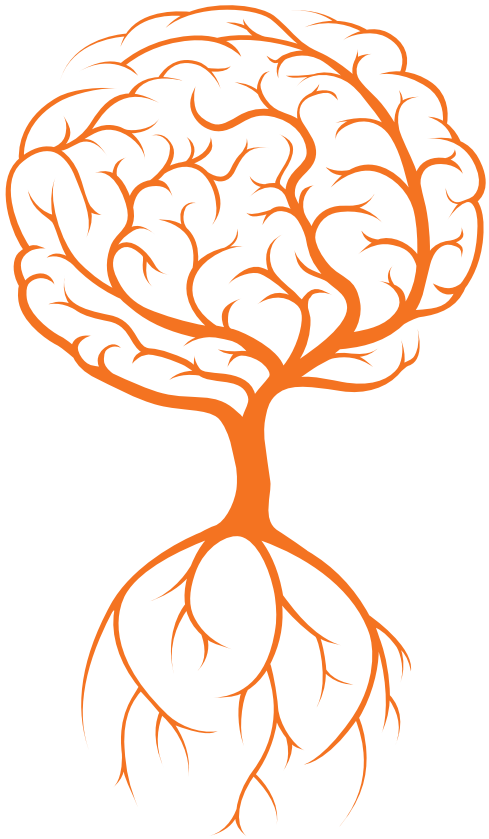
COMPREHENSIVE CENTER FOR BRAIN HEALTH (CCBH)

Led by world-renowned neurologist and researcher **Dr. Galvin**, the Center, located in Boca Raton, has a dual focus of diagnosis and prevention of neurodegenerative diseases such as Alzheimer's disease, Lewy body dementia, and frontotemporal degeneration. They provide personalized care for a wide range of memory disorders while also meeting the needs of family caregivers. Evaluation, diagnosis and treatment is provided by a multidisciplinary team composed of nurse practitioners, licensed clinical social workers and physical therapists. Their team is actively involved in research, developing and testing new diagnostics and treatments.

BACK TO TABLE OF CONTENTS

Dr. Galvin had many important scientific achievements this year. He received 5 NIH grants and 1 DOD. His most important accomplishment is the creation of a Brain Health Platform to measure brain health, risk of brain disease and cognitive performance to develop primary and secondary prevention programs. A patent for it is pending. He also has a patent pending for his Random Forest Detection of Dementia. All patents are listed in Section 7. He also created and researched a Resilience Index which can help neurologists to assess patients and possibly prevent, or at least mitigate cognitive decline. Information about diet, mindfulness and the other measures will help pinpoint specific adjustments that can help people reduce their cognitive risks. In addition, the index has great potential to advance fundamental neurological research.

Dr. Tolea, one of the 1FL ADRC REC program Alzheimer's Science Training to Advance Research Success (AlZstars) scholars, is mentored by Drs. Rundek and Galvin. She has published important papers and is an integral collaborator in Dr. Galvin's research. She worked on the 'Resilience Index' research and the Cognitive & Leisure Activity Scale (CLAS) which is a new measure to quantify cognitive activities in older adults with and without cognitive impairment.



Dr. Getz under the mentorship of **Drs. Galvin**, **Levin** and **Rundek**, completed a Clinician Scientist Fellowship submission to the Alzheimer's Association. Dr. Galvin has also been guiding her through the preparation of a K01 award submission.

BACK TO TABLE OF CONTENTS

BRAIN ENDOWMENT BANK

UNIVERSITY OF MIAMI
MILLER SCHOOL OF MEDICINE
BRAIN ENDOWMENT BANK

The University of Miami's Brain Endowment Bank™ is a National Institutes of Health (NIH) NeuroBioBank, one of six designated brain and tissue biorepositories in the nation. The Brain Endowment Bank encourages brain donation to support medical and scientific researchers, who study the human brain in search of better medications and treatments, and ultimately a cure for brain diseases and disorders. It is led by **Dr. William Scott**, Director (also an EMBI board member) and **Dr. Sun**, Co-Director.

The Brain Endowment Bank continues to look at control brains to compare to diseased ones in order to study the effects of the pathological brain changes vs. healthy aging brains. The Bank obtained ~185 specimens in 2021, and there are over 3,000 post-mortem brains there now. Their tissue bank is available to the research community and they are actively working on a brain recruitment strategy.

Dr. Vontell is one of our first two 1FL ADRC REC program Alzheimer's Science Training to Advance Research Success (AlZstars) scholars with Dr. Sun and Dr. Rundek as her mentors. She has been involved with some important publications including Dr. Sun's research on regionally selective synaptic dysfunction, microglial activation and clinical phenotypes in Alzheimer's disease. She has established a collaboration with Dr. Dalton Dietrich and Dr. Robert Keane (both with the Miami Project to Cure Paralysis) looking at inflammasome processes in neurons from brain donors with intermediate Alzheimer's disease.

BACK TO TABLE OF CONTENTS

CENTER FOR COGNITIVE NEUROSCIENCE AND AGING (CNSA)

This Center is led by **Dr. Loewenstein** whose mission is to be a national and international leader in understanding the aging brain and a hub to develop and implement the most state-of-the-art techniques for the study of brain disorders. The CNSA is grounded upon three pillars: research, clinical care and education. Their scientists are leaders in the development of cutting-edge methodologies to diagnose and treat cognitive disorders. Home to the state-funded and prestigious University of Miami Memory Disorders Clinic, their Center specialists are experts in the provision of clinical care for aging adults and their families. As part of a major academic medical center, the CNSA is committed to training the next generation of leaders in the fields of gerontology, geriatric psychiatry, neuropsychology and cognitive neuroscience.

Our CNSA collaborators' scientific achievements include the research done on deep phenotyping of older adults at risk for AD and ADRD as well as to identify protective factors. Also, the DOH grant that **Dr. Crocco** was awarded will be instrumental in reaching the underserved African American population. She will support a Registry that encourages education and outreach and promotes the value of research in the predominantly African American catchment area surrounding the Medical Center.

JOHN P. HUSSMAN INSTITUTE FOR HUMAN GENOMICS

The John P. Hussman Institute for Human Genomics (HIHG) was established at the University of Miami Miller School of Medicine (UMMSM) in 2007 and is directed by **Dr. Margaret Pericak-Vance**. It is dedicated to using the very latest in cutting-edge technologies to identify genes involved in human diseases for the diagnosis, intervention and prevention of illness. Their scientists are among the first researchers realizing the potential of the Human Genome Project, the working genetic map of human DNA that was completed in 2003.

BACK TO TABLE OF CONTENTS

We have continued to work with our EMBI collaborator **Dr. Susan Blanton** at the HIHG who is leading epigenetic studies of cognitive function. We established an additional collaboration with Dr. Pericak-Vance doing research on the genetics of cognitive function and dementia. We are also collaborating on genetic (whole genome sequencing) and epigenetic studies (DNS methylation) of cognitive phenotypes with the HIHG. **Dr. Galvin** is Co-Investigator with Dr. Pericak-Vance on a 2.9 million dollar Department of Defense grant awarded this year to study the genetics of frontotemporal degeneration in diverse populations. Our EMBI currently performs genetic (whole genome sequencing) and epigenetic studies (DNS methylation) of cognitive phenotypes in collaborations with the HIHG.

UM CENTER FOR AIDS RESEARCH (CFAR)

The Miami CFAR is the first NIH-funded AIDS research center in Florida. The US south is disproportionately impacted by HIV. Florida has the highest number of new HIV diagnoses in the country. The Miami CFAR is poised to make a difference with a multipronged approach to combat the HIV epidemic. The Miami CFAR's main goal is to provide scientific leadership, to foster integration of basic, clinical, and behavioral/social HIV/AIDS research, and to fill recognized gaps in research and practice.

Dr. Rundek has established a close collaboration with UM CFAR (Center for Aids Research), served on the Executive Committee of the CFAR and co-leads the SWG (Scientific Working Group) on Aging and HIV.
She co-leads this SWG with the broad goal to promote innovative and emerging areas of research in HIV and aging through multidisciplinary collaborations and to expand current research in areas contributing to the accelerated aging observed in people living with HIV. This SWG is uniquely positioned to leverage infrastructure and resources available at the UM Miller School of Medicine through support from our

BACK TO TABLE OF CONTENTS

McKnight Brain Institute, Center on Neurocognitive Science and Aging, Comprehensive Center on Brain Health, Diabetes Research Institute, Schiff Center for Liver Diseases and Sylvester Comprehensive Cancer Center. It will identify strengths and opportunities for collaborative research, strategize research priorities, generate preliminary data aligned with these priorities and create a steady pipeline of talented trainees (established and early-stage non-HIV investigators) addressing aging research.

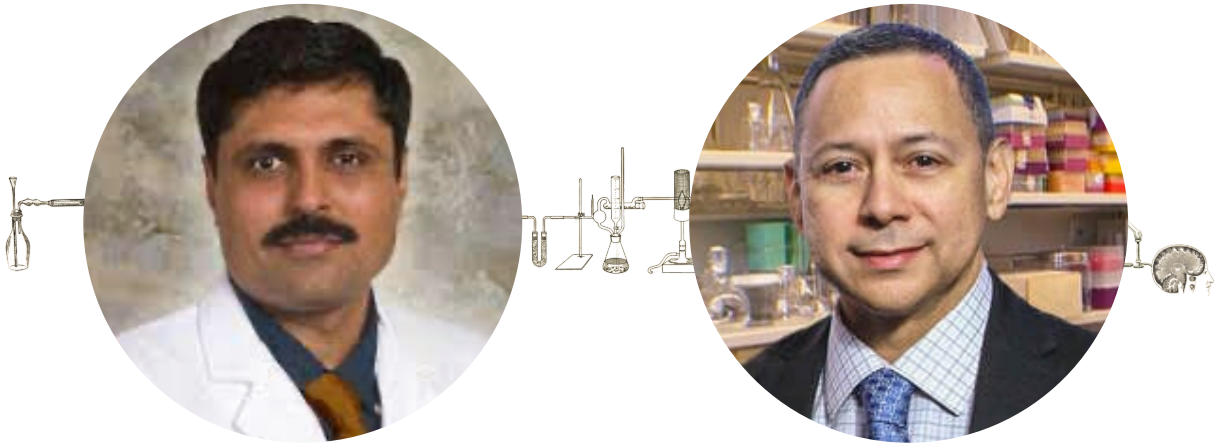
MIAMI CLINICAL TRANSLATIONAL SCIENCE INSTITUTE (CTSI)

The CTSI is directed by **Dr. Sacco**. It is a university-wide institute dedicated to accelerating and transforming culturalized clinical and translational science. Created to be an indispensable resource for researchers and stakeholders, the Miami CTSI serves as the Miami Hub of the national Clinical and Translational Science Award (CTSA) consortium, which works to advance scientific discoveries into improved health care. Together with Hub partners that include the entire University of Miami as well as Jackson Health System, Miami VA Healthcare System, One Florida Clinical Research Consortium, Health Choice Network and Health Council of South Florida, the Miami CTSI focuses on clinical and translational research infrastructure, translational workforce development and stakeholder engagement and culturalization. **Dr. Rundek** leads the CTSI K12 program and is Director of the MS degree in Clinical Translational Investigation, which is a highly-integrated, cross-disciplinary program to train the next generation of translational scientific leaders.

BACK TO TABLE OF CONTENTS

THE PERITZ SCHEINBERG CEREBRAL VASCULAR DISEASE RESEARCH LABORATORIES

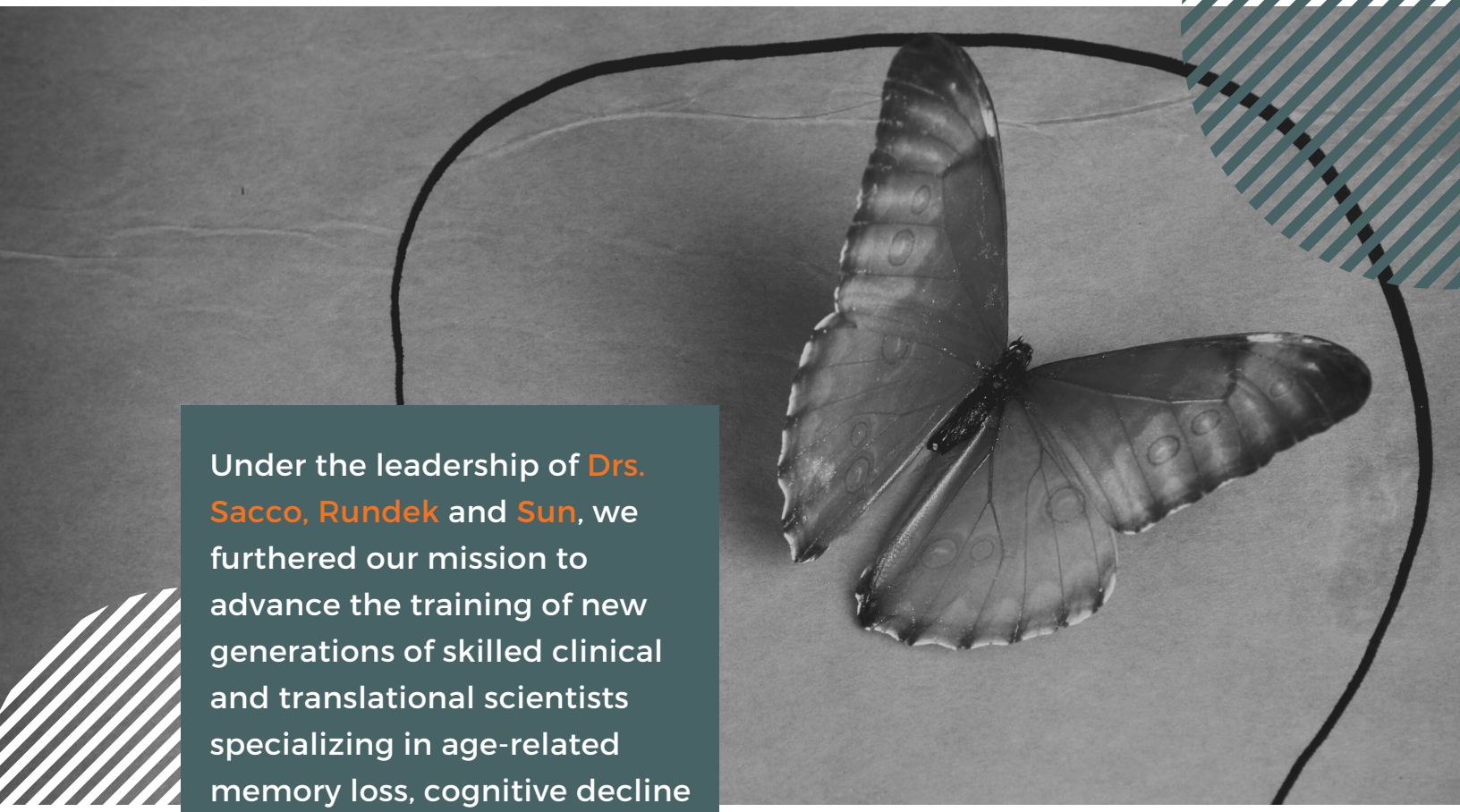
Led by **Dr. Perez-Pinzon**, these labs were established more than 55 years ago by Dr. Peritz Scheinberg, the founding Chairman of the Department of Neurology. The laboratories have a long history of research on studies of cerebral circulatory control mechanisms in animal models which have evolved over the years into studying cerebral ischemia from molecular biology to physiology and behavioral testing with the goal of finding novel therapies. Their scientists are constantly in search of novel findings, seeking to expand the knowledge of cerebrovascular disorders with the aim to treat and enhance quality of life.



They have a long tradition of being highly collaborative as well as training highly successful postdocs, graduate and undergraduate students. These researchers in the labs - Kunjan Dave, Ami Raval, Milena Pinto, Roshni Thakkar and David Della-Morte are McKnight collaborators conducting translational science to further our mission and vision. This year, **Dr. Dave** received 1 AHA and 2 NIH grants which are listed in Section 5.

BACK TO TABLE OF CONTENTS

C TRAINING, EDUCATION AND OUTREACH ACHIEVEMENTS



Under the leadership of Drs. Sacco, Rundek and Sun, we furthered our mission to advance the training of new generations of skilled clinical and translational scientists specializing in age-related memory loss, cognitive decline and promotion of brain health.

We worked specifically with 4 trainees: **Christian Agudelo, MD**, **Taylor Ariko, BS**, **Regina Vontell, PhD** and **Magda Tolea, PhD**. Our initial McKnight fellows **Michelle Marrero, MD**, **Christian Camargo, MD** and **Anita S.D. Saporta, MD** continue to work with our EMBI to further our vision and mission.

