



# CHARTING OUR PROGRESS

**2017 ANNUAL  
REVIEW**

CENTER FOR   
VITAL LONGEVITY

THE SCIENCE OF THE AGING MIND

# ACHIEVEMENTS &

## Further Understanding Effects of Age on Memory

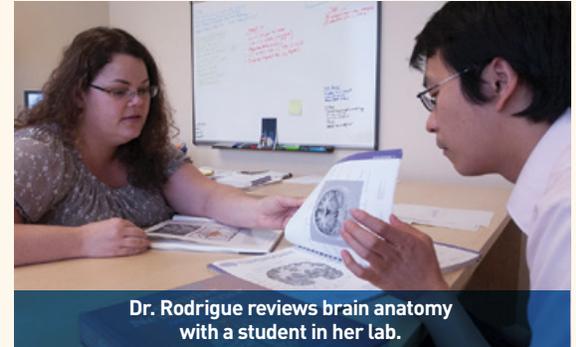
The **Functional Neuroimaging of Memory (FNiM)** lab led by Center Director Dr. **Michael Rugg** continued researching the effects of age on brain function and memory. Throughout the year, Dr. Rugg and lab members published a number of new findings in scientific journals, including the *Neurobiology of Aging*, in which Drs. Danielle King, Marianne de Chastelaine and Rugg examined recollection-related changes in brain connectivity in young, middle-aged and older adults. The findings indicated that there is a weakening with age of the relationship between connectivity change and recollection accuracy. This is thought to reflect a reduction in the influence on connectivity of neurotransmitters such as noradrenaline. Another finding, reported in *NeuroImage* with Dr. de Chastelaine as first author, explored familiarity-driven recognition memory — a sense of past occurrence that can occur even when specific details

of an event cannot be recalled. Dr. de Chastelaine and colleagues reported that the neural activity that accompanies familiarity-based memory judgments remains remarkably stable across much of the healthy adult lifespan, a finding in line with evidence that, unlike more complex forms of memory, familiarity is little affected as we grow older. Other findings reported during the year centered on the *core-recollection network*, a set of brain regions that increase their activity when an event is successfully recollected. In a paper published in the journal *Cortex*, Drs. Rugg, Preston Thakral and Tracy Wang demonstrated that it is possible to 'decode' the content of a remembered event by analyzing the patterns of activity occurring in different core regions. Continued federal

funding also facilitated new research aimed at uncovering the neural underpinnings of memory decline during the course of healthy aging. One focus of this research, which is supported by a continuing grant from the National Science Foundation, aims to understand how age-related differences in the brain's function and structure influence the vividness and accuracy of retrieved memories. Another focus, funded by an ongoing grant funded by the National Institute on Aging, examines how aging impacts the ability to "monitor" retrieved memories. A major new grant from the National Institute on Aging, totaling over \$2.6 million, will support research examining memory function in individuals with mild cognitive impairment, a condition associated with elevated risk for developing dementia due to Alzheimer's Disease. In a continuing collaborative project with Dr. Brad Lega and colleagues of UT Southwestern Medical Center, researchers in the FNiM lab are conducting a comparison of memory-related neural activity as this is indexed by EEG recordings from within the brains of patients undergoing monitoring prior to epilepsy surgery, and by fMRI data acquired from the same patients. Members of Dr. Rugg's lab made several presentations at scientific meetings over the course of the year, including the annual meetings of the Cognitive Neuroscience Society\* and the Society for Neuroscience\*. Over the summer, Dr. Rugg began a two-year term as chair of the Neurobiology of Learning and Memory Study Section of the National Institutes of Health Center for Scientific Review. Additionally, he stepped down after eight years from his position as editor-in-chief of the international journal *Neuropsychologia*. 🌟



Dr. Josh Koen operating the TMS system in Dr. Rugg's lab.



Dr. Rodrigue reviews brain anatomy with a student in her lab.

