

2016-2017

# Inside SARGENT

Boston University College of Health & Rehabilitation Sciences: Sargent College

# Getting the Words Back

OVERCOMING LANGUAGE LOSS—LONG AFTER A STROKE



Partnership Promotes Rehab for  
Neurological Disorders, P 6

An App for Understanding  
Schizophrenia, P 16

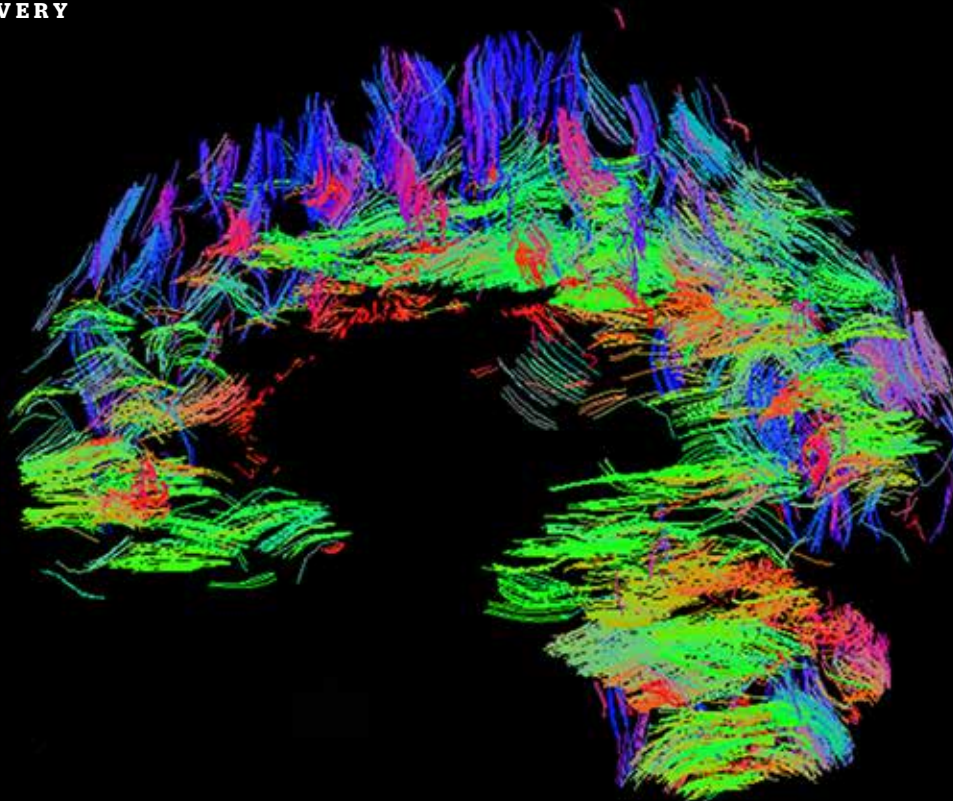
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**A Source for News & Events**

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**Partnership with Inspirational BU Alum**

Watch a video about Travis Roy (COM'00, Hon.'16), who works with Sargent to help others with spinal cord injuries, at [go.bu.edu/sargent/inside-sargent](http://go.bu.edu/sargent/inside-sargent).

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InsideSARGENT

2016-2017



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# Dean's Message



## Dear Friends,

Fall is the time for taking stock, renewing our focus, and planning new objectives. This past year has been a banner one by any measure. Led by our number 1 graduate Occupational Therapy program, all of our ranked programs rose in the *U.S. News & World Report* rankings; Speech-Language Pathology climbed to twelfth place (out of 249 programs) and Physical Therapy to fourteenth (out of 217 programs).

Another proud moment this year was the announcement of Sargent College's first endowed professorship, the Travis M. Roy Professorship in Rehabilitation Sciences, created through a \$2.5 million anonymous gift. A passionate advocate for those living with spinal cord injuries, Roy is a BU alum and former hockey player who was paralyzed 11 seconds into his first BU game. The yet-to-be-appointed Travis M. Roy professor will become part of Sargent's long tradition of leadership in research and education. (Read about this inspirational alum and his partnership with Sargent on page 6.) But what does Sargent's incredible year mean to you?

- **Among our peers**, these rankings and other accomplishments ensure that our graduates are seen as among the nation's best. Aspiring students recognize Sargent as a top training program, while recruiters consider the College a superlative source for well-prepared graduates and proven new professionals. For example, PhD candidate Jeffrey Johnson, mentored by aphasia expert Professor Swathi Kiran, is making his mark in the field of speech, language & hearing sciences with his research on treating language loss after a stroke. (Learn more in our cover story on page 12.)

**“Our professional standing and rising stature are confirmation that your support helps the College attract the very best.”**

- **For friends of Sargent**, our professional standing and rising stature are confirmation that your support helps the College attract the very best. Here, talented students study under the guidance of some of the most renowned faculty in health & rehabilitation sciences, like Associate Professor Paula A. Quatromoni, featured on page 22, who has worked for more than a decade to develop and refine models to treat eating disorders among college athletes.

- **For alumni**, sharing that you're a Sargent alum with a colleague, patient, or potential employer carries many assurances: you're ready to tackle the most pressing issues in your discipline, your perspective has both breadth and depth, and you're capable of making real change in the lives of others.

As we close in on our 135th year in 2016, Sargent enjoys the participation and successes of generations of loyal alums, many of whom give back through BU's Planned Giving Program, and others who support the College through the Annual Fund. So many of our alumni credit Sargent with some of the most joyful and defining moments in their lives, and they're eager to make similar opportunities possible for today's students. These pay-it-forward values of our alumni continue to make the College the truly remarkable place it is. It's an honor and a privilege to help guide this support to ensure that Sargent honors its heritage and enthusiastically pursues its future.

Best wishes,

Christopher A. Moore  
Dean and Professor





**STUDENTS GAIN  
NEW PERSPECTIVE  
ON THAILAND TRIP**

In May 2016, 19 students ventured on a service learning trip to Thailand (pictured here), where they taught health education and worked in a clinic. Trace Sears, a senior physical therapist and lecturer in physical therapy & athletic training, and Kelly Pesanelli, a lecturer in health sciences, led the trip. These annual experiences promote health education and community empowerment while cultivating educated, compassionate, global citizens. *Student scholarships for international service learning provided by the generosity of an anonymous donor and Cathryn Baty ('62, SED'63).*

KRISTYN ULANDAY

> continued from previous page



Also this year, students embarked on a trip to India (pictured here) headed by Diane Constantino, clinical associate professor of speech, language & hearing sciences, and Sarah McKinnon, lecturer in occupational therapy. Anna Monahan, a lecturer of health sciences, and Shelley Brown, a clinical assistant professor of health sciences, coordinate all of the service learning trips, and were recently named codirectors of international service learning and engagement.

**WebExtra:**  
Read more about the Thailand trip and watch a video at [go.bu.edu/sargent/inside-sargent](http://go.bu.edu/sargent/inside-sargent).



## NEW SLHS AND LINGUISTICS DEGREE

In fall 2016, Sargent launched a bachelor's degree program in Linguistics and Speech, Language & Hearing Sciences (SLHS) in conjunction with the College of Arts & Sciences (CAS). The joint degree gives students a foundation for pursuing careers in a variety of fields, including public health, medicine, neuropsychology, language technology, and child development and education. One of the few such programs offered by any university, the degree fosters interdisciplinary research and provides new opportunities for experiential learning. The program will be taught by faculty from Sargent and CAS, and jointly administered by Sudha Arunachalam, an assistant professor of SLHS at Sargent, and Carol Neidle, a professor of French and linguistics and director of the linguistics program at CAS.



## HANDS-ON APPROACH TO PHONETICS

Building on the movement to integrate research and clinical practice, SLHS began offering a new phonetics course in fall 2016. A revised and expanded version of Introduction to Phonetics, the course includes a lab portion for students to apply concepts taught in class to hands-on, multimedia listening and learning lab exercises. Students use the latest technology for measuring and viewing human speech production while working in small collaborative groups in Sargent's renovated computer classroom. The course is co-taught by Assistant Professor Tyler Perrachione, a Peter Paul Career Development Professor and director of the Communication Neuroscience Research Laboratory, and Barbara Oppenheimer, a clinical associate professor, and master clinician, in speech-language pathology.



## TACKLING NEUROSCIENCE BIG DATA

As neuroscientists collect ever more data from the brain, the global research community faces a challenge: synthesizing these "big data" to shed light on neurological and neuropsychiatric disorders. Sargent is collaborating with BU's Digital Learning Initiative to produce an open online course (OOC) for the University's edX platform that will make data analysis accessible to students, researchers, biologists, psychologists, and clinicians working with neural data. Scheduled to launch in early 2017, the OOC will be co-taught by Jason Bohland, an assistant professor of health sciences and an assistant professor of SLHS, and Uri Eden and Mark Kramer, associate professors of mathematics & statistics at CAS. The OOC is funded by a grant from the National Institutes of Health's Big Data to Knowledge initiative.



## RYAN CENTER CELEBRATES 10 YEARS

Since its founding in 2006, the state-of-the-art Ryan Center for Sports Medicine & Rehabilitation has treated thousands of patients from the BU community and beyond. The center promotes holistic preventive care by integrating clinicians and faculty from the Boston University Physical Therapy Center, Sargent Choice Nutrition Center, Athletic Training Services, and physicians from Boston Medical Center specializing in family medicine/sports medicine and orthopedics.

The only center in Boston that combines these resources—along with students, residents, and fellows—the Ryan Center has become a premier site for interprofessional practice and education. Sharon Ryan ('70) and her husband Robert, whose gift founded the center, recently established a fund to support PhD students in rehabilitation sciences. The next 10 years at the Ryan Center will see the development of a concussion clinic, as well as a novel system for the collection of clinical outcomes established in conjunction with Intermountain Healthcare.

**“My husband, Robert, and I have been impressed with the Ryan Center over the last 10 years, and we wanted to do something significant for students and research.”**

—Sharon Ryan ('70)

The Ryan Center's interprofessional team includes



13 physical therapists



4 athletic trainers



3 registered dietitians



5 sports medicine/family medicine physicians



2 orthopedic surgeons



1 radiology technician

Every year, the Ryan Center handles more than

**25,250**

patient visits

20,000

physical therapy

5,000

athletic training

250

nutrition counseling

## TOP AWARDS

### Faculty

**Sara Brown**, a clinical associate professor of athletic training, received the Sayers “Bud” Miller Distinguished Educator Award from the National Athletic Trainers’ Association. **Mark Laursen**, a clinical associate professor and director of athletic training services, received a Most Distinguished Athletic Trainer Award from the National Athletic Trainers’ Association and a Quality of Life Award from the College Athletic Trainers’ Society. **Cara Lewis**, an associate professor of physical therapy & athletic training, received a Eugene Michels New Investigator Award from the American Physical Therapy Association. **Paula A. Quatromoni**, an associate professor and chair of health sciences, received the Nutrition and Dietetic

Educators and Preceptors Area 7 DPD Outstanding Dietetics Educator Award. **Julie Starr**, a clinical associate professor of physical therapy, delivered the Linda Crane Memorial Lecture at the American Physical Therapy Association Combined Sections Meeting.

