Vol. 3 No. 3
FALL 2012

# Neural Activities

THE NEWSLETTER OF THE CENTER FOR VITAL LONGEVITY

## Center welcomes three new faculty members

The Center for Vital Longevity is boosting its research efforts toward delaying the onset of dementia and improving long-term cognitive health. Three new faculty research scientists at the forefront of understanding how the brain and cognition change with age join the center this year.

Drs. Kristen Kennedy, Karen Rodrigue, and Gagan Wig join the ranks of UT Dallas' accomplished faculty this year—as assistant professors in the School of Behavioral and Brain Sciences. They will be launching their new laboratories and research programs under the mentorship of center co-directors Dr. Denise Park and Dr. Michael Rugg.

Dr. Kristen Kennedy is one of three new faculty members joining the center this year.

***FACULTY*** *continued on page 5*

## On Our Minds

*A message from the center directors*

### Are we making progress on Alzheimer's disease?


Denise Park, PhD


Michael Rugg, PhD

Several recent news stories have described the failure of major drug candidates to slow or halt the progression of Alzheimer's disease. Although these setbacks are disappointing, they are helping to inform a new era of Alzheimer's disease research made possible by advanced new imaging tools being used by scientists at the Center for Vital Longevity and around the world.

Previous Alzheimer's drug trials have focused on reducing levels of amyloid in the brain. Excess accumulation of amyloid is thought to impair brain function and is a hallmark of the disease. Many scientists believe that amyloid accumulation is the actual cause of Alzheimer's disease but that anti-amyloid drugs have failed because patients received them too late—after irreversible damage to the brain has already occurred.

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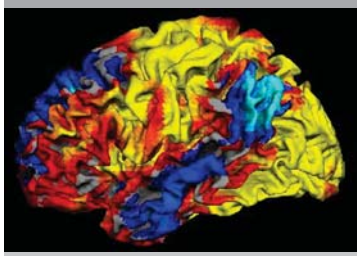

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# RESEARCH UPDATE

Results from a new study shed light on how the brain tackles math and suggest a possible route to aiding those with math learning disabilities, as well as older adults whose math skills have dulled.

The parietal cortex, the brain region located behind the frontal lobe, plays a central role in numerical cognition—our ability to understand and manipulate numbers. Brain imaging studies have shown that the right parietal cortex is primarily involved in basic quantity processing (like gauging relative amounts of fruit in baskets), while the left parietal cortex is involved in precise number processing and numerical tasks like addition and subtraction.

In the new study, led by postdoctoral fellow Dr. Joonkoo Park of Duke University and conducted in Dallas, researchers used functional magnetic resonance imaging to measure the brain activity of 27 healthy young adults while they performed simple numerical and arithmetic tasks. In one task, they were asked to judge whether two groups displayed the same or different numbers of shapes. In two other tasks, they were asked to solve simple addition and subtraction problems.

The researchers found that during the basic number-matching task, participants showed activity mainly in the right parietal cortex, consistent with previous studies. When challenged by addition and subtraction problems, however, participants showed additional activation in the left parietal cortex, suggesting that the subtraction task required more brain power than the other tasks. Moreover, the strength of the connection between the two brain regions predicted fast performance on the subtraction task.

"Our results suggest that when there is strong activity in left and right parietal regions at the same time, rather than just one side alone, subtraction performance is optimal," said center co-director Dr. Denise Park, who co-authored the study along with University of Michigan colleague Dr. Thad Polk.

The findings suggest that disruptive or inefficient communication between brain regions may contribute to the impaired math abilities seen in dyscalculia, the numerical equivalent of dyslexia. If that is indeed the case, it might be possible to improve numerical competence by developing training tasks designed to enhance connectivity between brain regions. Such a program might also help older adults whose math skills begin to falter as a normal part of age-related cognitive decline.

# SCIENTIST SPOTLIGHT

***Meet the Center for Vital Longevity researchers.***

PRESTON THAKRAL

Dr. Preston Thakral joined the center in July as a postdoctoral researcher in the laboratory of Dr. Michael Rugg after receiving his PhD in neuroscience from Boston College. His research is focused on understanding the neural mechanisms associated with memory retrieval. In his free time, Preston enjoys taking care of his crested gecko and listening to his favorite band, Metallica.

