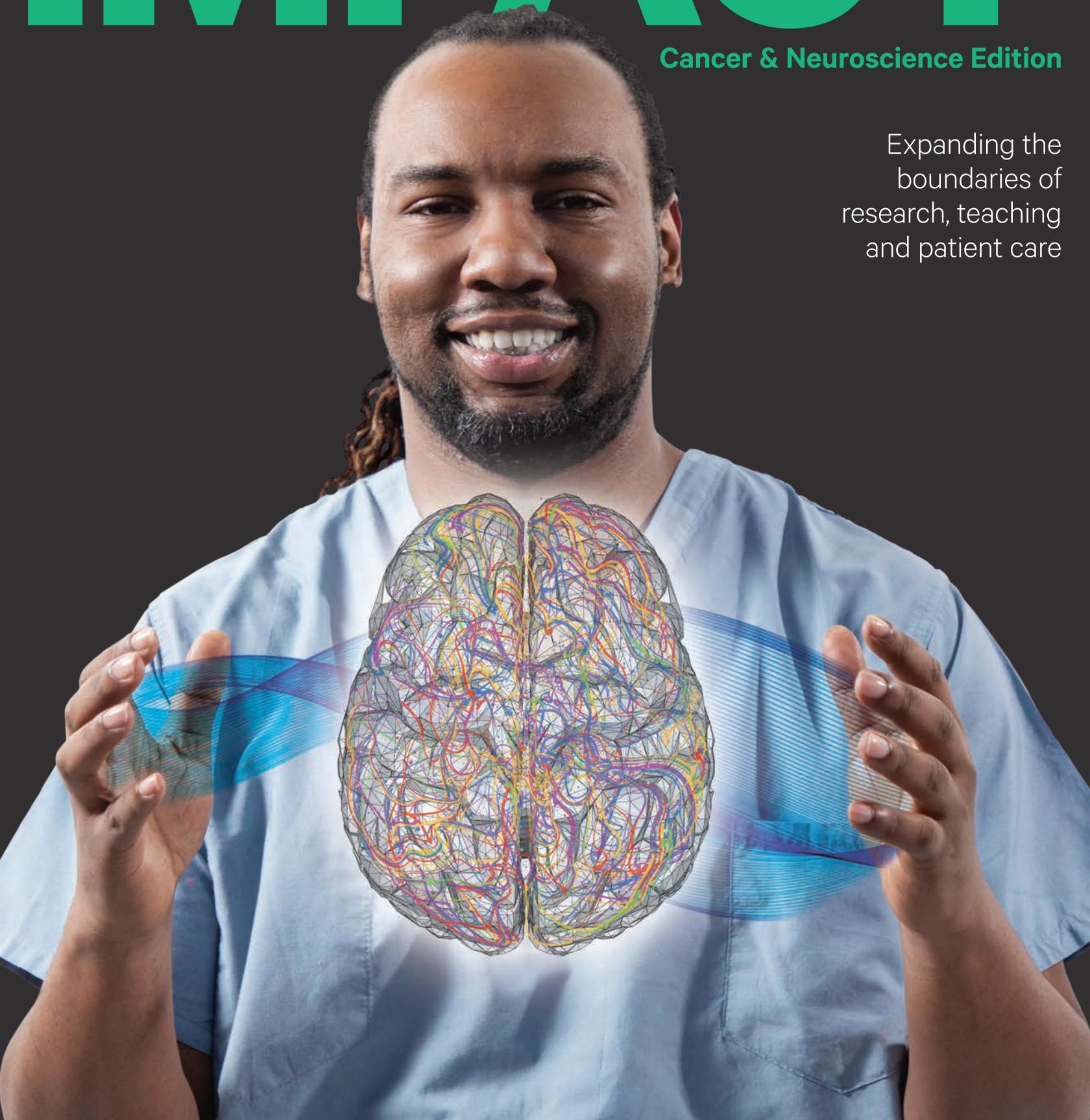


RUSH UNIVERSITY COLLEGE OF HEALTH SCIENCES

# IMPACT

Cancer & Neuroscience Edition

Expanding the  
boundaries of  
research, teaching  
and patient care



# We live the teacher-practitioner model every day

In our classrooms, clinics, labs and the communities we serve, the Rush University College of Health Sciences (CHS) lives our values of collaboration and care. With more than half the U.S. health care workforce in an allied health field, the need for exceptional professionals in the health sciences is constantly expanding — and our 15 programs prepare students to succeed as practitioners, managers and leaders.

The CHS is centered on Rush's teacher-practitioner model, which ensures students learn from active clinicians who excel in their professions. We integrate didactic study, patient care, research and service in the context of a world-class medical center, and our faculty and students regularly join forces with colleagues from other departments and colleges to further knowledge and improve patient outcomes. **Read on to learn how our CHS programs are helping to lead the way in cancer and neuroscience education, research, and patient care.**

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DeMar English (left and on the cover), BS in health sciences student, plans to pursue further study in occupational therapy and hopes to work with geriatric patients.

# Transforming health care chaplaincy

to a research-informed profession

George Fitchett, DMin, PhD, BCC

When George Fitchett, DMin, PhD, BCC, entered the field of health care chaplaincy in the mid-1970s, little research on the profession was being conducted. Thanks in large part to him and like-minded colleagues, today's newest chaplains increasingly expect their profession to be research informed so they can better guide, evaluate and advocate for the spiritual care they provide patients, family members and colleagues.

"Chaplaincy research is important for two significant reasons," said Fitchett, professor and director of research in Rush's religion, health and human values program. "Most significantly, it's a very powerful way to help us know whether we're providing the highest possible quality of care to our patients and their families.

"Health care chaplains work in an environment that uses data to guide decision-making," he continued. "So chaplaincy research also helps us more coherently communicate with our clinical and administrative colleagues about our services and their outcomes."

## Changes for chaplaincy

Along with Brandeis University's Wendy Cadge, PhD, Fitchett is a coinvestigator of Transforming Chaplaincy, a think tank with a mission to improve and accelerate chaplains' research literacy to improve patient outcomes. By integrating contemporary scholarship into ongoing practice, Transforming Chaplaincy helps chaplains improve their care, educators better prepare chaplains for their work, and health care administrators and professionals drive effective institutional change.

Initially funded by the John Templeton Foundation, Transforming Chaplaincy started in 2015 by issuing several dozen continuing professional education grants and

sponsoring two cohorts of research-literate chaplains studying public health at institutions around the country.

Already, the organization has become an international hub for research-informed chaplaincy: it sponsors summer workshops to integrate chaplains into research-informed practice; directly supports research projects; offers online courses and sponsors webinars building research literacy; and collects numerous resources for chaplains, educators, health care administrators and researchers. Representatives of numerous professional and academic organizations consult on Transforming Chaplaincy's goals, and the organization is now led by an interdisciplinary, multi-institutional advisory committee. →

As the program nears the end of its original four-year grant and prepares for what Fitchett calls Transforming Chaplaincy 2.0, “We’ve not only achieved all the goals that were in our original program, we also did a half-dozen other projects and got a number of affiliated grants,” Fitchett said.

**“This is one of the first times the NIH has funded a study that includes a chaplain-led spiritual care intervention.”**

— George Fitchett, DMin, PhD, BCC

“In some sense, we’re the right people at the right time. The chaplaincy profession is quite eager to use research to improve patient care and better communicate with health care colleagues.”

## Wide-ranging research

Both within and outside the Transforming Chaplaincy initiative, Fitchett has conducted a wide range of research. He has built on his research examining religious or spiritual struggle — a sense of spiritual distress or crisis — among cancer patients to help the Rush Cancer Center develop screening tools to help flag patients who may benefit from referral to a chaplain. He’s also

helping Jori Fleisher, MD, MSCE, assistant professor of neurological sciences in the Rush Medical College, “add chaplain interventions to a palliative care program she’s developing for advanced Parkinson’s disease patients.

One of Fitchett’s chief research interests is dignity therapy, a relatively new concept used to improve the quality of life and preserve the personal dignity of patients receiving end-of-life palliative care. He’s a co-principal investigator in a study receiving a \$3 million R01 grant from the National Institutes of Health’s (NIH) National Cancer Institute and National Institute for Nursing Research.

The goal of the five-year study being conducted at six sites across the country is to improve spiritual care outcomes for older cancer patients receiving palliative care. Thus far, dignity therapy has usually been provided by nurses. To help gauge the effectiveness of chaplain-led dignity therapy, the three-arm clinical study will include one group receiving only the usual palliative care, plus two other groups that will also receive dignity therapy from a nurse and a chaplain, respectively.

“This is one of the first times the NIH has funded a study that includes a chaplain-led spiritual care intervention,” Fitchett said. “It’s really an example of chaplaincy research getting to the next level.”

**One of Fitchett’s chief research interests is dignity therapy, a relatively new concept used to improve the quality of life.**

## Learning specialized perfusion techniques

The Rush master’s program in cardiovascular perfusion prepares students for careers as advanced perfusionists. As part of their rigorous coursework and clinical rotations, students learn procedures that support the cardiopulmonary and circulatory functions of cancer and neurological patients — including some treatments students in many other perfusion programs don’t have an opportunity to learn.

Rush perfusion students observe isolated limb infusions in patients with advanced melanoma in an arm or leg: the regional infusion of high levels of chemotherapy drugs that would normally be toxic to other areas of the body. “Rush is among a small number of medical centers to offer isolated limb infusions, so this is a good opportunity for our students to observe this procedure first hand,” said Gregory Mork, CCP, instructor and clinical preceptor, cardiopulmonary sciences, and director and clinical chief of perfusion, Rush University Medical Center.

In class and clinical rotations, students learn another technique performed in a relatively small number of health care systems. Hyperthermic (or heated) intraperitoneal chemotherapy (HIPEC) is a procedure used to treat cancers that have spread to the lining of the abdominal cavity, such as cancers of the appendix, colon, stomach and ovaries. Unlike intravenously administered chemotherapy, HIPEC delivers the drugs directly into the abdominal cavity. Because the targeted cancer cells have been known to respond more fully to chemotherapy agents delivered at high temperatures, perfusionists warm the blood to at least 42°C.

“The most classic example of a HIPEC candidate is a patient with mesothelioma,” Mork explained. “We’re now expanding use of HIPEC to other types of cancer, like ovarian cancer, and it’s not unusual to get 100 percent of the cancer cells in those cases.”

Rush perfusion students are trained on equipment and in techniques that assess and monitor neurofunction. “To help physicians evaluate neurological status, we

assist in transporting and monitoring patients to CT scanners and accompany patients on external life support on trips around the hospital,” said Julie Collins, CCP, LP, MS, assistant professor of cardiopulmonary sciences and acting director for the cardiovascular perfusion program. Perfusion students also learn the challenges of transporting patients on extracorporeal membrane oxygenation (ECMO). And they also become proficient at using a near-infrared spectroscopy (NIRS) cerebral monitor to ensure perfusion is at desirable levels while a patient is on cardiopulmonary bypass during surgery.