### Students

**Clare Brabson ('16)**, occupational therapy, received an Albert Schweitzer fellowship. **Kari Loverro ('19)**, rehabilitation sciences, was awarded the Science, Mathematics, and Research for Transformation Scholarship for Service Program. **Carolyn Michener ('16)**, SLHS, received the ASHA Students Preparing for Academic and Research Careers Award. **Liz Heller Murray ('18)**, SLHS, was awarded a PhD scholarship from the Council of Academic Programs in Communication Sciences and Disorders.

## NEW FACULTY AND PROMOTIONS

### New Faculty

**Louis Awad**, assistant professor, physical therapy & athletic training

**Alyssa Boucher**, clinical assistant professor, speech, language & hearing sciences

**Deepak Kumar**, assistant professor, physical therapy & athletic training

**Megan McCrory**, clinical associate professor, department of health sciences, programs in nutrition

**Craig Slater**, clinical assistant professor, director for interprofessional education and practice

### Promotions

**Cara Lewis**, associate professor, physical therapy & athletic training



# OUT OF TRAGEDY, A NEW





# SYNERGY

A HOCKEY  
ACCIDENT  
PARALYZED HIM.  
A PROFESSORSHIP  
IN HIS NAME  
WILL MOBILIZE  
RESEARCHERS.

BY PATRICK KENNEDY

# O

**N OCTOBER 20, 1995, TRAVIS ROY** leapt over the boards and onto the ice for his first game as a Boston University Terrier. Racing toward the puck, Roy (COM'00, Hon.'16) set up a routine play he had made many times as a star forward in high school. But on this night, he stumbled at an awkward angle and crashed head-first into the boards. The impact cracked his fourth and fifth cervical vertebrae, severely damaging his spinal cord and paralyzing him from the neck down.

The crowd at Walter Brown Arena—which only minutes earlier had cheered as BU's 1994–95 NCAA championship banner was raised to the rafters in a pregame ceremony—suddenly went silent as team trainers and medical personnel rushed to the prone player. Roy's father climbed onto the ice, urging his son to get up. He couldn't. Roy's career as a collegiate hockey player was over, 11 seconds after it had begun.

After emergency surgery and recovery at Boston Medical Center, Roy was flown to Shepherd Center in Atlanta, Georgia. The type of injury he'd sustained cuts off or impedes messages that the brain sends, via the spinal cord, to the muscles. He regained some movement in his right arm, however, and with the help of a spring-loaded brace, worked on feeding himself and steering his wheelchair. That wasn't enough for Roy, who was determined to graduate.

He returned to BU the next fall, where he worked with Sargent experts to continue his recovery. He did graduate, and went on to create the Travis Roy Foundation, which funds research and provides equipment for people with spinal cord injuries. The foundation has maintained a close relationship with the University, one that was bolstered last October, when the Travis M. Roy Professorship in Rehabilitation Sciences was established at Sargent. The endowed professorship will support the College as it leads research in rehabilitation, ultimately helping others who are suffering from a range of neurological disorders. >

## FULLY ENGAGED

Roy's return to BU wasn't a typical back-to-school transition. "It was only 10 months after my injury," Roy says. "I did my therapy right there at Sargent College, up on the sixth floor," just across Commonwealth Avenue from the College of Communication, where he majored in mass communication. Sargent faculty, students, and staff—including Terry Ellis, an assistant professor of physical therapy & athletic training and director of the Center for Neurorehabilitation—assisted Roy with the physical therapy that enabled him to continue his studies.

"I spent almost a year trying to get my right biceps as strong as possible to maximize my function," Roy says. Meanwhile, Sargent physical therapists and occupational therapists—including former professors Paula McDonald and Carolyn Podolski—worked with him on his right wrist, "giving me stability to operate the joystick to steer my wheelchair."

Crucially, the OT team also helped set up Roy's dorm room, giving him an automatic door opener that he could operate with a remote control, making sure his desk was the right height, and installing voice-recognition software on his computer. "It was just trying to use the technology that was available and make it work with the limited use that I had," he says. "And it was great. [The therapy] certainly provided me with some confidence, to be able to come and go as needed and do the work on my computer. Which was a big deal for me."

That's all part of the job description, says Clinical Associate Professor Karen Hutchinson, chair of the American Physical Therapy Association's Spinal Cord Injury Special Interest Group. "What physical and occupational therapists are doing is figuring out, given the amount of function you have, how to best maximize functional capacity and facilitate reengagement in everyday activities," she says.

The generosity of strangers—including \$7.23 from a young boy who emptied his piggy bank and \$5,000 from a couple who'd been saving the funds for their honeymoon—and BU volunteers, along with an NCAA insurance policy for catastrophic injuries, have continued to provide Roy with the assistance he needs to live a busy life. He has 24-hour home care at his Kenmore Square apartment, help getting showered and dressed, and transportation to his many motivational-speaking engagements.

Not all people who have a spinal cord injury (SCI)—and there are an estimated 273,000 of them in the United States—have that level of care. It's why Roy created his foundation. Since 1997, he has raised more than \$8 million to furnish those who have SCI with wheelchairs, vehicle lifts, and computer-assisted technology. In addition, the foundation has funneled \$2.1 million toward research in hopes of one day finding a cure for SCI.

## BRINGING IT BACK TO BU

In October 2015, 20 years after the accident that altered Roy's life, an anonymous group of donors gave Sargent a \$2.5 million gift to establish the professorship in Roy's name. The gift will also support an ongoing partnership with his foundation through funding for staffing as well as office space. The professorship and partnership will "provide specific support

and direction for innovative research, exemplary training, and scientific leadership in pursuing the shared goals of Sargent College and the Travis Roy Foundation," Dean Christopher A. Moore said in announcing the gift at an event honoring Roy at Agganis Arena.

Sargent anticipates that the named professorship will attract a top researcher in the rehabilitation sciences, Hutchinson says. While "SCI research is in its infancy here at BU," she says, Sargent's blend of disciplines positions the College to study many facets of these injuries.

In addition to motor and sensory changes, SCI impacts every system of the body, from digestion and kidney function to bladder and cardiovascular performance.

No matter the new hire's specialization, Roy says, the research he or she undertakes should ultimately help not only survivors of spinal cord injuries, but also those living with

other neurological disorders—such as Parkinson's, Alzheimer's, muscular dystrophy, multiple sclerosis, and arthritis—that similarly involve blockage or damage to neural pathways.

An anonymous group of donors gave Sargent a \$2.5 million gift to establish the Travis Roy professorship.

## FROM STUDENTS TO SCIENTISTS

The partnership between Sargent and the Roy Foundation officially kicked off in March 2016 with a one-day conference titled State of the Science in Spinal Cord Injury Research at the VA: Focus on Rehabilitation. The event brought scientists from the Boston area and beyond to Sargent to learn about and discuss the latest developments in SCI research. The highlight was a keynote speech by Audrey Kusiak, scientific program manager for regenerative medicine, spinal cord injury, and neuropathic pain programs at the US Department of Veterans Affairs.

Such gatherings not only boost Sargent's profile but will also be a boon to SCI research in the long run, says Hutchinson—in part because of the presence of Roy himself, whose lectures and appearances will draw students, educate them on spinal cord injuries, and inspire them to consider a career in that field.

"The professorship is how we're going to grow the science, and Travis being on campus will help mobilize and cultivate students to be the scientists who will do the work in these important areas," Hutchinson says.

"My hope is that we can have a big impact in all aspects of educating students at Sargent, on spinal cord injuries in both PT and OT," says Roy, who received an honorary Doctor of Humane Letters from BU in May 2016. "We can benefit from the knowledge gained [through research] at Sargent, and the school can benefit from the grants we provide. I think there's certainly synergy there, and it's going to be exciting to see the opportunities in the years to come." 

 **WebExtra:** Watch a video profile of Travis Roy at [go.bu.edu/sargent/inside-sargent](http://go.bu.edu/sargent/inside-sargent).



Teens and young adults with disabilities are working with Jessica M. Kramer (bottom left) to develop a computer program for better health care.

## An Empowering Process

**Y**outh with disabilities don't just have a right to be involved in decisions about their health care—they have the insight needed to create better care, says Jessica M. Kramer. The assistant professor of occupational therapy is working with Ariel Schwartz ('16) and six Boston-area teens and young adults to develop a computer program for young people who have intellectual or neurodevelopmental disabilities or certain genetic disorders. PEDI-PRO (Pediatric Evaluation of Disability Inventory Patient Reported Outcome) will guide users through a question-

naire that assesses their ability to engage in daily activities. It is expected to be the first self-assessment for this group, who are normally evaluated by parents and clinicians. Kramer, who also directs Sargent's Youth and Young Adult Empowerment, Leadership, and Learning (YELL) Lab, says the PEDI-PRO team thought of new assessment activities, such as remembering a debit card PIN and using a self-checkout machine. Families and clinicians will use PEDI-PRO to add crucial and practical information to their own evaluations. The PEDI-PRO can help its users gain independence, says high school senior Marianne

Mahoney, who has spina bifida and learning disabilities, and whose role on the youth team includes developing questions, running focus groups, and analyzing results. Self-evaluating when young, she says, will help youth with disabilities advocate for themselves later on in life. Funding for the tool, which Kramer estimates will be market-ready in five years, is provided in part by a National Institutes of Health grant of \$405,000 for the Comprehensive Opportunities in Rehabilitation Research Training (CORRT) program—a university collaborative in which BU is a partnering institution.—*Julie Butters* **IS**



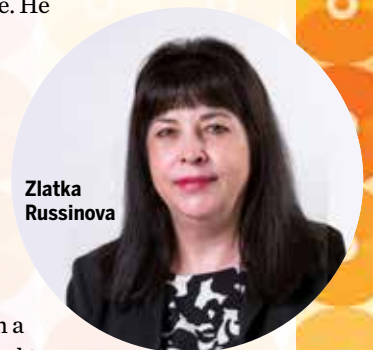
# DEALING WITH DOUBLE STIGMA

FOR PEOPLE IN THE LGBT COMMUNITY, RECOVERING FROM MENTAL ILLNESS BEGINS WITH ACCEPTANCE  
BY SUKI CASANAVE

**A**dam\* received the first diagnosis—obsessive-compulsive disorder—when he was 17. Other diagnoses followed, including bipolar disorder. He later experienced depression, had failed relationships, and made a suicide attempt, all while wrestling with what he calls the “chameleon” nature of his gender identity. Adam, who identifies as transgender, was assigned male at birth, but sometimes presents as female. He typically uses masculine pronouns.

Research has found that those in the LGBT community are at elevated risk for depression, anxiety, bipolar disorder, substance use, and suicide. “They’re already dealing with the stigma attached to their gender or sexual identity—and they may not feel they have the energy to address another stigma associated with a mental illness,” which can make the road to recovery from mental illness especially long and difficult, says Lauren Mizock, doctoral faculty at the Fielding Graduate University and a former postdoctoral fellow at BU’s Center for Psychiatric Rehabilitation. In collaboration with her fellowship mentor, Zlatka Russinova, Mizock is exploring the journey to recovery, which involves accepting the mental illness, rather than denying it.

