BRAIN MATTERS

SEARCHING FOR SAPPHIRE

“Getting in the game, helping others get wheels under themselves – can change people’s lives,” said Dana Juett, CEO of the Sapphire Foundation. And that sentiment has permeated his life and 15-year marriage to his wife, Kate.

Their generous contributions – their time, effort and financial support – have helped many rise to the top and succeed. Since 2013, the Sapphire Foundation has funded opportunities for young scientists to lead their own uniquely designed research studies in the lab of a Center for BrainHealth® faculty member. So far, their support has advanced research investigating concussions, brain training for young learners, and healthy aging as part of the Friends of BrainHealth Distinguished New Scientist Award initiative. Friends is a donor circle that supports research initiatives at the Center.

This year the Sapphire Foundation Distinguished New Scientist Award will go to Dr. Kihwan Han for his study titled “Neural networks underlying training-induced improvement in traumatic brain injury.” This research seeks to measure brain change and use the data to customize brain training programs for maximum benefit in individuals with chronic traumatic brain injury.

Dana and Kate admit that they are drawn to helping people “do good better, earlier,” a theme of Dana’s work with Dallas Social Venture Partners, a network of engaged community leaders committed to improving lives and maximizing social impact. The Social Venture Leadership Residency, which was named in honor of Dana, is a nine-month educational program for budding young philanthropists. It examines social issues, offers workshops and provides tutelage for nonprofit and for-profit executives.

The Juetts’ love for investing in others at pivotal life moments may have had its roots in rearing their children, coaching sports, counseling at a Boy Scout summer camp or serving through their church. Dana remembers one particular moment.

During a mission trip to Africa, Dana watched a blind goalkeeper play soccer with his schoolmates. The goalie was tending the box by sound. Someone had injected beads into the game ball so the goalie could hear it roll across the field. “He couldn’t get every ball, especially if they were flying through the air, but if it was a ground ball, the goalie was on it like a duck on a June bug,” said Dana.

“I thought it was amazing, watching the young boy be embraced by all of the other players, but it wasn’t until later that I realized the true significance of it: Someone cared more about that young boy getting in the game, playing with his schoolmates, and cared less about winning. It really resonated with me how little creative things can help other people get in the game – whatever the game is – sometimes it’s the game of life. There is a real message in that.”

For the man who has climbed Mount Kilimanjaro, made the 100-kilometer pilgrimage to Santiago de Compostela in Spain, and been to more than 70 countries, it was his wife, Kate, an accomplished artist, who launched them into their Center for BrainHealth adventure.

While seeking help to address her granddaughter’s learning differences, five years ago, long-time friend and Center for BrainHealth board chair Debbie Francis recommended that Kate investigate the Center’s SMART camp, a program that has had success teaching students how to learn and study.

“Being a different learner myself, I thought how fabulous it would have been if someone had known how to teach me those things when I was young. Instead, growing up, I had to either fake it or figure it out on my own,” Kate said. “We’ve had so many family members who have experienced brain-related issues that the Center is studying. Given the opportunity, these bright young scientists have the potential to unlock mysteries of the mind, helping all of us achieve higher brain function.”

“The work being done here is vital for each of us, the community as a whole and the future. We’re changing people’s lives. Growing up, I had so many people who gave me encouragement – whether through family, teachers, coaches – with a big emphasis on serving and helping. It was transformative for me, and I want to be that encourager,” said Dana. “Those of us who can should help in any way we can when we can, whenever we can. Giving little bits and pieces of help along the way to those who have the drive and desire can make a huge difference not only in their lives but for generations to come – that’s what we hope our efforts at the Center for BrainHealth will do.”