Julie Collins, CCP, LP, MS (standing), guides cardiovascular perfusion students

“Throughout the program, we’re teaching our students best practices to ensure the brain is fully perfused in various cases,” Collins said.

# Educator and scholar



Amanda Persons, PhD

Amanda Persons, PhD, has the balance of teaching, researching, managing and mentoring down to a science

Amanda Persons, PhD, assistant professor of physician assistant (PA) studies and psychiatry, has a primary appointment in the College of Health Sciences (CHS), a secondary one in the Rush Medical College and is a member of the Graduate College faculty. As a member of Rush's Center for Compulsive Behavior and Addiction, she conducts groundbreaking research alongside the center's director, T. Celeste Napier, PhD, and their colleague, Brinda Bradaric, PhD (see pages 9 and 12). Persons is also using her considerable expertise in substance use disorders to integrate information on addictions across the PA studies curriculum (also see page 10).

## Exploring the gut-brain axis

Persons' research focuses on substance abuse and neurological disorders. She was involved in foundational studies by Napier and her graduate students revealing that meth induces motor deficits and brain pathologies that mimic Parkinson's disease.

The research also uncovered a new facet of a hot trend in biomedicine: exploring the gut-brain axis. Modern theories state that Parkinson's can be initiated through the olfactory bulb, the topic of Bradaric's research, or through the gastrointestinal tract.

"By the time movement disorders are diagnosed, the disease is so advanced that therapy only treats the symptoms," Persons said. During the presymptomatic phase, a major patient complaint is constipation. Curious as to whether rats with forced abstinence from meth self-administration might show an increase in colon alpha-synuclein — a Parkinson's disease protein the research team previously identified in the brains of meth-exposed rats — Persons tested her theory.

"We did see an increase early on," she said, "but as rats are abstinent from meth for a longer period, alpha-synuclein normalizes in the gut, though it persists in

the brain." This may mean the changes in the gut had already been communicated to the brain to initiate Parkinson's-like neuropathology, or what Persons and her colleagues call the "train has left the station" effect.

"There really aren't any studies about gut dysfunction in meth-abusing patients, so we are exploring completely new territory," said Persons, who is now preparing the initial study results for publication.

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**With appointments in three of the four Rush colleges, Persons is a model of interprofessional teamwork.**

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## ADHD meds and Parkinson's

A new spin off of these studies was inspired by a seminar given by Glen Hanson, DDS, PhD. Hanson saw a nine-fold increase in early-onset Parkinson's disease in adults with a history of stimulant-treated ADHD, but the pathological links between these two have not been explored. Given the prevalence of ADHD in modern society, this presented an important area for novel neuroscience research.

With a Rush research-supporting Cohn Fellowship — which she hopes will lead to NIH funding — Persons and her colleagues treated adolescent rats with →

stimulant drugs used to treat adolescent humans with ADHD, then allowed the rats to mature to adults.

The results paralleled the team's earlier meth research in showing Parkinson's-like symptoms after a period of abstinence. As the rats reached the young adult stage, "we saw specific motor deficits that are markers of Parkinson's disease," Persons said. "Our next step will be looking at brain pathology

**“There really aren't any studies about gut dysfunction in meth-abusing patients, so we are exploring completely new territory.”**

— Amanda Persons, PhD

to check for classic signs of the disease.”

In other notable research, the Persons/Napier team is studying the way that dopamine agonists, used to treat motor dysfunction of Parkinson's disease and restless legs syndrome, may lead to disorders of impulse control and compulsivity, like problem gambling, compulsive shopping and binge eating. "Our long-term goal is to identify new treatments that can avoid inducing impulsive/compulsive disorders while still

providing the needed motor benefits," Persons said.

Another project explores HIV and substance abuse comorbidity. The Persons/Napier team hopes to identify therapeutic targets for the pathological mechanisms driving the greater morbidity and mortality among HIV-positive individuals who abuse meth.

## Cross-college appointment

Persons, whose appointment was originally in the Rush Medical College, began dividing her time between the medical school and the CHS physician assistant (PA) program in 2016. In 2018, she was appointed the PA program's director of academic education.

"The research is still fascinating to me — it is fun to see these students take our research and run with it," Persons said. As a faculty member in the Graduate College, she remains involved in student research by serving on MS thesis and PhD dissertation committees.

With appointments in three of the four Rush colleges, Persons is a model of interprofessional teamwork. "I really like being able to span the different schools and contribute to cross-college interaction," she said.

## Building bridges between departments and colleges

T. Celeste Napier, PhD, is a builder of bridges.

As director of Rush's Center for Compulsive Behavior and Addiction, which focuses on research for recovery and education for prevention, Napier continually forges connections among investigators, across colleges, and between Rush and the community. Many important connections she's built are centered in the College of Health Sciences (CHS).

Napier, a professor of psychiatry in Rush Medical College, is working closely with the CHS physician assistant (PA) studies program to integrate training about substance use disorders — especially opioid addiction — into every aspect of its curriculum.

**The bridges Napier and colleagues have built put the CHS at the forefront of Rush's commitment to addressing addictions.**

Two CHS faculty members, Amanda Persons, PhD (physician assistant studies), and Brinda Desai Bradaric, PhD (health sciences), conduct their research within the Napier laboratory.

Napier's innovative laboratory model shares resources and expertise to extend opportunities to investigators whose academic appointments or outside responsibilities may limit their time for research. With a mix of faculty, fellows, graduate students, undergraduate students, volunteers and technicians, Napier's lab runs on teamwork.

"I'm devoted to mentoring, especially helping women maintain their careers throughout their life course," Napier said. "Ours is a rich, diverse environment in which even researchers with limited time can be effective, find success and maintain their research history."

The bridges Napier and colleagues have built put the CHS at the forefront of Rush's commitment to addressing addictions.

"On the issue of substance use disorders education, Rush is ahead of the curve in Chicago," Napier said, "and CHS is leading the charge by integrating addiction education throughout its curricula."



Brinda Bradaric, PhD (left), T. Celeste Napier, PhD, and Amanda Persons, PhD

# A groundbreaking curriculum

Addiction topics incorporated throughout PA studies



Amanda Persons, PhD (left), and Regina Chen, PhD(c)

Addictions have a devastating effect not just on individual health, but also on communities. To better prepare both students and faculty to meet the challenges of this health care crisis, Rush's physician assistant (PA) program is retooling its curriculum to include comprehensive education about substance use disorders with a focus on opioid addiction.

In conjunction with T. Celeste Napier, PhD, professor of psychiatry, Rush Medical College, and director of Rush's Center for Compulsive Behavior and Addiction, the PA program has applied for a multiyear Primary Care Training and Enhancement Grant from the U.S. Health Resources and Services Administration (HRSA). The grant is designed to improve primary care and substance use disorder training for PAs.

The grant places heavy emphasis on enhancing PA training for underrepresented minorities, persons from medically underserved areas and military veterans. "We see this as a timely opportunity to build on our program's track record of excellence in PA training and providing health

care to underserved communities on Chicago's West Side," said Regina Chen, PhD(c), MS, PA-C, LAc, DiplCH, assistant professor and director of the PA program.

Although the program will incorporate substance use disorders education into its curriculum even without the grant, HRSA funding will allow Chen and her colleagues to institute a comprehensive, three-pronged approach:

- **Target student recruitment** from underrepresented, underserved or military backgrounds and develop support services to ensure all students successfully complete the program. "Much research shows that producing effective care providers in underrepresented communities means having providers who are from those communities," Chen said. "We'll increase our efforts to increase representation from underserved communities, especially here in Chicago."
- **Develop a longitudinal curriculum** that includes didactic and clinical rotation experiences. "Addiction disorders influence every angle of patient care. So, we are integrating how substance use disorders are manifested throughout the breadth and scope of PA practice," said curriculum developer Amanda Persons, PhD, assistant professor of PA studies and psychiatry, whose research focuses on addictions. A baseline goal is that all students will be Medication-Assisted Treatment (MAT)-waiver eligible when they apply for their PA licenses. Options for students interested in more in-depth understanding of addiction include additional specialized electives and a certificate of advanced training.
- **Increase faculty training opportunities** to enhance teaching efficacy in substance use disorders. Napier, an expert medical educator and internationally renowned scientist in the neurobiology of addiction, will spearhead the project's faculty development portion. "Essentially, all medical specialties are affected by substance use disorders, and the

neuroscience of addiction, best treatment practices, and cultural and legal contexts are constantly changing," Napier said. "We believe we need to reach faculty and practitioners throughout Rush University and its affiliated institutions — including those who have been in their fields for decades — as well as students in all colleges. The education model is a highly integrated, vertical approach."

The proposed retooling of the PA program is groundbreaking and ambitious — and Chen, Persons and Napier believe it to be a transferable model. "We envision this as something any other program at Rush could adapt to its particular curriculum," Chen said, "to effectively educate students and 'train the trainers' — the faculty who teach those students."



Amanda Persons, PhD (left), and Regina Chen, PhD(c), in the classroom

# Exploring the meth-Parkinson's link

Up to 90 percent of Parkinson's disease patients exhibit some olfactory loss prior to developing motor deficits. Brinda Bradaric, PhD, assistant professor and educational coordinator of the BS in health sciences program, wants to know whether those changes can shed light on the connection between methamphetamine abuse and the development of Parkinson's-like symptoms.

A member of Rush's Center for Compulsive Behaviors and Addiction, Bradaric is collaborating with Amanda Persons, PhD, assistant professor of physician assistant studies and psychiatry; T. Celeste Napier, PhD, professor of psychiatry and director of the center; and one of Napier's graduate college PhD candidates, Daphne Calma.

Intrigued by epidemiological findings showing that people who abuse meth are three times more likely to develop Parkinson's disease later in life, the Rush investigators created a longitudinal study in which rats self-administered meth via intravenous catheters.

"Our model of meth self-administration emulates human drug taking," Bradaric explained. In order to emulate successful abstinence by human meth abusers, the rats then underwent periods of time when they no longer had access to meth. Calma discovered that the longer rats were abstinent from meth, the greater the expression of Parkinson's-like motor deficits.

Bradaric, Persons and Napier extended these behavioral findings to study biomarkers of colon pathology that may correlate with early stages of Parkinson's disease. In 2017, they coauthored a presentation, "Parkinson's

Disease-like Pathology in the Brain and Colon Following Methamphetamine Self-Administration," that won a blue ribbon at the 21st International Congress of Parkinson's Disease and Movement Disorders.