“People who struggle with double stigma need to work through multiple layers of challenges,” says Russinova, a research associate professor of occupational therapy and a senior research specialist at the center. “Often people blame themselves for their illness. They go into a downward spiral of self-blame and are not able to forgive themselves—but self-



Zlatka  
Russinova



Lauren Mizock

forgiveness is critical to achieving acceptance,” a milestone in the recovery process.

For a study on acceptance and recovery, Mizock recruited 32 participants with serious mental illness (men, women, racial-ethnic minorities, and members of the LGBT community) who were recipients of services

at the center. In 60-minute in-person

interviews, Mizock gathered data on three issues: the participants’ sense of themselves as individuals diagnosed with mental illness, their experiences associated with mental illness, and the factors that contributed to their acceptance of their diagnosis. Participants were also asked to define what “acceptance” means to them.

Because this study required examining the perspectives of many individuals—and for those individuals to interpret their own experiences—Mizock used a grounded theory approach to analyze their responses. A common method for investigating the complex experiences and narratives of mental illness, the approach begins with exploratory questions and builds a theory “grounded” in observation and data, as opposed to a more traditional qualitative approach in which a researcher collects data and may impose preexisting theory onto the data. The participants’ responses shed light on their perceptions of themselves, the challenges they faced after diagnosis, and the changes they noticed in themselves once they accepted their illnesses.

The participants identified four components that contributed to their acceptance of mental illness: positive sense of self, acceptance of illness, willingness to seek help, and overcoming shame about illness. For example, Adam described to Mizock “a lack of interest in and acceptance of his gender expression and identity by his therapists.” By switching to a supportive care provider, he began to participate in his recovery. He became willing to learn about managing his bipolar disorder and to pursue effective treatment, accepting, for instance, “that I have to take as much medicine as I do.”

**“PEOPLE BLAME THEMSELVES FOR THEIR ILLNESS. . . . BUT SELF-FORGIVENESS IS CRITICAL TO ACHIEVING ACCEPTANCE.”**  
**—ZLATKA RUSSINOVA**

Language was equally important for Adam, who developed affirmative ways to describe his identity as a transgender “chameleon,” a term that helped him explain his identity both to himself and to others. “In order to overcome the stigma [of mental illness], one has to integrate this new part of themselves positively into the rest of their identity,” Mizock says, stressing that patients also advance their recovery when they realize they can manage their illness, and that they can help others as a peer counselor or activist.

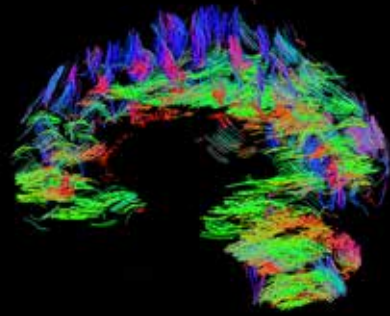
Mizock and Russinova highlight this study, among others, in their book, *Acceptance of Mental Illness: Promoting Recovery Among Culturally Diverse Groups* (Oxford University Press, 2016). The book offers tools for clinical psychologists and other providers who care for individuals—across a range of genders, ethnicities, and sexual orientations—with a variety of mental illnesses. Its holistic approach to patient care includes case studies, clinical strategies, discussion questions, and experimental activities intended to help providers facilitate the acceptance process in their clients and foster recovery from mental illness.

With support from an extended community of providers who help people develop tools of acceptance—positive language, supportive relationships, self-confidence, awareness, and education—Adam and others confronting a double stigma are finding it’s possible to transform their perspective from one of shame and denial to one of acceptance and empowerment. **IS**

*\*Name changed for privacy*



# Getting Wet Back



**Inset scan: Structural and functional neuroimaging techniques help researchers understand how stroke survivors' brains change in response to language therapy.**



# ng ds K

BY LARA EHRLICH

OVERCOMING  
LANGUAGE  
LOSS—LONG  
AFTER  
A STROKE.

**Kelly O'Day has no recollection** of suffering a stroke in January 2014, or of the months on life support that followed. She does know that when she was discharged from the hospital, she “couldn’t say much other than pleasantries,” she says. “I knew exactly what I wanted to say; I couldn’t get it out. I felt stuck.” >

O'Day has aphasia, a language disorder caused by damage to the brain. Its challenges range from trouble remembering words to full loss of language. For some, like O'Day, commonplace objects are divorced from their names. A person might fix on a related word (“table” instead of “chair”), substitute sounds (“cham” for “chair”), create a nonsense word, or be unable to come up with anything at all.

“I knew it was a chair,” she says. “And I knew you sat in it, but it didn’t all come together. It was just fragmented.”

O'Day was scared, but she was also determined to get better. “I just kept working and working and working on my own recovery,” she says, “not knowing what to expect.” It was only when she joined the Aphasia Community Group and the Aphasia Research Laboratory at Sargent and began comparing notes with others that she realized patients often undergo therapy to recover language skills.

O'Day’s situation is not unique. Stroke rehabilitation can vary depending on the severity of impairment, differences in insurance coverage, and a patient’s access to specialists during early recovery, among other factors. While some patients may undergo long-term speech-language therapy, others are

“[WE CAN TELL OUR PATIENTS] THAT AS THEY GET BETTER, THEIR BRAIN IS GOING TO BE MORE AND MORE LIKE A NORMAL BRAIN.”—SWATHI KIRAN

not referred to clinicians due to the perception that rehab is most effective in the six months immediately following a stroke, with diminishing returns over time. Therapists often discontinue therapy because of the persisting notion that the brain reaches a recovery threshold and stops healing. That’s the theory Professor Swathi Kiran and PhD candidate Jeffrey Johnson (’18) have proven wrong.

The two researchers used functional magnetic resonance imaging (fMRI) technology, which measures brain activity by blood flow, to confirm that therapy can help the brain keep healing—even years after a stroke.

### RETRAINING THE BRAIN

Johnson and his mentor, Kiran, a professor of speech, language & hearing sciences, and director of the Aphasia Research Laboratory, are researching impaired naming as part of a broader five-year study with Northwestern and Johns Hopkins Universities. The Sargent project, which began in 2013, recruited 15 people who had a stroke in the brain’s left hemisphere, the region responsible for language processing, at least 10 months prior. Before beginning therapy, they—along with a control group of 16 healthy adults—underwent fMRI scans to determine which regions of the brain were damaged and

to obtain a baseline for treatment. In this preliminary stage, Kiran and Johnson made a surprising discovery.

It was previously thought that the regions surrounding the damaged parts of the brain’s language center responsible for impaired naming (portions of the frontal, temporal, and parietal cortex) would be inactive in an fMRI scan. Instead, Kiran and Johnson saw a great deal of activation in those regions and in their right hemisphere counterparts—more, in fact, than in the brains of healthy individuals.

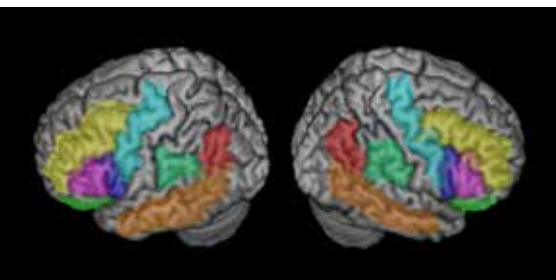
This hyperactivity makes sense, Kiran says, because after a stroke, the brain struggles to make connections that once came to it naturally. “Healthy people have a very efficient way of going about language processing. It is pretty automatic,” she says. “What happens as a function of a stroke is that automaticity is lost, and language processing is laborious. Patients really struggle with simple things in an inefficient way,” resulting in increased blood flow around the brain’s language center. The researchers translate the blood flow into numerical values; hyperactivity registers in higher values than the activity of a healthy brain. The goal of therapy is to train the brain to focus and approach language more efficiently.

Once the researchers established the participants’ baseline language function and conducted an initial fMRI scan, patients participated in 12 weeks of biweekly therapy sessions at the Aphasia Research Laboratory. At the end of this therapy, the patients received another fMRI scan to monitor changes in the brain’s function.

During therapy—which the participants replicated in the fMRI machine—the patients viewed images of objects and had approximately four seconds to name them. The researchers selected specific objects to maximize the benefits of the therapy. “Since you could never help someone relearn the names for everything, people in the field are interested in trying to figure out how to get the most bang for your buck,” Johnson says. In prior research projects, Kiran had found categorizing words to be effective for impaired naming therapy; this particular study employed four categories: furniture, vegetables, clothing, and birds. Since there are limitless items in each category, the researchers focused on “atypical” objects.

“For example,” Johnson says, “a prototypical bird might be a sparrow; it’s small, it has a beak, it has wings, it’s brownish. It’s going to share a lot of features with other birds in that category. But a penguin, an atypical bird, is not going to share a lot of those features; it can’t fly, it’s bigger, it lives in the cold. By training with items that are further from the prototype, you see more improvement in items at the core of the category. So if you work on penguin, you are more likely to improve on sparrow” than vice versa. Study participants were trained on 18 items from each of two categories, with an equal number of prototypical and atypical examples. (“I learned a lot about birds,” O’Day says.)

At the end of the 12 weeks, the researchers compared the participants’ brain function before and after treatment. They were not surprised to find that the patients had improved—that’s what they had expected—but they were surprised to see how the improvement was characterized in the scans.



**Kiran and Johnson (right) compared brain activity in the colored regions of the left and right hemispheres of study participants with aphasia and healthy participants (above). After 12 weeks of therapy, the brains of those with aphasia had normalized to a level more consistent with the brains of healthy individuals.**



The overactive brain had quieted to a level of activity more consistent with the brain of a healthy adult. The damaged regions of the brain were normalizing. Equally surprising, the researchers discovered that this activity was not taking place along a right-brain, left-brain divide.

It was previously thought that when a stroke occurred in the left hemisphere, the right hemisphere would compensate for the lost function. But this study shows “it’s not so much about what is happening in a particular region, as much as the remaining regions and how they are interacting,” Johnson says. Kiran adds, “It’s not left or right, it’s left *and* right. It all depends on which parts of the network are damaged and how the rest of the network figures itself out.” Tracking this reorganization process could give researchers and clinicians a more accurate assessment of how specific regions of the brain respond to therapy.

### **NORMALIZING THE NETWORK**

The implications of this study are profound. Because each brain is unique, the region affected by a stroke in one person’s brain is different from the region affected by a stroke in the brain of another person. Previously, a therapist would not “necessarily know if a treatment is going to be beneficial to a patient” and would counsel therapy through trial and error, expending time and resources in the process, says Johnson. This study will give therapists the “predictive power” to see what works and what doesn’t in the brain of a particular person.

Because fMRI technology indicates exactly which parts of an individual’s brain are active when processing language, therapy can be targeted for that patient’s brain. “With these techniques, we are able to understand how the brain is recovering after neurological disease, see the mechanisms of recovery, and try to individualize the way we understand

different patients and their trajectories,” Kiran says, which above all will provide hope to those who believed their brains were finished healing.

Typically when counseling patients, a speech-language pathologist could offer only the hope that the brain might reorganize to compensate for the function it had lost. A professor who once presented lectures might strive to speak a few sentences, for instance, and learn to live with “this functional, half-damaged system that is trying to compensate as best as it can,” Kiran says.