## Probing the Mechanisms of Healthy Brain Aging

The **Cognitive Neuroscience of Aging Laboratory** continued its research into understanding individual differences in healthy cognitive aging and healthy brain aging. Dr. **Karen Rodrigue** and her lab published several research papers and presented findings from new research that yielded further insight into the factors that drive changes in brain activity as people age. The group reported that older adults who carry the gene APOE4 — the most important known genetic risk factor for late-onset Alzheimer's Disease (AD) — have difficulty adapting their brain activity to increasing cognitive demands. In contrast, older people without the genetic risk factor were as capable of adjusting their activity as young adults. The findings appeared in the *Journal of Neuroscience*. In another study published in the journal *NeuroImage*, the researchers examined how differing levels of beta-amyloid, a key biomarker for AD, were related to brain function. Results showed that the presence of beta-amyloid, even in healthy older adults, can modify the extent to which the brain adjusts its activity in the face of challenging tasks. The findings suggest that subtle changes in brain function, which may be linked to preclinical AD, can be detected early in the course of aging before any cognitive decline emerges. This study was presented by postdoctoral fellow Dr. Chris Foster — a recipient of a young investigator travel award — at the Alzheimer's Association International Conference\*. In August, Dr. Rodrigue's lab was one of the beneficiaries of 10<sup>th</sup> annual BvB football game, which raised \$650,000 in support of Alzheimer's research. The funding is helping the lab begin a new study on brain function in individuals with mild cognitive impairment. In addition, Dr. Rodrigue continued to collaborate with CVL's Dr. Kristen Kennedy on a new \$2.5 million National Institute on Aging grant to track brain and cognitive aging in research participants longitudinally. Dr. Rodrigue is also collaborating with Drs. Warner Schaie and Sherry Willis on the Seattle Longitudinal Study of Aging, one of the longest running longitudinal studies of aging in the United States. In addition to conducting her own research, Dr. Rodrigue served as a reviewer for over a dozen scientific journals. Her lab members presented findings at national and international conferences including the annual meetings of the Organization for Human Brain Mapping\*, the Society for Neuroscience\* and the International Society for Behavioral Neuroscience\*. 🌟

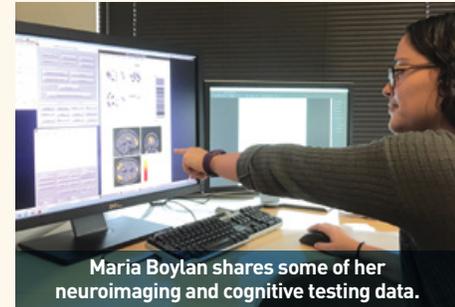
# ACTIVITIES

## A review of Center those within the 6

### Imaging the Aging Brain Structure & Function

Dr. **Kristen Kennedy** secured a \$2.5 million grant from the National Institutes of Health to fund a six-and-a-half year longitudinal follow-up study of approximately 180 people, with the goal of better understanding the factors that influence brain structure, function and cognition over time. Together with Dr. Karen Rodrigue's lab, the **Neuroimaging of Aging and Cognition Laboratory** lab led by Dr. Kennedy published several papers which characterize the age-related differences in the brain's ability to adapt its activity in response to cognitive challenge. These papers were based on the original cross-sectional study that led to the award of the new grant. They included a paper in *NeuroImage* with Dr. Jenny Rieck, now at the University of Toronto, and another paper in the *Neurobiology of Aging*. Further work investigating differences in the abilities of younger and older brains to modulate their neural activities in response to cognitive demands, including the influence of genetic risk factors on these abilities, was published in the *Journal of Neuroscience* and in *NeuroImage* with Drs. Chris Foster and Rodrigue. In a separate National Institute on Aging-funded study, members of Dr. Kennedy's lab described how degraded connections in certain brain regions might affect the ability to perform the financial calculations that are vital to everyday life among older adults. The results came from imaging the quality of white matter connections within the brain. Collaborating with researchers from the University of Alabama at Birmingham, where more than 100 healthy elderly, mildly impaired, and Alzheimer's Disease participants were studied, David Hoagey, a doctoral

student in Dr. Kennedy's lab, analyzed these diffusion-tensor images of the brain and related the measure to each individuals' performance on measures that assessed a variety of financial skills. The research was published in the *Journal of Alzheimer's Disease*. Other collaborative work with the Seattle Longitudinal Study revealed that thinning of brain tissue over time is significantly modulated by genetic and vascular variables. Members of Dr. Kennedy's lab presented these and other findings during the year at the Imaging Genetics Conference\*, the International Behavioral Neuroscience\* annual meeting, the Organization for Human Brain Mapping Conference\*, the Alzheimer's Association International Conference\* and at the Society for Neuroscience\* annual meeting. Additionally, Dr. Kennedy delivered a research update to the BvB Dallas organization, and an October update to CVLs Advisory Council. In a wider role, Dr. Kennedy served as Handling Editor for the journal *NeuroImage*, and was newly appointed an associate editor for the *Journal of Alzheimer's Disease*. A doctoral student in her lab, Maria Boylan, was selected as the recipient of a P.M. & J.G. Williamson Foundation grant. 🌟



Maria Boylan shares some of her neuroimaging and cognitive testing data.