The EMBI Evelyn F. McKnight Neurocognitive Scholar, Christian Agudelo, MD, is in his 2nd year fellowship studying the effects of sleep on age-related memory loss and cognitive decline.

BACK TO TABLE OF CONTENTS

OUR

TRAINEES

His research aims to identify sleep-specific mechanisms responsible for cognitive decline and to develop sleep-related biomarkers of cognitive aging. Such biomarkers could be used to diagnose pre-symptomatic cognitive disease, track disease progression, be used as targets for intervention and assess the efficacy of future therapies. He is mentored by **Drs. Rundek, Sun** and **Ramos**. He had 1 manuscript accepted for publication at the Journal of Alzheimer's and Dementia, and had an abstract and a poster accepted for presentation at the University of Pittsburgh Sleep and Circadian Science Research Day in 2021. Dr. Agudelo joined the editorial board of Precision Sleep Research (specialty section of the journal Frontiers in Sleep). He was interviewed by Neurology Live (magazine) and El Nuevo Herald (newspaper) to discuss the results of his published study, Actigraphic Sleep Patterns and Cognitive Decline in the Hispanic Community Health Study/Study of Latinos. He was also interviewed by CNN en Espanol, discussing sleep during the COVID-19 pandemic. More details about Dr. Agudelo can be found in Appendix 5.




Taylor Ariko has completed her first year as our EMBI student. Under the mentorship of **Dr. Rundek**, she has presented at McKnight meetings and strategized with EMBI collaborators. Her research goal is to improve current dementia risk models by developing a machine learning model to predict risk of cognitive impairment. Taylor has also collaborated with **Dr. Loewenstein** (Director of the Center for Cognitive Neuroscience and Aging) on her project as he helps teach the interpretation of neurocognitive tests. Taylor is trained on ongoing projects within the EMBI and has been analyzing and organizing the data. She is performing research carotid ultrasounds and is learning study coordinator tasks. She has been working with Dr. Agudelo on developing an automated MRI processing pipeline to analyze grey matter regions of interest for multiple studies within EMBI. Lastly, she is a contributing author on two papers with EMBI collaborators pending publication in Neurotherapeutics and Journal of Alzheimer's Disease.

BACK TO TABLE OF CONTENTS

We worked with **Drs. Tolea** and **Vontell** on their mentoring and training as part of their 1FLorida ADRC REC Alzheimer's Science Training to Advance Research Success (AlzSTARS) scholarship. This included collaborating with other scholars from the same program at UF, presenting their research with the programs the other scholars are in, and planning mentor-mentee sessions as well as specific grant writing and aging brain classes.

Dr. Marrero continues as a clinician under the leadership of **Dr. Baumel**. She has full clinics and is also participating as an Investigator in his clinical research. **Dr. Camargo** also sees clinic patients and has made tremendous progress on his study Reducing the Effects of Aging on Cognition with Therapeutic Intervention of an Oral Nutrient - The REACTION Study, funded through the AAN McKnight Clinical Translational Research Scholarship in Cognitive Aging and Age-Related Memory Loss. **Dr. Saporta** continues exploring the brain aging process in normal aging and in pathological conditions through the focused study of the cerebellum.

SCIENTIFIC TRAINING AND EDUCATION

PRESENTATIONS

Our EMBI team members have conducted training and education to students, fellows, residents and faculty via Grand Rounds, academic presentations, seminars and journal clubs. The topics are listed below.

BACK TO TABLE OF CONTENTS

GRAND ROUNDS PRESENTATIONS

- *Stroke Disparities: Transforming Data into Actions*, Neurology Grand Rounds, SUNY Downstate Medical Center - **Ralph Sacco MD, MS**, Virtual, April 2, 2021
- Robert J. Adams Lecture. *Stroke Disparities: Transforming Data into Actions*, Neurology Grand Rounds, Medical University of South Carolina - **Ralph Sacco MD, MS**, Virtual, May 6, 2021
- *Stroke Disparities: Transforming Data into Actions* Neurology Grand Rounds, Emory University School of Medicine - **Ralph Sacco MD, MS**, Virtual, May 21, 2021
- *Stroke Disparities: Transforming Data into Actions*, Neurology Grand Rounds, Rush University Medical Center- **Ralph Sacco MD, MS**, Virtual, November 9, 2021
- Eighth Annual J. Donald Easton Lectureship. *Stroke Disparities: Transforming Data into Actions*, Neurology Grand Rounds, Brown University - **Ralph Sacco MD, MS**, Virtual, December 1, 2021
- James H. Halsey Lecture. *Stroke Disparities: Transforming Data into Actions*, Neurology Grand Rounds, UAB University - **Ralph Sacco MD, MS**, Virtual, December 7, 2021
- *Dementia Prevention* Neurology Grand Rounds Tulane University, Department of Neurology - **Jim Galvin, MD, MPH**, February 8, 2021
- *Assessing Multicultural Communities for Brain Health and Cognitive Impairment* Grand Rounds Columbia University Mailman School of Public Health - **Jim Galvin, MD, MPH**, October 28, 2021
- *Clinical Pearls for Dementia Prevention* at the University of Miami Miller School of Medicine Neurology Update 2021 - **Jim Galvin, MD, MPH**, June 17, 2021
- *Resilience, Vulnerability, and the Risk of ADRD* Grand Rounds Hussman Institute for Human Genetics, University of Miami - **Jim Galvin, MD, MPH**, November 4, 2021
- *Appraisal of Caregiving for Persons with Dementia* Grand Rounds University of Michigan/Michigan VA GRECC - **Jim Galvin, MD, MPH**, November 4, 2021

BACK TO TABLE OF CONTENTS

SCIENTIFIC TRAINING AND EDUCATION

PRESENTATIONS

- *Measuring Cortical Hyperexcitability in Alzheimer's Disease with Transcranial Magnetic Stimulation* - **Stephanie Buss, MD** Guest Presenter from Harvard, January 27, 2021
- *Harnessing Neuroplasticity and Cardiorespiratory Fitness to Promote Brain Health in Aging* - **Joyce Gomes-Osman, PT, PhD**, February 10, 2021
- *Actigraphic Sleep Patterns and Cognitive Decline in the Hispanic Community Health Study/Study of Latinos*, **Christian Agudelo, MD**, February 17, 2021
- *The link between hearing loss and dementia* - **Taylor Ariko, BS** & **Andy Dykstra, PhD**, March 3, 2021
- *Neurocognitive Correlates of Scam Susceptibility in Age-related Memory and Hearing Loss* - **Sarah Getz, PhD**, March 17 2021
- *Modifying Pathways by Age and Sex for the Association Between Combined Sleep Disordered Breathing and Long Sleep Duration with Neurocognitive Decline in the Hispanic Community Health Study/Study of Latinos (HCHS/SOL* - **Sonya Kaur, PhD**, March 17, 2021
- *Molecular Subtyping of Alzheimer's Disease Using RNA Sequencing Data Reveals Novel Mechanisms and Targets* QuarterlyResident Cognitive Journal Club - **Andrés De León, MD** & **Melissa Bailey, MD**, March 24, 2021
- *Sleep in Neurocognitive Aging* - **Alberto Ramos, MD**, April 7, 2021
- *The Contribution of Capillary Stalling to Brain Blood Flow Reductions in Alzheimer's Disease* - **Oscar Bracko, PhD**, May 5, 2021
- *Distributed Multitask Multimodal Approach for the Prediction of Alzheimer's Disease in a Longitudinal Study* - **Taylor Ariko, BS**, May 19, 2021
- *Cyanobacterial Toxin Exposure and Mechanisms of Neurodegeneration* - **David Davis, PhD**, June 2, 2021

BACK TO TABLE OF CONTENTS

- *Relationship of Neighborhood Greenness to Alzheimer's Disease and Non-Alzheimer's Dementia* - **Scott Brown, PhD**, June 30, 2021

- *The Affective and Neural Benefits of Real-world Experiential Diversity Before, During, and (still during) the COVID-19 Pandemic* - **Aaron Heller, PhD**, September 15, 2021

- *The Multifaceted Contribution of Aging and Oxidative Stress in Metabolic and Neurodegenerative Disorders* - **David Della-Morte, MD, PhD**, October 6, 2021

- *Use of NMNAT Activity Against Alzheimer's Related Proteinopathy* - **Milena Pinto, PhD**, October 20, 2021

- *Cognitive Measures Lacking in EHR Prior to Dementia or Alzheimer's Disease Diagnosis* - **Jim Galvin, MD, MPH** November 3, 2021

- *A Novel Marker of Inflammaging in Relation to Neural Networks Underpinning Grip Strength During Midlife and Beyond* - **Roger McIntosh, PhD** & **Kaitlyn Dillon, MA**, November 17, 2021

THE FOLLOWING TRAINING AND EDUCATIONAL PROGRAMS ARE CONDUCTED THROUGHOUT THE YEAR.

- **Dr. Rundek** teaches classes for the MS degree in Clinical Translational Investigations, teaches the Team Science and Entrepreneurship class and a CTSI grant writing course.

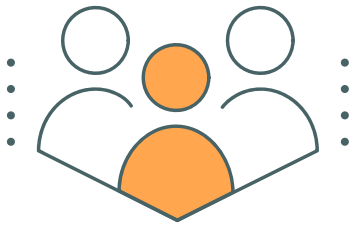
- **Dr. Levin** provides teaching seminars within the Division of Neuropsychology that include: Neuropsychology Rounds and weekly clinical teaching rounds, attended by practicum and graduate students, post-doctoral fellows and faculty in the Division of Neuropsychology and Cognitive Neuroscience. Dr. Levin is in charge of rounds case presentation and leading the discussion each week.

- **Dr. Crocco** conducts the Geriatric Psychiatry Lecture Series for the Jackson Memorial Health (JMH) General Psychiatry Residency Training Program and conducts weekly Case Conferences for the JMH Geriatric Psychiatry Training Program. She also oversees the Weekly Journal Club, teaches the Geriatric Psychiatry Seminar and teaches this class, Doctoring II: Dementia, to small groups of medical students.

BACK TO TABLE OF CONTENTS

COMMUNITY

OUTREACH



We have continued to reach the community with our educational outreach in English and Spanish which maintains our EMBI's presence as a significant resource of information on aging, cognition and brain health. Our social media efforts have become more sophisticated which helped in establishing a following in the community to attend our presentations and also enroll in our research.

COMMUNITY OUTREACH AND EDUCATION BY DR. GALVIN AND HIS COMPREHENSIVE CENTER FOR BRAIN HEALTH

- "Annual Comprehensive Center for Brain Health Seminar" *Healthy Brain Aging and Dementia Prevention*, February 2, 2021
- *I am Having Trouble with My Memory, What now? Differential Diagnosis of Dementia: The "Big 4" (plus 1)* for the Alzheimer's Association, March 13, 2021
- "*The Keys to Unlocking the Secrets of Healthy Brain Aging Seminar Series*" for the Institute for Learning in Retirement

  -*Overview of Brain Health and Cognitive Impairment,* March 17, 2021

  -*Physical Activity and Brain Health*, March 24, 2021

  -*Cultural Aspects of Brain Health and Dementia*, March 31, 2021

  -*Integrative Nutrition and Brain Health*, April 14, 2021

  -*Cognitive Preservation and the Power of the Arts*, April 21, 2021

  -*The Practice of Mindfulness and Brain Health*, April 28, 2021

  -*The Dementia Prevention Initiative*, May 5, 2021

BACK TO TABLE OF CONTENTS

- *Healthy Brain Aging and Dementia Prevention* for the Southeast Florida Chapter of the Alzheimer Association, May 12, 2021
- *A Guide to a Healthy Brain and Successful Aging* for the Palm Beach County Library, May 17, 2021
- *A Guide to a Healthy Brain and Successful Aging* for the Belmont Village, May 20, 2021
- *Something for Everyone: An Approach to Brain Aging and Dementia* for Alzheimer's Community Cares, May 27, 2021
- *A Guide to a Healthy Brain and Successful Aging* for the Kings Point Adult Community, June 4, 2021
- *Health Brain Aging and the Impact of Dance* for the Lennox Hills Community, June 11, 2021
- *Research Update on Brain Health and Dementia* for the Alzheimer Association Board of Directors South Florida Chapter, July 21, 2021
- *Healthy Brain Aging and the Risk of Dementia* for the Boynton Beach Healthcare Council, August, 2021
- *Differential Diagnosis of Dementia* at Artis Life Senior Care, September 21, 2021
- *The Science and Art of a Healthy Brain* for the Aging Life Care Association, October 28, 2021
- *Rx Mindfulness Matters: A Mindfulness Toolbox for Everyday Living* to the Aging Life Care Association, October 28, 2021
- Native American Heritage Month Lecture *Researching Brain Health and the Risk of ADRD in Native American Communities* for the University of Miami Miller School of Medicine, November 2, 2021

BACK TO TABLE OF CONTENTS

EMBI COMMUNITY OUTREACH AND EDUCATION:

- *El Impacto del Envejecimiento Humano Sobre el Derebro y el Funcionamiento Cognitive*, to the Doral Silver Club - **Christian Camargo, MD**, February 25, 2021
- *Como Dormir Para Mantener Nuestros Cerebros Saludables* to the Doral Silver Club - **Christian Agudelo, MD**, March 25, 2021
- *Como Se Beneficia Su Cerebro Con Ejercicios de Atencion Plena* to the Doral Silver Club - **Katalina McInerney, PhD**, April 22, 2021
- *How Nutrition Impacts the Brain* to the East Ridge Retirement Community - **Michelle Marrero, MD**, October 7, 2021
- *Aging and the Brain* to Mirabelle Senior Living, **Christian Camargo, MD**, October 8, 2021
- *How Mindfulness Affects the Brain* - **Katalina McInerney, PhD**, December 3, 2021
- "*Maintaining a Healthy Brain in a Pandemic World*" Seminar Series for the Miami-Dade Public Library System
  - *How your Mind and Cognition are Affected* - **Christian Camargo, MD**, December 2, 2021
  - *How Nutrition Impacts the Brain* - **Michelle Marrero, MD**, December 9, 2021
  - *How to Sleep to Preserve Brain Health* - **Christian Agudelo, MD**, December 16, 2021

CENTER FOR COGNITIVE NEUROSCIENCE AND AGING OUTREACH AND EDUCATION:

Dr. Crocco conducts the following training and education during the year.

- Training/Lectures for Community and Caregivers
- Alzheimer's disease Initiative (ADI) Caregiver Training Seminars in Dementia
- ADI Caregiving Training Program in Dementia
- ADI Respite Care and Day Care Centers

BACK TO TABLE OF CONTENTS

MOST IMPORTANT SCIENTIFIC ACHIEVEMENTS

We are proud of all of our EMBI's work and achievements in 2021. Of particular significance are the three listed below: 1) The Collaborative Cohort of Cohorts for COVID-19 Research (C4R), which will be of significance world-wide, 2) The Northern Manhattan Study (NOMAS) as a catalyst to foster research development and opportunities and 3) Our repertoire of funded grants in 2021, notably our NIH grants.

We participated in the Collaborative Cohort of Cohorts for COVID-19 Research (C4R), which is a national prospective study of adults at risk for coronavirus disease 2019 (COVID-19) comprising 14 established US prospective cohort studies. C4R is a unique resource that allows evaluation of risk and resilience factors for COVID-19 severity and outcomes, including post-acute sequelae, and assessment of the social and behavioral impact of the pandemic on long-term trajectories of health and aging.

BACK TO TABLE OF CONTENTS

NOMAS
NORTHERN MANHATTAN STUDY 2021

NOMAS

- An ongoing resource for important scientific achievements is the 28-year-old Northern Manhattan Study (NOMAS), a population-based cohort of White, Black and Caribbean Hispanic people living in the same community. Originally focused on stroke risk factors, the study demonstrates its versatility and enduring value through its comprehensive, rich dataset that now also contributes to brain health literature. NOMAS's extensive body of research and existing data has provided a platform for the development of successfully funded satellite brain health projects this year. One of these fully funded project rests on NOMAS's extensive work on identified associations between brain imaging biomarkers and trajectories in specific cognitive domains. Other NOMAS studies this year have explored modifiable risk factors such as known cardiovascular factors and more novel social determinants of health. This year, NOMAS has also produced novel and exploratory studies investigating the associations between neuropsychological testing, MRI volumetric data, and neuroimmune signatures derived from a 60-plex panel of plasma neuroimmune markers. Further demonstrating the versatility of the NOMAS dataset is the recently NIH funded project on "greenness" in protection against cognitive decline, which is also heavily reliant on previously collected NOMAS data.