Now, however, Kiran says therapists can tell patients that their brains are actively trying to return to normal, even years after a stroke. “While we still cannot tell our patients that they are going to be 100 percent recovered, we can at least tell them that as they get better, their brain is going to be more and more like a normal brain,” she says.

This study confirms the work Kiran has been doing for the last two decades. “We have always known treatment works because we see our patients improve over time, but this study proves that the brain is changing as a function of rehab,” says Kiran, who will translate her findings into real-world help for those with aphasia. She has already incorporated treatment for impaired naming into Constant Therapy, an interactive, personalized app that she developed for patients to continue therapy on an iPad at home.

“We are able to take the evidence-based treatment we know is effective and put it into a platform where somebody in Nebraska can now practice the same therapy we conduct in the lab,” she says.

And the therapy is working. “Where I was a year ago, I couldn’t really have a clear understanding of things—of everything,” O’Day says. “If I think about where I was even three months ago, everything is more clear in my head. It feels like every month I get better at it.” **IS**





**AN APP FOR  
UNDERSTANDING  
SCHIZOPHRENIA**

**New  
technology  
to encourage  
social  
interaction**

By Joel Brown

**G**athering accurate information on the social lives of people with schizophrenia has long been a challenge for researchers. They have tried to go beyond typical self-reporting methods by asking people to answer questions in the context of their daily lives using personal digital assistants or mobile phones, a method known as ecological momentary assessment. But many

people—not just those with schizophrenia—have difficulty providing an accurate picture of their activities that way.

Dan Fulford, an assistant professor of occupational therapy, and colleagues from San Francisco State University and the University of Saskatchewan are developing a cell phone app that collects social data in real time and takes the onus of reporting off the participants. They hope it will help clinicians better understand the illness and soon allow for real-time intervention.

People with schizophrenia—a chronic mental illness that affects about 7 or 8 individuals out of 1,000—often feel isolated. They want to make friends and have relationships, but they can't seem to translate that desire into action, says Fulford, a clinical psychologist and director of Sargent's Approach Motivation & Participation (AMP) Lab. The symptoms of schizophrenia can include delusions, hallucinations, and problems with thinking, concentration, and motivation—all of which can make social interaction difficult.

"So, how do we more specifically understand social motivation and drive? And how do we intervene?" asks Fulford, who also collaborates with BU's Center for Psychiatric Rehabilitation on projects to study motivation and social participation among people with schizophrenia, and how various therapies might affect them.

The app that Fulford and his colleagues are developing will help them identify when a person is feeling isolated; eventually they hope to use it to prompt social engagement. Built by developers from the University of Saskatchewan computer science department and customized for this project, the app employs a phone's GPS and accelerometer to monitor a person's movements and activity level. It uses the device's microphone to record samples of ambient noise, including the participant's conversations.

"These are random snippets throughout the day of what is happening in their environment," Fulford says, which will give the researchers "a richer, more qualitative understanding of their social worlds" and deeper insight into "how motivation for social connection breaks down in people with schizophrenia in the real-world environment."

In this and earlier studies, researchers have found that part of the problem is how people with schizophrenia perceive rewards. "Not the ability to experience satisfaction in the moment, per se—they experience the same pleasure when smelling a flower or tasting a great meal—but it's more in the anticipatory emotion, in which you're

## PEOPLE WITH SCHIZOPHRENIA TEND TO HAVE DIFFICULTY ANTICIPATING PLEASURE, WHICH DIMINISHES SOCIAL MOTIVATION.

anticipating feeling good in the future or having a positive outcome," Fulford says. "That's where the difficulties seem to lie."

The idea is that anticipating pleasure (and experiencing pleasure in anticipation) ultimately motivates social interactions. If people anticipate earning a reward from a social situation (e.g., "I will enjoy speaking with Jane"), then they will be more likely to engage in that activity ("I should walk up to Jane and start a conversation"). While people with schizophrenia show healthy levels of in-the-moment pleasure during positive events ("Wow, this is fun!"), they tend to have more difficulty anticipating pleasure, which diminishes their motivation for social interaction.



Dan Fulford

Ultimately, Fulford says, the app could be set up to help a person reach a defined social goal, such as "improve communication with my brother." When the app detects social isolation, the subject would be prompted with reminders of the goal (improve communication), requisite steps for goal progress (for example, call brother, share recent experience, ask how he is doing), and strategies for overcoming potential barriers (if brother doesn't want to talk, here is what you can do...).

Fulford's collaborator, David Gard, a professor of psychology at San Francisco State University, has been recruiting the study subjects through various mental health programs in the Bay Area, as well as through ads. The researchers expected that up to half of the patients would say they were not interested because they didn't want to use a cell phone app that monitors their every move, since people with schizophrenia often experience symptoms such as paranoia and hearing voices. But the researchers have found the opposite to be true. Of the 16 people with schizophrenia asked to be part of the study, only one declined, Gard says.

"People with schizophrenia often show interest in participating in research that will ultimately help others with similar problems," Fulford says. "Many feel that their involvement meaningfully contributes to the understanding of the disorder." With a deeper understanding of patients' interaction with other people, providers may be better able to help them enjoy full, functional social lives. **IS**



REGAINING

A

VOICE



## STRAINING YOUR VOICE IS EASY. FIXING IT CAN BE HARD. ONE RESEARCHER'S NONINVASIVE TOOL WILL MAKE THERAPY SIMPLER—AND MORE SCIENTIFIC.

BY JULIE BUTTERS

**W**hen Meghan Graham was an undergraduate at Ithaca College, her speech pathology professor pulled her aside after class, but not to discuss homework. “This may be personal,” she said, “but do you smoke?”

Her professor was concerned about the raspy quality of her voice, which could signal the presence of vocal nodules, callus-like growths on her vocal cords. Graham, a nonsmoker, was surprised; she'd always had a husky voice and didn't have throat pain. She made an appointment with an ear, nose, and throat doctor, who did find nodules, which were surgically removed.

Graham, who was studying to become a speech-language pathologist, learned that the nodules were likely caused by vocal hyperfunction, a common but little-understood disorder in which a person may develop too much tension in the muscles of the larynx by controlling them incorrectly. She tended to start sentences too forcefully and talk at length without taking a breath, habits made worse during her year working as a server in a restaurant while in college. “It was eye-opening to see that a voice disorder could happen to anyone,” says Graham ('06), now a lecturer and clinical supervisor at Sargent.

A voice disorder can particularly affect people who rely heavily on their voices, such as teachers, lawyers, and performers. Up to nine percent of the US population has experienced a voice disorder, ranging from laryngitis to nodules to throat cancer. These disorders stop the vocal cords from working properly and can cause discomfort and pain. They can also prevent speaking and singing. If left untreated, or if treated unsuccessfully, a voice disorder can cause permanent damage. One major factor in voice disorders is believed to be elevated laryngeal tension, a condition that can occur when people create excessive tension in the larynx—the mechanism that produces sound—by pushing their voices too hard.

Cara Stepp, an assistant professor of speech, language & hearing sciences, has developed a tool that uses an acoustic measure of small changes in people's voices, called relative fundamental frequency (RFF), that will make estimating laryngeal tension easy, noninvasive, reliable, and affordable. That's critical in helping patients through voice therapy. The tool, which is being tested for use in clinical practice, will also help speech scientists better understand how vocal hyperfunction works.

### BAD VIBRATIONS

Voice problems start in the larynx, a small organ at the top of the trachea that contains the vocal cords. These two bands of tissue vibrate as we push air from our lungs through them, creating sound at a particular frequency—or rate of vibration. Speaking or singing too forcefully increases tension in the larynx and can prevent the vocal cords from vibrating properly. >

Knowing a patient's laryngeal tension can be helpful in therapy, but it's difficult to measure. To diagnose and treat voice problems, clinicians often need to examine the vocal cords. The trouble is, "the larynx is not exactly easy to get to," says Stepp; you can't feel much of it with your hands through the skin. That means using invasive methods, such as an endoscopy, which involves inserting a camera-fitted scope into the airway through the nostril. A typical endoscopy system costs roughly \$80,000, says Stepp. "These are things that you see at big voice clinics, not at a school-based therapist's office."

But laryngeal tension can also be assessed indirectly through a correlate—something related to laryngeal tension. Stepp thinks RFF is the correlate to use. The tool she's created could provide clinicians with some of the same in-depth information gleaned from an endoscopy, she says, but "without having to stick anything inside anybody, which is both expensive and unpleasant."

RFF is measured from small frequency changes in our voices just before and after we say a voiceless consonant (such as "p," which doesn't cause the vocal cords to vibrate). If you have a healthy voice, laryngeal tension temporarily increases when you produce these consonants; that in turn increases RFF. But if, says Stepp, you have vocal hyperfunction and already have high laryngeal tension, "your ability to create these short-term increases will be reduced, and that produces lower RFF." Lower RFFs could therefore indicate the presence of laryngeal tension.

Stepp is the first to study RFF in individuals with vocal hyperfunction and explore its potential for estimating laryngeal tension. She and her collaborators also gave RFF its name. Until less than a decade ago, she says, RFF was just "a random acoustic feature people noticed in healthy people's voices. There was no reason to think it was clinically useful." Then a 2008 study in the *Journal of Voice* reported that people with Parkinson's disease had lower RFFs than people of the same age without Parkinson's. That got Stepp's attention. Parkinson's had long been known to affect the larynx and articulation, and to cause rigidity in the body. Could the low RFFs in people with Parkinson's disease signal the presence of elevated laryngeal tension? The study authors had posited that as one explanation.

Stepp found evidence supporting the hypothesis. Her research revealed that people with vocal hyperfunction, the most common voice disorder associated with laryngeal tension, have low RFFs on the same scale as those of people with Parkinson's. She also showed that patients with hyperfunction who received successful behavioral therapy with a speech-language pathologist increased their RFFs to levels closer to those of healthy voices.

Although Stepp's research indicates that RFF shows promise for assessing vocal hyperfunction, it hasn't been sufficiently tested for approval in clinical use. That's because there hasn't been a simple, standard, objective way to measure it until now. RFF is too subtle for the human ear to

pick up, and evaluating it is laborious. One method involves examining the movements of the vocal cords to measure their stiffness—just like a physical therapist might evaluate the stiffness of a limb by watching it in motion. This requires capturing images from video endoscopy, then measuring the angles of the vocal cords' movements. Stepp's new acoustic measure can provide the same information without invasive endoscopy and time-consuming calculations.

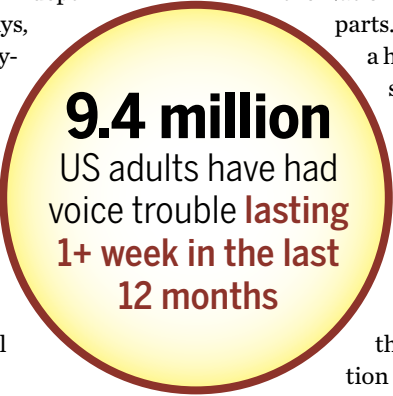
She is working on the project with a team of clinicians, scientists, and engineers at Sargent, the BU School of Medicine, and Massachusetts General Hospital. The tool, whose development received \$10,000 in funding from the American Speech-Language-Hearing Foundation and \$480,927 from the National Institutes of Health (NIH), consists of two parts. The first is a microphone, such as that on a high-quality, handheld digital recorder or a smartphone. The second is computer software that Stepp's team created. They came up with algorithms—a series of steps used by a computer to make calculations—that enable the software to compute an automatic reading of RFF based on the voice recording. Stepp's team plans to make the software program available for free on the website for the STEPP LAB for Sensorimotor Rehabilitation Engineering at BU later this year.