KAORU NASHIRO

Dr. Kaoru Nashiro joined the lab of Dr. Chandramallika Basak as a postdoctoral researcher in September after receiving her PhD in gerontology from the University of Southern California. The goal of her research is to identify general learning strategies for older adults by understanding how the aging brain processes information. In her free time, she enjoys hiking and Polynesian dancing.

# Mental Notes

***Alzheimer's expert headlines center event***

Dr. David Bennett, internationally recognized neuroscientist and director of the Rush Alzheimer's Disease Center at Rush University Medical Center in Chicago, Illinois, will speak at a reception for the Directors' Research Circle—a key group of donors to the Center for Vital Longevity—on September 24, 2012.

Dr. Bennett's research is focused on understanding how genetic and environmental risk factors contribute to cognitive decline and Alzheimer's. He is particularly interested in why and how many older people are able to live with the telltale signs of Alzheimer's in their brains without suffering from severe memory loss or other cognitive problems.

One of Dr. Bennett's best known research studies, featured on HBO's documentary series "The Alzheimer's Project," is the Religious Orders Study—a multi-center study involving more than 1100 older nuns, priests and brothers who have agreed to medical and psychological evaluation each year and to donate their brains to research upon their death.

Researchers hope to discover what changes in the brain are responsible for memory and movement problems in the elderly. They are also studying the transition from healthy brain aging to the mild cognitive impairment that can be an early sign of Alzheimer's disease, and how behavior, lifestyle and education affect this progression.

Dr. David Bennett

*For more about the **Directors' Research Circle**, contact Patti Broyles, Director of Development, at 972-883-3728.*

## BENCHMARKS

## Center grad student given a "nextgen voice"

Fourth-year graduate student Gérard Nisal Bischof was given a voice in one of the world's leading scientific journals this past summer.

*Science Magazine* asked young scientists to describe a specific experience that changed their research, training, or careers goals. Bischof's response was chosen as one of the best and was published in the "NexGen Voices" section of the journal's July 6 issue.

Bischof grew up in Germany, and when he was 18, worked in a hospice for a year as part is his civilian service requirement. He learned a number of life lessons from the older adults he helped care for, like the importance of changing priorities when you get older, of "letting things go," and the value of time over money.

"These and other experiences inspired me to study the psychology and neuroscience of aging, because I realized that the aging mind and body have a fascinating potential for recovery and experience that is often so underutilized," Bischof told *Science*.

Under the direction of center co-director Dr. Denise Park, Bischof is currently using brain-imaging techniques to examine how age-related changes in the brain affect cognitive functions such as memory and processing speed.

# Questions About Cognition

*Do you have a question about the aging mind and how it works? To submit a question, please visit us online at:* ***vitallongevity.utdallas.edu/newsletter***

## Is multitasking a good use of brain power?

Doing more than one thing at once might intuitively seem like a good way to save time, but not from the brain's perspective.

Except for a very small percentage of so-called "supertaskers," attempting to complete two or more tasks at once causes us to divide our attention, so that we focus less on each activity. As a result, multitasking can end up taking more time—and make us more prone to error—than if we did one task at a time.

That doesn't mean that drinking coffee while watching the morning news on TV isn't possible. But in general, tasks that require mental processing seem to be handled sequentially by the brain, not simultaneously. So, although we may think we are multitasking, our brain is rapidly switching its attention resources back and forth from one task to the next—not the most efficient use of brain power.

Focusing on one task at a time is likely to get the job done more quickly and with better results.

# Support the Center

### PLANNED GIVING

Planned gifts give the Center for Vital Longevity the opportunity to plan for future growth, knowing that these philanthropic commitments will be realized in the years to come.

Planned gifts may take the form of a bequest, charitable gift annuity, charitable remainder trust, or life insurance.