- Our EMBI members and collaborators submitted many grant applications of which, 17 were funded allowing them to continue their research premises or to start research on newer hypotheses. Of these grants, 9 were funded by the NIH and 1 was funded by the Department of Defense (DOD), and others by professional organizations and foundations.

9 NIH FUNDED

1 DOD FUNDED

17 FUNDED STUDIES

BACK TO TABLE OF CONTENTS

E BUDGET & INVESTMENT REPORT

SEE APPENDIX 6

In 2021 the EMBI was able to stay within budget. While the endowment revenue was slightly less than the previous year because of carry-forward of funds not spent in 2020, we were able to complete all programs as expected and support all researchers and staff as planned.

BACK TO TABLE OF CONTENTS

5 COLLABORATIVE PROGRAMS WITH MCKNIGHT INSTITUTES AND NON-MCKNIGHT INSTITUTES

A WITH MCKNIGHT INSTITUTES

- **Collaboration with the UA Evelyn F. McKnight Brain Institute**

  Precision Aging Network (PAN) - **Dr. Rundek** and team worked with Drs. Carol Barnes and Lee Ryan at UA in 2020 to gather pilot data for the U19 submission. Our EMBI pilot data was instrumental in its success and the $60 million UA-led initiative was funded. Collaborators: Emory University, Johns Hopkins University, Baylor College of Medicine, Georgia Institute of Technology, and the Phoenix-based Translational Genomics Research Institute (TGen). Using collaborative team science, we aim to better understand the neural mechanisms that account for optimal brain performance in older-age adults and those that underlie age-related cognitive impairment and disorders such as Alzheimer's disease. We will use our expertise in recruiting minority and underserved populations. Drs. Rundek, Sacco and Levin will lead the project at UM.

- **Collaboration with the UAB Evelyn F. McKnight Brain Institute**

  Dr. Wang, Site Investigator and **Dr. Rundek** as Co-Is, are working with UAB and Dr. Lazar on Improving Age-Related Cognitive Decline with Exercise in Hypertensive Older Adults: A Pilot Study to Investigate A Retinal Microvascular Biomarker and the Role of IGF-1 (DECLARE) awarded from the Cognitive Aging and Memory Intervention Core Inter-Institutional Pilot 2020-2022 Program project.

- **Collaboration with the UF Evelyn F. and William L. McKnight Brain Institute**

  Dr. Rundek is a Co-Director of the "*OneFLorida ADRC REC AlzSTARS*" program with Dr. Glenn Smith from UF. The Contact PI of the 1FL ADRC is Dr. Golde at UF and the Miami PI is **Dr. Loewenstein**. The 1FL ADRC REC program is called the Alzheimer's Science Training to Advance Research Success (*AlzSTARS*), with the primary objective to train diverse, multidisciplinary early stage Investigators across the 1FL ADRC consortium for leadership roles in research translation. Magda Tolea, PhD and Regina Vontell, PhD from the UM EMBI were chosen to receive the *OneFLorida ADRC REC AlzSTARS* scholarship.

BACK TO TABLE OF CONTENTS

B WITH NON-MCKNIGHT INSTITUTES

- *Neighborhood Greenness, Cognitive Performance and Vascular Outcomes in the Northern Manhattan Study: NOMAS-Greenness* - This multi-centered collaborative project will investigate neighborhood greenness exposure as a novel environmental protective factor for cognitive decline and vascular outcomes (stroke, myocardial infarction [MI] or vascular death. It builds on the Northern Manhattan Study (NOMAS). MPIs on this project are **Dr. Rundek** and Drs. Brown and Szapocznik from UM Public Health Sciences.

- *Florida Consortium to Reduce Misinformation and Exploitation in Alzheimer's Disease* PIs: Nichole Lighthall (UCF), Natalie Ebner (UF), **Bonnie Levin** (UM) This consortium will utilize joint efforts to fight the burgeoning health crisis of misinformation and exploitation in Florida targeting older adults at risk for Alzheimer's Disease. The project builds on research showing parallel disease and fraud vulnerability trajectories rendering older individuals with cognitive impairments, in particular those from underserved racial/ethnic backgrounds, most vulnerable to deception. Our findings will be used to design interventions in concert with community partners.

BACK TO TABLE OF CONTENTS

6 HONORS, NEW GRANTS AND AWARDS

A HONORS

- **Ralph Sacco, MD, MS** was named Editor-In-Chief of the prestigious journal Stroke. He also received the World Hypertension League Daniel Lackland Excellence Award in Diplomacy & Advocacy for Population Hypertension Risk Reduction.

- **Tatjana Rundek, MD, PhD** was named President of the Intersocietal Accreditation Commission (IAC) Vascular Testing Board. The IAC's mission is to improve high-quality care through accreditation. She will have an opportunity to work on increasing the number of accredited vascular testing facilities, particularly of neurovascular testing services, and on improvement of patient care though quality improvement programs and implementation research.

- **Alberto Ramos, MD** 1) Was named Chair of the American Academy of Sleep Medicine Foundation's Sleep Research Program for Advancing Careers and 2) Was appointed an Ad-hoc member of the Sleep Disorders Research Advisory Board for the NIH's National Heart, Lung and Blood Institute.

- **David Loewenstein, PhD** 1) Received a Post- Doctoral Fellowship Grant in Neuropsychology from the Florida Department of Health (FDOH) and 2) Was named Vice Chair of the UM Miller Medical School Tenure and Promotions Committee.

- **Ami Raval, PhD** received a VA Merit review for her research on Therapeutic interventions for post-stroke rehabilitation.

- **Elizabeth Crocco, MD** 1) Was named most outstanding didactic teacher in the General Psychiatry Training Program from UM Dept. Psychiatry and Behavioral Science and 2) Received funding for an African American Older Adult Registry Awarded by Florida Department of Health (FDOH).

- **Roger McIntosh, PhD** 1) Received a UM Department of Psychology Diversity and Equity Committee Faculty Leadership Award and 2) Was accepted into the NIH Loan Repayment Program (Health Disparities Research).

BACK TO TABLE OF CONTENTS

B NEW GRANTS AND AWARDS

- **Tatjana Rundek, MD, PhD** and **Scott Brown, PhD** of the EMBI along with Dr. Szapocznik, received a new NIH four-year, over $4 million grant for the project Greenness, *Cognitive Performance and Vascular Outcomes in the NOMAS Study*. The study will investigate the relationship between block-level greenness, cognitive decline and vascular outcomes. It builds on the Northern Manhattan Study (NOMAS), which conducts research on stroke and stroke risk factors in the multi-cultural, aging population based in northern part of the borough of Manhattan in New York City.

- *Impact of COVID on VCID Outcomes in a Multicultural Rural Population* - **Jim Galvin**, **MD, MPH**, Principal Investigator. The major goal of this project is to examine the effects of particulate air pollution on risk of COPD and COVID-19 and the subsequent effects on the risk, progression and outcomes associated with VCID and ADRD. R01 from the NIH/NINDS 10/1/21-9/30/23

- *Multicultural Community Dementia Screening* - **Jim Galvin, MD, MPH**, Principal Investigator. The major goals of this project are to conduct a population-based dementia screening, validate findings in a longitudinal study of ADRD biomarkers, and establish the potential benefits and harms of dementia screening in a multicultural sample. R01 NIH/NIA 4/1/21-3/31/26

- *Natives Engaged in Alzheimer's Research (NEAR)* - **Jim Galvin, MD, MPH,** MPI and Scientific Director. The major goals of this project are to engage, enroll and study American Indians, Alaskan Natives, and Native Hawaiians and Pacific Islanders in novel Alzheimer detection and treatment interventions and encourage biomarker and autopsy program participation. P01 NIH/NIA 4/1/21-3/31/26

- *A Randomized, Double-Blind, Placebo-Controlled, Parallel-Group, Phase 2 Study to Evaluate the Safety and Efficacy of CT1812 in Subjects with Dementia with Lewy Bodies* - **Jim Galvin, MD, MPH**, MPI. The major goal of this project is to conduct a Phase 2 clinical trial of CT1812, a novel disease-modifying compound, in patients with mild to moderate dementia with Lewy bodies (DLB). R01 4/1/21-3/31/24

BACK TO TABLE OF CONTENTS

- *Wabanaki Native American Research Centers for Health (NARCH)* - **Jim Galvin, MD, MPH,** Project 1 Co-Lead. The major goal of this project is to create research infrastructure to enable Wabanaki Tribal Health to develop sustainable clinical-translational research programs in brain aging and dementia. NIH/NIGMS 4/1/21-3/31/26

- *Genetics of Frontotemporal Degeneration in Diverse Populations* - **Jim Galvin, MD, MPH,** Co-Investigator. The overall goal of this Peer Reviewed Medical Research Program (PRMRP) proposal on FTD will address a specific Area of Encouragement; to identify and characterize genetic factors and networks contributing to FTD in the Hispanic population. U.S. Dept of Defense 7/1/21-6/30/25

- *Florida Consortium to Reduce Misinformation and Exploitation in Alzheimer's Disease* - **Bonnie Levin, PhD,** Investigator. CO-Is :Nichole Lighthall (UCF), Natalie Ebner (UF). This project was funded by the Florida Department of Health (FDOH) Ed and Ethel Moore Alzheimer Disease Research Program.

- *Cerebral ischemia and exposure to recurrent hypoglycemia (RH) in diabetes* - **Kunjan Dave, PhD**, Principal Investigator. The long-term goal of this project is to improve the neurological health of patients with diabetes by decreasing the severity and incidence of cerebral ischemia. Stroke ·and heart disease are the most serious complications of diabetes, accounting for more than 84% of the mortality. The proposal will test the hypothesis that prior exposure to RH increases the risk of cerebral ischemia and exacerbates post-cerebral ischemia hypoperfusion by platelet dysfunction. We expect these studies to provide insight into the mechanism by which prior exposure to RH increases cerebral ischemia risk and post-cerebral ischemic damage in patients with Diabetes in order to help lower their risk of cerebral ischemia. NIH 9/2021-6/2026

- *Cerebral Venous Drainage Augmentation in Stroke (VEDAS)* - **Kunjan Dave, PhD** & **Miguel Perez-Pinzon, PhD**, Co-Investigators (Dr. Koch). Cerebral edema is associated with worse outcomes following cerebral infarction. In this study, we will evaluate a novel endovascular approach to treat cerebral edema following a stroke in a rodent model. Preliminary data generated in this pilot project will help support the application for funding for more definitive preclinical proof of concept studies. Univ. of Miami SAC

BACK TO TABLE OF CONTENTS

- *Mitochondrial dysfunction and increased cerebral ischemic damage in recurrent hypoglycemia-exposed diabetic rats* - **Kunjan Dave, PhD**, Principal Investigator. Diabetes increases the risk of stroke. Diabetes increases stroke damage. Patients with diabetes experience repeated hypoglycemic events. Repeated hypoglycemic events in diabetic rats increase stroke damage. Since mitochondrial dysfunction play an important role in post-stroke damage, the present study will evaluate the role of mitochondria in increased stroke damage in patients of diabetes experiencing exposures to recurrent hypoglycemia. AHA 01/2021 – 12/2023

- *Sleep in Neurocognitive Aging and Alzheimer's Research (SANAR)* - **Alberto Ramos, MD**, Principal Investigator. This $13 million grant will investigate the impact of obstructive sleep apnea (OSA) on the risk of Alzheimer's disease and other related dementias in Hispanic/Latino adults. NIH R01 01/2021 - 12/2026

- **Alberto Ramos, MD** is a Co-I (Co-I DeBuc) on a multi-site study investigating *An AI-assisted screening platform within a multivariate framework for biomarkers of mild cognitive impairment due to Alzheimer's disease*. NIH R41 1/2021 – 8/2022

- **David Della-Morte, MD, PhD** received a grant in Italy to study the project *Evaluation of the effects of infrared technology on cell proliferation and neoangiogenesis*.

- **Hong Jiang, MD** and **Jianhua Wang, MD, PhD** - University of Miami Provost's Research Award to study *Circuit Resistance Training and Retinal Vascular Changes in Older Persons* (Signorile PI)

- **Jinhua Wang, MD, PhD** is the EMBI Site PI awarded funds to study *Improving Age-Related Cognitve Decline with Exercise in Hypertensive Older Adults: A Pilot Study to Investigate A Retinal Microvascular Biomarker and the Role of IGF-1 (DECLARE)* from the Cognitive Aging and Memory Intervention Core Inter-Institutional Pilot 2020-2022 Program.

- **Regina Vontell, PhD** and **Magda Tolea, PhD** received the OneFLorida ADRC REC AlzSTARS scholarship.

BACK TO TABLE OF CONTENTS

7 TECHNOLOGY TRANSFER

PATENTS/APPLICATIONS: REVENUE GENERATED FROM TECHNOLOGY

The following are patents obtained or pending for Dr. Galvin

Vulnerability Index, 2021
Frontal Behavioral Battery, 2021
Modified CAIDE Score (mCAIDE), 2021
Brain Health Resilience Index, 2021
Cognitive Reserve Units Scale (CRUS), 2021
The Dementia Literacy Assessment (DELA), 2021
The Healthy Brain 9 (HB9), Pending 2021
Depression, Anxiety and Apathy Assessment (DA3), Pending 2021

BACK TO TABLE OF CONTENTS

8 FUNDS

Funds were not used for a prohibited purpose.

9 GIFT AGREEMENT

There are no modifications to the gift agreement.

10 PURPOSE

Did all activities during the report period further the Purpose?

All activities during the report period and our Strategic Plan furthered the purpose and is in line with 1) the University of Miami Miller School of Medicine's focus on brain health and 2) the MBRF's mission to strive to better understand and alleviate age-related cognitive decline and memory loss to help people age successfully and maintain their brain health. Our Strategic Plan goals guide and direct our EMBI's activities. We hope that this report for 2021 demonstrates how we furthered the purpose of the MBRF via the execution of our Strategic Plan goals listed here: Goal 1 - Develop a scientific program directly related to UM-EMBI and the McKnight Brain Research Foundation mission, Goal 2 - Education and mentorship, Goal 3 - Promote communication and collaboration and Goal 4 - Develop community outreach.