So far, Stepp's research with healthy adults is promising, showing the acoustic measurements of RFF to be as reliable as established methods like the one obtained with the endoscope. But to take her tool into clinical practice, Stepp needs to prove its validity on a larger scale, performing more detailed studies involving people with injured voices that are examined over a longer period of time.

### THE FUTURE OF VOICE THERAPY

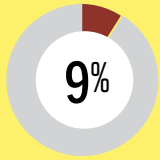
Stepp and a group of colleagues including Joseph Perkell, a senior research scientist at Sargent, and Pieter Noordzij, a professor of otolaryngology at MED and an affiliate professor at Sargent, have received a roughly \$2 million Research Project Grant (R01) from the NIH to expand their research on the ability of the acoustic RFF measure to estimate laryngeal tension. They will assess how well it stacks up against established methods and how efficiently it tracks changes in laryngeal tension in two sets of people: those with Parkinson's, as their disease progresses, and those with vocal hyperfunction, after they've undergone therapy.

The R01 grant will also help Stepp and her collaborators complete a project they've been working on for five years: a voice reference database for clinicians. Just as your doctor can determine your healthy target weight based on your height, sex, and age, therapists would consult this database to give you a score corresponding to what a healthy voice for your age, sex, and condition (Parkinson's disease or no Parkinson's disease) should sound like. Clinicians would then help you achieve that score. Stepp says it could potentially also act as an aid in diagnosis.



**9.4 million**  
US adults have had  
voice trouble **lasting**  
**1+ week in the last**  
**12 months**

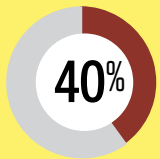
## VOCAL DISORDERS IN NUMBERS



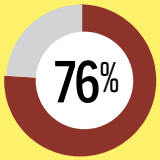
of the US population has experienced a voice disorder



of patients at voice clinics are teachers—who make up only 4% of the US workforce



of referrals to multidisciplinary voice clinics are for vocal hyperfunction



of people with voice disorders report the problem negatively impacts their job performance

Cara Stepp, an assistant professor of speech, language & hearing sciences, is the first to study relative fundamental frequency (RFF) in individuals with vocal hyperfunction.



## STEPP'S TOOL COULD PROVIDE CLINICIANS WITH THE SAME INFORMATION AS AN ENDOSCOPY, BUT WITHOUT THE INVASIVENESS AND EXPENSE. ■■

Graham says a tool like Stepp's would have helped her in therapy, which wasn't prescribed for her after surgery and which she obtained at Sargent as a volunteer research subject for Stepp. Along with promoting healthy vocal hygiene—such as staying hydrated, breathing from the diaphragm for support, and resting her voice—Stepp's tool would have given Graham and her clinician a reliable way of tracking her progress. Stepp says her acoustic measure would never replace a laryngologist's diagnosis of a voice problem, but it would help “easily, quickly, and frequently track progress through therapy or through other intervention like surgery.” It would also aid research aiming to validate behavioral treatments and surgeries.

It may be 5 to 10 years before Stepp's tool is in widespread use by clinicians. In the meantime, she helps prevent voice disorders by raising awareness about proper vocal care. In 2015, she co-organized a voice awareness day for voice performance majors from Gordon College in Wenham, Massachusetts. The event included an anatomy talk, vocal hygiene counseling from Sargent faculty and students, and endoscopies. “They got to do some of their warmups and sing some tricky passages and then talk through” what they noticed about their vocal cords with the professionals, says Stepp, who hopes to repeat the event this fall. With this vocal knowledge, the future Adeles of the world will better know when to rock—and when to give their voice a rest. **IS**



# RUNNING FOR LI

## AN ATHLETE AND A NUTRITIONIST ARE CHAMPIONING EATING DISORDER TREATMENT ON CAMPUS

BY ANDREW THURSTON

**Elite long-distance runner** David Proctor came to the United States ready to take on the world. At 18, the Briton had earned an exclusive athletics scholarship at Boston University—the first step to realizing his dream of Olympic glory. Within three months, his ambitions would begin to crumble, his confidence eroded by homesickness, pressure to perform, and the beginnings of a life-threatening eating disorder.

The downward spiral started with five devastating words: “You’re getting a little fat.” His coach had drummed them home with a playful pat of Proctor’s belly.

Proctor (’08) stopped eating, determined to drop from a hardly corpulent 160 pounds to a scrawny 140. He slashed his caloric intake to as low as 500 calories a day—far short of the minimum 2,500 recommended for long-distance runners. Eventually, his weight bottomed out at 130 pounds. The 5-foot-11-inch Proctor had an eating disorder.

Without adequate fuel, Proctor increased his risks of stress fractures and bone loss—during his sophomore season, he was plagued by anemia and injuries. His speed, stamina, and mental focus were slipping away, and so were his Olympic hopes.

Studies have shown that Proctor’s struggles are not uncommon. According to the NCAA, 25 percent of female and 20 percent of male college athletes suffer from disordered eating, abnormal behaviors like skipping meals or eating compulsively, which are often precursors to full-blown eating disorders such as anorexia and bulimia. (Many experts think that with so many athletes underreporting problems, the true prevalence may be much higher.) The risk factors, from genetics to competitive pressures, are also well known. Less well studied is what helps these athletes recover, says nutritionist Paula A. Quatromoni, chair of Sargent’s Department of Health Sciences.

For more than a decade, Associate Professor Quatromoni has worked to develop and refine models for treating eating disorders among college athletes. Now, she’s chronicling the path to sustained recovery through journal articles and presentations and implementing her lessons beyond BU.

### PEAK PERFORMANCE

In February 2016, an NBC investigative unit found that administrators at California’s 21 Division I and II athletic programs were unaware of how many of their students had been treated for

eating disorders and lacked plans for helping them. In the years before Proctor arrived on American soil, there was no consistent approach at BU for spotting and treating those with disordered eating: students would see athletic trainers and physicians—and sometimes get referred to off-campus sports nutritionists.

That changed in 2004, when Quatromoni received a call from BU’s sports medicine director: a female runner seemed dangerously thin. Could she help? During the next few years, Quatromoni became an integral part of the lineup of sports medicine physicians and psychologists caring for athletes. Together, they formed the BU Sports Medicine Wellness Team, the core of an on-campus eating disorder treatment program. According to Quatromoni’s 2008 report on the program in the *Journal of the American Dietetic Association*, the team also pulled in athletic trainers, coaches, strength and conditioning coaches, and academic counselors. Formalized nutrition education programs, counseling services, and guidelines covering the journey from screening to treatment rounded out the model. Proctor and his female teammate were the first recipients of care.

Proctor had chosen to see Quatromoni, but refused her recommendation that he also see a psychologist. Eventually, he agreed to go if Quatromoni sat in on the sessions. Quatromoni says that working alongside sports psychologist Amy L. Baltzell, a clinical associate professor at BU School of Education, was life-changing for Proctor, and for Quatromoni as a professional.

“David could be very engaged in the middle of a conversation with Amy and he would put forward a very disordered belief about food that there was no way she could respond to,” she says, “but I was sitting right there, so I could jump in.”

The three met weekly for an entire summer. Proctor was given help normalizing his eating habits and addressing distorted thoughts; he added lunch to his meal routine, replaced his dorm room scale with a mini fridge, and had his body fat measured by a strength coach to reassure him that, despite the pounds of muscle he was gaining, he was still quite lean.

Proctor closed out his college career as an All-American, a track record holder, and BU’s first sub-four-minute-mile athlete.

The success of the group sessions convinced Quatromoni that a multidisciplinary model was necessary for increasing a patient’s chances of a durable recovery. Yet, more than a decade since the BU wellness team was founded, she says, “the major-

A full-page photograph of a man running on a beach. He is shirtless, wearing white athletic shorts with a red stripe on the side, and white sneakers with red accents. He has a watch on his left wrist and sunglasses on his head. The background is a clear blue sky and the ocean. The word 'FE' is written in large, bold, yellow letters on the left side of the image.

# FE

Olympic hopeful David Proctor ('08) developed an eating disorder as a freshman. The BU Sports Medicine Wellness Team helped him recover and close out his college career as an All-American.

ity of collegiate athletic departments do not employ full-time registered dietitians, leaving nutritional risk unattended to.

“In practice, there are a lot of barriers to treatment. Off-campus therapists and nutritionists are difficult for athletes to access; if a client is resistant to therapy, lack of a trusted, accessible provider becomes a barrier. My experience and reading of the literature suggests we need to break down these barriers if we truly want to help.”

In the February 2015 edition of the *Annals of Sports Medicine and Research*, Quatromoni and Proctor wrote about the athlete’s experiences with the program—and his subsequent recovery. Proctor has also joined Quatromoni on the speaking circuit: in 2015, the two presented at a sports science summit in the United Kingdom and, in 2016, at two conferences for sports dietitians in



**Paula A. Quatromoni, chair of health sciences, helped form the BU Sports Medicine Wellness Team.**

the United States. Quatromoni says there is a growing number of dietitians working with athletes, but few are sharing their success stories—it means her papers and presentations are serving a largely unmet need.

And, she adds, the chance to add Proctor’s voice to the literature is a rare one: He’s male *and* willing to talk. Quatromoni believes his case also helps highlight gender biases in patterns of screening, recognition, referral, and treatment of eating disorders.

As an undernourished freshman, Proctor was never mandated to see Quatromoni, nor was he placed on a contract outlining recovery goals. He self-referred to her because he thought she could help him *lose* more weight. By contrast, the female athlete Quatromoni saw at the same time received a mandated referral from BU Athletics and was sidelined from running with a therapeutic contract—she was banned from training and competition until she met certain recovery targets. BU’s revamped program aims to equalize referrals across genders, but Quatromoni says systems elsewhere and societal attitudes may still work against male athletes and undermine early intervention.

Competitive athletics “is a very macho environment—you’re not allowed to show weakness in any way; that’s just how it is when you’re part of an elite-level sport,” says Proctor.

Another reason Quatromoni is keen to share Proctor’s story is that he was treated (using BU resources) for five years. “Most people don’t stay in treatment that long,” she says. “Insurance doesn’t pay for that.” Quatromoni says that limitations in health insurance coverage for eating disorder treatment are a common barrier to care. She adds that Proctor’s long-term sporting success is important to share, too. Today, Proctor is still an elite runner and competed in the 2016 British Olympic trials.

“Not everybody recovers from eating disorders,” says Quatromoni. “There’s a very high mortality rate, the highest of any psychological disorder.” Studies have shown that anorexia has a 46 percent recovery rate—and a 6 percent death rate.