Bradaric is now extending this research a step farther. A decrease in tyrosine hydroxylase, an enzymatic precursor to dopamine, and an increase of alpha-synuclein, a protein that's a major constituent of Lewy bodies, are neuropathological hallmarks of Parkinson's disease.

"We're exploring whether similar changes occur in the olfactory bulb of meth-treated rats," Bradaric explained. If so, she and her colleagues would have further evidence of the connection between meth abuse and development of Parkinson's later in life.

## Mentoring students

Bradaric, who's also the associate discipline director of pharmacology in Rush Medical College, has significant teaching and administrative responsibilities in the BS in health sciences program. These limit the amount of time she can spend on research, so the opportunity to work in Napier's lab is critical to her scholarship. This relationship also provides a place for Bradaric's College of Health Sciences (CHS) students to gain firsthand experience in biomedical research.

"Dr. Napier's team-based lab helps young investigators like me advance our careers," said Bradaric, who also sits on several MS thesis committees in the CHS and Graduate College. "I share my expertise with students,

and they help me out by conducting some of the daily assays. It's a great relationship that benefits everyone."

Patryk Czyzewski wasn't sure which health care field he wanted to enter when he enrolled in the Rush BS in health science program — but he made up his mind along the way. A 2018 graduate of the program, Czyzewski is currently volunteering in the Napier/Bradaric lab while he prepares to apply for medical school.

"The farther I went into the program and the more clinical hours I completed, the more I gained the confidence to pursue a medical career," said Czyzewski, who's learning a variety of research tasks as he assists with Bradaric's study of olfactory bulb changes in rats.

"This year is giving me a whole new experience in research," he added. "I'd thought it was a lone wolf kind of thing, but when I stepped into Dr. Bradaric's research program, I learned how important collaboration is."

**Working in the Napier/Bradaric lab "is giving me a whole new experience in research... I learned how important collaboration is."**

— **Patryk Czyzewski,**  
2018 BS in Health Sciences graduate



Brinda Bradaric, PhD (left), and colleagues in lab

## Nicholas Moore: Educating lab leaders



Nicholas Moore, PhD, MLS(ASCP)<sup>cm</sup> (right)

*Nicholas Moore, PhD, MLS(ASCP)<sup>cm</sup>, assistant professor of medical laboratory science (MLS), says his teaching and clinical appointments continually enrich each other. A clinical microbiologist, Moore is also assistant director of the Division of Clinical Microbiology for Rush University Medical Center. “My work in the lab keeps me current in the classroom — I get to give my students information that’s hot off the press,” he said.*

**Student centered:** Unfulfilled in a repetitive forensic science job, Moore started looking at careers in health care. “I didn’t want to be a physician,” he explained, “and the Rush MLS master’s program let me use my love of science to help patients in a different way. The program’s passionate professors are deeply committed to students. Now, as an MLS faculty member, I try to emulate them: I really believe that students’ success is my success.”

**Research focus:** After earning his master’s degree, Moore held several laboratory positions and entered the CHS’ online doctoral program in health sciences. His doctoral research focusing on resistance to carbapenem antibiotics — antibiotics designed for severe or high-risk antibiotic-resistant infections — in long-term acute care hospitals led to his ongoing scholarship in multidrug-resistant organism infections and health care-associated infections.

**Classroom and clinical mentorship:** Moore teaches the MLS clinical microbiology courses as well as a molecular diagnostics course. He also directs clinical microbiology rotations at several Chicago-area medical centers “to give students hands-on experience in evaluating patients with significant and complex health problems,” he says.

**Joining forces against a public health threat:** Moore is a member of the Chicago Prevention and Intervention Epicenter (C-PIE), a joint effort of RUMC and the Cook County Health and Hospitals System. Funded with a serial grant from the Centers for Disease Control and Prevention, C-PIE works to define the epidemiology of some of the most serious antibiotic resistance threats and lessen health care-associated infections. Among other focuses, “C-PIE is looking to understand the role of the gastrointestinal microbiome — which affects so many aspects of our health, including neurological conditions — in the acquisition of antimicrobial-resistant organisms,” Moore said.

**Diagnostic stewardship:** A current focus for Moore may impact the MLS curriculum and student research opportunities. “Similar to antibiotic stewardship, which aims to prescribe the right antibiotics at the right time to reduce resistance caused by overuse, we’d like the lab to become more involved in diagnostic stewardship: helping physicians order the appropriate tests to answer their questions,” he said. “If we can assist physicians in not ordering five tests where one or two suffice, we’re being fiscally responsible while still making the best choices for our patients.”

## Mentoring an early-career investigator

At Rush, seasoned researchers routinely share their expertise with early-career investigators. Tricia J. Johnson, PhD, professor and associate chairperson of health systems management and an expert on health economics, is one of several established researchers mentoring Jori E. Fleisher, MD, assistant professor of neurological sciences in the Rush Medical College, for Fleisher’s study “Reaching the Most Vulnerable: A Novel Model of Care in Advanced Parkinson’s Disease.”

As Parkinson’s disease progresses and symptoms worsen, between 10,000 and 20,000 U.S. patients annually become homebound — and many lose access to much-needed care. With a five-year National Institutes of Health (NIH) K23 grant that provides support for the career development of investigators focusing on patient-oriented research, Fleisher is testing the effectiveness of an interdisciplinary home visit program for patients with advanced Parkinson’s.

The study will measure patient quality of life and caregiver strain in a home-based program when compared with institutional, facility-based care. Fleisher also will compare the effects of peer mentoring on caregiver health.

Johnson’s role is helping Fleisher develop the skills to evaluate the economic impact of the model. During scheduled monthly meetings and informal check-ins, the two discuss the elements needed for an accurate economic evaluation of the project — and soon will begin reviewing Fleisher’s preliminary data to measure actual costs.

“It’s so important to know what potential programs cost, whether we find it costs more to get better patient outcomes or discover we can actually improve outcomes and reduce costs,” Johnson said. “Being able to mentor a physician like Jori brings together the clinical and economic or business sides so that we can truly understand the value of new interventions.”



Tricia Johnson, PhD (left), mentors Jori Fleisher, MD MSCE

“As a junior investigator, great mentorship makes all the difference between just having a good idea and really being able to grow it into something novel, feasible and ready to be studied,” Fleisher said. “Dr. Johnson’s mentorship enables me to study the clinical intervention we have created through the lens of health economics and imagine how it could be adapted in other settings. Her guidance and enthusiasm have been invaluable.”

The mentoring relationship develops stronger junior investigators — but it enriches the work of established researchers, too. Johnson explained, “One of the main reasons I chose to come to — and stay at — Rush is the opportunity to work with faculty across the four colleges, clinicians and other health care professionals on exciting work that is strengthened with interdisciplinary teams.”

# Making things better

Clinical nutrition research that changes lives

## In the Community



Lisa Barnes, PhD  
Alzheimer's Disease Center, is examining the mechanisms that may account for the relationship of these risk factors to cognitive decline in a group of 350

Although studies suggest that emotional and social factors play a role in cognitive decline and dementia, most of these studies have not involved minority populations. With funding from the National Institute on Aging, Lisa Barnes, PhD, associate professor in neurological sciences and psychology at a cognitive neuropsychologist in the Rush

black individuals who were free of dementia at the start of the study. Participants will be evaluated annually on cognition, social isolation and perceived discrimination. Preliminary results indicate a relationship between perception of discrimination and diminished performance on cognition tests. Barnes also is studying markers of inflammation in participants' blood to test whether these markers are associated with cognitive decline.

Physicians may sometimes under-treat pain to avoid medication side effects. In a study published in *Quality Management in Health-care* (July-September 2008), a team of researchers headed by professor Robert McInnis, MD



at the Department of Internal Medicine, published a study on physician behavior in ordering pain medication. The study found that physicians at Rush were trained on a simulation on how much a given dose and type of pain medication would reduce a patient's pain and when the pain would return. The study found that 60 percent of physicians trained on the simulation prescribed pain medications, compared to only 35 percent of those who were not trained. Most important, patients treated by physicians who had markedly reduced pain. Researchers hope their research on innovative ways to change pain medication.



Sandra L. Gomez-Perez, PhD, RD, LDN (left), and Christy Tangney, PhD, FACN, CNS

“The joy of doing research is the possibility of making things better,” said Christy Tangney, PhD, FACN, CNS, professor of clinical nutrition and associate dean for research in the College of Health Sciences. “Eating well has a tremendous impact on everything else we all do. As researchers, we’re always supporting efforts to better understand how to help people follow a healthier lifestyle.”

Rush’s clinical nutrition faculty members are active researchers who frequently collaborate on studies with investigators inside and outside Rush. Tangney’s own voluminous scholarship has evolved to include population approaches in nutritional epidemiology. Much of her research focuses on the development of short, easily administered dietary screeners to monitor changes in dietary behaviors and key biomarkers in a variety of populations, including breast cancer survivors and individuals with Alzheimer’s disease or Parkinson’s disease.

## Nutrition and cognition

One of Tangney’s current research roles is nutrition collaborator on an R01 grant from the National Institutes of Health (NIH). The randomized pilot trial is testing a multicomponent intervention to prevent cognitive decline among older adults with lower education levels, a top risk factor for Alzheimer’s disease.

Both polyphenol-rich foods and speed-of-processing cognitive training have been hypothesized to improve cognitive reserve. Trial participants are given iPads loaded with app-based games. Partnering with Meals on Wheels, the Indianapolis study team also delivers meals to participants’ homes. Investigators will compare results among participants who received polyphenol-rich foods, those who played games designed to improve their speed of processing, those who received both components and those who experienced neither.

Tangney and her colleague, Annie Lin, PhD, RD, a Rush clinical nutrition alum, led efforts to develop polyphenol-rich recipes that would appeal to participants. “People aged 60 to 80 are used to their own diets. We needed them to want to eat our recipes — so we thoroughly tested them,” Tangney explained.

“We won’t know the end of the story for nearly three years, but this study offers possibilities for individuals who are potentially challenged to make healthy choices that will improve their thinking.”

Tangney is also an investigator on a collaborative pilot study between Rush and the University of Chicago funded with an NIH Clinical and Translational Science Award. The researchers hope to identify a cognitive marker — replacing or supplementing the less sophisticated measure of regained weight — for determining how well anorexic young women respond to psychiatric treatment and change restrictive behaviors.

And she’s helping Rush colleagues in the movement disorder clinical practice integrate a version of a short dietary screening tool. The Mediterranean Eating Pattern for Americans (MEPA) was developed with former Rush clinical nutrition faculty member Heather E. Rasmussen, PhD, RD, and several former students, including Leah Cerwinske, MS, RD, LDN. Cerwinske is now a Rush clinical nutrition instructor.