APPENDICES

Appendix 1
List of McKnight faculty, area of focus, dept. affiliation
List of Trainees

Appendix 2
Top 20 Publications from 2021 relevant to MBRF

Appendix 3
Top 10 presentations at scientific or public meetings relevant to the MBRF

Appendix 4
Highlights of website development, media coverage and/or social media audience development

Appendix 5
Evelyn F. McKnight Neurocognitive Scholar Update

Appendix 6
Budget & Investment Report

BACK TO TABLE OF CONTENTS

APPENDIX 1

List of McKnight Affiliate Faculty and their area of focus and department affiliations, including a list of post-doctoral and pre-doctoral trainees

MIAMI EVELYN F.MCKNIGHT BRAIN INSTITUTE (EMBI)

EMBI EXECUTIVE DIRECTOR
Dr. Ralph L. Sacco

SCIENTIFIC DIRECTOR
Dr. Tatjana Rundek

EDUCATION DIRECTOR
Dr. Xiaoyan Sun

RESEARCH & ADMINISTRATION DIRECTOR
Stacy S. Merritt

DIRECTOR OF MARKETING AND ADMINISTRATION
Susan Fox-Rosellini

Research & Design Coordinator
Marti Flothmann

SCIENTIFIC ADVISORY BOARD

David Loewenstein, PhD

James Galvin, MD, MPH

Olveen Carrisquillo, MD

William Scott, PhD

Phillip McCabe, PhD

Bonnie Levin, PhD

Miguel Perez-Pinzon, PhD

Tatjana Rundek, MD, PhD, FANA

Ralph Sacco, MD, MS, FANA, FAAN

Xiaoyan Sun, MD, PhD

Clinical Research
Dr. Baumel & Dr. Rundek

Cognitive Core
Dr. Levin

MRI Core
Dr. Alperin

Basic Translational Science
Dr. Perez-Pinzon & Dr. Dave

BACK TO TABLE OF CONTENTS

FACULTY

LEADERSHIP & MEMBERS

Name	Institute Role	Area of Expertise
Noam Alperin, PhD	Neuroimaging Core Director	Radiology, Physics (MRI)
Christian Camargo, MD	Member	Neurology
Kunjan R. Dave, PhD	Member	Neurobiology, Basic Science
David Della-Morte, MD, PhD	Member	Neurology
Joyce Gomes-Osman, PT, PhD	Member	Physical Therapy, Neurology
Hong Jiang, MD, PhD	Member	Neuro-opthalmology, Neurology
Bonnie Levin, PhD	Cognitive Core Director & Scientific Advisory Board	Neuropsychology
Miguel Perez-Pinzon, PhD	Member & Scientific Advisory Board	Neuroscience
Tatjana Rundek, MD, PhD	Scientific Director & Scientific Advisory Board	Neurology, Epidemiology
Ralph L. Sacco, MD, MS	Executive Director & Scientific Advisory Board	Neurology, Epidemiology, Genetics
Xiaoyan Sun, MD, PhD	Educational Director & Scientific Advisory Board	Neuroscience, Biochemistry

BACK TO TABLE OF CONTENTS

FACULTY

COLLABORATORS

Name	Institute Role	Area of Expertise
Susan Blanton, PhD	Collaborator	Genetics
Scott Brown, PhD	Collaborator	Public Health
Elizabeth Crocco, MD	Collaborator	Psychiatry
Chuanhui Dong, PhD	Collaborator	Epidemiology, Biostatistics
James Galvin, MD, MPH	Collaborator & Scientific Advisory Board	Neurology
Sarah Getz, PhD	Collaborator	Neuropsychology
David Loewenstein, PhD	Collaborator & Scientific Advisory Board	Neuropsychology
Katalina McInerney, PhD	Collaborator	Neuropsychology
Roger McIntosh, PhD	Collaborator	Psychology
Milena Pinto, PhD	Collaborator	Neuroscience
Alberto Ramos, MD	Collaborator	Neurology, Sleep Medicine
Ami P. Raval, PhD	Collaborator	Neuroscience, Epidemiology
Regina Vontell, PhD	Collaborator	Neurology
Jianhua Wang, MD, PhD	Collaborator	Neuro-ophthalmology, Neurology

BACK TO TABLE OF CONTENTS

TRAINEES

Name	Institute Role	Academic Focus	Mentor
Christian Agudelo, MD	McKnight Cognitive Scholar	Neurology	Alberto Ramos, MD Tatjana Rundek, MD, PhD Xiaoyan Sun, MD, PhD
Shriya Airen	MD Student	Neurology	Hong Jiang, MD Jinhua Wang, MD, PhD
Taylor Ariko, BS	PhD Student	Biomedical Engineering	Tatjana Rundek, MD, PhD Andrew Dykstra, PhD
Nikhil Sebastian Banerjee, PhD	Post-Doctoral Fellow	Neuropsychology	Bonnie Levin, PhD
Maria DiBello	Trainee	Neuroscience	Roger McIntosh, PhD
Justin Burgess	Practicum Student	Neuropsychology	Bonnie Levin, PhD
Carla Cabrera	Practicum Student	Neuropsychology	Bonnie Levin, PhD
Marlene Cabrera, PsyD	Post-Doctoral Fellow	Neuropsychology	Bonnie Levin, PhD
Ileana Pacheco-Colon	Practicum Student	Neuropsychology	Bonnie Levin, PhD
E. Valerie Daniel, PhD	Post-Doctoral Fellow	Public Health	James Galvin, MD, MPH
Brittney Damato	Practicum Student	Neuropsychology	Bonnie Levin, PhD
Katie Dillon, MA	Graduate Trainee	Neuroscience, Psychology	Roger McIntosh, PhD
Iris Escobar	PhD Student	Neurology	Miguel Perez-Pinzon, PhD
Min Fang	Post-Doctoral Fellow	Neuro-ophthalmology	Hong Jiang, MD Jinhua Wang, MD, PhD
Eric Fargali	PhD Student	Neuroscience	Miguel Perez-Pinzon, PhD
Kathleen Feeney	Practicum Student	Neuropsychology	Bonnie Levin, PhD
Elizabeth Mahanna Gabrielli, MD	Post-Doctoral Fellow	Anesthesiology	Alberto Ramos, MD
Meghan Gilmore	Practicum Student	Neuropsychology	Bonnie Levin, PhD
Ryan Gober, BS	PhD Candidate	Neuroscience	Regina Vontell, PhD

BACK TO TABLE OF CONTENTS

Eugenia Victoria Gomez	Undergraduate Student	Neuroscience	Milena Pinto, PhD
Christian Gonzalez, PhD	Post-Doctoral Fellow	Neuropsychology	David Loewenstein, PhD
Zachary Goodman	Practicum Student	Neuropsychology	Bonnie Levin, PhD
Damin Hadorn-Papke	Practicum Student	Neuropsychology	Bonnie Levin, PhD
Scott Harcourt	Post-Doctoral Fellow	Neuropsychology	Bonnie Levin, PhD
Diana Hipcample, PhD	Post-Doctoral Fellow	Neuropsychology	David Loewenstein, PhD
Melissa Huberman	Medical Student	Neuroscience	Ami P. Raval, PhD
Charlie Jackson	Graduate Student	Neuroscience	Miguel Perez-Pinzon, PhD
Karlon Johnson, PhD	Pre-Doctoral Trainee	Epidemiology	Ralph Sacco, MD, MS
Nathan Johnson	PhD Candidate	Neurology	Xiaoyan Sun, MD, PhD
Sonya Kaur, PhD	Instructor	Neuropsychology	Bonnie Levin, PhD Tatjana Rundek, MD, PhD Alberto Ramos, MD Ralph Sacco, MD, MS
Michael Kleiman, PhD	Data Scientist	Experimental Psychology	James Galvin, MD, MPH
Nastajjia Krementz, MD	Stroke-Net Fellow	Neurology, Stroke	Ralph Sacco, MD, MS
Eduaro Leal, PhD	Post-Doctoral Fellow	Neuropsychology	David Loewenstein, PhD
Che Liu	Graduate Student	Neuroradiology	Noam Alperin, PhD
Zhiping Liu	MD/PhD Candidate	Neurology	Hong Jiang, MD Jinhua Wang, MD, PhD
Rosario Pintos Lobo	Practicum Student	Neuropsychology	Bonnie Levin, PhD
Mikahela Lopez	Post-Doctoral Fellow	Neuroscience	Miguel Perez-Pinzon, PhD
Michelle Marrero, MD	Instructor	Neurology	Xiaoyan Sun, MD, PhD
Emily Cecilia Morales	Graduate Student	Biochemistry	Ami P. Raval, PhD
Alexander Mull	Practicum Student	Neuropsychology	Bonnie Levin, PhD
Amanda Neves	Post-Doctoral Trainee	Basic Science Neurology	Milena Pinto, PhD
Qismat Niazi	Student	Neuroscience	Ami P. Raval, PhD

BACK TO TABLE OF CONTENTS

Alexandria Nuccio	Practicum Student	Neuropsychology	Bonnie Levin, PhD
Alexandra Ortega	Post-Doctoral Fellow	Neuropsychology	David Loewenstein, PhD
Nidhi H. Patel, MD	Graduate Trainee	Neurology, Stroke	Ralph Sacco, MD, MS
Sonya Patel	Undergrad Student	Neuroscience	Ami P. Raval, PhD
Jahanett Ramirez, MD, MPH	Post-Doctoral Trainee	Neurology	Alberto Ramos, MD
Varun Reddy	Student	Neuroscience	Ami P. Raval, PhD
Ashish Rehni, PhD	Post-Doctoral Fellow	Neuroscience	Kunjan Dave, PhD
Dayana Rodriguez	Post-Doctoral Fellow	Neuropsychology	Bonnie Levin, PhD
Anita Seixas Dias Saporta, MD	McKnight Fellow	Neurology, Imaging	Tatjana Rundek, MD, PhD Ralph Sacco, MD, MS
Sharnikha Saravanan	Undergrad Student	Neuroscience	Ami P. Raval, PhD
Ratanpriya Sharma, MA	Graduate Trainee	Neuroscience, Psychology	Roger McIntosh, PhD
Jessica Smith	Practicum Student	Neuropsychology	Bonnie Levin, PhD
Samantha Spagna	Practicum Student	Neuropsychology	Bonnie Levin, PhD
Christina Stutts	Graduate Student	Music Therapy	Xiaoyan Sun, MD, PhD
Jonathan Siegel	Graduate Student	Biochemistry	Ami P. Raval, PhD
Nicole B. Sur, MD	Assistant Professor	Neurology, Stroke	Ralph Sacco, MD, MS
Chiara Villa	Post-Doctoral Trainee	Neurology	Milena Pinto, PhD
Juan Zhang, PhD	Post-Doctoral Trainee	Neurology	Hong Jiang, MD Jinhua Wang, MD, PhD

BACK TO TABLE OF CONTENTS

APPENDIX 2

TOP 20 PUBLICATIONS FROM FY21 RELEVANT TO THE MBRF

1. **Agudelo C**, Tarraf W, Wu B, Wallace DM, Patel SR, Redline S, **Kaur S**, Daviglus M, Zee PC, Simonelli G, Mossavar-Rahmani Y, **Ramos AR**. Actigraphic sleep patterns and cognitive decline in the Hispanic Community Health Study/Study of Latinos. Alzheimer's & Dementia, 17(6), pp.959-968. 2021.

2. Gardener H, **Levin B**, DeRosa J, **Rundek T**, Wright CB, Elkind MSV, **Sacco RL**. Social Connectivity is Related to Mild Cognitive Impairment and Dementia. J Alzheimers Dis, 2021 Oct 29. PMID: 34719491.

3. **Sun X**, Dong C, **Levin BE**, Caunca M, Zeki Al Hazzouri A, DeRosa JT, Stern Y, Cheung YK, Elkind MSV, **Rundek T**, Wright CB, **Sacco RL**. Erratum to: Systolic Blood Pressure and Cognition in the Elderly: The Northern Manhattan Study. J Alzheimers Dis, Nov 9 2021;84(2):915. PMID: 34719513.

4. **Tolea MI**, Heo J, Chrisphonte S, **Galvin JE**. The Cognitive & Leisure Activity Scale (CLAS): A New Measure to Quantify Cognitive Activities in Older Adults with and without Cognitive Impairment. J Alzheimer Dis, 82:1755-1768, 2021 (PMCID: 8483620).

5. Fang M, Strand K, Zhang J, Totillo M, Signorile JF, **Galvin JE**, **Wang J**, **Jiang H**. Retinal vessel density correlated with cognitive function in older adults. Exp Gerontol, 152:111433, 2021.

6. **Liu C**, **Lee SH**, **Loewenstein DA**, **Galvin JE**, **Camargo CJ**, **Alperin N**. J Poor sleep accelerates hippocampal and posterior cingulate volume loss in cognitively normal healthy older adults. Sleep Res 2021, Dec 19;e13538. doi: 10.1111/jsr.13538. Online ahead of print.

7. **Rundek T**, **Tolea M**, **Ariko T**. et al. Vascular Cognitive Impairment (VCI). Neurotherapeutics (2021). https://doi.org/10.1007/s13311-021-01170-y.

BACK TO TABLE OF CONTENTS

8. Coto J, Alvarez CL, Cejas I, Colbert BM, **Levin BE**, Huppert J, **Rundek T**, Balaban C, **Blanton SH**, Lee DJ, **Loewenstein D**, Hoffer M, & Liu XZ. Peripheral vestibular system: Age-related vestibular loss and associated deficits. Journal of otology, 16(4), 258–265, 2021 https://doi.org/10.1016/j.joto.2021.06.001.

9. Gornik HL, **Rundek T**, Gardener H, Benenati JF, Dahiya N, Hamburg N, Kupinski A, Leers SA, Lily MP, Lohr JM, Pellerito JS, Rholl KS, Vickery MA, Hutchisson MS, Needleman L. On behalf of the IAC Vascular Testing Division Carotid Diagnostic Criteria Committee. Optimization of duplex velocity criteria for diagnosis of internal carotid artery (ICA) stenosis: A report of the Intersocietal Accreditation Commission (IAC) Vascular Testing Division Carotid Diagnostic Criteria Committee, 26(5) 515-525, Oct 2021.

10. Levine DA, Gross AL, Briceño EM, Tilton N, Giordani BJ, Sussman JB, Hayward RA, Burke JF, Hingtgen S, Elkind MSV, Manly JJ, Gottesman RF, Gaskin DJ, Sidney S, **Sacco RL**, Tom SE, Wright CB, Yaffe K, Galecki AT. Sex Differences in Cognitive Decline Among US Adults. JAMA Netw Open, 2021 Feb 1;4(2):e210169. PMID: 33630089 PMCID: PMC7907956.

11. Oelsner EC, Allen NB, Ali T, Anugu P, Andrews H, Asaro A, Balte PP, Barr RG, Bertoni AG, Bon J, Boyle R, Chang AA, Chen G, Cole SA, Coresh J, Cornell E, Correa A, Couper D, Cushman M, Demmer RT, Elkind MSV, Folsom AR, Fretts AM, Gabriel KP, Gallo L, Gutierrez J, Han MK, Henderson JM, Howard VJ, Isasi CR, Jacobs DR, Judd SE, Mukaz DK, Kanaya AM, Kandula NR, Kaplan R, Krishnaswamy A, Kinney GL, Kucharska-Newton A, Lee JS, Lewis CE, Levine DA, Levitan EB, Levy B, Make B, Malloy K, Manly JJ, Meyer KA, Min YI, Moll M, Moore WC, Mauger D, Ortega VE, Palta P, Parker MM, Phipatanakul W, Post W, Psaty BM, Regan EA, Ring K, Roger VL, Rotter JI, **Rundek T**, **Sacco RL**, Schembri M, Schwartz DA, Seshadri S, Shikany JM, Sims M, Hinckley Stukovsky KD, Talavera GA, Tracy RP, Umans JG, Vasan RS, Watson K, Wenzel SE, Winters K, Woodruff PG, Xanthakis V, Zhang Y, Zhang Y; C4R Investigators. Collaborative Cohort of Cohorts for COVID-19 Research (C4R) Study: Study Design. medRxiv 2021 Mar 20;2021.03.19.21253986. PMID: 33758891 PMCID: PMC7987050.

12. Elkind MSV, Moon M, **Rundek T**, Wright CB, Cheung K, **Sacco RL**, Hornig M. Immune markers are associated with cognitive performance in a multiethnic cohort: The Northern Manhattan Study. Brain Behav Immun, 2021 Jul 25;S0889-1591(21)00275-0. PMID: 34320382; PMCID: PMC8453105.

13. **Sun X**, Wang Q, Blennow K, Zetterberg H, McCarthy M, **Loewenstein DA**, **Vontell R**, Yue Z, Zhang B. Association of neurogranin gene expression with AD pathology in the perirhinal cortex Alzheimer's & Dementia: Translational Research & Clinical Interventions. (In press).

14. **Neves AF**, **Camargo C**, Premer C, Hare JM, **Baumel BS**, **Pinto M**. Intravenous administration of mesenchymal stem cells reduces Tau phosphorylation and inflammation in the 3xTg-AD mouse model of Alzheimer's disease. Exp Neurol, 2021 Jul, PMID: 33757765.

15. **Galvin JE**, Kleiman MJ, Chrisphonte S, Cohen I, Disla S, Galvin CB, Greenfield KK, Moore C, Rawn S, Riccio ML, Rosenfeld A, Simon J, Walker M, **Tolea MI**. The Resilience Index: A quantifiable measure of brain health and risk of cognitive impairment and dementia. J Alzheimer Dis, 2021 Oct 30. doi: 10.3233/JAD-215077 [Online ahead of print].

16. McConnell BV, Kronberg E, Teale PD, Sillau SH, Fishback GM, Kaplan RI, Fought AJ, Dhanasekaran AR, Berman BD, **Ramos AR**, McClure RL. The aging slow wave: a shifting amalgam of distinct slow wave and spindle coupling subtypes define slow wave sleep across the human lifespan. Sleep, 44(10), p.zsab125, 2021.

17. **Jiang H**, **Wang J**, **Levin BE**, **Baumel BS**, **Camargo CJ**, Signorile JF, **Rundek T**. Retinal Microvascular Alterations as the Biomarkers for Alzheimer Disease: Are We There Yet? J Neuroophthalmol. 2021 Jun 1;41(2):251-260.

18. **Rundek T**, Roy S, Hornig M, Cheung YK, Gardener H, DeRosa J, **Levin B**, Wright CB, Del Brutto VJ, Elkind MS, **Sacco RL**. Gut permeability and cognitive decline: A pilot investigation in the Northern Manhattan Study. Brain Behav Immun Health, 2021 Mar;12.