### Measuring & Manipulating Brain Network Organization & Function

Dr. **Gagan Wig's Cognitive Neuroimaging Laboratory** was awarded a grant from the National Science Foundation (NSF) to investigate whether certain cognitive abilities can be enhanced by directly modulating brain function with non-invasive brain stimulation. The project involves stimulating a small patch of the brain's cortex, using a technique known as transcranial magnetic stimulation (TMS), in an effort to enhance cognitive abilities such as executive function, long-term memory, and language in healthy young adults. The study involves extensive cognitive testing and measurements of brain network organization using functional magnetic resonance imaging, acquired both prior to and following multiple TMS sessions. The TMS sessions themselves are targeting critical "nodes" within brain systems that have been implicated in cognition. By initially focusing on modifying cognition in healthy young adults, the researchers hope to develop methods to improve cognition in older populations and individuals suffering from memory impairment. Throughout the year, researchers in the CNL published a number of new findings on brain anatomy and functional network organization over the



Dr. Wig and Dr. Micaela Chan go over data one afternoon at CVL.

adult lifespan. This research appeared in *Human Brain Mapping* and the *Journal of Neuroscience*, respectively. Dr. Wig also published a major review of human brain networks, describing their importance for understanding both healthy and disordered brain function. The review discusses how maintaining segregated networks allows the brain to adapt to the demands of different tasks while remaining protected from minor insults. The paper was published in *Trends in Cognitive Sciences*. At the annual meeting of the American College of Neuropsychopharmacology\*, Dr. Wig presented some of his work on brain networks in major depressive disorder. Dr. Wig reported that the way the brain is organized while "at rest" (i.e., when the individual is not tasked with any particular activity) can be useful in separating patients with major depressive disorder into clinically distinct subgroups. This work was conducted in collaboration with Dr. Madhukar Trivedi, chair of depression research and clinical care at UT Southwestern. In a meeting of Dallas and Austin-area memory researchers, co-organized by Dr. Wig and held at UT Austin, members of the CNL presented their research on aging and brain networks. 🌟

### Center scientists published more than 25 papers in peer-reviewed journals during the year:

- Basak, C. & Qin, S. (In press). Virtual tools for cognitive training in healthy aging and mild cognitive impairment. In R. Pak & A. C. McLaughlin (Eds.), *Aging, Technology, and Health*. New York, New York: Elsevier.
- Chan, M.Y., Alhazmi, F., Park, D.C., Savalia, N.K., Wig, G.S. (2017). Resting-state network topology differentiates task signals across the adult lifespan. *Journal of Neuroscience*, 37, 2734-2745.
- Chen, X., Hertzog, C., Park D.C. (2017). Cognitive predictors of everyday problem solving across the lifespan. *Gerontology*, 63, 372-384.
- de Chastelaine, M., Mattson, J.T., Wang, T.H., Donley, B.E., Rugg, M.D. (2017) Independent contributions of fMRI familiarity and novelty effects to recognition memory and their stability across the adult lifespan. *NeuroImage*, 156, 340-351.
- Farrell, M.E., Kennedy, K.M., Rodrigue, K.M., Wig, G.S., Bischof, G.N., Rieck, J.R., Chen, X., Festini, S.B., Devous, M.D. Sr., Park, D.C. (2017). Association of longitudinal cognitive decline with amyloid burden in middle-aged and older adults: Evidence for a dose-response relationship. *JAMA Neurology*, 74, 830-838.
- Foster, C.M., Kennedy, K.M., Hoagey, D.A., Horn, M.M., Rodrigue, K.M. (2018). Both hyper- and hypo-activation to cognitive challenge are associated with increased beta-amyloid deposition in healthy aging: A nonlinear effect. *NeuroImage*, 166, 285-292.