BRAIN CENTRAL

03 Chronic Marijuana Use Disrupts the Brain’s Natural Reward Processes
04 Putting Brain and Body Fitness Head to Head
06 Jane’s Story: Embracing Life After an Alzheimer’s Diagnosis
We found just that, and more, in Dr. Benson. You might say that we have hit the jackpot! Dr. Benson is nationally recognized in the field of engineering and greatly admired by his colleagues. Prior to accepting the lead role at UT Dallas, he was dean of one of the top engineering schools in the country at Virginia Tech.

While we will greatly miss Dick’s leadership as our dean, UT Dallas has gained an energetic, dynamic leader whose vision and passion will guide this institution to great new heights. “We wish him well in his new endeavor,” said Virginia Tech President Tim Sands.

We at UT Dallas are confident that Dr. Benson’s calm and focused leadership will further propel our university to new levels of national and international prominence. He is a great team builder who, as a dean at Virginia Tech, doubled the number of student applicants during his tenure.

Supporters of the Center for BrainHealth and its Brain Performance Institute™ will be excited to know that Dr. Benson’s interest and track record show his aptitude for creating innovative collaborations between engineering, science, and medicine. He is also a respected researcher who has twice been honored by the American Society of Mechanical Engineers (ASME).

In my interactions with Dr. Benson, I found him to be approachable, warm and sincere. Now that he and his wife, Leslie, are officially part of the UT Dallas family, I hope given the chance you will extend them a warm and gracious welcome!

Sincerely,

Debbie Francis
Center for BrainHealth
Advisory Board Chair

UT DALLAS PRESIDENT BENSON: BUILDING A FUTURE WITH YOU

To UT Dallas students, faculty, staff members, alumni and friends,

As the academic year gets underway, I expect to go through an experience much like that of our newest students, and be immersed in all things UT Dallas: our culture, its history, its excellence and its dreams for the future.

Along the way, I hope to continue what I term my “listening tour.” I enjoy getting out of my office and learning from the people who make this institution a dynamic hub of activity and innovation. I am curious to know just how we’re using chemistry to revive historically important paintings; how we’re solving mysteries of pain, delving into the complexities of Alzheimer’s, and understanding the world’s economic markets; and how we’re helping our kids survive in a digital world.

From my travels across campus and around the community, I have come to this conclusion: UT Dallas owes much to the leadership of my predecessors – Dr. David E. Daniel and Dr. Hobson Wildenthal. Evidence of their strategic influence can be seen throughout campus – in our truly outstanding students, distinguished faculty, dedicated staff, successful alumni, innovative programs and remarkable facilities.

I had the privilege this summer to tour the new Bioengineering and Sciences Building, which is a 220,000-square-foot testament to their vision and to our commitment to interdisciplinary research. Here, talented minds from vastly different fields are working side by side in state-of-the-art facilities to find new approaches that come from blending diverse perspectives.

Crossing boundaries and encouraging creative partnerships have been keys to this university’s success; in fact, it was born from them. The university was founded by the fathers of Texas Instruments, who didn’t hesitate to reach out of the corporate realm and establish a place of higher learning. As an engineer who began my career in private industry, and later moved into the academic world, I know that nourishing this symbiotic relationship with our technology partners in the Metroplex is a win–win proposition for UT Dallas, the community and our students.

Dr. Daniel has left us with an excellent blueprint in the university’s strategic plan. In reading it, I was struck by the critical role of state support for emerging research universities. I want to be certain that UT Dallas remains successful in securing that continued support while solidifying its path to becoming a Tier One national research university. I welcome opportunities to champion this university, through micro-chats across campus, in conversations with community partners, and during interactions with other leaders in Texas.

It’s clear our momentum will not slow. I am particularly encouraged by our recent rise in the Carnegie Classification™ of Institutions of Higher Education, which placed us among 115 select American universities recognized in the highest research category.

Our progress also remains visible, with several more buildings under construction, which will better serve students and provide vital room for instruction and research.

But probably the best evidence of our promise is the growing number of exceptional students and faculty arriving here each fall.