“We created MEPA because we wanted a screener that can be implemented in five minutes to monitor diet in a way that doesn’t burden participants,” Tangney explained. Working with clinical nutrition colleague Kelly Roehl, MS, RDN, LDN, CNSC (see sidebar on page 18), Tangney and Rasmussen are modifying the tool to incorporate ketogenic diet concepts with an eye toward eventually expanding to other Rush patient populations — in particular, adults with epilepsy.

“Our long-term goal is to use the tool to educate patients on either a Mediterranean or a ketogenic diet, whichever works best for their specific health situation and quality of life,” Tangney said.

## The obesity-cancer link

Sandra Gomez-Perez, PhD, RD, LDN, assistant professor of clinical nutrition, is an early-career investigator who focuses her research on the relationships among race/ethnicity, obesity, body composition, inflammation, insulin resistance and obesity-related cancers, particularly colorectal and breast cancers. “I’m interested in the big three: cancer, diabetes and cardiological issues,” she said.

Gomez-Perez is currently involved in several diverse studies examining the relationship between body composition and cancer. Ece Mutlu, MD, MS, MBA, professor of gastroenterology at Rush Medical College, is a →

principal investigator on a five-year R01 grant from the NIH. “The parent study is examining the association between abdominal fat, lean tissue and colorectal adenoma risk, and evaluating differences by race,” Gomez-Perez explained.

For her two-year research and career training grant within the parent study, Gomez-Perez is gaining skills in gut microbiota analysis and bioinformatics, as well as evaluating body composition by race/ethnicity using dual-energy x-ray absorptiometry and ultrasound, among other areas of investigation.

Gomez-Perez’s dissertation research used computed tomography imaging body composition analysis to explore associations between regional fat distribution, serum biomarkers of colorectal cancer risk and race/ethnicity. “This study is an opportunity to extend my skills in understanding of the gut microbiota, but it also lets me expand some of the questions left over from my dissertation,” she said. “It’s taking a step back and taking an earlier look at body composition issues that may lead to cancer risk.”

Gomez-Perez is also coinvestigator on a multi-institutional study examining the association between body composition and quality of life and symptom burden in women undergoing treatment for estrogen receptor-negative metastatic breast cancer. “This is a largely understudied population,” she said, “and this preliminary study is exploring whether a form of nutritional and exercise intervention may be possible in the near future.”

For a study in collaboration with others including Alfonso Torquati, MD, MSCI, professor of surgery at Rush Medical College, Gomez-Perez is helping to characterize adipose tissue structure and gene expression in the context of three major U.S. racial groups: African Americans, non-Hispanic whites and Hispanics.

“I absolutely love working in an environment of team science and collaborative research,” said Gomez-Perez of these interprofessional studies. “The beauty of nutrition is that it crosses so many fields and specialties that where you can go and what you can do are almost limitless. It’s just a matter of having the right idea and the right team of people.”

## More nutrition research

In addition to the projects highlighted here, the College of Health Sciences clinical nutrition faculty is involved in a wide range of other research related to cancer and neurological issues. Here’s a sampling:

**Monica Bojko, MS, RDN, LDN**, clinical dietitian and instructor, explores the benefits of nutrition services for oncology patients. She’s currently investigating prophylactic versus reactive percutaneous endoscopic gastrostomy (PEG) placement in head and neck cancer patients.

**Marisa Mozer, MS, RDN, LDN, CNSC**, senior clinical dietitian and instructor, researches symptom management and adequate nutrient delivery for radiation oncology patients. Mozer is currently working to identify a protocol for predicting the need for PEG tubes during treatment of patients with head and neck cancers.

**Kelly Roehl, MS, RDN, LDN, CNSC**, advanced-level dietitian and instructor, focuses her research on neurocritical care, ketogenic diet therapy and metabolism. In her clinical work, Roehl implements various forms of ketogenic diet therapy among both adult and pediatric patients with epilepsy and other neurological conditions.

## OT program trains practitioners to focus on individual client needs

Rush College of Health Sciences doesn’t just build skills in its graduates. It creates leaders. Through a mix of clinical experiences and fieldwork that complements the classroom portion of the program, students in the college’s occupational therapy (OT) doctoral program gain the confidence to lead in planning individualized care that focuses on clients’ individual needs.

Building on shorter clinical observations shadowing seasoned practitioners, OT students complete substantial fieldwork in Chicago-area acute care hospital settings and rehabilitation centers, often serving patients with neurological or cancer-related conditions.

Midway through the program, students complete a group leadership project. In groups of three, students visit selected Rush or community sites, assess a patient population and plan a variety of activities based on those patients’ specific requirements.

“One of our most valued partners in the group leadership project is the Midwest Brain Injury Clubhouse, which serves patients with either traumatic brain injury (TBI) or acute brain injury such as stroke,” said Linda Olson, PhD, OTR/L, assistant professor and chairperson of occupational therapy. “Students at this and other sites have put together cooking groups, memory games and even a band playing handmade musical instruments.

We leave it wide open for what students want to do to meet the needs of the community site.”

It’s at this point in the OT program, Olson said, that she and other faculty members see a significant change in their students. “Client centeredness is at the core of our profession,” she explained. “The group leadership project teaches students to take responsibility for what they’ve learned in the classroom and plan interventions based on what’s going to work best for each client.”

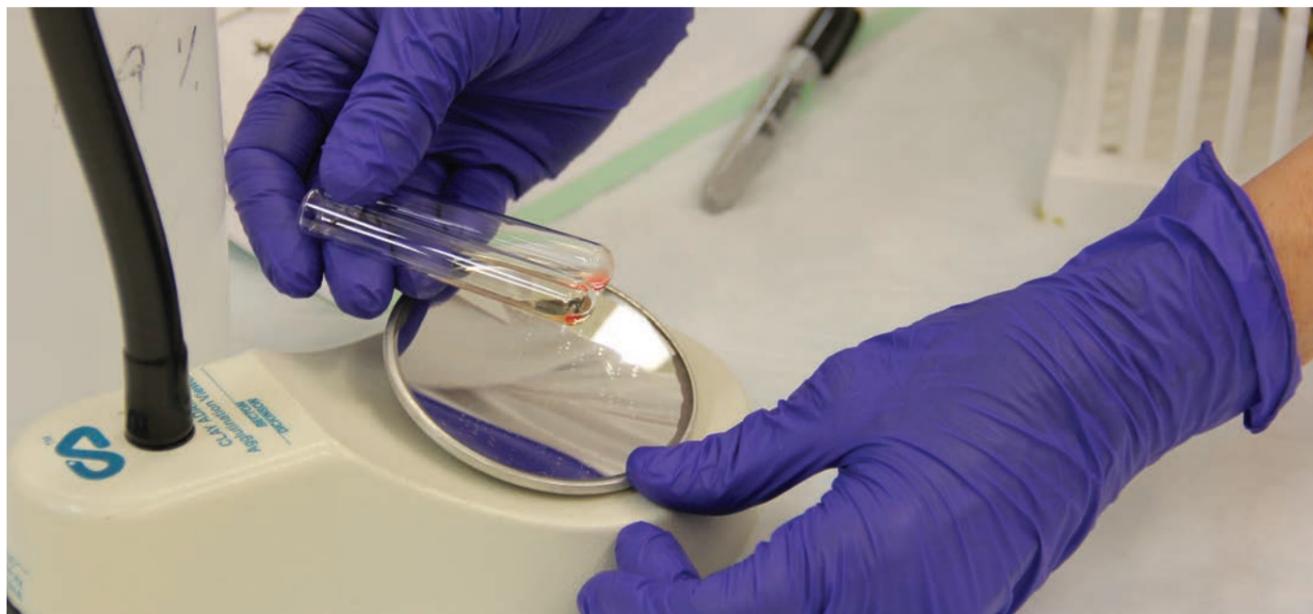
OT students also complete a 14-week capstone experience. Several current students are working in clubhouses for TBI and spinal cord injury (SCI) patients. One is interested in introducing animal therapy to the clubhouse; another is examining caregiver burdens for families of TBI patients; still

another is looking to increase engagement in leisure activities for patients with SCI.

“The capstone experience is completely student driven,” Olson said. “It’s a chance for students to go deeper into areas that have interested them during the program. They’re demonstrating that they’ve synthesized what they’ve learned and are using it to create important new knowledge.”



Linda Olson, PhD, OTR/L (right), with an OT student



# Win-win

## Developing students — and the laboratory profession

Every student in the Rush University specialist in blood bank technology (SBB) certificate program or master's program in clinical laboratory management (CLM) is a working laboratory professional. So, when students take on projects designed to build their translational research skills, most select topics that directly relate to their laboratory positions.

“We try to get students to look at something current and relevant going on in their labs when they're writing research papers,” said Laurie Gillard, MS, MLS(ASCP)<sup>cm</sup> SBB, assistant professor of medical laboratory science and SBB program director. “They're producing publishable pieces that also improve their workplaces. It's a win-win for everybody.”

### Keeping patients safe

Some SBB and CLM students' research has implications for the blood needs of cancer and neurology patients. Jeff Stuckey, MLS(ASCP)<sup>cm</sup>, is a medical laboratory scientist in the Rush University Medical Center Blood Bank who's currently earning his SBB certificate. He recently wrote a paper documenting the extensive installation, operational and performance validation processes for a new blood product irradiator.

Irradiated blood products are given to immune-compromised individuals — including leukemia and lymphoma patients — to avoid a rare but fatal complication that occurs when donor lymphocytes mount an immune response against the recipient. Stuckey's participation in the validation project

fulfilled Rush Blood Bank requirements for moving from a level I to a level II lab technologist.

Stuckey, who plans to also earn his CLM master's degree at Rush, likes the structure of the Rush program, which enables students who earn SBB certificates to finish the CLM program in just a year more. “Not many programs offer that option,” he said.

He also appreciates the way the program doesn't duplicate the existing clinical knowledge of working laboratory professionals. “It's very personalized, so you can focus on getting the skills you haven't gotten through work,” he explained.

Blood Center,” published in the Medical Laboratory Observer in September 2018, details the complicated and overlapping logistics involved in moving the Rush Blood Bank closer to the operating rooms and critical care units in early 2018.

Since the move, “transport time from the blood bank to the floors is under five minutes,” Holguin said. “The OR and critical care units know we're right there, so they don't over order blood products as a safety net. That's reduced blood wastage.

“It was a good story to tell, and writing the paper really encouraged me to develop other ideas to write up,” Holguin continued. “I'd never considered myself a writer, but the program encourages us to reach out and discover new things.”

Besides honing students' scholarly writing skills, project papers like Stuckey's and Holguin's serve as useful resources to the laboratory profession as a whole, particularly when they deal with unusual topics like the challenges of moving a major medical center's blood bank.

“We're trying to contribute to best practices,” Gillard said. “It comes down to improving workflow and patient safety, finding ways to give something back to our laboratory workplaces.”