- Foster, C.M., Kennedy, K.M., Rodrigue, K.M. (2017). Differential aging trajectories of modulation of activation to cognitive challenge in APOE ε4 groups: Reduced modulation predicts poorer cognitive performance. *Journal of Neuroscience*, 37, 6894-6901.
- Gerstenecker, A., Hoagey, D.A., Marson, D.C., Kennedy, K.M. (2017). White matter degradation is associated with reduced financial capacity in mild cognitive impairment and Alzheimer's Disease. *Journal of Alzheimer's Disease*, 60, 537-547.
- Horn, M.M., Kennedy, K.M., Rodrigue, K.M. (In press). Association between subjective memory assessment and associative memory performance: Role of AD risk factors. *Psychology and Aging*, Special Issue on Age-Related Differences in Associative Memory.
- Kennedy, K.M., Rieck, J.R., Boylan, M.A., Rodrigue, K.M. (2017). Functional magnetic resonance imaging data of incremental increases in visuo-spatial difficulty in a large adult lifespan sample. *Data in Brief*, 11, 54-60.
- Kennedy, K.M., Boylan, M.A., Rieck, J.R., Foster, C.M., Rodrigue, K.M. (2017). Dynamic range in BOLD modulation: Lifespan aging trajectories and association with performance. *Neurobiology of Aging*, 60, 153-163.
- King, D.R., de Chastelaine, M., Elward, R.L., Wang, T.H., Rugg, M.D. (In press). Dissociation between the neural correlates of recollection and familiarity in the striatum and hippocampus: Across-study convergence. *Behavioral Brain Research*.
- King, D.R., de Chastelaine, M., Rugg, M.D. (2018). Recollection-related increases in functional connectivity across the healthy adult lifespan. *Neurobiology of Aging*, 62, 1-19.
- Lega, B., Germi, J., Rugg, M.D. (2017). Modulation of oscillatory power and connectivity in the human posterior cingulate

### Peer-Reviewed Scientific

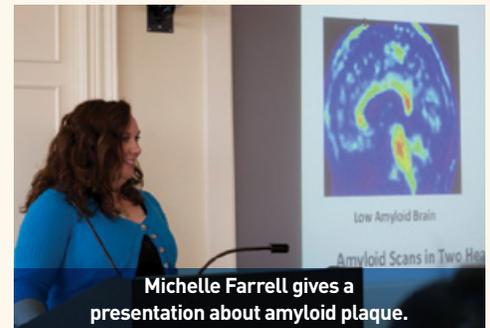
# activities over the past year, including laboratories that are the Center's core.

## Predicting & Possibly Preventing Cognitive Decline Earlier in the Lifespan

The **Aging Mind Laboratory**, led by Dr. **Denise Park**, continued its focus on the Dallas Lifespan Brain Study (DLBS), presenting and publishing new findings from the project, as well as receiving \$5.7 million from the National Institute on Aging (NIA) to extend the DLBS for five more years. The study was initiated when Dr. Park first arrived in Dallas from the University of Illinois at Urbana-Champaign in 2008, funded by a 10-year MERIT Award from the NIA. The DLBS uses neuroimaging techniques to measure changes in brain structure and function in healthy adults over a period of years and to relate these changes to cognitive function. Nearly 500 people, ranging in age from 20 to 89, have been enrolled. The study includes measurement of brain amyloid, a potential early marker of Alzheimer's Disease. In the past year, Dr. Park's research team has begun to develop a "neural footprint" of what predicts cognitive decline or cognitive stability as people age. One major finding from the study this past year was that the amount of amyloid detected in individuals' brains at the time of entry into the study predicted the magnitude of cognitive decline over the subsequent four years. Graduate student Michelle Farrell was the lead author on the paper, which was published in *JAMA Neurology*, along with Dr. Sara Festini, graduate student Xi Chen, Dr. Park and others. Dr. Farrell has since completed her doctorate and taken up a postdoctoral appointment to work with Dr. Reisa Sperling at Massachusetts General Hospital, part of Harvard University. In other developments, Dr. Park was elected to the Publications

and Communications Board of the American Psychological Association (APA), which oversees the extensive APA publishing operation, including the appointment of editors. In addition, her work was cited throughout the year by multiple media outlets including *The New York Times* and the *BBC News*.