For me, my wife Leslie, and my fellow arrivals, let’s become devoted Comets together. Let’s learn to traverse campus with native precision; let’s watch mind-blowing chess tournaments; let’s cheer at athletic contests; and let’s search for the best nearby Tex-Mex cuisine.

Let’s lean in … and enjoy the Whoaish!

Sincerely,

Richard C. Benson
President
The University of Texas at Dallas

Reprinted from the UT Dallas President’s Viewpoint newsletter, August 2016.
In a paper published in *Human Brain Mapping*, researchers demonstrated for the first time with functional magnetic resonance imaging that long-term marijuana users had more brain activity in the mesocorticolimbic-reward system when presented with cannabis cues than with natural reward cues.

“This study shows that marijuana disrupts the natural reward circuitry of the brain, making marijuana highly salient to those who use it heavily. In essence, these brain alterations could be a marker of transition from recreational marijuana use to problematic use,” said Dr. Francesca Filbey, director of Cognitive Neuroscience Research in Addictive Disorders at the Center for BrainHealth and associate professor in the School of Behavioral and Brain Sciences.

Researchers studied 59 adult marijuana users and 70 nonusers, accounting for potential biases such as traumatic brain injury and other drug use. Study participants rated their urge to use marijuana after looking at various visual cannabis cues, such as a pipe, bong, joint or blunt, and self-selected images of preferred fruit, such as a banana, an apple, grapes or an orange. Researchers also collected self-reports from study participants to measure problems associated with marijuana use. On average, marijuana participants had used the drug for 12 years.

When presented with marijuana cues compared to fruit, marijuana users showed enhanced response in the brain regions associated with reward, such as the orbitofrontal cortex, striatum, anterior cingulate gyrus, precuneus and the ventral tegmental area.

“We found that this disruption of the reward system correlates with the number of problems, such as family issues, individuals have because of their marijuana use,” Filbey said. “Continued marijuana use despite these problems is an indicator of marijuana dependence.”

The research was funded by the National Institute on Drug Abuse.
The study, published in *Frontiers in Human Neuroscience*, found that healthy adults who participated in cognitive training demonstrated positive changes in executive brain function as well as a 7.9 percent increase in global brain flow compared to study counterparts who participated in an aerobic exercise program. The aerobic exercise group showed increases in immediate and delayed memory performance that were not seen in the cognitive training group. Exercisers with improved memory performance showed higher cerebral blood flow in the bilateral hippocampi, an area underlying memory function and particularly vulnerable to aging and dementia. The randomized trial is the first to compare cerebral blood flow and cerebrovascular reactivity data obtained via MRI.

"Many adults without dementia experience slow, continuous and significant age-related changes in the brain, specifically in the areas of memory and executive function, such as planning and problem solving," said Dr. Sandra Bond Chapman, study lead author, founder and chief director of the Center for BrainHealth. "We can lose 1 to 2 percent in global brain blood flow every decade, starting in our 20s. To see almost an 8 percent increase in brain blood flow in the cognitive training group may be as amazing decades of brain health since blood flow is linked to neural health."

For the study, 36 sedentary adults ages 56 to 75 were randomized into either a cognitive training or a physical training group. Each group took part in training three hours per week over 12 weeks. Neurocognitive, physiological, and MRI data were taken before, during and after training. The cognitive group received Strategic Memory Advanced Reasoning Training (SMART), a manualized brain training developed at the Center for BrainHealth. The physical training group completed three 60-minute sessions per week that included five minutes of warm-up and cool down with 50 minutes of treadmill or stationary bike activity while maintaining 50 to 75 percent of maximum heart rate.

"Most people tell me that they want a better memory and notice memory changes as they get older," said Dr. Mark D’Esposito, study co-author and professor of neuroscience and psychology, and director of the Henry H. Wheeler, Jr. Brain Imaging Center at the Helen Wills Neuroscience Institute at the University of California, Berkeley. "While memory is important, executive functions such as decision-making and the ability to synthesize information are equally, if not more so, but we often take them for granted. The takeaway: Aerobic activity and reasoning training are both valuable tools that give your brain a boost in different ways."