In its first two years of full operation, BU’s Sports Medicine Wellness Team gave nutrition advice to 68 student-athletes from 19 teams; 46 percent of those served showed signs of disordered eating and were treated by members of the wellness team. Many of those students would have gone untreated in the past. In 2009, the Sargent Choice Nutrition Center took over the provision of nutrition services to athletes, incorporating them into its suite of programs for the wider BU community.

### **IT TAKES AN ARMY**

Quatromoni hopes her successes in referring and treating athletes serve as a call to action, and not just within college sports. Since 2015, she’s worked as a senior consultant to Walden Behavioral Care, a Boston-area eating disorder treatment group. She helped it launch Walden GOALS, an intensive outpatient treatment program that shares the approach of the BU effort: nutritionists and mental health professionals working as a team to address the specific needs and vulnerabilities of athletes of all ages. Quatromoni knows of only one other similar private initiative in the United States—the Victory Program at McCallum Place in St. Louis, Missouri.

The Walden partnership also opens new practicum positions for Sargent dietetics students and research opportunities for Quatromoni. She’s keen to delve into the clinic’s 16 years’ worth of patient data, particularly on the understudied male population. In a separate project, Quatromoni is surveying members of the International Federation of Eating Disorder Dietitians to examine the quality and availability of training opportunities for nutritionists working in eating disorder treatment settings.

Every so often, Quatromoni still gets a call from the athletes who helped her pilot BU’s care model, including Andrea Walkonen (’08, SED’10), the runner whose eating disorder sparked that first call from the sports medicine director. As an undergraduate, Walkonen was diagnosed with a common trifecta among female athletes: disordered eating, over-exercising, and amenorrhea, or loss of menstrual periods.

“It takes an army to deal with this sort of thing,” says Walkonen, who, like Proctor, recovered, becoming an All-American and competing in the 2016 US Olympic trials. “It’s not something that will go away, but I’m at the point where I’ve learned to overcome negative thoughts and continue to progress.” **IS**



## Step by Step

A student takes research into the home to discover why falling remains a risk after weight loss

BY STEPHANIE ROTONDO

**For people struggling with obesity,** everyday movements like walking and stepping onto a curb are more than laborious. They can be treacherous, posing the risk of falling. Surgical weight loss can make walking easier, but it doesn't necessarily cut the risk of taking a tumble.

It seems counterintuitive, but researchers have an explanation: those who have undergone bariatric surgery often retain atypical walking habits they developed to accommodate their weight. Individuals with obesity must exert more energy to maintain their balance while walking than those with average body mass indices (BMI). And when they step over an obstacle, their supporting leg uses extra energy to keep the body balanced. They adapt their gait—by taking shorter, slower steps, for example—to avoid expending excess energy, but such atypical walking patterns lead to a higher risk of falling. There is no targeted intervention to help people learn to adjust their gait following bariatric surgery.

Lena Huang ('17), a human physiology and premed student, is studying the body's movements to determine the variables contributing to fall risk. While previous experiments have been conducted in the lab and on flat ground, Huang is researching the risk of falling after bariatric surgery in a natural environment where obstacles abound: the home. With new technology, she's gathering data that could lead to more targeted therapies and a reduced risk of falling. "We're trying to address something not very well known in terms of how to help these clients move safely during their everyday activities," says Huang's mentor, Simone V. Gill, an assistant professor of occupational therapy and director of Sargent's Motor Development Lab.

With funding from Boston University's Undergraduate Research Opportunities Program (UROP), Huang is conducting a study for which she aims to engage 20 participants, 10 of whom have undergone bariatric surgery and 10 who have not. The work begins in the lab, where she wraps electronic LEGSys sensors around each participant's legs, just above the ankle and knee. She secures another sensor to the small of the participant's back. The participants complete five laps on a runway and step over one of three obstacles—a limbo-style pole at three different heights—introduced midway through each lap. Using Bluetooth technology,



**Lena Huang ('17) hopes her research will inform future studies on the benefits of retraining patients in walking after weight loss.**

the sensors deliver real-time data about the individual's stride length and width, as well as the number of steps per minute, providing a full picture of their gait and potential fall risk.

The participants continue the assessment at home using a PAMSys sensor, a small device worn around the neck for two consecutive days, except when showering or sleeping. A relatively new tool, the PAMSys sensor provides more realistic measures than when individuals perform specific tasks over a short, predetermined period of time in a lab.

For instance, PAMSys sensors track how individuals transition from standing to sitting.


## LENA HUANG IS STUDYING THE BODY'S MOVEMENTS TO DETERMINE THE VARIABLES CONTRIBUTING TO FALL RISK.

"Some might hold on to the armrest and slowly go down, where others might plop down," explains Huang.

Her research could illuminate whether potential changes in center of mass or stride length and width associated with weight reduction are connected to postural instability. When one variable changes to an extreme, the other offers a counterbalance to prevent fall risk. For example, an individual's center of mass is constantly shifting left to right and front to back when walking; if the body shifts a little too far from a normal range, the likelihood of falling increases.

Huang intends for this research to inform future studies on the benefits of retraining patients in walking after weight loss and hopes it will lead to innovations that minimize fall risk. "Ideally, clinicians will be able to tailor interventions to the client," Gill says. Such interventions could include prescribing activities for home practice while a wearable device communicates patients' progress to their practitioners, who will help them adjust their movements.

Huang's work earned her the Outstanding Student Researcher Award at the 2015 UROP Symposium. It has also provided her with a foundation for future research and her intended career as a doctor of family medicine. In particular, collaborating with experts, including physicians, statisticians, and biomedical engineers, has given her a deeper understanding of the connections among health disciplines.

Working with Gill, she's learning how to conduct a study, from applying for grants and designing the protocol, to recruiting subjects and analyzing data. "UROP helped me see how research works and how to do it effectively," she says. "It helped me see how everything works together." 

# Grant Awards

**BU SARGENT COLLEGE'S FACULTY RECEIVED \$12,982,332 IN RESEARCH FUNDING IN 2015-2016. HERE IS A LIST OF OUR PROJECTS AND THE AGENCIES AND FOUNDATIONS SUPPORTING THEM.**

SARGENT INVESTIGATOR	TITLE OF PROJECT	AGENCY/FOUNDATION	FUNDS AWARDED 2015-2016	YEAR OF AWARD	TOTAL AWARD
Sudha Arunachalam, assistant professor of speech, language & hearing sciences	Improving Child-Caregiver Interactions for Young Children with Autism	Charles H. Hood Foundation	\$75,000	1 of 2	\$150,000
	Mechanisms Underlying Word Learning in Children with ASD: Non-social Learning and Memory Consolidation	NIH/NIDCD	\$172,195	2 of 4	\$637,054
	Caregiver-Child Interactions and the Trajectory of Language Development in Korean and English	Jasper and Marion Whiting Foundation	\$4,350	1 of 1	\$4,350
	Verb Processing and Verb Acquisition in Late Talking Toddlers	American Speech-Language-Hearing Foundation	\$25,000	1 of 2	\$25,000
Helen Barbas, professor of health sciences	Organization of Prefrontal Feedback Circuits	NIH/NIMH	\$438,124	5 of 5	\$2,260,464
	Prefrontal Anatomic Pathways in Executive Control	NIH/NINDS	\$572,969	2 of 5	\$1,779,573
	Prefrontal Anatomic Pathways in Executive Control	NIH/NINDS	\$567,217	1 of 1	\$567,217
Helen Barbas (with Sabina Berretta, principal investigator)	Thalamic Axonal Pathways and Extracellular Matrix Abnormalities in Schizophrenia	McLean Hospital (NIH/NIMH)	\$49,051	1 of 2	\$99,079
Jason Bohland, assistant professor of health sciences and assistant professor of speech, language & hearing sciences	An Open, Online Course in Neuronal Data Analysis for the Practicing Neuroscientist	NIH/NIGMS	\$193,815	1 of 3	\$536,637
	The Transcriptional Landscape of Genes Implicated in Speech and Language Disorders	American Speech-Language-Hearing Foundation	\$25,000	1 of 1	\$25,000
Terry Ellis, assistant professor of physical therapy & athletic training	Mobile Health Technology to Promote Physical Activity in Persons with Parkinson Disease	American Parkinson Disease Association, Inc.	\$50,000	1 of 1	\$50,000
Terry Ellis (with Conor Walsh, principal investigator)	CPS:TTP Option: Synergy: Human Machine Interaction with Mobility Enhancing Soft Exosuits	Wyss Institute for Biologically Inspired Engineering-NSF Subcontract	\$76,147	2 of 4	\$328,803
Terry Ellis	Maintaining Physical Independence in Older Adults	Partners Healthcare System, Inc.-RX Foundation Subcontract	\$91,727	2 of 2.5	\$151,740
Marianne Farkas, director of training & international services, BU Center for Psychiatric Rehabilitation, and E. Sally Rogers, executive director, BU Center for Psychiatric Rehabilitation	Bringing Recovery Supports to Scale Technical Assistance Center Strategy	Health and Human Services/SAMHSA	\$25,000	5 of 5	\$708,521

SARGENT INVESTIGATOR	TITLE OF PROJECT	AGENCY/FOUNDATION	FUNDS AWARDED 2015-2016	YEAR OF AWARD	TOTAL AWARD
Miguel Garcia-Cabezas, research associate	Circuits and Molecular Features of Anterior Cingulate Areas and Depression	Brain & Behavior Research Foundation	\$30,000	1 of 2	\$65,000
Simone Gill, assistant professor of occupational therapy (with Michael J. Mueller, principal investigator)	Multicenter Career Development Program for Physical and Occupational Therapy	CORRT NIH/NICHHD-Washington University	\$135,000	2 of 2	\$270,000
Simone Gill	Massive Weight Loss and Its Effects on Postural Stability and Fall Risks	NIH/NIAMS	\$98,191	2 of 3	\$270,438
	Use of Motor Learning Principles to Reduce Fall Risks after Surgical Weight Loss	AOTF	\$49,999	1 of 1	\$49,999
Mahasweta Girgenrath, assistant professor of health sciences	Inhibition of Angiotensin II Signaling in Congenital Muscular Dystrophy Type 1A (MDC1A)	Cure CMD	\$50,000	2 of 2	\$100,000
	Evaluating Efficacy of ANG(1-7) in Improving the Overall Muscle Health and Survivability in DYW Mice	Tarix Orphan, LLC	\$199,862	1 of 1	\$199,862
	Efficacy of Recombinant in DyW Mice, a Model for MDC1A	Tivorsan Pharmaceuticals	\$110,000	1 of 1	\$110,000
	Utilizing Natural History to Identify Optimal Timeline for Promoyogenic/Antifibrotic Combinatorial Therapy	Muscular Dystrophy Association	\$100,000	1 of 2	\$200,000
Jennifer Gottlieb, research assistant professor, BU Center for Psychiatric Rehabilitation	Improving Quality and Reducing Cost in Schizophrenia Care and New Technologies and New Personnel	Centers for Medicare and Medicaid Services	\$15,564	3 of 3	\$409,022
Frank Guenther, professor of speech, language & hearing sciences	Neural Modeling and Imaging of Speech	NIH/NIDCD	\$347,181	5 of 5	\$1,777,490
	Neural Modeling and Imaging of Speech	NIH/NIDCD	\$60,171	1 of 1	\$60,171
	Sequencing and Initiation in Speech Production	NIH/NIDCD	\$361,097	1 of 5	\$1,760,216
Frank Guenther (with Helen Tager-Flusberg, principal investigator)	Minimally Verbal ASD: From Basic Mechanisms to Innovative Interventions	NIH/NIDCD	\$394,066	4 of 4	\$1,982,833
Kenneth G. Holt, associate professor of physical therapy & athletic training (with Conor Walsh, principal investigator)	Biologically Inspired Soft Smart Exosuit for Injury Prevention and Performance Augmentation	Wyss Institute for Biologically Inspired Engineering-NSF Subcontract	\$108,088	2 of 2	\$175,888
Dorothy Hutchinson, director of research, BU Center for Psychiatric Rehabilitation	The Learning and Working During the Transition to Adulthood RRTC	US Department of Education-NIDRR	\$6,756	1 of 3	\$201,024
	MA Youth Suicide Prevention Project	HHS/SAMHSA	\$20,853	1 of 5	\$156,233
Karen Jacobs, clinical professor of occupational therapy (with Phillip Rumrill, principal investigator)	Project Career: Development of a Multidisciplinary Demonstration to Support the Transition of Students with Traumatic Brain Injuries from Postsecondary Education to Employment	US Department of Education-Kent State University Subcontract	\$89,424	3 of 5	\$407,210
Susan Kandarian, professor of health sciences	The Molecular Basis of Muscle Wasting in Cancer Cachexia	NIH/NIAMS	\$368,325	5 of 5	\$1,815,430
Julie Keysor, associate professor of physical therapy & athletic training	ENACT	US Department of Education	\$799,991	5 of 5	\$3,999,923