Members of the Aging Mind Lab attended conferences and symposia, presenting original findings at such meetings as the Alzheimer's Association International Conference\* and the Human Amyloid Imaging Conference\*, where Drs. Farrell and Festini presented their research on the relationship between amyloid burden and cognitive functions in healthy adults. In other news, Dr. Festini, the Aging Mind Foundation Postdoctoral Fellow in the lab, accepted a position at the University of Tampa as an assistant professor of psychology while postdoctoral student Avanti Dey joined the lab in November from Columbia University. ☀



Michelle Farrell gives a presentation about amyloid plaque.

## Delaying Dementia with Video-based Cognitive Training

Dr. **Chandramallika Basak**, who leads the **Lifespan Neuroscience & Cognition Lab** (LiNC), received more than \$420,000 over three years as part of an NIH Small Business Innovation Research Program grant awarded during the year. The funding recognizes the role of her lab, in collaboration with the University of Iowa, as a test site for evaluating a genre of video game training that may enhance brain plasticity and delay the onset or progression of Alzheimer's Disease. In another set of studies, Dr. Basak and her team in the LiNC Lab investigated the brain regions typically associated with different video games in both younger and older adults. In research published in *Restorative Neurology and Neuroscience* earlier in the year, Dr. Basak and her team reported that learning to play strategy-based games resulted in increased processing speed and brain connectivity, while learning to play an action game led to greater activity in a brain region linked to mood. The also reported that both genres of games led to better performance on tasks engaging working memory. Later in the year, researchers in the lab, including graduate students Shuo Qin and Maggie O'Connell, completed a comprehensive meta-analysis that compared the effects of cognitive training on cognitively healthy people versus people with mild cognitive impairment (MCI). The analysis compared gains across different types of training modules that targeted a single cognitive

component, multiple cognitive components, or social engagement. Results shared at the Annual Psychonomic Society Meeting\* suggested that cognitive training in more than one component improved cognition in healthy older adults. In MCI patients, however, targeting a specific cognitive function during training while isolating others may be more effective in preserving cognition. Members of Dr. Basak's lab also presented new research findings on task complexity, functional connectivity and attention in a nanosymposium held at the annual meeting of Society for Neuroscience\*. Additionally, Dr. Basak and Shuo Qin had a manuscript on virtual training in healthy aging and mild cognitive impairment accepted in *Aging, Technology and Health*. At year-end, Dr. Basak teamed up with the Perot Museum for a visual illusions exhibit that was shown during the museum's annual "Night at the Museum" gala. ☀



Andrew Sun, a research assistant in Dr. Basak's Lab, tests a new portable EEG headpiece.

## ific Publications in 2017

cortex supports the encoding and retrieval of episodic memories. *Journal of Cognitive Neuroscience*, 8, 1415-1432

Lin, J.J., Rugg, M.D., Das, S., Stein, J., Rizzuto, D.S., Kahana, M.J., Lega, B. (2017) Theta band power increases in the posterior hippocampus predict successful episodic memory encoding in humans. *Hippocampus*, 10, 1040-1053.

Liu, Peiyang, Li, Y., Pinho, M., Park, D.C., Welch, B.G., Lu, H. (2017). Cerebrovascular reactivity mapping without gas challenges. *NeuroImage*, 146, 320-326.

Miller, K.J., Hermes, D., Pestilli, F., Wig, G.S., Ojemann, J.G. (2017). Face percept formation in human ventral temporal cortex. *Journal of Neurophysiology*, 118, 2614-2627.

Na, Jinkyung, Huang, C.M., Park, D.C. (2017). When age and culture interact in an easy and yet cognitively-demanding task: older adults, but not younger adults show the expected cultural difference. *Frontiers in Psychology*, 8, 457.

Nashiro, K., Qin, S., O'Connell, M.A., Basak, C. (In press) Age-related Differences in BOLD Modulation to Cognitive Control Costs in a Multitasking Paradigm: Global Switch, Local Switch, and Compatibility-Switch Costs. *NeuroImage*.

Park, D.C. & Festini (In press). Cognitive health. In Bornstein, R.H., (Ed.) *The SAGE Encyclopedia of Lifespan Human Development*. Thousand Oaks, Calif.: SAGE Publishing.