This work was supported by a grant from the National Institutes of Health and by grants from the Lyda Hill Foundation, T. Boone Pickens Foundation and the Dee Weyer Distinguished University Endowment.
STUDY: TRAINING HELPS MILD COGNITIVE IMPAIRMENT

New Center for BrainHealth® research published in the International Journal of Geriatric Psychiatry shows targeted training can improve cognitive performance for those with mild cognitive impairment (MCI), a group of people who are at a higher risk for dementia than the general population.

“Changes in memory associated with MCI are often disconcerting, but cognitive challenges such as lapses in sound decision-making and judgment can have potentially worse consequences,” said Dr. Sandra Bond Chapman, founder and chief director at the Center for BrainHealth and study principal investigator. “Interventions that mitigate cognitive deterioration without causing side effects may provide an additive, safe option for individuals who are worried about brain and memory changes.”

The study was conducted in collaboration with the University of Illinois at Urbana-Champaign. Fifty adults, ages 54 to 94, with amnestic MCI were randomly assigned to either a strategy-based, gist reasoning training group or a new-learning control group. Each group received two hour-long training sessions each week. The gist reasoning group received and practiced strategies focused on higher-level brain functions. The new-learning group learned and discussed facts about the brain and factors that influence brain health.

Pre- and post-training assessments measured changes in cognitive functions between the two groups. The gist reasoning group improved in executive function, memory span and concept abstraction (the ability to process and abstract relationships to find similarities). The new-learning group improved in detail memory.

“Our findings support the potential benefit of gist reasoning training as a way to strengthen cognitive domains that have implications for everyday functioning in individuals with MCI,” said Dr. Raksha Mudar, study lead author and assistant professor at the University of Illinois at Urbana-Champaign.

“Findings from this study, in addition to our previous Alzheimer’s research, support the potential for cognitive training, and specifically gist reasoning training, to impact cognitive function for those with MCI,” said Audette Rackley, head of special programs at the Center for BrainHealth. “We hope studies like ours will aid in the development of multidimensional treatment options for an ever-growing number of people with concerns about memory in the absence of dementia.”

UPDATE: BvB DALLAS SUPPORTS NEXT PHASE OF MCI RESEARCH

BvB Dallas, an MCI pilot study supporter, has signed on to fund the next phase of the study that will investigate whether adding a neurostimulation treatment directly before reasoning training sessions can provide additional cognitive improvement for people with MCI.

“BvB Dallas is honored to support the groundbreaking research being performed by the Center for BrainHealth®,” said Rachel Anderson, BvB Dallas co-president. “In the coming decades, we will begin to see the full force of the Alzheimer’s epidemic. We believe that funding cutting-edge research aimed at improving cognitive performance in patients who are at the highest risk for the disease is a giant step to one day tackling Alzheimer’s.”

BvB Dallas is a young professionals group that raises money for Alzheimer’s research and programs. The highlight event is an annual blondes vs. brunettes powder-puff football game that has raised more than $2.8 million for Alzheimer’s research and care in North Texas. This season, Center for BrainHealth is one of three BvB beneficiaries that will receive a portion of the more than $560,000 raised on game day.

To learn more about the next phase of the study, and to find out if you are eligible to participate, visit: centerforbrainhealth.org/research/participate

Dr. Vincenzo Fiore is a postdoctoral fellow in the Computational Psychiatry Unit lab of Dr. Xiaosi Gu. Fiore explores novel scientific techniques and computational models to help better illustrate neural activity during human decision-making. His research focuses on addiction and how an area of the brain known as the basal ganglia influences the disorder.

Q: What sparked your interest to research decision-making?