19. Lobo JD, **Goodman ZT**, Shmaus J, Uddin LQ, **McIntosh RC**. Association of Cardiometabolic Health Factors with Age-Related Executive Function and Episodic Memory. Aging, Neuropsychology and Cognition https://doi.org/10.1080/13825585.2021.1915948 (2021).

20. Shah B, Jagtap P, Sarmah D, Datta A, Raut S, Sarkar A, Bohra M, Singh U, Baidya F, Kalia K, Borah A, **Dave KR**, Yavagal DR, Bhattacharya P. Cerebro-renal interaction and stroke. Eur J Neurosci, 2021 Feb;53(4):1279-1299.

APPENDIX 3

TOP 10 PRESENTATIONS AT SCIENTIFIC OR PUBLIC MEETINGS RELEVANT TO THE MBRF

1. Enlarged Perivascular Spaces in Cognitive Impairment. 19th Annual MCI Symposium, Miami Beach, FL, **Tatjana Rundek, MD, PhD**, February, 2021.

2. 22nd Cairo Neurology Conference, Present and Future Advances in Stroke Diagnosis and Treatment, Virtual, **Ralph Sacco, MD, MS**, February 11, 2021.

3. A teleneuropsychology protocol for the cognitive assessment of older adults during COVID-19. 19th Annual MCI Symposium, Virtual Presentation. Miami Beach, FL, Refereed. Kitaigorodsky M, **Loewenstein D**, Curiel-Cid R, **Crocco E**, Gorman K, Gonzalez-Jimenez C., February-March, 2021.

4. Mechtler Institute for Neurological Disorders (MIND) Clinic Neuroscience Lecture Series: Preventing Stroke and Maintaining Brain Health, Budapest Hungary, Virtual, **Ralph Sacco, MD, MS**, June 18, 2021.

5. Neurology Update & Stroke Intensive 2021, Primary Stroke Prevention, Virtual, **Ralph Sacco, MD, MS**, June 19, 2021.

6. REACTION: Reducing the Effects of Aging on Cognition with Therapeutic Intervention of an Oral Nutrient, A Pilot Interventional Study for Age-Related Cognitive Decline - Design and Overview. Alzheimer's Association International Conference, **Camargo C**, **McInerney K**, de Wilde, J, Counotte D, **Rundek T**, July, 2021.

7. Association of Enlarged Perivascular Spaces (ePVS) and MRI markers of small vessel disease (SVD) and neurodegeneration in the Florida Vascular Imaging Phenotypes (FL-VIP) Study of AD Risk. Alzheimer's Association International Conference, Haq I, Del Brutto V, Goryawala M, **Seixas Dias A**, Merritt S, **Camargo C**, **Agudelo C**, **Ariko T**, Dong C, **Loewenstein D**, Duara R, **Rundek T**, July, 2021.

8. NINDS Health Disparities and Inequities in Neurological Disorders, Defining Health Disparities in Neurological Disorders and Early Clinical Studies, Virtual, **Ralph Sacco, MD, MS**, September 22, 2021.

9. 25th World Congress of Neurology, Vascular Determinants of Cognitive Decline, Virtual, **Ralph Sacco, MD, MS**, October 7, 2021.

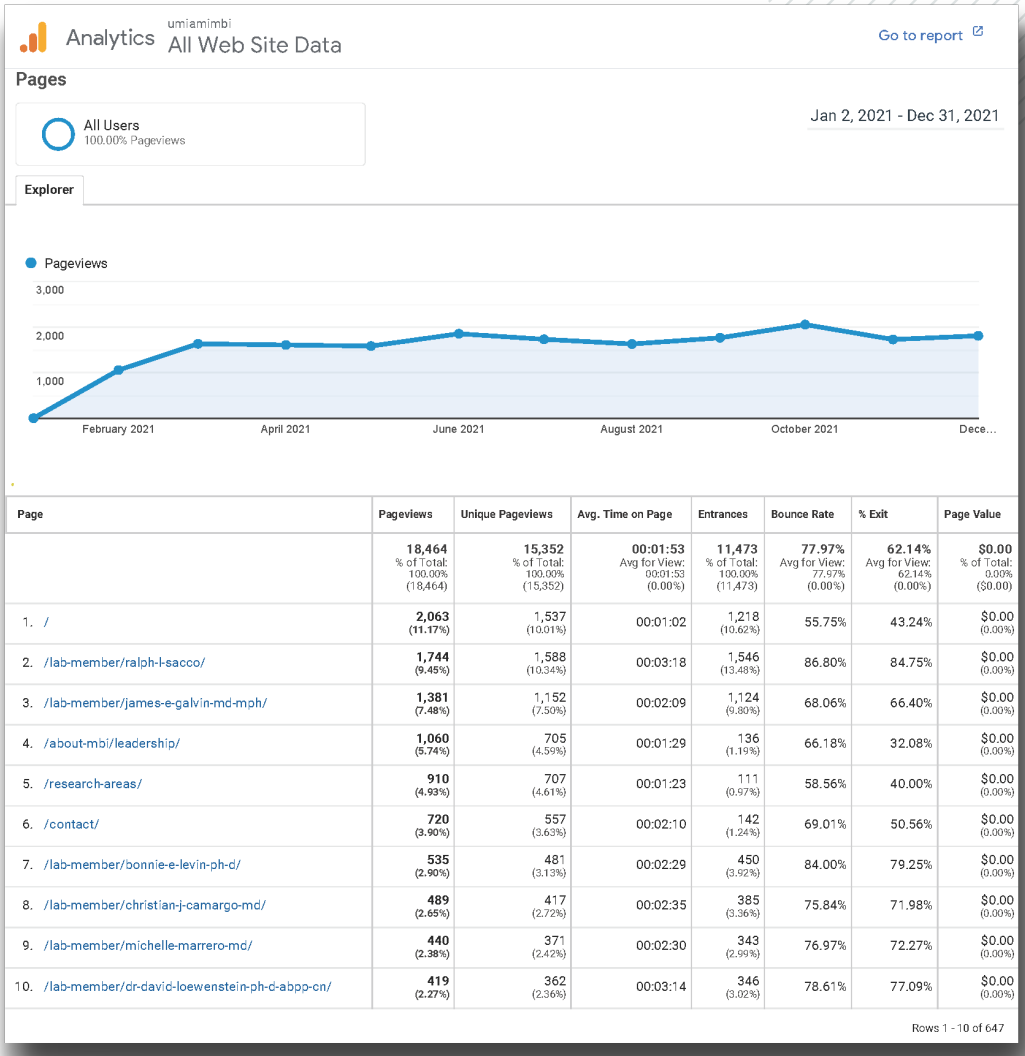
10. Mexican Academy of Neurology, Addressing the Needs of Academic Neurology, Virtual, **Ralph Sacco, MD, MS**, October 15, 2021.

BACK TO TABLE OF CONTENTS

APPENDIX 4

HIGHLIGHTS OF WEBSITE DEVELOPMENT, MEDIA COVERAGE AND/OR SOCIAL MEDIA AUDIENCE DEVELOPMENT

We redesigned our EMBI website mbi-umiami.org in 2021. The premise was to expand the site to serve as a unified information point about our EMBI leadership, organizational structure, collaborations and partnerships and to be a resource for age-related memory loss and cognitive impairment programs and activities. Our goal is to offer a wealth of resources on brain health and to be an interactive site with a large network of linked websites and resources. We used Google Analytics tracking to see who is visiting our site and for what reason, as seen in the graphs below.

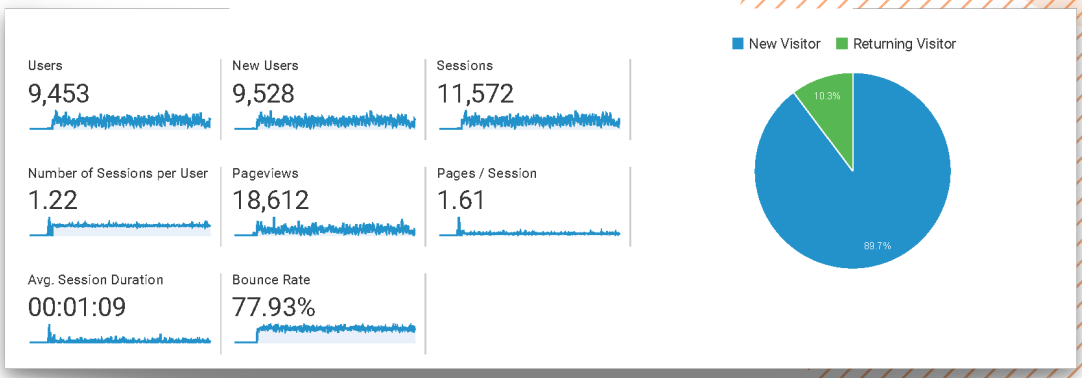


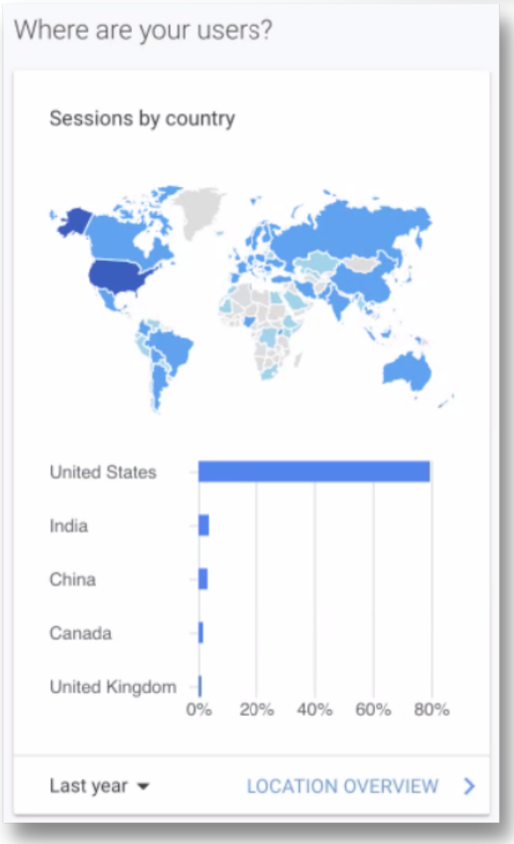
Page	Pageviews	Unique Pageviews	Avg. Time on Page	Entrances	Bounce Rate	% Exit	Page Value
	18,464 % of Total: 100.00% (18,464)	15,352 % of Total: 100.00% (15,352)	00:01:53 Avg for View: 00:01:53 (0.00%)	11,473 % of Total: 100.00% (11,473)	77.97% Avg for View: 77.97% (0.00%)	62.14% Avg for View: 62.14% (0.00%)	$0.00 % of Total: 0.00% ($0.00)
1. /	2,063 (11.17%)	1,537 (10.01%)	00:01:02	1,218 (10.62%)	55.75%	43.24%	$0.00 (0.00%)
2. /lab-member/ralph-l-sacco/	1,744 (9.45%)	1,588 (10.34%)	00:03:18	1,546 (13.48%)	86.80%	84.75%	$0.00 (0.00%)
3. /lab-member/james-e-galvin-md-mph/	1,381 (7.48%)	1,152 (7.50%)	00:02:09	1,124 (9.80%)	68.06%	66.40%	$0.00 (0.00%)
4. /about-mbi/leadership/	1,060 (5.74%)	705 (4.59%)	00:01:29	136 (1.19%)	66.18%	32.08%	$0.00 (0.00%)
5. /research-areas/	910 (4.93%)	707 (4.61%)	00:01:23	111 (0.97%)	58.56%	40.00%	$0.00 (0.00%)
6. /contact/	720 (3.90%)	557 (3.63%)	00:02:10	142 (1.24%)	69.01%	50.56%	$0.00 (0.00%)
7. /lab-member/bonnie-e-levin-ph-d/	535 (2.90%)	481 (3.13%)	00:02:29	450 (3.92%)	84.00%	79.25%	$0.00 (0.00%)
8. /lab-member/christian-j-camargo-md/	489 (2.65%)	417 (2.72%)	00:02:35	385 (3.36%)	75.84%	71.98%	$0.00 (0.00%)
9. /lab-member/michelle-marrero-md/	440 (2.38%)	371 (2.42%)	00:02:30	343 (2.99%)	76.97%	72.27%	$0.00 (0.00%)
10. /lab-member/dr-david-loewenstein-ph-d-abpp-cn/	419 (2.27%)	362 (2.36%)	00:03:14	346 (3.02%)	78.61%	77.09%	$0.00 (0.00%)

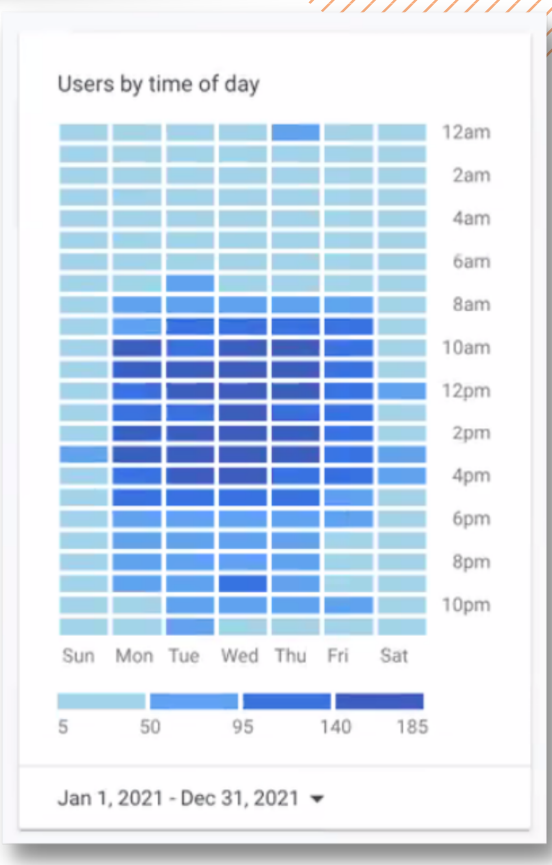
Rows 1 - 10 of 647

BACK TO TABLE OF CONTENTS

The mbi-umiami.org website is set up so all news posts and events are visible on the home page, therefore events and news updates are easily visible to those who land on our site. We have many new visitors from all over the world, but it is no surprise that most of our visitors are in the U.S. and visit primarily during business hours. This data helps us to target our postings to peak hours and lets us know which posts and pages are most popular, as well as what areas need improvement.