Rast, P., Kennedy, K.M., Rodrigue, K.M., Robinson, P.R.A.W., Gross, A.L., McClaren, D.G., Grabowski, T., Schaie, K.W., Willis, S.L. (2017). APOE4 genotype and hypertension modify 8-year cortical thinning: Five occasion

evidence from the Seattle Longitudinal Study. *Cerebral Cortex*, 21, 1-12

Ray, N.R.R., O'Connell, M.A., Nashiro, K., Smith, E.T., Qin, S., Basak, C. (2017) Evaluating the relationship between white matter integrity, cognition and varieties of video game learning. *Restorative Neurology and Neuroscience*, 35, 437-456.

Rieck, J.R., Rodrigue, K.M., Boylan, M.A., Kennedy, K.M. (2017). Age-related reduction of BOLD modulation to cognitive difficulty predicts poorer task accuracy and poorer fluid reasoning ability. *NeuroImage*, 147, 262-271.

Rugg, M.D. & King, D.R. (In press) Ventral lateral parietal cortex and episodic memory retrieval. *Cortex*.

Savalia, N.K., Agres, P.F., Chan, M.Y., Feczko, E.J., Kennedy, K.M., Wig, G.S. (2017). Motion-related artifacts in structural brain images revealed with independent estimates of in-scanner head motion. *Human Brain Mapping*, 38, 472-492.

Sweeney-Reed, C.M., Zaehle, T., Voges, J., Schmitt, F.C., Buentjen, L., Borchardt, V., Walter, M., Hinrichs, H., Heinze, H.J., Rugg, M.D., Knight R.T. (2017) Anterior thalamic high frequency band activity is coupled with theta oscillations at rest. *Frontiers in Human Neuroscience*, 11, 1358.

Thakral, P.P., Wang, T.H., Rugg, M.D. (2017). Decoding the content of recollection within the core recollection network and beyond. *Cortex*, 91, 101-113.

Wig, G. (2017). Segregated systems of human brain networks. *Trends in Cognitive Sciences*, 21, 981-996.

# CENTER TALKS & EVENTS

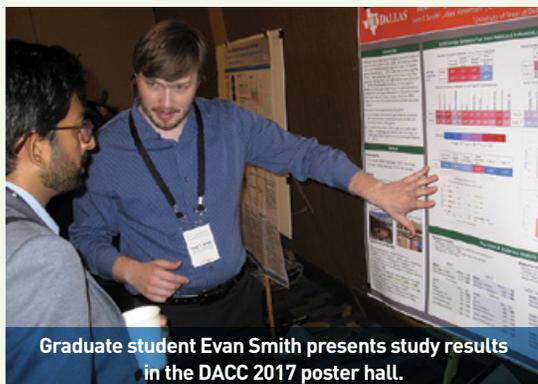
## The 2017 Dallas Aging & Cognition Conference

The fifth biennial Dallas Aging and Cognition Conference (DACC) was held at the end of January, bringing together cognitive neuroscientists from across the world to downtown Dallas for two days of talks organized along four themes: “Neural Organization and Connectivity,” opened by plenary speaker Dr. Cheryl Grady, of the University of Toronto; “The Biomarkers of Successful and Unsuccessful Aging,” opened by Dr. William Jagust of the University of California, Berkeley; “Cognitive Reserve,” opened by Dr. Yaakov Stern of Columbia University; and “Neural Stimulation, Cognitive Training and Enrichment,” opened by Dr. Cindy Lustig of the University of Michigan.

About 250 researchers discussed the latest developments in the cognitive neuroscience of aging, including the imaging of brain pathologies thought to



Dr. Kristen Kennedy presents at DACC 2017.



Graduate student Evan Smith presents study results in the DACC 2017 poster hall.

play a crucial role in the onset and development of Alzheimer’s Disease and other forms of dementia. Scientists from over 50 universities attended, including several attendees from universities in Germany, South Korea, England, Australia and Canada. There were particularly large groups from the

University of Michigan, and from Massachusetts General Hospital/Harvard University. The conference was made possible with generous support from the UT Dallas School of Behavioral and Brain Sciences, and the Office of the Provost. ☀



Dr. Marilyn Albert discusses recent advancements in treating Alzheimer’s Disease.