A: It started as a question about how you make decisions and how you store information to exploit it for future selections or preferences. I was very interested in game theory, at first, especially understanding and predicting choices that rely on a person’s system of values. The topics evolved into questions about how you create your system of values – what is good for you and what is not. While studying robotics in Rome, I investigated how to make the robot construct decisions, which led to questions about how the brain works. Those questions led me to London, where I began my sole focus of neuroscience research.

Q: How can your research help others?

A: I would like to be able to see whether these theories about the basal ganglia can be validated and applied to addiction. This would be very important because it could give a strong prediction of how to create and apply individualized treatment.

Q: What are some of your hobbies?

A: I used to play basketball, and now I like to travel the U.S. and visit lots of different cities, and hope to visit several other countries soon.
JANE'S STORY: EMBRACING LIFE AFTER AN ALZHEIMER’S DIAGNOSIS

A little over a year ago, Jane McManus was diagnosed with Alzheimer’s disease. “After we found out, and went through all of the fears, scares and tears, we decided. This is going to be our new normal. So, we set out to start each day with something joyful,” said Jane.

Jane and her husband of 39 years, Jerry, were shocked by her Alzheimer’s diagnosis at age 75.

“We thought that we had checked all the right boxes,” explained Jerry. “We have a healthy diet and exercise regularly, taking walks and [going to the gym].”

After being diagnosed, Jane gave up her practice as a psychotherapist, where she had been helping people for more than 40 years. She was trained in biofeedback therapy at the Mayo Clinic, and one of her specialties had been working with Vietnam veterans returning from war. She had seen people survive horrific events and learn to live a new normal.

“After years of helping others, I knew that you can’t just suck your thumb and stay at home,” said Jane. “Jerry and I refused to let the diagnosis rob us of a sense of normalcy.”

Friends connected them with the Discovery Group at the Center for BrainHealth®, where they could begin to plot a new course, reframing the diagnosis from a position of strength.

“Each Wednesday, we had a theme,” said Jerry. “The first theme was on brain plasticity and how the brain can develop pathways around roadblocks – that’s a lesson that still sticks with me.”

Over the 12-week course, Jane and Jerry became very close to the 10 couples living with a dementia diagnosis. They shared their daily challenges, fears, successes, and in return gained strategies and perspectives from each other and BrainHealth clinicians. Jerry and fellow caregivers learned about what to expect with their spouse, ways to approach situations and community resources available. Jerry also had the chance to express what it means to be a co-pilot amid the disease.

“It is comforting to be around others who can offer more than condolences,” said Jerry. “This group allows people trudging through the same obstacles an outlet and the ability to share notes. It brings a sense of normalcy.”

Jane spent concentrated time with others, like her, who were early in their diagnosis, and she created a collection of stories – a memory book of photos and significant life moments that she cherishes.

“It is really important that people who help those living with dementia, or living with a family or friend with dementia, realize how relationships like these are so essential,” said Jane. “The ability to laugh and cry with friends and family helps you get through the good and bad days.”

Jane and Jerry’s Discovery Group completed its 12-week course in August. They are inaugural members of a Discovery alumni group that starts this fall, where they look forward to new adventures every other week with their newfound friends.

TAG DERBY RAISES FUNDS TO HELP IMPROVE LIFE AFTER A DEMENTIA DIAGNOSIS

On Saturday, May 7, more than 350 young professionals donning their Derby best attended the Think Ahead Group’s (TAG) sixth annual Kentucky Derby Party benefiting the Center for BrainHealth®. Sponsored by Sewell Automotive Companies, the soiree was held at Marie Gabrielle Restaurant and Gardens in Dallas and included signature southern sips and bites, a silent auction, lawn games, photo booth, DJ and viewing of the 142nd running of the Kentucky Derby.

Co-chaired by Lindsay Gehan and Kate Seale, the event helped TAG reach its goal of raising $50,000 for the Discovery Group, a program at the Center for BrainHealth that works to improve quality of life after an Alzheimer’s diagnosis and raise awareness about the signs of dementia.