“It comes down to improving workflow and patient safety, finding ways to give something back to our laboratory workplaces.”

— Laurie Gillard, MS, MLS(ASCP)<sup>cm</sup> SBB<sup>cm</sup>

### Sharing an unusual experience

CLM student Michelle Holguin, MLS(ASCP)<sup>cm</sup>, quality assurance coordinator at the Rush Blood Bank, also based her SBB project paper on a workplace initiative she completed as a promotion requirement. “Relocating the



Laurie Gillard, MS, MLS(ASCP)<sup>cm</sup> SBB<sup>cm</sup>

# Research that renders results

“We’re a team—but each of us has an area of specialization,” said Emily Wang, PhD, CCC-SLP, associate professor and chairperson of communication sciences and disorders, describing the Rush speech-language pathology (SLP) master’s program.

With a deep commitment to the Rush teacher-practitioner model, SLP faculty members bring their clinical expertise into the classroom while also turning their specialized knowledge to scholarship. Clinical practice is an inseparable part of determining SLP professors’ research priorities. “To see what research needs to be done, we go where the patients are,” Wang said.

With this focus on clinical and translational research, SLP faculty investigators are making discoveries that are improving outcomes and furthering quality care in neuroscience and cancer.

## Breakthrough findings

Richard Peach, PhD, CCC-SLP, professor of communication disorders and sciences, directs the Cognition and Language Disorders Lab. The goal of the lab’s research is to develop theoretically sound treatments for stroke-induced aphasia or language disorders due to traumatic brain injury (TBI).

Recent research has demonstrated that aphasia is the result of an attentional deficit. But most interventions, assuming this deficit is separate from language processing itself, have focused on a more general approach to improving attention — often with weak results.

In recent investigations, Peach and his colleagues found that an approach that exploits attentional processing specifically for language yielded better outcomes for patients with aphasia than a more general approach. “We developed a program called Language-Specific Attention Training, or L-SAT, that has multiple language tasks known to recruit attention,” he said. When his team compared the L-SAT program to more generally focused training programs, “the data clearly favored the language-specific approach.”

An L-SAT protocol his team developed and made available “has had interest from people all over the world,” Peach reported.

A line of Peach’s research concerning language after TBI is breaking new ground. “While people with aphasia have attentional difficulties, people with TBI have executive deficits,” Peach explained. “Their conversation may be tangential or irrelevant or they may have trouble following the conversation.” Most accounts suggest the sentence structure of these conversational narratives isn’t affected and therefore conclude that these individuals might have a true language impairment.

Peach and his colleagues began examining “pause time,” points in conversation at which speakers pause to plan the next words or phrases of a sentence, and “mazes,” behaviors like interjections and repetitions that suggest a problem with planning sentence production.

“We found that both pauses and mazes were occurring far more frequently than they do with normal speakers, which suggests that individuals with TBI do have language-based issues,” said Peach. Combined with his related investigations, this research demonstrates that “planning the overall organization and higher levels of narrative production isn’t achieved separately from planning for production of the components — individual sentences or the linking of relationships between those sentences — that make up that narrative.” The most recent of these pioneering findings will be published later this year.

Emily Wang, PhD, CCC-SLP (left), Anne Hoffmann, PhD, CCC-SLP, Lisa LaGorio, PhD, MPH, CCC-SLP, and Richard Peach, PhD, CCC-SLP

## Dysphagia and cognition

The Rush Alzheimer's Disease Center (RADC) has decades of data showing that lower functional scores in walking, balance and other motor skills are a precursor to Alzheimer's disease and other dementias. Lisa LaGorio, PhD, MPH, CCC-SLP, whose research interests include the study of aging effects on swallowing physiology and the development of novel protocols for dysphagia evaluation, prevention and rehabilitation, wondered whether subtle changes in swallowing are among the motor markers for future cognitive issues.

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**“We've been able to improve outcomes and save money by enhancing our internal processes.”**

— Lisa LaGorio, PhD, MPH, CCC-SLP

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Using the RADC's self-reported patient data as a foundation, LaGorio used standardized testing to screen normally functioning older adults — and found that individuals with subtle, subclinical dysphagia have lower cognitive scores. “I'm looking for common neural pathways between the motor and cognitive functions, which is a whole new area of neurological research,” said LaGorio, an assistant professor of communication disorders and sciences and acting director of the SLP program. “If we can identify the underlying issues resulting in the functional swallowing changes, we may be able to develop targeted rehabilitation or prevention therapies.”

LaGorio is one of many coinvestigators on a study led by Elizabeth Berry-Kravis, MD, PhD, professor of neurology at Rush Medical College, investigating the long-term treatment

of Niemann-Pick type C disease with the drug intrathecal 2-hydroxypropyl- $\beta$ -cyclodextrin. The team is monitoring disease progression, measuring function in five neurological domains typically impacted by the disease: cognitive/language, gait/balance, fine motor, swallowing and eye movement.

The literature says Niemann-Pick patients have dysphagia, “but no one has described it with baseline scores,” LaGorio said. As her part of the study, “We've developed a profile of how swallowing is changing in these patients and are measuring how the medication is helping.”

The Rush Cancer Center excels in treating head and neck cancer, a condition in which dysphagia is a frequent morbidity. LaGorio is assisting the center in several ways, including measuring swallowing outcomes in patients whose cancer has been treated by transoral robotic surgery and revising the criteria for which patients receive feeding tubes.

“Not everybody with dysphagia needs a feeding tube,” she explained. “We've been able to improve outcomes and save money by enhancing our internal processes.”

## Tackling PD symptoms

Wang specializes in the evaluation and treatment of motor speech disorders and swallowing disorders resulting from neurodegenerative diseases. She works closely with Rush Medical College's internationally renowned Christopher Goetz, MD, the Parkinson's Foundation chair in neurological sciences, and Leo Verhagen, MD, PhD, professor of neurological sciences.

Wang is principal investigator in a study that's the first to test a treatment method — an approach developed for head and neck cancer patients — on patients with Parkinson's disease (PD).

“Difficulty initiating swallowing and delayed swallowing response due to rigidity and bradykinesia are frequent symptoms in mid-stage patients with PD. These symptoms tend to lead to aspiration, which can lead to aspiration pneumonia and even death,” Wang explained.

She and her coinvestigators are examining use of the Masako maneuver, a specialized swallowing technique

that, when delivered in a high-frequency, high-intensity regimen based on motor learning principles, improves oral pressure and reduces pooling of food around the entrance of the airway. LaGorio, a coinvestigator on the study, is helping with specific swallowing measures.

“We can improve and prolong patients' swallowing function if we can start the exercise early enough,” Wang said.

In a spinoff study, Wang and student Faviola Camarena, one of the first recipients of the newly established Rush Diversity Leadership Scholarship, are beginning investigation of swallowing issues in Hispanic patients with Parkinson's.

Working with Meagan Bailey, MD, assistant professor of neurological sciences at Rush Medical College, “We've been able to identify over 1,000 Hispanic patients with PD and hope to find answers to some fundamental questions,” Wang said.

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**“To see what research needs to be done, we go where the patients are.”**

— Emily Wang, PhD, CCC-SLP

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Wang is also conducting a funded study in which she's exploring using acoustic measures obtained from patients' speech to monitor involuntary movement, or dyskinesia, resulting from treatment with L-Dopa. Even small, involuntary movement superimposed on speech movement can lead to detectable changes in acoustic measures.

“We found that three speech acoustic measures demonstrated sensitivity to changes associated with L-Dopa-induced dyskinesia, or LID,” Wang said. The next phase of the study will use smartphones to monitor patients' LID in real time over medication

cycles at home using these acoustic measures.

## A look at language

Anne Hoffmann, PhD, CCC-SLP, assistant professor of communication disorders and sciences, focuses her research on language and social communication development in pediatric individuals with neurodevelopmental disorders, especially fragile X syndrome.

Funded by a new investigator's grant from the American Speech-Language-Hearing Foundation, Hoffmann is examining pragmatic language among very young children at the minimally verbal stage of development. “We're looking at things like eye gaze and gestures to see why the kids are communicating: to get attention, to have a request fulfilled or something else,” she explained. “The initial data shows a tendency for children with fragile X to use even more social communication than neurotypical children.” In that study, Hoffmann compares children with fragile X, children with autism and neurotypical children. Autism and fragile X syndrome have many similarities, creating significant interest among pharmaceutical companies in targeting the underlying mechanisms of fragile X with the hope of creating interventions for the much larger population affected by autism. With Berry-Kravis as principal investigator, Hoffman is coinvestigator on a National Institutes of Health-funded study on the effects of a novel pharmaceutical agent on language learning in young children with fragile X syndrome.

Along with Berry-Kravis and LaGorio, Hoffmann is also part of the investigation team on the Niemann-Pick disease study. While LaGorio's area of the research pertains to swallowing, “mine is cognitive/language,” Hoffmann explained, calling the research “a really strong collaborative model with good mentoring.”

She adds, “It's great for an early-career investigator to have an opportunity to be part of this kind of study.”

# Across the CHS curriculum: Cancer topics

Across the Rush College of Health Sciences curriculum, students receive a solid foundation in cancer topics relating to their respective fields. A sampling of cancer-related content in courses and clinical experiences includes:

## EARLY DETECTORS

Audiologists are sometimes the first health care providers to notice cancers of the skin on and around the ear. As they learn to conduct patient exams, Rush audiology students are trained to look for skin abnormalities that may indicate basal and squamous cell carcinomas and melanomas.

## RARE OPPORTUNITY

Rush is one of a very few institutions to offer its speech-language pathology (SLP) students a course dedicated to head and neck cancer. On clinical rotations, students are routinely placed with SLPs serving head and neck cancer patients.

## DELVING INTO DIAGNOSTICS

Students in the medical laboratory science program study and observe laboratory cancer diagnostics in courses and clinical practica covering hematology, clinical immunology, laboratory fundamentals, microbiology and clinical chemistry.

## SPECIALIZED NUTRITION

Clinical nutrition coursework covers specialized nutrition care for cancer patients, as well as the significant role of nutrition in cancer prevention. Students also complete rotations in cancer care with clinical RDNs as preceptors.

## CLINICIANS SHARE EXPERTISE

Physician assistants and physicians on the Rush hematology-oncology team guest lecture in the physician assistant studies program on cancer epidemiology, diagnosis and management in all organ systems. Many students choose an elective rotation in this area.

## FIRST PRINCIPLES

In courses on biochemistry, clinical immunology and pharmacology, students in the BS in health sciences program learn principles of cancer therapy, potential interventions and the immune regulation of tumors.

## PATIENT PERSPECTIVE

The health systems management program's course on patient experience uses the Cancer Center as a setting for students to observe the clinic's processes from the patient perspective.

## CANCER-SPECIFIC THERAPIES

In courses on health conditions and physical disabilities, occupational therapy students learn about and apply specific cancer-related interventions.