**Grant Awards**

SARGENT INVESTIGATOR	TITLE OF PROJECT	AGENCY/FOUNDATION	FUNDS AWARDED 2015-2016	YEAR OF AWARD	TOTAL AWARD
Julie Keysor (with Leigh Callahan, principal investigator)	Osteoarthritis Action Alliance	University of North Carolina/Arthritis Foundation	\$43,786	1 of 1	\$43,786
Gerald Kidd, professor of speech, language & hearing sciences	Central Factors in Auditory Masking	NIH/NIDCD	\$527,870	5 of 5	\$2,689,489
	Top Down Control of Selective Amplification	NIH/NIDCD	\$541,979	3 of 5	\$2,750,773
Gerald Kidd and H. Steven Colburn, professor of biomedical engineering	Core Center Grant-Sound Field Laboratory (Core 1)	NIH/NIDCD	\$212,929	5 of 5	\$1,208,700
Swathi Kiran, professor of speech, language & hearing sciences (with Cynthia Thompson, principal investigator)	The Neurobiology of Recovery in Aphasia: Natural History and Treatment-Induced Recovery	NIH/NIDCD Subaward-Northwestern University	\$271,374	4 of 5	\$1,299,549
Swathi Kiran and Caroline Niziolek, postdoctoral student of speech, language & hearing sciences	Neural Markers of Speech Error Detection and Correction Abilities in Aphasia	NIH/NIDCD	\$100,038	1 of 2	\$200,076
Jessica Kramer, assistant professor of occupational therapy	An Environment Problem Solving Strategy for Parents of Youth with Disabilities	AOTF	\$49,999	1 of 1	\$49,999
Jessica Kramer (with Michael J. Mueller, principal investigator)	Multicenter Career Development Program for Physical and Occupational Therapy	CORRT NIH/NICHHD-Washington University	\$135,000	3 of 3	\$405,000
Jessica Kramer	Kramer Commercialization Assistance Program (CAP) Proposal	NIH/Translation of Rehabilitation Engineering Advances and Technology (TREAT)	\$16,196	1 of 1	\$16,196
Susan Langmore, clinical professor of speech, language & hearing sciences	Non-Invasive Brain Stimulation for Swallowing Recovery After Dysphagic Stroke	Beth Israel Deaconess Medical Center/NIH	\$96,649	4 of 5	\$476,591
Cara L. Lewis, associate professor of physical therapy & athletic training	Effect of Femoroacetabular Impingement (FAI) on Hip Motion in Young Adults	NIH/NIAMS	\$130,680	3 of 5	\$653,400
	Effect of Femoroacetabular Impingement (FAI) on Hip Motion in Young Adults	NIH/NIAMS	\$866	1 of 1	\$866
Susan McGurk, associate professor of occupational therapy and senior researcher, BU Center for Psychiatric Rehabilitation	A Dismantling Study of Cognitive Remediation for Supported Employment	NIH/NIMH	\$522,538	4 of 5	\$2,771,031
	A Dismantling Study of Cognitive Remediation for Supported Employment	NIH/NIMH	\$128,527	1 of 1	\$128,527
Christopher Moore, Dean, and Barbara Shinn-Cunningham, professor of biomedical engineering	Advanced Research Training in Communication Sciences Disorders	NIH/NIDCD	\$205,055	1 of 5	\$1,860,223
Kathleen Morgan, professor of health sciences	The Role of the Cytoskeleton in Vascular Aging	NIH/NIA	\$204,625	1 of 2	\$444,802
Kim Mueser, professor of occupational therapy	Treating Co-Occurring Substance Use and Mental Disorders Among Jail Inmates	NIH/NIMH	\$18,827	2 of 3	\$56,481

SARGENT INVESTIGATOR	TITLE OF PROJECT	AGENCY/FOUNDATION	FUNDS AWARDED 2015-2016	YEAR OF AWARD	TOTAL AWARD
Kim Mueser	Enhancing Assertive Community Treatment with CBT and SST for Schizophrenia	NIH/NIMH	\$43,421	5 of 5	\$182,712
	Effectiveness of Psychosocial Treatment for Inpatients with Psychosis	NIH/NIMH	\$18,827	3 of 3	\$56,481
	Development and Randomized Controlled Trial of a Mobile System for Self Management of Schizophrenia	NIH/NIMH	\$7,407	3 of 3	\$37,035
Gael Orsmond, associate professor, and Wendy J. Coster, professor of occupational therapy	Transition Outcomes of High Functioning Students with Autism: How and When Students Learn the Skills Necessary for Self-Management of Daily Responsibilities	US Department of Education/Institute of Education Sciences	\$365,600	1 of 4	\$1,578,509
Tyler Perrachione, assistant professor of speech, language & hearing sciences	Neural Bases of Phonological Working Memory in Developmental Language Disorders	NIH/NIDCD	\$163,700	2 of 3	\$491,100
	Dysfunction of Cortical Systems for Language and Working Memory in Autism Spectrum Disorder	Brain & Behavior Research Foundation	\$70,000	1 of 2	\$70,000
E. Sally Rogers, executive director, BU Center for Psychiatric Rehabilitation, and Marianne Farkas, director of training & international services, BU Center for Psychiatric Rehabilitation	Improved Employment Outcomes for Individuals with Psychiatric Disabilities	SAMHSA/ACL	\$901,991	2 of 5	\$4,374,848
Zlatka Russinova, research associate professor of occupational therapy and senior research specialist, BU Center for Psychiatric Rehabilitation	Testing Effectiveness of a Peer Led Intervention to Enhance Community Integration	NIH/NIMH	\$528,673	2 of 4	\$2,079,531
	Enhancing the Community Living and Participation of Individuals with Psychiatric Disabilities	Health and Human Services-Administration for Community Living	\$494,829	2 of 4	\$2,499,724
	Recovery 4 Us-Development of a Photovoice Based Social Media Program to Enhance the Community Participation and Recovery of Individuals with Psychiatric Disabilities	Health and Human Services-Administration for Community Living	\$199,994	2 of 3	\$599,855
	Advanced Research Training Program in Employment and Vocational Rehab	Health and Human Services-Administration for Community Living	\$149,991	3 of 5	\$749,806
Elliot Lee Saltzman, associate professor of physical therapy & athletic training	RI: Medium: Collaborative Research: Multilingual Gestural Models for Robust Language-Independent Speech Recognition	NSF	\$52,627	4 of 4	\$52,627
Elliot Lee Saltzman (with Michael Richardson, principal investigator, and Richard Schmidt, principal investigator)	Modeling the Behavioral Dynamics of Social Coordination and Joint Action	NIH/NIGMS Subaward University of Cincinnati	\$24,900	4 of 5	\$124,500
Joshua Stefanik, research assistant professor of physical therapy & athletic training	Identifying Cases of PFJ OA & Their Hip Impairments	RRF/ACR	\$125,000	2 of 3	\$374,998
Cara E. Stepp, assistant professor of speech, language & hearing sciences	Career: Enabling Enhanced Communication through Human-Machine-Interfaces	NSF	\$110,143	1 of 5	\$537,538

SARGENT INVESTIGATOR	TITLE OF PROJECT	AGENCY/FOUNDATION	FUNDS AWARDED 2015-2016	YEAR OF AWARD	TOTAL AWARD
Cara E. Stepp	Automation of Relative Fundamental Frequency Estimation	NIH/NIDCD	\$163,700	3 of 3	\$480,927
	UNS: Collaborative Research: Prosodic Control of Speech Synthesis for Assistive Communication in Severe Paralysis	NSF	\$95,593	1 of 3	\$217,670
Cara E. Stepp and Meredith Cler, doctoral student	Optimization and Prediction for Fast and Robust AAC	NIH/NIDCD	\$39,965	1 of 3	\$102,387
Lawrence Were, lecturer of health sciences	Evaluation of Health System Intervention for Natural Disaster Preparedness-The Case of Nepal 2015 Earthquake	Save the Children, UK	\$15,353	1 of 1	\$15,353
Stacey Zawacki, director of BU Sargent Choice Nutrition Center (with Stephen J. Bartels, principal investigator)	Statewide Intervention to Reduce Early Mortality in Persons with Mental Illness	NIH/NIMH	\$14,391	1 of 1	\$18,133
	Randomized Controlled Trial of a Learning Collaborative to Implement Health Promotion in Mental Health	Dartmouth College-NIH/NIMH	\$63,056	2 of 2	\$63,056
Stacey Zawacki (with Sarah Pratt, principal investigator)	New Hampshire Wellness Incentive Program	Dartmouth College	\$6,820	1 of 1	\$6,820
Basilis Zikopoulos, research assistant professor of health sciences	Organization of Excitatory and Inhibitory Prefrontal Circuits in Children with Autism	NIH/NIMH	\$409,250	3 of 5	\$2,018,222
<b>TOTAL</b>			<b>\$12,982,332</b>		<b>\$53,121,498</b>

## 2016 Dudley Allen Sargent Lecture

Presented by Christopher J. L. Murray, director of the Institute for Health Metrics and Evaluation and professor of global health at the University of Washington

Physician and health economist Christopher J. L. Murray has dedicated his career to improving health for everyone worldwide by improving health evidence. His work has led to the development of a range of new methods and empirical studies to strengthen health measurement, analyze the performance of public health and medical care systems, and assess the cost effectiveness of health technologies. Murray was profiled in the book *Epic Measures* and is a founder of the Global Burden of Disease approach, a systematic effort to quantify the comparative magnitude of health loss due to diseases, injuries, and risk factors by age, sex, and geography over time. Murray has authored or edited 14 books, numerous book chapters, and more than 250 journal articles in international, peer-reviewed publications.