BACK TO TABLE OF CONTENTS

News Posts in 2021:

1. New funding will support research on neighborhood greenness and brain and vascular health
2. Evelyn F. McKnight Brain Institute Collaborates on $60M Initiative for the Precision Aging Network
3. REACTION — Reducing the Effects of Aging on Cognition with Therapeutic Intervention of an Oral Nutrient: An Exploratory Trial
4. Miller School Researcher Study on Internal Carotid Artery Stenosis Published in Vascular Medicine
5. High Mentally Stimulating Jobs May Lower Dementia Risk Later in Life
6. UM Neurologist Has Leadership Role in Large-Scale Collaborative Project to Combat Dementia in Indigenous Communities
7. Neurology and Neurosurgery Nationally Ranked #35 by US News and World Report in the 2021-2022 Best Hospitals Rankings
8. Neurologist Awarded $13 Million to Conduct Multicultural Dementia Screenings
9. Poor Sleep Predicts Long-term Cognitive Decline in Hispanics More Than in Whites
10. Dr. Tatjana Rundek Named President of the Intersocietal Accreditation Commission Vascular Testing Board
11. Neurology Week July 14-18, 2021
12. Congratulations to Drs. Vontell and Tolea on Being Selected for the NIA- 1FL ADRC AlzSTARS Scholarship
13. Join us for a fantastic talk in Spanish, given by Dr. Michelle Marrero. El rol vital de la nutrición en el cerebro
14. McKnight Brain Research Foundation Innovator Awards in Cognitive Aging and Memory Loss DEADLINE IS JULY 15th, 2021
15. 5 Things to Know About the Alzheimer's Drug Aducanumab
16. The FDA approves Aduhelm (aducanumab) to treat patients with Alzheimer's disease
17. Medicine Magazine Focuses on Healthy Aging
18. NIA study identifies FDA-approved drugs that may also be helpful for dementia
19. Do You Have Sleep Apnea?
20. Providing the Right Diagnosis for Lewy Body Dementia Patients
21. Como dormir para mantener nuestros cerebros saludables
22. Webinar: "El impacto del envejecimiento humano sobre el cerebro y el funcionamiento cognitivo."
23. Dr. Christian Agudelo's Neurology Live Interview featured in U Communications

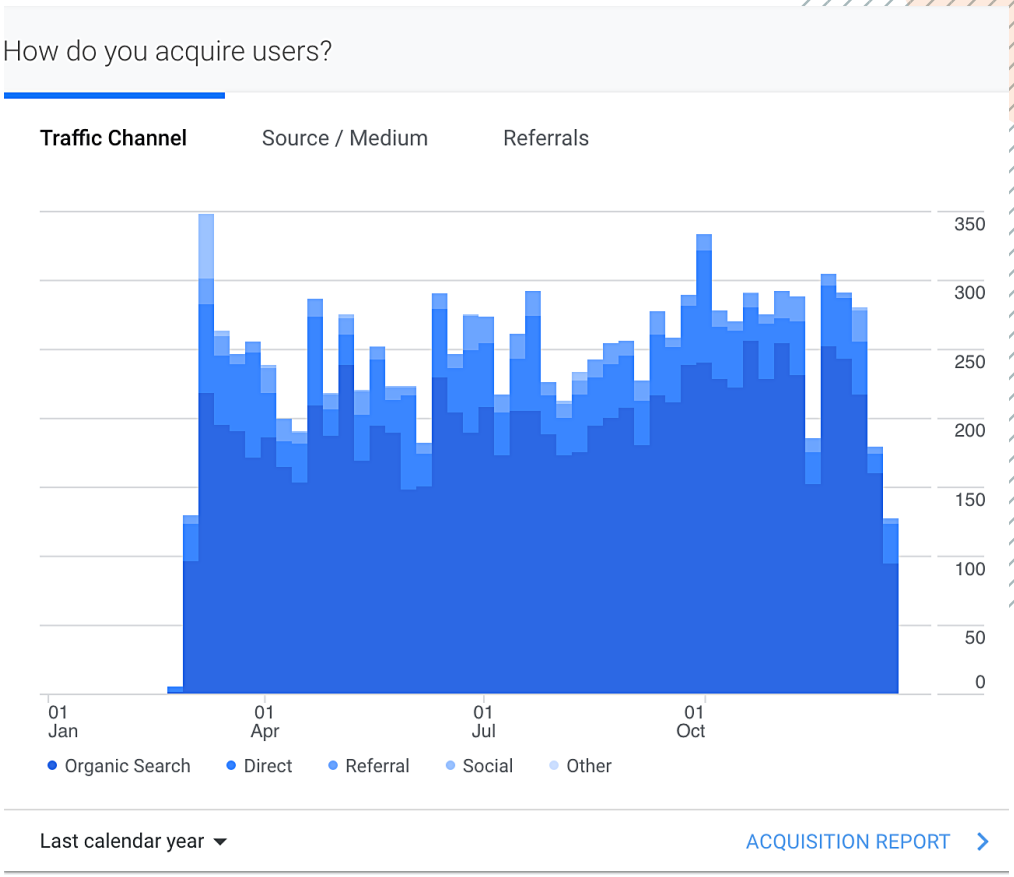
BACK TO TABLE OF CONTENTS

Events Posted in 2021:

1. Online Event: Maintaining a Healthy Aging Brain in a Pandemic World December 16
2. Online Event: Maintaining a Healthy Aging Brain in a Pandemic World December 9
3. How Mindfulness Affects the Brain December 3
4. Online Event: Maintaining a Healthy Aging Brain in a Pandemic World December 2
5. Roger McIntosh, PhD and Kaitlyn Dillon, MA Research Update November 17
6. James E. Galvin, MD "Cognitive measures lacking in EHR prior to dementia or Alzheimer's disease diagnosis" November 3
7. Researching Brain Health and the Risk of Alzheimer's Disease in Native American Communities November 2
8. "Are mHealth exercise interventions good for brain health? Migrating from the lab to the real world" October 20
9. Research Updates – Milena Pinto, PhD October 20
10. The Multifaceted Contribution of Aging and Oxidative Stress in Metabolic and Neurodegenerative Disorders October 6
11. Epigenetic-level approaches to studying memory and age-related memory deficits September 23
12. Doctors for America Lunch & Learn – Racing to the Bottom: FDA's Approval of Aducanumab July 27
13. Neuroscience & Neurology Grand Rounds Presents: "Evidence for a Synaptic Approach to Enhance Cognition in Normal Aging through Specific MultiNutrient Intervention: Rationale and Design of the REACTION* Trial" July 16
14. SPARK viewing event with Dr. James Galvin MD, MPH and the Comprehensive Center for Brain Health May 18
15. 2021 Virtual McKnight Brain Institute Inter-Institutional Meeting April 28
16. Examining the relationship between hearing loss and cognitive decline March 10
17. NIA Workshop: Bilingualism and Cognitive Reserve and Resilience March 2
18. El impacto del envejecimiento humano sobre el cerebro y el funcionamiento cognitivo February 25
19. Actigraphic Sleep Patterns and Cognitive Decline in the Hispanic Community Health Study/Study of Latinos February 10
20. Healthy Brain Aging and Prevention of Dementia February 2
21. Measuring Cortical Hyperexcitability in Alzheimer's Disease with Transcranial Magnetic Stimulation January 27

BACK TO TABLE OF CONTENTS

With the use of Google Analytics this year, we were able to see where most of our users are from. We will continue to track this data and use it to promote our website content in areas that tend to attract the most traffic, and reevaluate our approach in areas that are not generating as much traffic.



In late 2021 we established Facebook and Twitter accounts @UMiamiMBI after using the @umiamiNeuro pages, which garnered a lot of interest in the posts. We also created a Nextdoor business profile for more community interaction and a McKnight YouTube channel where we hope to start sharing educational videos for both the scientific community and the general public.

We look forward to making social media audience development a priority in 2022, so we can share relevant news and research, announce outreach and educational activities and to recruit for projects such as the Precision Aging Network (PAN).

BACK TO TABLE OF CONTENTS

Finally, our clinicians have had important opportunities to be covered by media as can be seen by the list below.

DR. SACCO-PRESS APPEARANCES

Brain Disorders - Innovative Cures and Treatments, In the Know, April 20, 2021

FSR Director Discusses Florida Stroke Registry Findings on Disparities in Stroke Care, WLRN Interview, June 10, 2021

DR. CAMARGO-PRESS APPEARANCES

Veciana-Suarez, Ana. You Are What You Breathe Health News | University of Miami Hospitals and Clinics, University of Miami Miller School of Medicine, 21 Dec. 2020,

GO TO PAGE

Marabito, Maria. High Mentally Stimulating Jobs May Lower Dementia Risk Later in Life, Healio, 27 Aug. 2021,

GO TO PAGE

Interviews about novel FDA-approved Alzheimer's drug aducanumab:

- Ahora con Oscar Haza. June 11, 2021. Mega TV WSBS-TV. Miami, FL
- The Brian Mudd Show. June 10, 2021. NewsRadio WIOD. Miami, FL
- Noticias 23. June 8, 2021. Univision 23 WLTV HDTV. Miami, FL

DR. RAMOS-PRESS APPEARANCES

La pandemia de covid-19 nos ha robado horas de sueño, ¿cuántas te ha quitado a ti?

GO TO PAGE

Researcher Awarded NIH Grant to Study Impact of Sleep Apnea on Alzheimer's Disease in Hispanics

GO TO PAGE

DR. VONTELL-PRESS APPEARANCE

Her important journal article *Microglia activation in postmortem brains with schizophrenia* demonstrates distinct morphological changes between brain regions is featured on the cover of the journal Brain Pathology.

BACK TO TABLE OF CONTENTS

APPENDIX 5

CHRISTIAN AGUDELO, MD,
EVELYN F. MCKNIGHT NEUROCOGNITIVE SCHOLAR UPDATE

In 2021, **Christian Agudelo, MD**, was in the second year of his Evelyn F. McKnight Neurocognitive Scholarship. He met with his mentoring team Tatjana Rundek, MD, PhD, Xiaoyan Sun, MD, PhD and Alberto Ramos, MD weekly to track the progress of his Individualized Development Plan. He submitted papers, abstracts and posters and had important achievements, awards and recognitions. These are all listed below.

PUBLISHED REFEREED MANUSCRIPT:

Agudelo, C; Tarraf, W; Wu, B; Wallace, DM; Patel, SR; Redline, S; Kaur, S; Daviglus, M; Zee, PC; Simonelli, G; Mossavar-Rahmani, Y; Sotres-Alvarez, D; Zeng, D; González, HM; Ramos, AR. Actigraphic Sleep Patterns and Cognitive Decline in the Hispanic Community Health Study/Study of Latinos." Alzheimer's and Dementia;17(6):959-968; 2021

ACCEPTED REFEREED ABSTRACT AND POSTER:

Agudelo, C; Tarraf, W; Wu, B; Wallace, DM; Patel, SR; Redline, S; Kaur, S; Daviglus, M; Zee, PC; Simonelli, G; Mossavar-Rahmani, Y; Sotres-Alvarez, D; Zeng, D; González, HM; Ramos, AR. Actigraphic Sleep Patterns and Cognitive Decline in the Hispanic Community Health Study/Study of Latinos." Alzheimer's and Dementia;17(6):959-968; 2021.

MANUSCRIPTS UNDER REVIEW:

Agudelo, C; Ramos, AR; Sun, X; Kaur, S, Del Papa, DF; Kather, JM; Wallace, DM; Alzheimer's Disease Neuroimaging Initiative (ADNI). "Sleep Disordered Breathing Risk with Comorbid Insomnia is Associated with Mild Cognitive Impairment." Submitted and under peer review November 2021.

Rundek, T; Del Brutto, VJ; Goryawala, MZ; Dong, C; **Agudelo, C***; Saporta, A; Merritt, S; Camargo, C; Ariko, T; Loewenstein, DA; Duara, R; Haq, I; "Vascular Risk Factors and Perivascular Spaces on MRI: The Florida Vascular Imaging Phenotypes (FL-VIP) Study of Alzheimer's Disease Risk." *Submitted as corresponding author and under peer review November 2021.

BACK TO TABLE OF CONTENTS

ABSTRACTS UNDER REVIEW:

Gonzalez, KA; Tarraf, W; Stickel, AM; Kaur, S; **Agudelo, C**; DeCarli, C; González, HM; Ramos, AR; "Association between sleep duration and brain MRI measures: preliminary results from SOL-INCA MRI study." Submitted to the APSS Sleep 2021 Conference and under peer review.

Gonzalez, KA; Tarraf W; Testai, FD; Redline, S; Patel, SR; Stores-Alvarez, D; Gallo, L; Isasi, C; Talavera, G; Schneiderman, N; Daviglus, M; Stickel, AM; Kaur, S; **Agudelo, C**; DeCarli, C; González, HM; Ramos, AR; "Sleep disordered breathing and neuroimaging markers of brain health in Hispanic/Latinos." Submitted to the APSS Sleep 2021 Conference and under peer review.

DR. AGUDELO'S ACHIEVEMENTS, AWARDS AND RECOGNITIONS INCLUDE:

- He was selected, given a travel award, and attended the 2021 Fall Sleep and Circadian Workshop on Indispensable Methods hosted by the University of Pittsburgh Center for Sleep and Circadian Science in November 2021.
- He was selected for and attended the American Academy of Sleep Medicine 2021 Young Investigator Research Forum.
- He presented a poster (Sleep Disordered Breathing Risk with Comorbid Insomnia is Associated with Mild Cognitive Impairment) at The University of Pittsburgh Sleep and Circadian Science 6th Annual Sleep & Circadian Science Research Day; November 2021.
- He was selected for and attended the Mentor and Mentee Workshop Series at the University of Miami in March 2021.
- He attended the 12th Annual McKnight Inter-Institutional Meeting in April 2021.
- He attended monthly meetings of an inter-instituional group of researchers to discuss diversity, equity, and inclusion in sleep and circadian science. This group, named the DIVERs, is led by facluty at the University of Pittsburgh , including Martica Hall, PhD, and Sanjay Patel, MD.
- He completed a mentored manuscript review for the Journal of Sleep Health in February 2021.
- He completed a manuscript review for the journal, CHEST, in December 2021.
- He Joined the editorial board of Precision Sleep Research (specialty section of the journal Frontiers in Sleep) in December 2021.
- He was interviewed by Neurology Live (magazine) and El Nuevo Herald (newspaper) in January 2021 to discuss the resutls of his published study, Actigraphic Sleep Patterns and Cognitive Decline in the Hispanic Community Health Study/Study of Latinos.

BACK TO TABLE OF CONTENTS

- He was interviewed by CNN en Espanol in March 2021, discussing sleep during the COVID-19 pandemic.
- He presented at NeuroUpdate, a professional symposia hosted by the University of Miami to educate neurologists on the state of the field. His presenetation topic was Obstructive sleep apnea as a potential modifiable risk factor for stroke prevention.
- He presented to the University of Miami McKnight Brain Institute a talk titled Actigraphic sleep patterns and cognitive decline in the Hispanic Community Health Study/ Study of Latinos in February 2021.
- As part of the McKnight Community Education Program, he presented in the Miami-Dade Plublic Library lecture series, Maintaining A Health Aging Brain. He discussed How to Sleep to Maintain Brain Health.
- He presented Como Dormir Para Mantener Nuestros Cerebros Saludables to the Doral Silver Club in March of 2021.

UPDATE ON DR. AGUDELO'S PROJECTS

Dr. Agudelo's program of research has an overarching theme to identify modifiable sleep-related biomarkers of cognitive aging. Ultimately, his goal is to modify sleep to ameliorate cognitive decline. By leveraging excellent mentorship, ongoing research within the University of Miami Evelyn F. McKnight Brain Institute, his affiliation with the Hispanic Community Health Study / Study of Latinos, and access to Alzheimer's Disease Neuroimaging Initiative (ADNI) data, Dr. Agudelo developed three projects. As the Evelyn F. McKnight Neurocognitive Scholar, he obtained the training and mentorship needed to complete Project 1 and translate Projects 2 and 3 into upcoming grant submissions. His project titles are listed here.

- Project 1: The association between co-morbid insomnia and sleep disordered breathing and mild cognitive impairment in the ADNI study.
- Project 2: Sleep disordered breathing (SDB) may be a modifiable risk factor for cognitive disease mediated by the loss of gray matter microstructure integrity.
- Project 3: The relationship between sleep may be modified by the loss of gray matter microstructure integrity and enlarged perivascular spaces (PVS).