## BLOOD NEEDS OF CANCER PATIENTS

Students in the blood bank specialization program learn the range of specialized blood products and techniques for cancer patients, from irradiating blood to transfusing platelets to finding compatible blood products for patients who have developed alloimmunization.

## TRACHEOSTOMY MANAGEMENT

Respiratory care students obtain clinical experience caring for tracheostomy patients, a significant number of whom have head and neck cancers or neurological conditions.

## OVERCOMING OBSTACLES

Vascular ultrasound students learn to address problems associated with cancer, such as a tendency to develop deep vein thrombosis or a tumor blocking blood flow to organs and limbs.



# Inspiring future investigators

Maribeth Flaws, PhD, MLS(ASCP)<sup>cm</sup>, SM, SI (left),  
answers a student's question

In the medical laboratory science (MLS) field, research hasn't been a career emphasis for most professionals. "Some clinical laboratories hire a person dedicated to research; others will offer limited research opportunities and ask for volunteers. But often, research is outside the day-to-day requirements of the job," said Maribeth Flaws, PhD, MLS(ASCP)<sup>cm</sup>, SM, SI, associate professor and chairperson of medical laboratory science and director of the MLS master's program. "A lot of research about MLS is done by industry sponsors or other health care professionals outside our field."

The College of Health Sciences MLS program is beginning to change that perception by educating students in the value of research. "Our goal is to build them into leaders and active contributors to the body of knowledge in our profession," said Flaws.

The Rush MLS program includes a research component that pairs students with seasoned investigators at Rush and other Chicago-area medical centers. Many students have worked with neurologist Elizabeth Berry-Kravis, MD, PhD, professor of pediatrics at Rush Medical College and codirector of the molecular diagnostics section of Rush University Medical Center's Genetics Laboratory, and with Lela Buckingham, PhD, MB(ASCP), DLM(ASCP), assistant professor of medical laboratory science.

Some recent neuroscience-focused student projects have included:

- ▶ "A Novel Aryl 2-Cylcopropylamine Improves Motor Impairment in a Rat Model of Parkinson's Disease" (Nicholas Steder)
- ▶ "Clinical Testing of the Asuragen Amplide X™ Assay to Detect Hexanucleotide Repeat Expansions in C9orf72 and Evaluation of its Usage in the Clinical Laboratory for Early Detection of Amyotrophic Lateral Sclerosis and Frontotemporal Dementia" (Tifani W. Eshoo-Anton)
- ▶ "A Capillary Electrophoresis Assay for Diagnosing Myotonic Dystrophy Type I" (Robin Spoehr)
- ▶ "Spinal Muscular Dystrophy Carrier Test Using Real-Time Polymerase Chain Reaction" (Bridget Simpson)

Other MLS students have focused their research on a wide variety of cancer-related topics, working with investigators inside and outside Rush. Recent student research has included:

- ▶ "A Study of BRCA Gene Promoter Methylation in Non-Small Cell Lung Cancer Coupled with Effective Treatment with DNA Damaging Agents" (Greg Pelkey)
- ▶ "Epigenetic Loss of PTEN in Glioblastoma" (Eunice Choi)
- ▶ "Detecting Novel or Rare Fusion Transcripts in Poorly Differentiated Sarcomas Using Next Generation Sequencing" (Nneka Wallace)
- ▶ "Tyrosine Phosphatase SHP1 Hypermethylation and Hox Transcript Antisense RNA Expression in Acute Myeloid Leukemia" (Lenny Hong)
- ▶ "Spherical Nucleic Acids Engineered to Induce a Beneficial Immune Response in Prostate Cancer Patients" (Jonathan French)
- ▶ "Mir-149 Oncogene Expression in Plasma from Patients Undergoing CT Screening for Lung Cancer" (Angelo Rivera)
- ▶ "Genomic Methylation and Epigenetic Modulator Mutations in Tubular Adenomas" (Stephanie Sutherland)

"Researchers in the MLS field are starting to find their footing," Flaws said — and the Rush program is contributing to the formation of leaders in scholarship. "We're developing students who understand the importance of generating data and expanding knowledge that significantly impacts patient care," she said.

# Research with instant applicability



David Vines, PhD (c), MHS, RRT, FAARC, FCCP, and Constance Mussa, PhD, RRT-NPS (second from left), with students

Restrictive lung disease pattern is a common finding in pulmonary function testing of obese patients. Sara Hanif Mirza, MD, MS, assistant professor of internal medicine at Rush Medical College, wondered whether this finding can be attributed solely to obesity, or whether an underlying cause such as neuromuscular weakness might be in play.

Ellen Becker, PhD, RRT-NPS, RPFT, AE-C, FAARC, professor of cardiopulmonary sciences, Rush College of Health Sciences, joined Mirza and others in a study aimed at answering the question. Up to a 10 percent decrease in forced vital capacity (FVC) can be expected when normal, healthy individuals shift from an upright to a supine position. Becker and her colleagues compared FVC in patients with a high waist-hip ratio to investigate whether positional FVC changes in abdominally obese patients differed more than in non-obese individuals.

The researchers found abdominal girth alone doesn't create more than a 10 percent difference. "That means a patient with a reduced supine value should be investigated for a neuromuscular condition or other comorbidity," Becker said. "It's a study that came from a real-world clinical problem, and its results have immediate applicability here at Rush."

An emphasis on this kind of translational research is a hallmark of the Rush College of Health Sciences respiratory care program, which is tightly interwoven with clinical practice at Rush University Medical Center. Respiratory care faculty members are partnered with — and frequently conduct research alongside — clinicians in a variety of pulmonary specialty areas.

"Our research focus is improving quality of care at Rush," said David Vines, PhD (c), MHS, RRT, FAARC, FCCP, associate professor and chairperson of cardiopulmonary sciences and director of the respiratory care master's program. "Because our academic program is intricately involved with clinical practice, we have a common strategic plan and combine talent to engage students, faculty and employees. Our students really like this model, which involves →

them in clinical practice and gives them opportunities for research most respiratory care students don't receive."

## Building reliable tools

Another respiratory care research project resulted in a tool that benefits all intensive care unit (ICU) patients, including those with neurological conditions.

Between 2 percent and 40 percent of surgeries result in postoperative pulmonary complications (PPCs), which are associated with longer hospital stays, higher rates of morbidity and mortality, and create more than \$3 billion in additional costs each year.

Most current tools that identify risks for PPCs include assessment of non-modifiable factors like age and smoking history. These scoring tools aren't helpful in assessing the effectiveness of postoperative therapy — and current evidence doesn't support routine use of lung expansion therapy to prevent PPCs.

To create a system that better targets therapy and reduces misallocation, Vines' team developed the Respiratory Assessment and Allocation of Therapy (RAAT) tool. "RAAT identifies patient-specific findings and symptoms that may lead to PPCs and assists in allocating respiratory therapy for non-intubated ICU patients," Vines explained.

The RAAT score utilizes five modifiable components: level of respiratory distress, chest x-ray findings, need for oxygen therapy, ability to clear secretions and vital capacity. Each component is weighted to derive a total RAAT score used to allocate respiratory care based on a series of protocols. The score is reassessed every 12 hours.

"Preliminary data with surgical and medical ICU patients revealed a significant association between RAAT scores of 10 or higher and the development of atelectasis,

hospital-acquired pneumonia and need for positive-pressure ventilation." Vines said. He and his colleagues continue to refine the tool through further study.

In yet another collaborative study, Becker and others helped project lead Sharon Foley, PhD, RD, LDN, assistant professor of clinical nutrition, investigate whether respiratory muscle strength is a potential indicator of nutritional status in hospitalized patients.

After patients were assessed using established standards for measuring malnutrition, investigators measured

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**Collaborative projects "illustrate our faculty members' commitment to modeling interprofessional teamwork."**

— Ellen Becker, PhD, RRT-NPS, RPFT, AE-C, FAARC

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respiratory muscle strength, including maximal inspiratory pressure (MIP), maximal expiratory pressure (MEP) and sniff nasal inspiratory pressure (SNIP). Their conclusion: differences in respiratory muscle strength between normally nourished and malnourished patients — particularly SNIP, which is simpler than MIP and MEP to perform and thus has added value for clinical nutritionists in the field

— provide evidence that these measures are a potential proxy of musculature for nutritional assessment.

Like the study of FVC in obese patients, coauthored by a pulmonary fellow and respiratory care student in addition to Mirza and Becker, this project is a

solid example of cross-departmental collaboration. Coinvestigators included both faculty members and students from clinical nutrition and respiratory care.

"This study gave us an opportunity to learn each other's languages and deepen our discussion," said Becker.

### Respiratory Care

## Learning about neuromuscular conditions

"When people think about respiratory therapy, they usually think about diseases of the lungs," said J. Brady Scott, MSc, RRT-ACCS, AE-C, FAARC, FCCP, associate professor of cardiopulmonary sciences and director of clinical education for the respiratory care master's program. "But many conditions can impact a person's breathing and the ways a respiratory therapist will intervene."

The Rush respiratory care MS program trains its students to address the individual needs of patients whose pulmonary function is compromised for a variety of reasons — including neuromuscular disease patients, who may require extensive respiratory treatment.

As part of their clinical rotations, respiratory care students assist in testing neuromuscular patients' pulmonary function, screening for respiratory muscle weakness. They also help initiate and monitor patients'

use of noninvasive mechanical ventilation, such as CPAP and BiPAP breathing assistance machines, and assist with mask fitting for these machines. Students may also help neuromuscular patients with their coughing function, both by teaching effective coughing techniques and by training patients to use mechanical devices like a cough assist machine or vest therapy.



Respiratory care students learn to address disease-specific breathing issues

Rush's respiratory care program is one of only three U.S. entry-level education programs to receive the American Association for Respiratory Care's 2019-20 APEX Recognition Award — a reflection, in part, of Rush's commitment to ensuring all patients receive high quality respiratory care tailored to their respective conditions. "We're

about supporting people throughout the process, regardless of what their conditions may be," Scott said.

## Casey Sparks: Agent of change



Casey Sparks, MHA

*Casey Sparks, MHA, project manager for the Rush Cancer Center, is responsible for developing the cancer service line and improving center operations through Lean management principles. As an adjunct faculty member in health systems management, she regularly brings her Cancer Center work to her teaching. “One of the best things about working at Rush is the ability to take what you’re doing in your job and tie it into the classroom,” Sparks said.*

**Her career path:** Sparks holds a master’s degree in health administration from the University of Kentucky. A 2016-17 Rush administrative fellow — and now coordinator of the Administrative Fellowship Program — Sparks started her Rush career with diverse projects in process improvement, operations, strategy and finance, reporting to the president and chief operating officer. In 2017, she stepped into her current role at the Cancer Center.