**October 26 at 4 p.m.**  
**Sargent College**  
[bu.edu/sargent/das](http://bu.edu/sargent/das)

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**Boston University** College of Health & Rehabilitation Sciences: Sargent College



# Faculty in Print

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OUR FACULTY'S RESEARCH REACHES AUDIENCES ACROSS THE GLOBE. HERE'S A SELECTION OF PUBLICATIONS AND ARTICLES WRITTEN BY BU SARGENT COLLEGE FACULTY DURING 2015-2016.

**Bandini, L.,** Danielson, M., Esposito, L. E., Foley, J. T., Fox, M. H., Frey, G. C., Fleming, R. K., Krahn, G., Must, A., Porretta, D. L., Rodgers, A. B., Stanish, H., Urv, T., Vogel, L. C., and Humphries, K. (2015). Obesity in children with developmental and/or physical disabilities. *Disability and Health Journal*, Epub. (3):309-316. doi: 10.1016/j.dhjo.2015.04.005.

**Berger, S., Kaldenberg, J.,** Selmane, R., and Carlo, S. (2016). Occupational therapy interventions to address visual and visual perceptual impairments in adults with TBI: a systematic review. *American Journal of Occupational Therapy*, 70, 7003180010. doi: 10.5014/ajot.2016.020875.

Sandberg, C. W., **Bohland, J. W.,** and **Kiran, S.** (2015). Changes in functional connectivity related to direct training and generalization effects of a word finding treatment in chronic aphasia. *Brain and Language*, 150:103-116. doi:10.1016/j.bandl.2015.09.002.

Sprague, C., and **Brown, S.** (2016). Global HIV and aging: transforming our epidemic response. *Interdisciplinary Topics in Gerontology and Geriatrics: HIV and Aging*. Ed. M. Brennan-Ing and R. F. DeMarco. doi: 10.1159/000448532.

**Coster, W. J.,** Ni, P., Slavin, M., Kisala, P., Nandakumar, R., Mulcahey, M. J., Tulsy, D., and Jette, A. M. (2016). Differential item functioning in PROMIS® pediatric short forms in a sample of children and adolescents with cerebral palsy. *Developmental Medicine & Child Neurology*. doi: 10.1111/dmcn.13138.

**Demir, M.,** and **Kramer, J. M.** (2015). Key elements supporting goal attainment for

transition-age young adults: a case study illustration from Project TEAM. *Inclusion*, 3(3), 145-161. doi: 10.1352/2326-6988-3.3.145.

**Dunham, B.** (2016). Homebirth midwifery in the United States: evolutionary origins and modern challenges. *Human Nature*. doi: 10.1007/s12110-016-9266-7.

**Ellis, T.,** DeAngelis, T., **Dalton, D.,** and Venne, J. (2016). *Be Active & Beyond: A Guide to Exercise and Wellness for People with Parkinson's Disease*. The American Parkinson's Disease Association.

**Fulford, D.,** Eisner, L. R., and Johnson, S. L. (2015). Differentiating risk for mania and borderline personality disorder: the nature of goal regulation and impulsivity. *Psychiatry Research*, 227, 347-352. doi: 10.1016/j.psychres.2015.02.001.

**Gill, S. V.** (2015). Walking to the beat of their own drum: how children and adults meet task constraints. *PLOS ONE*, 10, e0127894.

Heller Murray, E. S., Mendoza, J. O., **Gill, S. V.,** **Perkell, J. S.,** and **Stepp, C. E.** (2016). Effects of biofeedback on control and



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generalization of nasalization in typical speakers. *Journal of Speech, Language, and Hearing Research*.

**Heislein, D. M.**, and Eisemon, E. O. (2016). Physical rehabilitation after total knee arthroplasty. *Pathology and Intervention in Musculoskeletal Rehabilitation* (2nd ed). Ed. Magee, Zachazewski, Quillin. (St. Louis: Elsevier Saunders).

**Jacobs, K., Doyle, N.**, and Ryan, C. (2015). The nature, perception, and impact of e-mentoring on post-professional occupational therapy doctoral students. *Occupational Therapy in Health Care*, 29(2): 201–213, 2015. doi: 10.3109/07380577.2015.1006752. PMID: 25821883.

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AlHeresh, R. A., and **Keysor, J. J.** (2015). The work activity and participation outcomes framework: a new look at work disability outcomes through the lens of the ICF. *International Journal of Rehabilitation Research*, 107–112.

**Kiran, S.**, Meier, E. L., Kapse, K. J., and Glynn, P. A. (2015). Changes in task-based effective connectivity in language networks following rehabilitation in post-stroke patients with aphasia. *Frontiers in Human Neuroscience*, 9, 316. doi: 10.3389/fnhum.2015.00316.

**Kramer, J.**, Liljenquist, K., and **Coster, W.** (2016). Validity, reliability, and usability of the PEDI-CAT (ASD). *Developmental Medicine and Child Neurology*. 58 (3), 255–261. doi: 10.1111/dmcn.12837. PMID: PMC4688240.

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**Marinko, L. N.**, Christie, R. E., and **Lewis, C. L.** (2015). Successful rehabilitation of a young adult with total hip arthroplasty a decade after a Girdlestone procedure: a case report. *PM&R*. Aug; 7(8):895–900. doi: 10.1016/j.pmrj.2015.04.002. Epub 2015 Apr 7. PMID: 25857591.

Lindenmayer, J. P., Khan, A., Lachman, H., **McGurk, S. R.**, Goldring, A., Thanju, A., and Kaushik, S. (2015). COMT genotype and response to cognitive remediation in schizophrenia. *Schizophrenia Research*, 168(1–2), 279–284. doi: 10.1016/j.schres.2015.07.037.

**McGurk, S. R.**, **Mueser, K. T.**, Xie, H., Welsh, J., Kaiser, S., Drake, R. E., Becker, D., Bailey, E., Fraser, G., Wolfe, R., and McHugo, G. J. (2015). Cognitive enhancement treatment for people with mental illness who do not respond to supported employment: a randomized controlled trial. *American Journal of Psychiatry*, 172(9), 852–861. doi: 10.1176/appi.ajp.2015.14030374.

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Fahey, N., Soni, A., Allison, J., Vankar, J., Prabhakaran, A., Moore Simas, T., Byatt, N., Phatak, A., **O’Keefe, E.**, and Nimbalkar, S. (2016). Higher levels of education mitigate the relationship between perceived stress and positive screening for common mental disorders among women in rural India: results of a cross-sectional study. *Annals of Global Health*. doi: 10.1016/j.aogh.2016.04.001.

**Orsmond, G. I.**, and **Cohn, E. S.** (2015). The distinctive features of a feasibility study: objectives and guiding questions. *OTJR: Occupation, Participation and Health*, 35, 169–177.

Proctor, D., and **Quatromoni, P. A.** (2015). Two voices: recovery from dis-

ordered eating as told by an elite male athlete and his sports nutritionist. *Annals of Sports Medicine and Research*, 2(2): 1016–1022. www.jscimedcentral.com/SportsMedicine/sportsmedicine-2-1016.pdf.

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# BU Sargent College

## Who We Are

### Students

	Undergraduate	Graduate
Number of full-time students	1,239	451
Average SAT*	1989	n/a
Average GRE*	n/a	312

### Faculty

Full-time	72
Part-time	68

### Alumni

17,138 in 59 countries

### Clinical Sites

More than 1,200 in 46 states and 2 countries

### Programs of Study

Athletic Training  
 Behavior & Health  
 Health Science  
 Human Physiology (Pre-Med)  
 Nutrition  
 Occupational Therapy  
 Physical Therapy  
 Rehabilitation Sciences  
 Speech, Language & Hearing Sciences  
 Speech-Language Pathology

### Special Programs

- Combined BS and MPH in Public Health
- Combined BS in Health Studies and Doctor of Physical Therapy
- Combined BS and MS in Human Physiology
- Joint Bachelor of Science in Linguistics and Speech, Language & Hearing Sciences
- Fellowship in Orthopaedic Manual Physical Therapy
- Neurological Physical Therapy Residency Program

### New Programs

- Entry-Level Doctor of Occupational Therapy (new in 2016)
- Master of Science in Athletic Training (new in 2016)

\*for incoming fall 2016

## U.S. News & World Report Best Graduate School Rankings

Our graduate programs are officially among the nation's best—Sargent programs tracked by *U.S. News & World Report* all rank in the **top 6 percent** in their respective fields:

1

### Occupational Therapy Program

ranked number 1 out of 164 programs

14

### Physical Therapy Program

ranked number 14 out of 217 programs

12

### Speech-Language Pathology Program

ranked number 12 out of 249 programs

## National Certification Board Exam Passing Rates

100% NUTRITION

99% OCCUPATIONAL THERAPY

99% PHYSICAL THERAPY

100% SPEECH-LANGUAGE PATHOLOGY

Percentage of BU Sargent College students in entry-level graduate programs who passed their certification exams the first time (data averaged over the past three years)

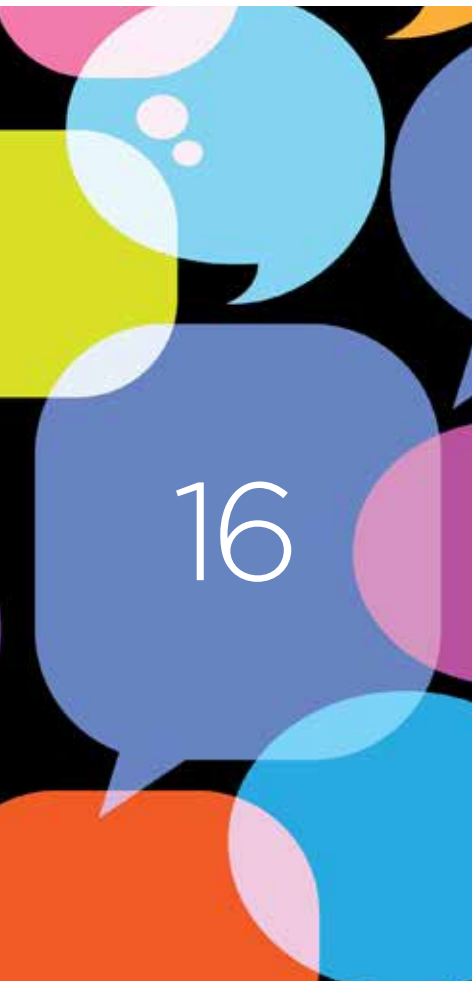
**ABOUT US** Boston University College of Health & Rehabilitation Sciences: Sargent College has been defining health care leadership for more than 130 years. Our learning environment fosters the values, effective communication, and clinical skills that distinguish outstanding health professionals, and we continuously improve our degree programs to meet their future needs. Our curriculum also includes a fieldwork component, providing students in every degree program with clinical experience, as well as clinical internships at more than 1,200 health care facilities across the country. The College also operates outpatient centers that offer a wide range of services to greater Boston.





**Boston University** College of Health  
& Rehabilitation Sciences: Sargent College

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