TAG is a young professionals organization that is passionate about brain health. Since its inception in 2009, TAG has donated more than $245,000 in support of the Center for BrainHealth and its Brain Performance Institute®.

We want to bring a sense of normalcy and help families reframe the diagnosis. We want to help them prepare for the changes that will come, but we also want them to focus on their strengths and realize that they still have a lot to contribute. Their life still has purpose.

Audette Rackley, M.S., CCC / SLP, head of special programs leads the Center for BrainHealth® Discovery Group; she is the author of the book I Can Still Laugh. She has spent more than 15 years developing approaches, for individuals diagnosed with dementia, that emphasize remaining strengths.
There is a long tradition of research showing that government and high-performance brain training for North Texas veterans, their spouses and their children. Over the next year, the Brain Performance Institute at the Center for BrainHealth® will provide Strategic Memory Advanced Reasoning Training (SMART) to at least 330 individuals, 50 of whom will receive extensive neurocognitive testing before and after training. The data collected will further evaluate the effectiveness of SMART, measuring changes in cognitive and emotional functioning as well as daily activities.

“There is a significant stigma attached to the concept of ‘mental health services’ — and it is even more amplified for our military veterans, given their propensity toward high achievement in the face of adversity,” said Sarah Tillman, program manager for the Texas Veterans + Family Alliance. “Our goal for this pilot program is to support organizations that are delivering innovative approaches to this issue. We selected the Center for BrainHealth to be part of this pilot because its high-performance brain training responds to these challenges in a unique way — one that is rooted in scientific evidence and appeals to a military culture that champions elite performers.”

Randomized clinical trials with SMART in teen and mature adult populations have shown cognitive gains, including memory and reasoning. Civilians and veterans who had sustained a traumatic brain injury and completed the strategy-based cognitive training reported a 58 percent reduction in depressive symptoms and a 42 percent reduction in stress-related symptoms.

“We are thankful for HHCS’s support, and grateful to be a part of the ‘team of teams’ that HHCS has put together that will comprehensively address gaps in services for warriors so that we can truly make a difference in the lives of our bravest Americans and their families,” said Dr. Jenny Wright Meier, Warrior Initiative program manager at the Center for BrainHealth’s Brain Performance Institute.

Through this grant, the Brain Performance Institute warrior training team will deliver SMART to warriors in North Texas both on-site and at its partner facilities, including veterans’ service organizations and educational institutions where veterans and their family members already access other services. SMART programs tailored for military spouses and caregivers as well as children and teens over age 10 will be available at select locations.

Collaborative partners include Accenture, Allies in Service, Attitudes & Attire, Carry The Load, Equest, Heroes on the Water, Higher Ground, Iraq and Afghanistan Veterans of America (IAVA), La Quinta Inns & Suites, Lone Star Veterans, North Lake College, Operation Homefront, Snowball Express, Southwest Airlines, United Way Cameron County and the University of Texas Rio Grande Valley.

SMART CLINICIAN DR. JENNY MEIER

“In addition to loving all things related to brain function, I look forward to working every day because I am fortunate enough to have the opportunity to work with men and women who serve our country,” said Dr. Jenny Wright Meier, a licensed clinical psychologist and Warrior Initiative program manager at the Center for BrainHealth’s Brain Performance Institute®, who has been working in the clinical psychology and neuropsychology field for more than seven years.

As the daughter of a Vietnam veteran who suffered from post-traumatic stress disorder, Meier feels a close connection with the veteran population. She works with active-duty military service members and veterans all over the country facilitating Warrior SMART — a program rooted in the Center for BrainHealth’s high-performance brain training program.

Meier is testing two different protocols: transcranial direct current stimulation (tDCS) and bromocriptine, a substance that activates dopamine receptors in the brain. Meier said, “We are excited about the possibility of taking brain performance to the next level.”