## The 2017 Jean & Bill Booziotis Distinguished Lecture

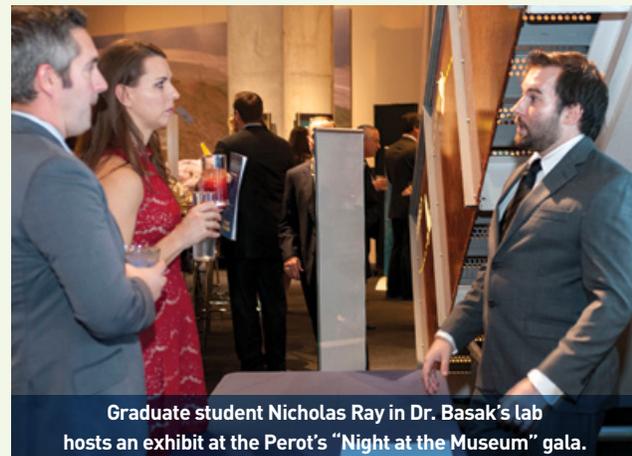
Dr. Marilyn Albert, who directs the Division of Cognitive Neuroscience at Johns Hopkins University, delivered the fourth annual Jean & Bill Booziotis Distinguished Lecture at the Communities Foundation of Texas in April.

More than 150 community members and CVL supporters gathered to hear about recent advances toward developing effective treatments of Alzheimer’s Disease. Determining who is at risk for developing Alzheimer’s well before symptoms appear is a major challenge faced by researchers and clinicians seeking to treat this form of dementia, Dr. Albert said. With advances in imaging, such as PET scanning to identify potentially harmful plaque deposits, and improvements in cognitive and genetic testing, however, characteristic signs of disease are being detected earlier. Finding even more accurate or sensitive biological markers that determine risk perhaps decades before onset could have profound impacts on public health ahead, she said. ☀

# OUTSIDE TALKS & PRESENTATIONS\*

*In 2017, Center scientists gave more than 40 presentations & invited talks internationally, nationally and locally at such meetings as:*

Psychonomic Society Annual Meeting, Vancouver, Canada  
Memory Disorders Research Society Annual Meeting, Chicago, Illinois  
Society for Neuroscience Annual Meeting, Washington, D.C.  
Cognitive Neuroscience Society Annual Meeting, San Francisco, California  
Alzheimer’s Association International Conference, London, England  
Human Amyloid Imaging Conference, Miami, Florida  
Organization for Human Brain Mapping Conference, Vancouver, Canada  
Dallas & Austin-Area Memory Meeting, Austin, Texas  
American Col. of Neuropsychopharmacology Annual Meeting, Palm Springs, California  
International Imaging Genetics Conference, Irvine, California  
International Behavioral Neuroscience Annual Meeting, Las Vegas, Nevada  
Highland Park Presbyterian Church Speaker Series, Dallas, Texas  
Belmont Village Alzheimer’s & Brain Awareness Month Lecture, Dallas, Texas  
Caruth Haven Court Family Connections Speaker Series, Dallas, Texas  
Perot Museum Night of Intrigue Annual Gala, Dallas, Texas



Graduate student Nicholas Ray in Dr. Basak’s lab hosts an exhibit at the Perot’s “Night at the Museum” gala.

# DIRECTOR'S RESEARCH CIRCLE ACTIVITIES

The Director's Research Circle (DRC) hosted a number of activities throughout the year, giving supporters unique opportunities to interact with Center and visiting scientists.

A highlight associated with the 2017 Dallas Aging & Cognition Conference in January was a special DRC dinner that featured a talk by the University of California, Berkeley's Dr. William Jagust, a professor of public health and neuroscience. Dr. Jagust described the advances in understanding Alzheimer's Disease being achieved through studying families who have a heritable form of the disease. He also explained how new imaging techniques permit scientists to study the accumulation of amyloid plaques and the infiltration of tau protein in the brains of seemingly healthy adults, providing an understanding of the earliest phases of Alzheimer's.

In connection with April's Jean & Bill Booziotis Distinguished Lecture, Dr. Marilyn Albert, director of the Division of Cognitive Neuroscience at Johns Hopkins University, met with DRC members in a reception attended by UT Dallas Executive Vice President Hobson Wildenthal, and members



Chairman Lawrence Warder greets January DRC speaker Dr. William Jagust, as Dr. Denise Park looks on.