**Time for change:** Although its standard of care has always been high, the Cancer Center has faced challenges including isolated divisions, redundancies and unclear roles. The service line model allows for physician buy-in, improved communication, better financial accountability and decision-making, standardization in operations, dedicated support for each program and a more cohesive team.

**Clearer focus on the patient:** The reorganization “puts the patient even more at the center,” Sparks said. “Moving toward the service line model means all our providers are talking to each other, which improves not just communication but also research and patient care. With the traditional department and division model, we were seeing a lot of siloes. We’re starting to see the barriers come down.”

**Casey’s case studies:** At the invitation of Andrew N. Garman, PsyD, professor of health systems management, Sparks helps teach the program’s Organizational Analysis course. She creates case studies for student projects using actual components of Cancer Center changes. For example, she recently asked students to create a comprehensive plan for communicating Cancer Center Call Center changes to stakeholders — and enthusiastic student participants later asked for updates on how well the plan performed. “I’m already thinking about how we can introduce some of the center’s changes of the past year into the curriculum this year,” Sparks said.

**Kudos from the associate chair:** “Casey exemplifies what makes Rush’s practitioner-teacher model so unique and valuable,” says Tricia J. Johnson, PhD, professor and associate chairperson of health systems management. “She brings real examples she’s facing today into the classroom for students to solve, and can bring the classroom learning back to the work setting. Our students select Rush because of the opportunity to learn from and be mentored by practitioner faculty members like Casey.”

## PhD students’ research is helping create the future of health sciences

The Rush doctoral program in health sciences provides students with the skills to advance the science and practice of health care, particularly within allied health. Several recent and current students in the program have focused their dissertation research on aspects of cancer and neuroscience:

- Recent graduate Mezgebe Gebrekiristos, PhD, is a molecular biology specialist and medical technologist III at Rush University Medical Center. His 2017 dissertation, “MicroRNA Dysregulation: The Role of miRNA200a and Let-7c in Colon Tumorigenesis,” examined gene expression in two non-coding RNA molecules, miRNA200a and Let-7c, in colonic tissue samples that were normal, precancerous and cancerous. “Dr. Gebrekiristos found an association with the expression of these two microRNAs with the development of tumors,” said Douglas Kuperman, PhD, professor and chairperson of health sciences and director of the health sciences PhD program.
- Tina Boehner, a current student, is engaged in additional cancer-related dissertation research. “Evaluation of Fluciclovine Uptake in Patients with Cervical, Epithelial or Endometrial Cancer” is examining positive emission tomography using the diagnostic agent fluciclovine, which is frequently used with suspected prostate cancer patients. “It’s hoped that this novel compound will aid in the identification of these specific cancers in medical imaging,” Kuperman explained.
- “A Novel Deep Brain Stimulator Programming Paradigm in Parkinson’s Disease,” the dissertation research of current student Jessica Karl, “compares different types of electrical stimuli to see which best improves the symptoms of Parkinson’s disease,” Kuperman said. Karl is testing a novel interleaving stimulation that delivers two different frequencies to address the worsened gait and balance that

may follow high-frequency stimulation and the lack of symptomatic relief that may come with low-frequency stimulation.

The health sciences doctoral program, which emphasizes leadership, education and professional development as well as research, “produces experienced health sciences professionals with a broad-based, interdisciplinary education who are prepared to lead, teach, practice clinically and perform research at the highest levels of competency and integrity,” said Kuperman. “We believe our students will become the future stewards of health sciences.”



Douglas Kuperman, PhD

# Making sense of sound

Using nonlinguistic stimuli for auditory testing and training

In most auditory testing, the emphasis is on accuracy in speech recognition, since speech is our primary means of communication. But myriad sounds beyond language are key to our understanding of the world around us.

“A car honking, a baby crying, a fire alarm — recognizing these sounds can be important to our safety,” explained Valeriy Shafiro, PhD. “And there are also lots of nonlinguistic environmental sounds we enjoy listening to: the sound of the ocean, the wind in the trees when we walk in the woods.”

Shafiro, an associate professor of communication disorders and principal investigator in the Rush Auditory Research Laboratory, conducts research in hearing and speech perception that focuses on finding new ways to diagnose auditory deficits and improve communication abilities in adults. These new diagnostic techniques have the potential to improve the quality of life of a variety of audiology patients — even well beyond the groups Shafiro is currently studying.

## Addressing a rehab deficit

Much of Shafiro’s lab’s past work, which has been funded by the National Institutes of Health (NIH), the American Speech-Language-Hearing Foundation (ASHFoundation) and the Hearing Health Foundation, formerly known as the Deafness Research Foundation, has assessed the ability of people with cochlear implants to recognize a variety of nonspeech sounds — a particularly useful means of auditory assessment in a large, urban medical center that treats many non-English speakers.

A recent study tested listeners’ ability to recognize those sounds with or without the contextual clues present in everyday life. For example, an ambiguous sound can be perceived as a burning fuse when preceded by

the sound of a match being struck and followed by the sound of an explosion, but it may be perceived as bacon frying when surrounded by other kitchen sounds.

“Compared with people with normal hearing, people with cochlear implants show some pretty clear deficits in identifying environmental sounds as well as speech,” Shafiro said. “Research from several labs, including ours, shows the possibility for cochlear implant users to improve if they work on it. But there are few readily available opportunities for these patients to obtain rehabilitation, for reasons including travel difficulties, health care reimbursements and scope of practice.”

Shafiro is now evaluating the usefulness of Internet-based environmental sound and speech training for people who rely on cochlear implants in daily life. “A Randomized Controlled Trial to Evaluate the Benefits of an Internet-Based Auditory Training Program for Cochlear Implant Patients,” a two-year grant from the ASHFoundation, aims to help fill the rehabilitation deficit for adults who receive cochlear implants.

“With Internet access now widely available, patients can do the auditory exercises online, at their own pace and without having to travel,” Shafiro said. When completed, the study will give him and his colleagues a deeper understanding of the benefits and challenges of computerized auditory training.

## Hearing-dementia link

Measuring listeners’ recognition of nonlinguistic sounds was also a component of a recent study from the Rush Auditory Research Laboratory in collaboration with the Rush Alzheimer’s Disease Center.



Valeriy Shafiro, PhD

“Hearing, Speech and Episodic Memory in Older African-American and White Adults,” funded with a grant from the NIH, examined a topic of wide current interest: the relationship between aging, hearing loss and cognitive deficits. As Baby Boomers age, research like this has major implications for the health and well-being of older adults.

“Some recent research has reported that people with a greater rate of age-related hearing loss also have a →

greater rate of cognitive decline,” Shafiro explained. “Typical tests of working memory are based on retaining words or numbers, but we wanted to explore this further by measuring both nonspeech and speech perception.”

Using tests previously designed by Stanley Sheft, senior researcher at the Rush Auditory Research Laboratory and principal investigator on the study, the team measured the ability of a cohort of community-dwelling older adults without known dementia to discriminate brief nonlinguistic sound patterns.

The addition of nonlinguistic sounds produced somewhat different results than those yielded by previous research. Although other studies have associated speech perception with cognitive performance, the Rush study did not find this correlation when measuring hearing thresholds or the ability to recognize speech in noise.



Cochlear implants are a Shafiro research focus

However, “We found a relationship between working memory and the ability to discriminate brief auditory patterns,” said Shafiro, who hopes to revisit the study cohort in the future to see whether the tests may be predictive of the trajectory of cognitive decline.

## Audiology

# Combating a chemo side effect

Chemotherapy may effectively combat cancer cells — but it also can challenge patients’ audiologic health. Several frequently used chemotherapy drugs, including cisplatin and carboplatin, are ototoxic. These agents may cause hearing loss, tinnitus, hypersensitivity to louder sounds and certain pitches of sound, and a variety of balance problems.

Hearing loss resulting from chemotherapy treatment can adversely affect communication in both adults and children. “Identification and monitoring of hearing loss in children undergoing cancer treatments is particularly imperative because hearing loss can significantly undermine speech, language and learning development,” said Patricia McCarthy, PhD, professor of communication disorders and sciences and director of the doctor of audiology program.

In classroom instruction and clinical rotations, students in the Rush audiology program learn about ototoxic drugs and are trained to support treatment teams working with patients receiving these agents. “We see patients for baseline audiologic evaluations and monitor them throughout the treatment phase and upon completion of chemotherapy,” McCarthy said. “Patients who develop hearing loss or balance issues are followed for full assessments and audiologic rehabilitation.”

# Laura Vasquez: Master of device advice

*A triple Rush University graduate — BS in vascular ultrasound, MS in perfusion technology and PhD in health sciences — Laura Vasquez, PhD, RVT (ARDMS), RT (R), (MR), (ARRT), MRSO (MRSC™), said her affection for Rush solidified as she “completed the trifecta” of degrees. An assistant professor and acting chairperson of medical imaging sciences and program director of the imaging sciences BS program, Vasquez said her students “motivate me every day.”*



Laura Vasquez, PhD, RVT (ARDMS), RT (R), (MR), (ARRT), MRSO (MRSC™) (center front)

**Central role in cancer screening and treatment:** With magnetic resonance imaging (MRI) and computed tomography (CT) the preferred modalities for detecting neoplasms, medical imaging plays a central role in cancer screening as well as in targeted therapy after diagnosis. For example, technologies like multi-slice CT systems have applications in lung cancer screening and virtual colonography. “These are new technologies, and our students have a marketable advantage in learning these innovative procedures,” Vasquez said.

**Safeguarding patients:** Vasquez’s dissertation, “Evaluation of MRI Issues for a Wirelessly Powered Freedom-8a Stimulator with Freedom Receiver Used for Spinal Cord Stimulation,” grew into her ongoing interest in device and implant safety during MRIs. “An increasing number of patients are using spinal cord stimulators for back pain, particularly as we work to reduce opioid use,” she explained. “Patients with complex neurological disorders like Parkinson’s disease use deep-brain stimulators to help with involuntary muscle movements. MRI is the optimal technology we have for imaging soft tissues like the brain and spine — therefore, we need to know whether patients with these implants and devices can be safely scanned under MRI conditions.”

**A sought-after advisor:** Vasquez serves in advisory roles to government, industry and other policymaking organizations related to neurological implant and device testing in association with MRI safety. She sits on several testing-related committees of the American Society for Testing and Materials (ASTM), which develops and publishes technical standards with the goal of enhancing performance and safety. The Food and Drug Administration recognizes standards developed by ASTM.

**Graduates with an edge:** Because Vasquez tapped her expertise to create a course on device testing and safety related to MRIs, “Our students become MRI technologists with a great niche: they learn advanced MRI safety procedures and understand MRI labeling of implants and devices,” she said. “That lets our students graduate with an edge. They receive an in-depth application of MRI safety concepts that further enhances their knowledge of MRI risk profiles and best MRI practices.”