BACK TO TABLE OF CONTENTS

APPENDIX 6

CURRENT BUDGET AND ENDOWMENT INVESTMENT REPORT

BACK TO TABLE OF CONTENTS

Annual Report

BUDGET for June 1, 2021 - May 31, 2022

Revenue from Endowment			**679,944.00**
Revenue Carryover from 2019/2020			**98,000.00**
Revenue for Scholar			**100,000.00**
Total Revenue			**877,944.00**
Personnel			
Faculty	***Role In Project***	***Effort***	
Tatjana Rundek, MD	Scientific Director	25%	
Ralph Sacco, MD	Executive Director	5%	
Xiaojan Sun, MD	Educational Director	10%	
Bonnie Levin, PhD	Neuropsychology	25%	
Kunjan Dave, PhD	Neurology -Basic Science	5%	
Chuanhui Dong, PhD	Neurology	5%	
Noam Alperin, MD	Radiology	10%	
Hong Jiang, MD	Neurology	5%	
Sarah Getz, PhD	Neuropsychology	5%	
Sonya Kaur, PhD	Neuropsychology	10%	
Christian Camargo, MD	Neurology	5%	
Katalina McInereny, PhD	Neuropsychology	10%	
Subtotal Faculty Salary and CFB			***399,743.72***
Christian Agueldo - McKnight Fellow	Neurology	100%	***100,081.00***
Staff	***Role in Project***	***Effort***	
Stacy Merritt	Project Mgr	80%	
Sang Lee	Radiology	10%	
Marti Flothamn	Clinical Outreach Coordinator	80%	
Taylor Ariko	MD PHD Student - Neuro/BioMed	100%	
Isabel Saul	Research Support Specialist- Basic Science	15%	
Anita Saporta	Neuropsycology	25%	
Susan Fox-Rosellini	Marketing/Outreach Admin Director	50%	
Digna Cabral	Neurology	10%	
NeuroPsych 2	Neuropsychology	25%	
NeuroPsych 3	Neuropsychology	25%	
NeuroPsych 4	Neuropsychology	25%	
NeuroPsych 5	Neuropsychology	25%	
Subtotal Staff and CFB			339,346.28
Total Personnel			***839,171.00***
Non Personnel Expenses			
SC08818 - Publication Costs (Excluding Copying)			
SC08801 - Registration Conferences & Seminars			
SC08803 - Dues & Memberships - Other			
SC08611 - Employee Domestic Travel			
SC08619 - Meetings - Subsistence			
SC08624 - Entertainment - F&B, Recep			
SC08852 - Monthly - Lines & Sets & SC08858 - Monthly - Voice Mail			
SC08103 - Advertising - Other			
SC08024 - Interdepart/ Intercomp - Service			
SC08235 - Computer Hardware & Software Non-Capital			
SC08218 - Clerical Supplies			
SC08219 - Instructional supplies			
SC08229 - Photocopy, Publishing, & Print Supplies			
SC08200 - Chemicals/blood samples store/ship			
SC08011 - Interdepartmental / Intercompany - Animal Care Services - Internal			
SC08225 - Technical Supplies - Other			
Total Non Personnel Expenses			***38,773.00***
Grand Total Expenses			877,944.00

Annual Report

McKnight Brain Research Foundation
Sponsored Institutes and Research Programs
(Include activity of all McKnight supported faculty and trainees)
Report Period: May 31, 2021

Financial Summary for Endowments

Evelyn F. McKnight Brain Institute at the University of Miami Miller School of Medicine

Summary for 12 months ended May 31, 2021

Account Name: 2002 Gift

A.	Beginning Balance on 6/1/2020	$	11,372,548
B.	Investment Growth	$	3,623,333
C.	Distributions	$	497,276
D.	Additional Contribution	$	0
E.	Ending Balance on 5/31/2021	$	14,498,605
F.	Unmatched Balance (if applicable)		NA

Account Name: 2014 Gift

A.	Beginning Balance on 6/1/2020	$	4,177,533
B.	Investment Growth	$	1,330,976
C.	Distributions	$	182,667
D.	Additional Contribution	$	0
E.	Ending Balance on 5/31/2021	$	5,325,843
F.	Unmatched Balance (if applicable)		NA
	TOTAL ENDING BALANCE ON 5/31/2021	**$**	**19,824,448**

Account Name: McKnight Scholar

A.	Beginning Balance on 6/1/2021	$	0
B.	McKnight Scholar Gift	$	100,000
C.	Ending Balance on 5/31/2022		0

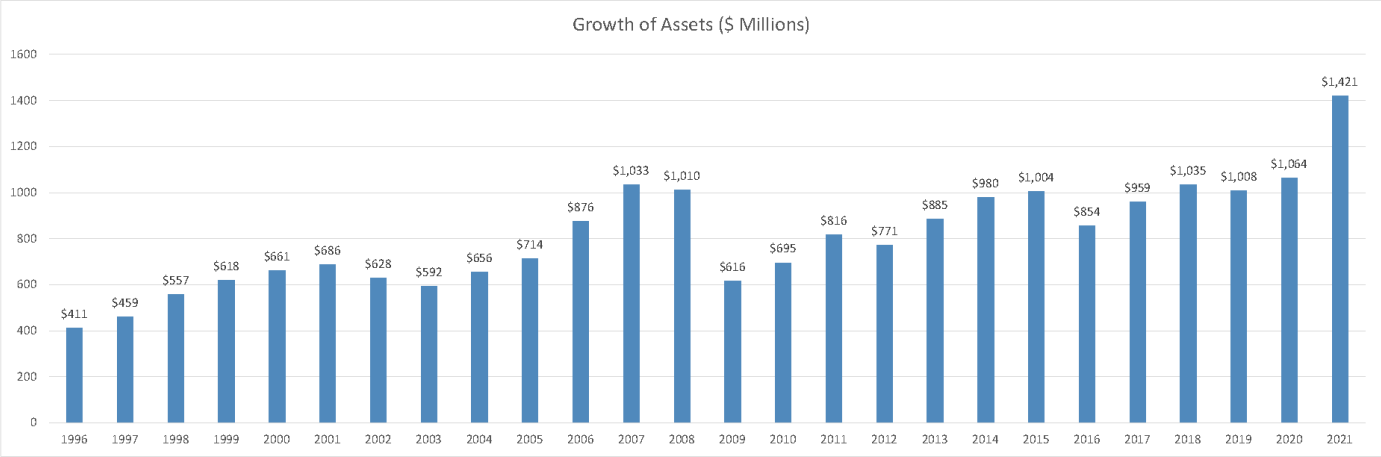
UNIVERSITY OF MIAMI - ALL MANAGED ASSETS
Performance Periods Ending: May 31, 2021

Total Returns (Periods Greater Than 1 Year are Annualized)						
Growth Pool	Inception	1 Year (%)	3 Year (%)	5 Year (%)	7 Year (%)	10 Year (%)
Growth Pool Total Composite*	12/31/1990	33.6	11.0	11.2	7.7	7.8
Growth Pool Market Benchmark**	12/31/1990	33.8	11.6	11.6	8.4	8.5
Value (+/-)		-0.2	-0.6	-0.4	-0.7	-0.7

Inception-to-Date Growth Pool Risk/Return as of May 31, 2021		
Growth Pool	15 Year Return	15 Year Standard Deviation
Growth Pool Total Composite	6.6	10.6
Growth Pool Market Benchmark	6.9	11.6

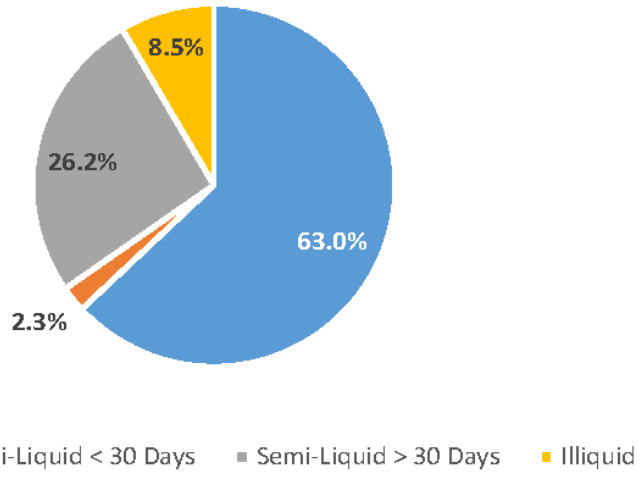
*Net of fee returns

** A weighted average return derived by applying the target policy weights of each asset class to the performance of the asset class benchmarks



UNIVERSITY OF MIAMI - GROWTH POOL

Portfolio Liquidity Restrictions: Based on Market Value



BACK TO TABLE OF CONTENTS

UNIVERSITY OF MIAMI - GROWTH POOL

Manager Structure - Market Values and Allocations Period Ending May 31, 2021

Growth Pool			
Manager	Asset Class	Market Value ($)	% of Total Fund
Large/Mid/All Cap Equity		534,261,411	37.6%
Vanguard Institutional Index (10/31/14)	US Large Cap Core Equity	267,538,750.12	18.8%
Adage Capital Mgmt (6/30/04)	US Large Cap Core Equity	175,951,734.00	12.4%
MFS Large Cap Value (2/2/17)	US Large Cap Value Equity	24,109,525.21	1.7%
Earnest Partners Mid Cap (8/31/2018)	US Midcap Value Equity	30,569,537	2.2%
Janus Enterprise Mid Cap Growth (2/2/17)	US Midcap Growth Equity	23,029,610	1.6%
Vanguard Mid Cap (2/2/17)	US Midcap Core Equity	13,062,255	0.9%
Small Cap Equity		44,780,861	3.2%
Ariel Small Cap (8/31/2018)	US Small Cap Value Equity	32,616,471	2.3%
Artisan Small Cap (08/31/2020)	US Small Cap Equity	12,164,390	0.9%
International Equity		361,383,817	25.4%
Developed International Equity		259,771,213	18.3%
Silchester International (6/30/05)	Non-US DM/EM Value Equity	76,413,684	5.4%
Vanguard Developed Markets (2/2/17)	Non-US DM Core Equity	153,275,753	10.8%
GQG International (4/1/2020)	Non-US DM Core Equity	30,081,776	2.1%
Emerging Markets		101,612,604	7.1%
Neuberger Berman (9/30/2018)	Non-US EM Equity	40,485,786	2.8%
Vanguard FTSE Emerging Markets (2/2/17)	Non-US EM Equity	31,145,632	2.2%
WGI Emerging Markets (10/31/08)	Non-US EM Equity	29,981,186	2.1%
Total Alternative Investments		133,565,078	9.4%
Credit Strategies		44,363,396	3.1%
Davidson Kempner (10/01/93)	Credit Strategy	17,750,466	1.2%
137 Ventures (12/30/2020)	Credit Strategy	1,954,729	0.1%
TCW Talf Fund (4/30/2020)	Credit Strategy	1	0.0%
Octagon CLO III (1/31/2019)	Credit Strategy	138,388	0.0%
Shenkman Opp Crd (8/31/2018)	Credit Strategy	24,519,812	1.7%
Equity Long/Short		37,483,074	2.6%
Viking Global Equities III (11/30/10)	Equity Long/Short	32,052,573	2.3%
Renaissance Institutional (8/31/17)	Equity Long/Short	1	0.0%
Melvin (3/31/2021)	Equity Long/Short	5,179,590	0.4%
Glenview Capital Management (2/01/06)	Equity Long/Short	250,911	0.0%
Multi-Strategy		51,718,608	3.6%
AQR Risk Parity (2/21/17)	Multi-Strategy	35,562,424	2.5%
Janus Multi-Strat (4/1/20)	Multi-Strategy	16,156,184	1.1%
Private Equity		87,136,231	6.1%
TIFF Partners V (04/30/04)	Private Equity	160,262.00	0.0%
Tiff Partners IV (01/31/01)	Private Equity	108,682.00	0.0%
TIFF Partners 2006 (01/31/06)	Private Equity	255,262.00	0.0%
TIFF Partners 2007 (01/31/07)	Private Equity	1,743,665	0.1%

BACK TO TABLE OF CONTENTS

Manager	Asset Class	Market Value ($)	% of Total Fund
Private Equity (Continued)			
TIFF Partners 2008 (01/31/08)	Private Equity	2,918,327	0.2%
OCM Principal Opportunities IV (12/31/06)	Private Equity	5,012	0.0%
Denham Commodity Fund V (6/30/08)	Private Equity	1,174,270	0.1%
Clayton, Dubilier & Rice Fund IX (5/31/2014)	Private Equity	14,500,131	1.0%
645 Ventures (12/31/2020)	Private Equity	917,026	0.1%
Bessemer XI (01/31/2021)	Private Equity	574,392	0.0%
IVP XVII (01/31/2021)	Private Equity	1,300,000.00	0.1%
Carlyle Strategic IV (11/30/16)	Private Equity	4,020,971.00	0.3%
KKR Americas XII (9/30/16)	Private Equity	12,761,804.00	0.9%
HIG Advantage Buyout (4/30/18)	Private Equity	2,602,593.00	0.2%
Carlyle Partners VII (12/31/2018)	Private Equity	6,174,509.00	0.4%
Apollo Investment Fund IX (3/15/2019)	Private Equity	2,625,670	0.2%
Silver Lake Partners (6/30/2018)	Private Equity	14,756,451.00	1.0%
General Atlantic (12/31/19)	Private Equity	4,978,766.00	0.4%
CINVEN Fund VII (1/31/19)	Private Equity	1,142,802.96	0.1%
Broadway Strategic (6/30/19)	Private Equity	1,679,545	0.1%
Spark Capital (5/31/19)	Private Equity	1,138,258.00	0.1%
Spark Growth III (2/29/20)	Private Equity	4,967,661.00	0.3%
Vista Equity Partners (6/30/2018)	Private Equity	6,630,171.00	0.5%
Private Real Assets		51,828,942	3.6%
WCP Real Estate Fund I (7/31/06)	Private Real Assets	1,299,103	0.1%
WCP Real Estate Fund II (11/30/08)	Private Real Assets	93,185	0.0%
SRI Nine REIT (3/31/08)	Private Real Assets	124,756	0.0%
LBA Realty IV (10/31/09)	Private Real Assets	544,628	0.0%
Warburg Energy (5/31/14)	Private Real Assets	4,912,522	0.3%
Grain Communications (12/31/2020)	Private Real Assets	1	0.0%
Lazard Global Infr (8/31/2021)	Public Real Assets	21,632,242.52	1.5%
Ishares Inf. Global ETF (6/30/2018)	Public Real Assets	4,760,812.26	0.3%
ITE Rail (1/31/20)	Private Real Assets	10,003,013.00	0.7%
JPMorgan GTIF (2/29/20)	Private Real Assets	5,267,926.00	0.4%
GS Renew PWR LLC (8/31/2018)	Private Real Assets	3,190,753.00	0.2%
Total Fixed		194,183,210	13.7%
CIFC Sr. Secured Corp Fund (8/31/2018)	Corporate Bonds	32,755,267.36	2.3%
PIMCO Income Fund (7/24/17)	Aggregate Bonds	36,557,518.21	2.6%
Prudential US High Yield (2/2/17)	High Yield Bonds	34,954,812.33	2.5%
SSGA 1-3 YR UST (7/31/19)	Short Duration Bonds	45,904,488.39	3.2%
SSGA US Agg (7/31/19)	Aggregate Bonds	44,011,123.98	3.1%
Cash		14,076,643.04	1.0%
Total Managed Assets		1,421,216,194	100.0%
Allocation to Index or Enhanced Index Strategies			
		Growth Pool	
% of Total:		39.9%	

BACK TO TABLE OF CONTENTS

UNIVERSITY OF MIAMI - GROWTH POOL

Inception to Date Performance vs. Relevant Benchmark(s)

Periods ending - May 31, 2021

Net of Fees

Total Returns (%) - Annualized if Greater than 1 Year			
Large/Mid/All Cap Equity	**ROR**	**Value Added (+/-)**	**Years**
Vanguard Institutional Index (9/30/14)	13.80	-0.47	6.7
S&P 500	14.26		6.7
Adage Capital Mgmt (6/30/04)	13.26	2.91	16.9
S&P 500	10.35		16.9
Earnest Partners Mid Cap (8/31/2018)	17.82	2.75	2.8
Russell Midcap	15.07		2.8
MFS Large Cap Value (2/2/17)	12.46	1.07	4.3
Russell 1000 Value	11.39		4.3
Janus Enterprise Mid Cap Growth (2/2/17)	19.54	-0.35	4.3
Russell Midcap Growth	19.89		4.3
Vanguard Mid Cap (2/2/17)	15.19	-0.03	4.3
CRSP MidCap Index	15.22		4.3
Small Cap Equity			
Ariel Small Cap (8/31/2018)	14.39	4.54	2.8
Russell 2000 Value	9.85		2.8
Artisian Small Cap (8/31/2020)	21.64	-10.39	0.7
Russell 2000 Growth	32.03		0.7
Developed International Equity			
Silchester International (6/30/05)	8.12	2.33	15.9
MSCI EAFE Value ND	5.80		15.9
GQG International (4/1/20)	41.89	-6.62	1.2
MSCI ACWI ex US	48.51		1.2
Vanguard Developed Markets (10/31/2014)	7.36	-0.29	6.6
FTSE Dev All Cap ex US	7.64		6.6
Emerging Markets			
Neuberger Berman (9/30/2018)	11.84	-1.36	2.7
MSCI Emerging Markets ND	13.20		2.7
Vanguard FTSE Emerging Markets (2/2/17)	11.19	-1.24	4.3
MSCI Emerging Markets ND	12.43		4.3
WGI Emerging Markets (10/31/08)	10.63	5.29	2.6
MSCI Emerging Markets ND	5.34		2.6
Credit Strategies			
Davidson Kempner (10/01/93)	8.79	-0.31	27.7
HFR Event-Driven	9.10		27.7
Shenkman Opp Crd (8/31/2018)	9.71	1.54	2.8
HFRI ED: DIST RS (USD)	8.16		2.8
Equity Long/Short			
Viking Global Equities III (11/30/10)	11.12	-0.10	10.5
MSCI World Index	11.22		10.5

BACK TO TABLE OF CONTENTS

Total Returns (%) - Annualized if Greater than 1 Year			
Equity Long/Short (Continued)	**ROR**	**Value Added (+/-)**	**Years**
Melvin (03/31/2021)	3.59	-2.48	0.2
S&P 500	6.07		0.2
Multi-Strategy			
Janus Multi-Strat (4/1/20)	6.57	6.50	1.2
FTSE 1-Month T-Bill	0.07		1.2
AQR Risk Parity (2/21/17)	7.98		4.3
60 MSCI AC WORLD/40 BB Barclays U.S. Aggregate	10.00		4.3
SSGA US Agg (7/31/19)	3.16	-0.80	1.8
BB Barclays U.S. Aggregate	3.96		1.8
Pimco Income Fund (7/24/17)	4.79	1.09	3.9
BB Barclays U.S. Aggregate	3.69		3.9
Prudential US High Yield (2/2/17)	6.64	0.45	4.3
BB Barclays U.S. Corporate High Yield	6.19		4.3
CIFC Sr. Secured Corp Fund (8/31/2018)	3.81	-0.42	2.8
S&P/LTSA Lev Loan Index	4.23		2.8
SSGA 1-3 YR UST (7/31/19)	2.13	-0.30	1.8
BB Barc US Agg Treasury 1-3 Yrs	2.43		1.8