DRC member Dr. Kenneth Altschuler with DRC speaker Dr. Carol Tamminga.

of the CVL advisory council. Following the reception, members gathered at the Communities Foundation of Texas, the site of the fourth annual lecture, to learn about the need to intervene in the Alzheimer's Disease process much earlier by pursuing more sensitive biomarkers that can detect risk factors before they spur the recognizable symptoms commonly associated with the disease.

In early October, UT Southwestern chair of psychiatry Dr. Carol Tamminga spoke at the Center for Vital Longevity about psychotic illnesses and their connection to memory disorders. Until relatively recently, mental illnesses such as schizophrenia were diagnosed by their behavioral symptoms or "phenomenology," Dr. Tamminga told the group. Dr. Tamminga's work aims to understand the biological underpinnings of schizophrenia and related illnesses, she reported, to help develop more rational, individualized treatments.

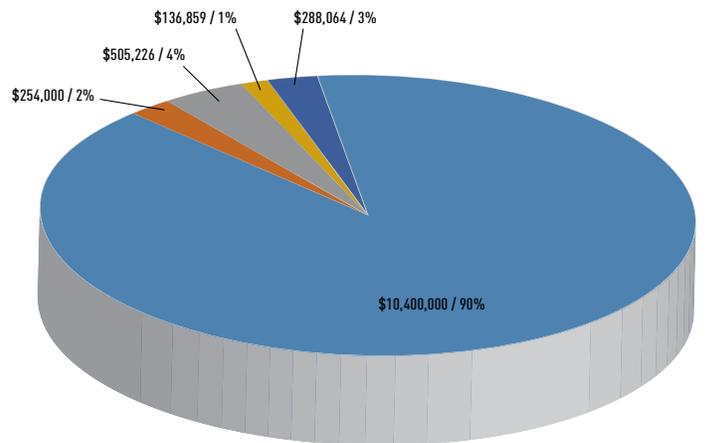
Making a minimum gift of \$2,500 annually, members of the DRC are invited to private receptions, lectures and dinners with internationally recognized scientists during the year. Please visit [supportcvl.org](http://supportcvl.org) to learn more about the benefits of joining. 🌞

## 2017 CVL ADVISORY COUNCIL

The advisory council of the Center for Vital Longevity, in partnership with the UT Dallas Office of the President, brings together a group of distinguished individuals, community leaders and UTD alumni with a commitment to the vision and goals of the Center. The Council's mission is to provide assistance to the Center through annual philanthropic support, community engagement, strategic introductions and advocacy. The council, currently chaired by Mr. Lawrence Warder, comprises 19 individuals who represent a critical intersection of mutual interests, business concerns and non-profit pursuits in the community.

- Mr. Lawrence Warder, Retired CFO, US Department of Education
- Ms. Chela Abdallah, Community Volunteer
- Ms. Mary Susan Barnhill, Owner, MSB Interiors
- Ms. Cassie Crosby, Community Volunteer
- Mr. Giles Davidson, Managing Partner, GoWest
- Ms. Lisanne Glew, First Vice President, UBS
- Ms. Roslyn Thibodeaux Goodall, Community Volunteer
- Ms. Jannah Hodges, Managing Partner, Hodges Partners
- Ms. Laree Hulshoff, Community Volunteer
- Ms. Linda Ivy, Community Volunteer
- Mr. Ken Kay, Partner, Armanino, LLP
- Ms. Ocie Kazee-McCallister, District Director, State Representative Toni Rose
- Ms. Lindsey Kluempers, Commercial Lines Insurance, Swingle Collins & Associates
- Ms. Joan E. Mason, Portfolio Manager, Morgan Stanley Wealth Management
- Mr. Scott Murray, Chairman/CEO, Murray Media
- Ms. Nancy M. O'Neil, Community Volunteer
- Mr. Charles Seay, Sr. Implementation Manager, Tonic Health
- Ms. Lisa Shardon, CEO, Home Health Companions
- Dr. John Stilwell, Clinical Professor, UT Dallas

## EXTERNAL RESEARCH FUNDING



- National Institute on Aging (NIH)
- BvB
- National Science Foundation
- National Institute of Health—Small Business Innovation Research
- Private Gifts and Individual Donations