## Across the CHS curriculum: Neuroscience topics

Students in a variety of Rush College of Health Sciences programs study aspects of neuroscience that relate to their respective professions. Some of the neuroscience-related content in courses and clinical experiences include:

### LEARNING THE BASICS

The Fundamentals of Neuroscience course gives students in the BS in health science (BSHS) program a grounding in neuroscience. BSHS students also learn principles of neuroscience and neurological interventions in pathophysiology and pharmacology courses, and complete practicum rotations with the epilepsy and stroke teams and in neuroscience research.

### DIAGNOSTIC DETAILS

Medical laboratory science students learn about the diagnosis of neurological diseases in courses covering laboratory fundamentals and clinical immunology.

### A KEY TO THE PROGRAM

Neuroscience is a foundation for many components of the speech-language pathology program, including courses on dysarthria, dysphagia, aphasia, cognition of acquired language and communication disorders. A dedicated neuroscience course is being introduced into the curriculum beginning in fall 2019.

### NEUROSCIENCE FOR OTS

Occupational therapy students observe neurosurgery and complete an introduction to neuroscience course and a class on neurological inventions.

### NEUROSCIENCE NUTRITION

An advanced nutrition course for clinical nutrition students reviews research evidence and the nutrition care process for individuals with neurologic disorders. Students complete rotations in neuroscience, including epilepsy and Parkinson's disease, with clinical RDNs as preceptors.

### ACROSS THE LIFESPAN

In its clinical medicine course, the physician assistant studies program educates students about neurological disorders across the lifespan. Lectures are given by physician assistants and MDs on the Rush neurology team. Many students select an elective rotation in neurology. The program also offers a third-year focused track in neurology and neurosurgery.

### BEST BLOOD PRACTICES

Blood bank technology students learn about the need for additional blood products to support patients having brain surgery, the process of tissue banking for cranioplasty, and best practices for transfusion during neurosurgery.

### LEARNING SCANNING

Vascular ultrasound students are trained in duplex ultrasound scanning that identifies and grades the severity of atherosclerotic obstructions, dissections, fibromuscular dysplasia and other vascular conditions that may affect the function of the brain.

### STUDYING STROKE OUTCOMES

Some second-year health systems management students have focused their applied research projects on stroke outcomes.

## Hands-on experience puts Rush students a step ahead

Rush's BS in vascular ultrasound program ensures its students obtain the broadest possible clinical experience. One offering that sets Rush's BS program apart: hands-on experience in performing transcranial Doppler (TCD) exams.

TCD ultrasonography measures the mean velocity of blood flow through the brain's blood vessels. It's an important tool for diagnosing emboli, intracranial stenosis and vasospasm from a subarachnoid hemorrhage, among other conditions.

"These exams aren't performed at all vascular labs, and not all academic programs offer the opportunity to perform this procedure," said Jacqueline Ortiz, MA, BS, RVT, assistant professor of medical imaging sciences and director of the vascular ultrasound program. Although clinical sites that perform TCD exams are limited, "We work very hard to be sure all of our students have a rotation that allows them to perform TCD exams on actual patients in a clinical setting under the guidance of a credentialed vascular technologist," she said.

TCD exams can be challenging to perform. "Every patient receiving a TCD exam is different, and you really have to work to find those acoustic windows and the depth and velocity of vessels," said Ryan Beebe, a Rush vascular ultrasound student.

Beebe, who's currently completing a clinical rotation at the University of Michigan Medical Center in Ann Arbor, said his supervisors have told him that Rush students arrive better prepared because of their hands-on experience.

"The first day of classes at Rush, you have a probe in your hand," he said. "That practical experience gives me an advantage over other students. When I'm looking for a job, my experience with TCD will really give me a leg up."



Jacqueline Ortiz, MA, BS, RVT (left), guides students through a TCD exam



# From learners to teachers: CHS alumni become faculty members

The Chicago area has more than one top 10 program in audiology. But almost as soon as Amy Winston, AuD, CCC-A, stepped onto the Rush campus, she knew she'd found the right fit. "I met the very welcoming faculty, saw them in clinical practice and gained an understanding of how well they integrate the classroom with the clinic," Winston said. "Rush's teacher-practitioner model works — and it sets our program apart."

Today, Winston is a Rush assistant professor of communication disorders and sciences, teaching and practicing in the same halls where she earned her audiology degree. She's one of many College of Health Sciences faculty members who valued their Rush educational experience so much that they made the transition from student to faculty member.



J. Brady Scott, MSc, RRT, RRT-ACCS, AE-C, FAARC, FCCP (left)  
Sarah Peterson, RD, PhD, LDN  
Amy Winston, AuD, CCC-A  
Jacqueline Ortiz, MA, BS, RVT

## Simultaneously student and teacher

J. Brady Scott, MSc, RRT, RRT-ACCS, AE-C, FAARC, FCCP, associate professor and director of clinical education for the respiratory care MS program, was a bachelor's-prepared respiratory therapist when he joined Rush's clinical staff. As an employee, he earned his Rush master's degree in respiratory care. Because of his solid clinical experience, Scott found himself in the unusual role of teaching clinical skills while he was a student in the same program.

"I was engulfed in all angles of this rich learning environment," he recalled, "sharing my own clinical experience while learning new skills like research and education theory. I can't imagine having more of an experiential learning experience."

Scott has received numerous accolades, including the American Association for Respiratory Care's Practitioner of the Year award and multiple Rush awards for teaching excellence. "Because they'll be caring for someone else's loved ones, I train my students well enough to take care of my own family members," he said. "And some of them actually did when my daughter was born prematurely and was in the Rush neonatal intensive care unit."

Now a student in the Rush PhD in health sciences program, Scott has conducted a variety of research projects with colleagues from his own and other departments. One study in which he's participating as a PhD student has personal meaning. A native of central Appalachia, Scott helped design interventions and train community health workers as part of a University of Kentucky study examining the prevalence of asthma and chronic obstructive pulmonary disease in Scott's region of origin.

"Participating in an epidemiological study meant stepping out of my comfort zone, but Rush faculty members more experienced in the area were exceptionally willing to help me, even though we're from different departments," he said. "This is a very collegial environment that really fosters growth of young faculty members."

## Relating the didactic and clinical

Sarah Peterson, RD, PhD, LDN, assistant professor and acting program director, clinical nutrition, joined the Rush clinical staff as she finished her MS in clinical nutrition at Rush. By the time she earned her PhD in kinesiology, nutrition and rehabilitation sciences at the University of Illinois at Chicago, Peterson was teaching courses in the Rush clinical nutrition program. Since 2017, she's had a full-time appointment in the College of Health Sciences.

"As a student, I really enjoyed learning from faculty and preceptors who were nationally recognized experts in the field," she said. "Dietitians practice at an advanced level at Rush. We integrate research into practice and are always looking for a new or better way to do things. And we advocate for the role of dietitians in improving patient outcomes across the medical center."

Peterson's research interests are in body composition, including studying muscle mass to assess nutritional status. "A lot of times people who have low muscle mass are sarcopenic, but we can't detect it because they have a high body mass index," she said, noting that her research "perfectly complements" her colleague Sandra Gomez-Perez's studies of adipose tissue's relation to cancer (also see page 16).

Going from a clinical setting to a fully academic appointment was a challenge at times, Peterson said, but the Rush teacher-practitioner model made the transition easier. "I try to make what I teach case-based, showing students how they'll use the knowledge," she said. "The profession and best practices change. I teach my students that they'll always need to take the lead in relating the didactic and the clinical: finding the articles, synthesizing them and applying what's relevant to their work."

## Discovering the joys of teaching

Interested in health care but unsure of her path after community college, Jacqueline Ortiz, MA, BS, RVT,

discussed the Rush vascular ultrasound program with former program director Eileen French-Sherry, MA, RVT, and immediately knew it was the place for her.

“My faculty members were truly dedicated and passionate about what they do, and the real-life experiences they brought to the classroom helped me learn so much,” Ortiz said of her time as a student. Now an assistant professor of medical imaging sciences, “I share stories from my own years of clinical experience with my students, knowing that practical applications really brought the information home for me.

“I feel fortunate to have been a student here before becoming an instructor,” she added. “I understand what my students are experiencing, and I think that improves my teaching.”

Ortiz had graduated and amassed several years of practice experience at area hospitals when French-Sherry asked whether she'd like to substitute teach. “I discovered that I enjoyed teaching so much that Eileen offered me a regular course,” Ortiz said. Her transition to full-time Rush faculty member had begun.

Seeking advanced credentials, Ortiz recently completed an MA degree in applied professional studies from DePaul University. “I was essentially able to design the degree myself. I chose to hone my teaching skills, focusing on adult learning theory,” Ortiz said. “My confidence and skills as a leader have really grown.” In January 2019, Ortiz put those new competencies to work as she began a new role directing the vascular ultrasound BS program.

“This is a close-knit organization, full of supportive, helpful colleagues who are always willing to help our students,” she said. “Life as a Rush faculty member is overwhelmingly good.”

### Where she wanted to work

After Winston earned her Rush audiology degree, she worked as a per diem employee for nearly two years — “until they were able to hire me full time,” she recalled. “I knew Rush was where I wanted to work.”

The same students she teaches in the classroom are frequently with her in the clinic. “One of my goals is to make information immediately relevant to my students,” said Winston, who consistently gets top ratings from her students for her teaching skills and received the college's 2017 Faculty Award for Excellence in Education. “I do a lot of case-based work in the classroom. Being able to go from the didactic to the clinical grabs their interest, gives them more of a hook and helps them make the connection.

“When I work with students, I tell them they're future colleagues of mine,” she continued. “In the classroom and in the clinic, my goal is to have them be as learned and inquisitive as possible — because at some point, I may be turning to them and asking them a question. That means developing them as people and as professionals.”

Winston's interest in the less well known area of audiology that studies the role the inner ear plays in helping maintain balance led her to take the lead in overseeing and expanding Rush's clinical vestibular program. Because of her expertise in this area, she's often consulted by colleagues both within the department and in other programs such as physical therapy and neurology.

She also frequently addresses vestibular issues in her research and case studies. Like her teaching, Winston's scholarship is focused on applicability to practice.

“Clinic-based research rather than benchwork — working with patients and seeing the immediate transfer from what I'm learning to what I'm doing in the clinic — is what got me as a student,” Winston said. “It's also what keeps me here at Rush.”

**“This is a close-knit organization, full of supportive, helpful colleagues who are always willing to help our students.”**

— Jacqueline Ortiz, MA, BS, RVT

**“Rush's teacher-practitioner model works — and it sets our program apart.”**

— Amy Winston, AuD, CCC-A

**“We integrate research into practice and are always looking for a new or better way to do things.”**

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