BACK TO TABLE OF CONTENTS


UNIVERSITY OF MIAMI
MILLER SCHOOL OF MEDICINE
EVELYN F. McKNIGHT
BRAIN INSTITUTE

APPENDIX 6

CURRENT BUDGET AND ENDOWMENT INVESTMENT REPORT

BACK TO TABLE OF CONTENTS

Annual Report

BUDGET for June 1, 2021 - May 31, 2022

Revenue from Endowment			**679,944.00**
Revenue Carryover from 2019/2020			**98,000.00**
Revenue for Scholar			**100,000.00**
Total Revenue			**877,944.00**
Personnel			
Faculty	***Role In Project***	***Effort***	
Tatjana Rundek, MD	Scientific Director	25%	
Ralph Sacco, MD	Executive Director	5%	
Xiaojan Sun, MD	Educational Director	10%	
Bonnie Levin, PhD	Neuropsychology	25%	
Kunjan Dave, PhD	Neurology -Basic Science	5%	
Chuanhui Dong, PhD	Neurology	5%	
Noam Alperin, MD	Radiology	10%	
Hong Jiang, MD	Neurology	5%	
Sarah Getz, PhD	Neuropsychology	5%	
Sonya Kaur, PhD	Neuropsychology	10%	
Christian Camargo, MD	Neurology	5%	
Katalina McInereny, PhD	Neuropsychology	10%	
Subtotal Faculty Salary and CFB			***399,743.72***
Christian Agueldo - McKnight Fellow	Neurology	100%	***100,081.00***
Staff	***Role in Project***	***Effort***	
Stacy Merritt	Project Mgr	80%	
Sang Lee	Radiology	10%	
Marti Flothamn	Clinical Outreach Coordinator	80%	
Taylor Ariko	MD PHD Student - Neuro/BioMed	100%	
Isabel Saul	Research Support Specialist- Basic Science	15%	
Anita Saporta	Neuropsycology	25%	
Susan Fox-Rosellini	Marketing/Outreach Admin Director	50%	
Digna Cabral	Neurology	10%	
NeuroPsych 2	Neuropsychology	25%	
NeuroPsych 3	Neuropsychology	25%	
NeuroPsych 4	Neuropsychology	25%	
NeuroPsych 5	Neuropsychology	25%	
Subtotal Staff and CFB			339,346.28
Total Personnel			***839,171.00***
Non Personnel Expenses			
SC08818 - Publication Costs (Excluding Copying)			
SC08801 - Registration Conferences & Seminars			
SC08803 - Dues & Memberships - Other			
SC08611 - Employee Domestic Travel			
SC08619 - Meetings - Subsistence			
SC08624 - Entertainment - F&B, Recep			
SC08852 - Monthly - Lines & Sets & SC08858 - Monthly - Voice Mail			
SC08103 - Advertising - Other			
SC08024 - Interdepart/ Intercomp - Service			
SC08235 - Computer Hardware & Software Non-Capital			
SC08218 - Clerical Supplies			
SC08219 - Instructional supplies			
SC08229 - Photocopy, Publishing, & Print Supplies			
SC08200 - Chemicals/blood samples store/ship			
SC08011 - Interdepartmental / Intercompany - Animal Care Services - Internal			
SC08225 - Technical Supplies - Other			
Total Non Personnel Expenses			***38,773.00***
Grand Total Expenses			877,944.00

Annual Report

McKnight Brain Research Foundation
Sponsored Institutes and Research Programs
(Include activity of all McKnight supported faculty and trainees)
Report Period: May 31, 2021

Financial Summary for Endowments

Evelyn F. McKnight Brain Institute at the University of Miami Miller School of Medicine

Summary for 12 months ended May 31, 2021

Account Name: 2002 Gift

A.	Beginning Balance on 6/1/2020	$	11,372,548
B.	Investment Growth	$	3,623,333
C.	Distributions	$	497,276
D.	Additional Contribution	$	0
E.	Ending Balance on 5/31/2021	$	14,498,605
F.	Unmatched Balance (if applicable)		NA

Account Name: 2014 Gift

A.	Beginning Balance on 6/1/2020	$	4,177,533
B.	Investment Growth	$	1,330,976
C.	Distributions	$	182,667
D.	Additional Contribution	$	0
E.	Ending Balance on 5/31/2021	$	5,325,843
F.	Unmatched Balance (if applicable)		NA
	TOTAL ENDING BALANCE ON 5/31/2021	**$**	**19,824,448**

Account Name: McKnight Scholar

A.	Beginning Balance on 6/1/2021	$	0
B.	McKnight Scholar Gift	$	100,000
C.	Ending Balance on 5/31/2022		0

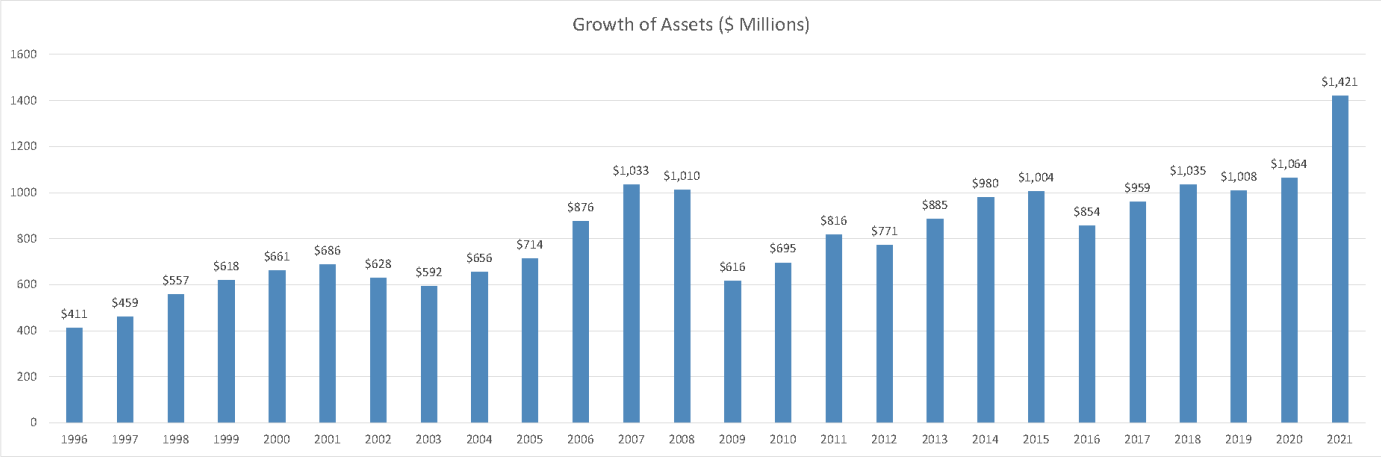
UNIVERSITY OF MIAMI - ALL MANAGED ASSETS
Performance Periods Ending: May 31, 2021

Total Returns (Periods Greater Than 1 Year are Annualized)						
Growth Pool	Inception	1 Year (%)	3 Year (%)	5 Year (%)	7 Year (%)	10 Year (%)
Growth Pool Total Composite*	12/31/1990	33.6	11.0	11.2	7.7	7.8
Growth Pool Market Benchmark**	12/31/1990	33.8	11.6	11.6	8.4	8.5
Value (+/-)		-0.2	-0.6	-0.4	-0.7	-0.7

Inception-to-Date Growth Pool Risk/Return as of May 31, 2021		
Growth Pool	15 Year Return	15 Year Standard Deviation
Growth Pool Total Composite	6.6	10.6
Growth Pool Market Benchmark	6.9	11.6

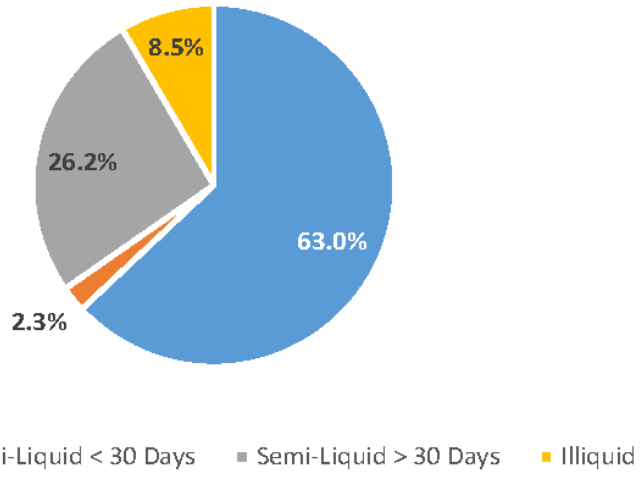
*Net of fee returns

** A weighted average return derived by applying the target policy weights of each asset class to the performance of the asset class benchmarks



UNIVERSITY OF MIAMI - GROWTH POOL

Portfolio Liquidity Restrictions: Based on Market Value



BACK TO TABLE OF CONTENTS

UNIVERSITY OF MIAMI - GROWTH POOL

Manager Structure - Market Values and Allocations Period Ending May 31, 2021

Growth Pool			
Manager	Asset Class	Market Value ($)	% of Total Fund
Large/Mid/All Cap Equity		534,261,411	37.6%
Vanguard Institutional Index (10/31/14)	US Large Cap Core Equity	267,538,750.12	18.8%
Adage Capital Mgmt (6/30/04)	US Large Cap Core Equity	175,951,734.00	12.4%
MFS Large Cap Value (2/2/17)	US Large Cap Value Equity	24,109,525.21	1.7%
Earnest Partners Mid Cap (8/31/2018)	US Midcap Value Equity	30,569,537	2.2%
Janus Enterprise Mid Cap Growth (2/2/17)	US Midcap Growth Equity	23,029,610	1.6%
Vanguard Mid Cap (2/2/17)	US Midcap Core Equity	13,062,255	0.9%
Small Cap Equity		44,780,861	3.2%
Ariel Small Cap (8/31/2018)	US Small Cap Value Equity	32,616,471	2.3%
Artisan Small Cap (08/31/2020)	US Small Cap Equity	12,164,390	0.9%
International Equity		361,383,817	25.4%
Developed International Equity		259,771,213	18.3%
Silchester International (6/30/05)	Non-US DM/EM Value Equity	76,413,684	5.4%
Vanguard Developed Markets (2/2/17)	Non-US DM Core Equity	153,275,753	10.8%
GQG International (4/1/2020)	Non-US DM Core Equity	30,081,776	2.1%
Emerging Markets		101,612,604	7.1%
Neuberger Berman (9/30/2018)	Non-US EM Equity	40,485,786	2.8%
Vanguard FTSE Emerging Markets (2/2/17)	Non-US EM Equity	31,145,632	2.2%
WGI Emerging Markets (10/31/08)	Non-US EM Equity	29,981,186	2.1%
Total Alternative Investments		133,565,078	9.4%
Credit Strategies		44,363,396	3.1%
Davidson Kempner (10/01/93)	Credit Strategy	17,750,466	1.2%
137 Ventures (12/30/2020)	Credit Strategy	1,954,729	0.1%
TCW Talf Fund (4/30/2020)	Credit Strategy	1	0.0%
Octagon CLO III (1/31/2019)	Credit Strategy	138,388	0.0%
Shenkman Opp Crd (8/31/2018)	Credit Strategy	24,519,812	1.7%
Equity Long/Short		37,483,074	2.6%
Viking Global Equities III (11/30/10)	Equity Long/Short	32,052,573	2.3%
Renaissance Institutional (8/31/17)	Equity Long/Short	1	0.0%
Melvin (3/31/2021)	Equity Long/Short	5,179,590	0.4%
Glenview Capital Management (2/01/06)	Equity Long/Short	250,911	0.0%
Multi-Strategy		51,718,608	3.6%
AQR Risk Parity (2/21/17)	Multi-Strategy	35,562,424	2.5%
Janus Multi-Strat (4/1/20)	Multi-Strategy	16,156,184	1.1%
Private Equity		87,136,231	6.1%
TIFF Partners V (04/30/04)	Private Equity	160,262.00	0.0%
Tiff Partners IV (01/31/01)	Private Equity	108,682.00	0.0%
TIFF Partners 2006 (01/31/06)	Private Equity	255,262.00	0.0%
TIFF Partners 2007 (01/31/07)	Private Equity	1,743,665	0.1%

BACK TO TABLE OF CONTENTS

Manager	Asset Class	Market Value ($)	% of Total Fund
Private Equity (Continued)			
TIFF Partners 2008 (01/31/08)	Private Equity	2,918,327	0.2%
OCM Principal Opportunities IV (12/31/06)	Private Equity	5,012	0.0%
Denham Commodity Fund V (6/30/08)	Private Equity	1,174,270	0.1%
Clayton, Dubilier & Rice Fund IX (5/31/2014)	Private Equity	14,500,131	1.0%
645 Ventures (12/31/2020)	Private Equity	917,026	0.1%
Bessemer XI (01/31/2021)	Private Equity	574,392	0.0%
IVP XVII (01/31/2021)	Private Equity	1,300,000.00	0.1%
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Cash		14,076,643.04	1.0%
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BACK TO TABLE OF CONTENTS

UNIVERSITY OF MIAMI - GROWTH POOL

Inception to Date Performance vs. Relevant Benchmark(s)

Periods ending - May 31, 2021

Net of Fees

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S&P 500	14.26		6.7
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Russell 1000 Value	11.39		4.3
Janus Enterprise Mid Cap Growth (2/2/17)	19.54	-0.35	4.3
Russell Midcap Growth	19.89		4.3
Vanguard Mid Cap (2/2/17)	15.19	-0.03	4.3
CRSP MidCap Index	15.22		4.3
Small Cap Equity			
Ariel Small Cap (8/31/2018)	14.39	4.54	2.8
Russell 2000 Value	9.85		2.8
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Silchester International (6/30/05)	8.12	2.33	15.9
MSCI EAFE Value ND	5.80		15.9
GQG International (4/1/20)	41.89	-6.62	1.2
MSCI ACWI ex US	48.51		1.2
Vanguard Developed Markets (10/31/2014)	7.36	-0.29	6.6
FTSE Dev All Cap ex US	7.64		6.6
Emerging Markets			
Neuberger Berman (9/30/2018)	11.84	-1.36	2.7
MSCI Emerging Markets ND	13.20		2.7
Vanguard FTSE Emerging Markets (2/2/17)	11.19	-1.24	4.3
MSCI Emerging Markets ND	12.43		4.3
WGI Emerging Markets (10/31/08)	10.63	5.29	2.6
MSCI Emerging Markets ND	5.34		2.6
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Davidson Kempner (10/01/93)	8.79	-0.31	27.7
HFR Event-Driven	9.10		27.7
Shenkman Opp Crd (8/31/2018)	9.71	1.54	2.8
HFRI ED: DIST RS (USD)	8.16		2.8
Equity Long/Short			
Viking Global Equities III (11/30/10)	11.12	-0.10	10.5
MSCI World Index	11.22		10.5

BACK TO TABLE OF CONTENTS

Total Returns (%) - Annualized if Greater than 1 Year			
Equity Long/Short (Continued)	**ROR**	**Value Added (+/-)**	**Years**
Melvin (03/31/2021)	3.59	-2.48	0.2
S&P 500	6.07		0.2
Multi-Strategy			
Janus Multi-Strat (4/1/20)	6.57	6.50	1.2
FTSE 1-Month T-Bill	0.07		1.2
AQR Risk Parity (2/21/17)	7.98		4.3
60 MSCI AC WORLD/40 BB Barclays U.S. Aggregate	10.00		4.3
SSGA US Agg (7/31/19)	3.16	-0.80	1.8
BB Barclays U.S. Aggregate	3.96		1.8
Pimco Income Fund (7/24/17)	4.79	1.09	3.9
BB Barclays U.S. Aggregate	3.69		3.9
Prudential US High Yield (2/2/17)	6.64	0.45	4.3
BB Barclays U.S. Corporate High Yield	6.19		4.3
CIFC Sr. Secured Corp Fund (8/31/2018)	3.81	-0.42	2.8
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BACK TO TABLE OF CONTENTS