INNOVATIVE RESEARCH

Meier received the Friends of BrainHealth Katherine and Bob Penn Distinguished New Scientist Award in 2015, which funded a pilot study for veterans with brain injuries. The research aims to determine whether it is possible to improve the cognitive benefits of SMART with non-invasive brain stimulators. Meier is testing two different protocols: transcranial direct current stimulation (tDCS) and bromocriptine, a substance that activates dopamine receptors in the brain. Meier said, “We are excited about the possibility of taking brain performance to the next level.”

JONES WINS NATIONAL AWARD FOR DISSERTATION

Dr. Bruce Jones, director of research and operations at the Center for BrainHealth®, received a national award for his dissertation, “An fMRI study of the reward preferences of government and business leaders.” The study explored monetary motivational differences found in brain reward circuitry between corporate and government executives in North Texas.

The American Political Science Association honored Jones with the 2016 Leonard D. White Award in August. The award, named after a founder in the field of public administration, goes to the best dissertation successfully defended during the previous two years based on faculty submissions from universities across the nation and overseas.

The research was part of an ongoing study, “The Brains of Leaders,” that explores the brain activity associated with many leadership attributes. One of the principal investigators is Dr. Douglas Kiel, professor of public and nonprofit management, Jones’ PhD advisor. The second principal investigator of the research, and another of Jones’ primary dissertation advisors, is John Hart Jr., professor of cognition and neuroscience.

“There is a long tradition of research showing that government executives are less motivated by money than are business executives,” said Jones. “The results indicate that business executives showed greater arousal in their reward centers, to both financial gain and loss, than did government executives.”

The research has been submitted for publication. Jones and his colleagues are planning ways to use the data to springboard further studies about brain structure differences, specifically dopaminergic channels, found in public and private executives. The researchers hope to discover if these brain circuit differences are a result of innate or learned behavior.

Jones earned his PhD in public affairs from the UT Dallas School of Economic, Political and Policy Sciences in December 2015. For his dissertation, Jones studied the brain activity of 12 non-elected government leaders and 12 business leaders who underwent functional MRI scans.

The research combining public administration and neuroscience earned Jones the opportunity to share his dissertation’s preliminary results at the March 2015 Cognitive Neuroscience Society Conference in San Francisco.
FOOD FOR THOUGHT: NEUROSTIMULATION
PROMISING OUTCOMES AND POTENTIAL FUTURE TREATMENTS

In the last 15 years, researchers have investigated the benefits of tDCS (transcranial direct current stimulation), a non-invasive neurostimulation that uses direct electric current to stimulate the brain in a wide range of conditions such as chronic pain, stroke, aphasia, tinnitus, depression, schizophrenia, migraine, fibromyalgia, and Parkinson’s disease.

Dr. Sven Vanneste, Center for BrainHealth’s newly appointed director of neuromodulation, will be spearheading new initiatives to understand the underlying neural mechanisms in neurological and psychiatric diseases and developing novel treatments using invasive and non-invasive neurostimulation.

Center for BrainHealth researchers, in collaboration with a neurosurgeon at the University of Otago in New Zealand, recently published a comprehensive review and best practices for two types of tDCS: conventional tDCS and high-definition tDCS.

“tDCS has been found to be a safe and well-tolerated investigational device as well as a treatment tool when used within the standard parameters,” explained Dr. Wing Ting To, a research scientist at Center for BrainHealth and lead author of the article that appears in the journal Expert Review of Medical Devices.

HOW IT WORKS

The most commonly used equipment for tDCS involves two saline-soaked sponges, electrodes (typically conductive rubber), non-conductive elastic straps, cables, and a battery-powered direct current delivering device.

HD-tDCS uses an array of electrodes, instead of two large pads, that can be placed in specific configurations to more reliably target specific brain areas and produce brain changes that may outlast conventional tDCS.

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