### THE LEGACY SOCIETY

The Legacy Society recognizes any individual who has made a planned gift commitment to UT Dallas.

Your membership allows us to thank and honor you for the plans you have made, and we hope it will inspire generosity in others.

Benefits include an annual recognition event, invitations to special events, and information on tax saving measures for you and your family.

### CHARITABLE GIFT ANNUITIES

If you are over 55 and want to support groundbreaking research on the aging mind, consider a charitable gift annuity (CGA).

A CGA is a contract between you and The University of Texas Foundation. You make a gift of at least $10,000 to the Center for Vital Longevity at UT Dallas and we send you a payment each month, quarter or year for 4–8% of your contribution, depending on your age.

Depending on your age, a CGA can provide a greater return than a lot of assets in your retirement portfolio. Plus, CGAs give you an immediate tax deduction. Best of all, you're investing in pivotal research that will improve the cognitive health and vitality of present and future generations—and there is no better investment!

To learn more about making a planned gift or other opportunuites for supporting the center's work, please contact Patti Broyles, Director of Development, at **pbroyles@utdallas.edu** or **972-883-3728**.

## FACULTY *continued from page 1*

"We are excited to welcome these outstanding new faculty to UT Dallas and are confident that their discoveries will lead to tangible benefits to science and society while helping to raise the university into the top tier of research institutions," said Dr. Bert Moore, Dean of the School of Behavioral and Brain Sciences. "They add to the core of excellence established at the Center for Vital Longevity, which in its short history has become an international leader in improving our understanding of cognitive aging."

Drs. Kennedy and Rodrigue are both recipients of the prestigious Pathway to Independence Award from the National Institute on Aging, a highly competitive career-development grant given to only a handful of recipients each year. They also know their way around the center—both previously trained as postdoctoral research scientists in the laboratory of Dr. Park.

Dr. Kennedy is interested in understanding how the brain changes with age—both adaptively, and detrimentally—and how this knowledge might be used to stave off cognitive decline. Dr. Rodrigue is investigating how health factors such as hypertension can shape the course of cognitive aging and influence the deposition of amyloid protein in the brain, a diagnostic marker of Alzheimer's disease.

When asked why they chose to stay at UT Dallas instead of moving to another university, Drs. Kennedy and Rodrigue cite superb research facilities, established collaborations with UT Dallas and UT Southwestern faculty, and a very supportive academic environment.

Dr. Gagan Wig will join the center in January 2013 from Washington University Medical School in St. Louis, where he has been heavily involved in the Human Connectome Project—a multi-institution effort to map the structural and functional connections in the human brain using a combination of sophisticated brain imaging and modeling techniques.

"Our new faculty help bolster our position as one of the world's leading aging-mind research centers and will greatly accelerate our progress toward understanding the aging mind and ensuring cognitive health for life " says Dr. Park.

*"We are excited to welcome these outstanding new faculty to UT Dallas and are confident that their discoveries will lead to tangible benefits to science and society while helping to raise the university into the top tier of research institutions."*

—Dean Bert S. Moore
School of Behavioral and
Brain Sciences
UT Dallas

## ON OUR MINDS *continued from page 1*

But what if these same therapies could be given years earlier, before irreparable damage to the brain is done? Could Alzheimer's disease be halted or even prevented?

The questions are tantalizing and the scientific community is closer than ever to being able to answer them. Three new clinical trials that are expected to begin next year will attempt to treat people at risk for Alzheimer's before they develop symptoms. Researchers at the Center for Vital Longevity are contributing vital knowledge to these efforts. They are using sophisticated brain imaging techniques to measure amyloid levels in seemingly healthy adults and to track its accumulation over time. This work is fundamental to learning whether we can identify and treat individuals at risk as early as possible, similar to the way statins are used to treat high cholesterol and preempt heart disease.

We are making great progress, and quickly. But the cost of brain imaging studies continues to rise and the competition for federal research dollars is becoming ever more stringent. Adequate funding of this research must not become the biggest issue impeding further progress. Your support will help ensure that our children and grandchildren will not face the threat of Alzheimer's disease.

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