

Shaping the landscape of MS



Research and clinical fellows work to change what it means to live with MS.

By Vicky Uhland

When New York law student Sylvia Lawry's brother Bernard was diagnosed with multiple sclerosis in 1945, few scientists or doctors could even identify the disease, let alone treat it or search for a cause or cure.

So, in 1946, Lawry gathered 20 of the nation's most prominent researchers and medical experts and founded what would become the National Multiple Sclerosis Society. Nine years later, the Society funded its first fellowship to encourage MS research.

Since then, the Society has supported the training and development of more than 1,000 postdoctoral fellows. These top researchers and clinicians have been responsible for some of the most significant breakthroughs in MS knowledge and treatments over the years.

Society fellows have played a role in developing cutting-edge medications like Tysabri and Ocrevus. They've trained dozens of young neurologists in the intricacies of caring for patients with MS. And they've dedicated their careers to finding a cure for MS.

"We need more people to solve the difficult challenge of MS. By making these investments in our fellows, we help ensure that the brightest scientific minds are focused on MS," says Tim Coetzee, PhD, who was a fellow in the 1990s and now serves as the Society's chief advocacy, services and science officer.

The Society funds basic science research, clinical research and clinical care programs. There are about 120 basic science and clinical research fellows and nine clinical care fellows. Here's a look at the backgrounds and interests of seven of those fellows.

Research fellows

Researching MS requires understanding a complex disease process across multiple scientific disciplines. That's why the Society funds different research fellowship programs, says Mark Allegretta, PhD, vice president of research for the Society and an alum of the fellowship programs.

"Quite simply, it takes people to find a cure for MS," Allegretta says. "But we can't do that without people who are trained in researching this unique, complex disease. Fellowships play a major role in shaping the MS research landscape."

Kimystian Harrison, MD: Honoring family legacies past and present



Kimystian Harrison, MD

Kimystian Harrison, MD, was in ninth grade when her mother was diagnosed with MS. "She was in training, about to be deployed for military duty, and she noticed numbness and tingling in one side of her body and that her walking was different," Harrison recalls. "She knew something was wrong."

Harrison had mixed feelings about her mother's diagnosis. While she was relieved that her mom wouldn't be deployed, she was scared about how the disease would progress. But her mother was able to start interferon injections, which helped control many of the physical symptoms initially.

Harrison had always been interested in science. After her mother was diagnosed, she had an

opportunity to participate in some basic research at the hospital across the street from her high school. She continued to study science and, eventually, medicine. Harrison majored in biology at Tougaloo College in Mississippi, then earned a master of science degree from Mississippi College. In 2017, she received her medical degree from the University of Mississippi Medical Center.

Harrison did her internship and residency at Washington University and Barnes Jewish Hospital in St. Louis. As she homed in on her specialty, she felt a particular connection with the people with MS. "As I saw more MS patients during my residency, I realized how they may be feeling with their diagnosis, and also how their families may be feeling," she says. "And I knew what that was like."

Harrison became interested in clinical trials for MS therapies and treatments. Her three-year Sylvia Lawry National MS Society research fellowship at Johns Hopkins University's Department of Neurology allows her to work with some of the top researchers in the field.

Harrison is working on multiple clinical trials, including the TREAT-MS trial, evaluating whether an early, aggressive therapy course lowers the risk of future disability better than starting slower with a traditional, first-line therapy like interferon. She's also working directly with MS patients in the Hopkins clinic. Eventually, Harrison wants to divide her time between conducting clinical trials and working as a skilled MS specialist who treats patients.

Harrison is one of the Society's Sylvia Lawry research fellows, and the significance of that is important to her. "Sylvia Lawry started the National MS Society because she wanted to find a cure for her brother," she says. "I want to do the same thing for my mother."

Brett Fling, PhD: Finally, an opportunity to conduct MS research

When Brett Fling, PhD, was 13, his mother was diagnosed with relapsing-remitting MS. The following year, her younger sister was diagnosed with primary progressive MS.

Three decades later, Fling's mother's symptoms are still manageable. But her sister's disease progressed rapidly.

"She was essentially paralyzed the last 10 years of her life, and she died two years ago," Fling says.



Brett Fling, PhD

Fling has always wondered how a single disease could manifest differently in two closely related people.

As he progressed through his academic career, earning a bachelor's degree in 2002, a master's degree in 2007 and a PhD from the University of Michigan in 2012, he tried to find answers.

“During every stop I made, I wanted to do something with MS. But none of the labs I worked in were researching people with MS at that time,” he says. So he studied the nervous system in general, looking into the effects of conditions that had more research funding, like strokes, cerebral palsy and Parkinson's disease.

In 2016, Fling was named director of the Sensorimotor Neuroimaging Laboratory (SNL) at Colorado State University. And he finally got his chance to study MS.

SNL research focuses on how the brain's neural networks contribute to everyday movements like walking and maintaining balance. Fling and his team use cutting-edge brain imaging and physical training to help people with MS, Parkinson's disease, traumatic brain injuries and other conditions that affect the central nervous system improve their mobility — and consequently bolster their independence and quality of life.

SNL researchers are also looking into healthy aging and athletic performance. “We're interested in how your nervous system controls your muscles to move your body,” Fling says.

Fling estimates that 75% of his work is devoted to MS research, thanks to funding like the Society's Harry Weaver Scholar Award. This five-year research fellowship, which was awarded to Fling in 2020, is named after the Society's first director of research.

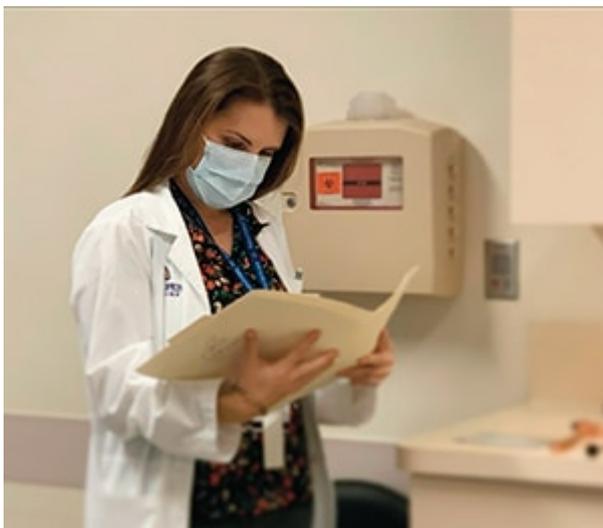
One study Fling and his team are currently working on focuses on a concept called forced-use rehabilitation. Because MS often affects the sides of the body differently, people can have a “good leg” versus a “bad leg,” Fling says. To improve the movement of a bad leg, the SNL team uses a split-belt treadmill, which has independent belts under each leg. By speeding up

the belt under the bad leg, a person can learn to make bigger and more frequent steps. At the same time, the SNL team is looking at how the brain contributes to asymmetries in people with MS.

The five-year study will examine whether it's possible to develop some sort of wearable, small-vibration device using sensory feedback to improve gait, Fling says.

Alexandra Simpson, MD: A commitment to finding new MS therapies

Some doctors know from an early age that they want a career in medicine. But Alexandra Simpson, MD, didn't decide to go to medical school until she was in her senior year at the University of Maryland.



Alexandra Simpson, MD

A family friend had been diagnosed with MS in her late 20s, and she asked Simpson to administer her Betaseron injections several times a week. During those visits, the friend shared her story with Simpson.

"She was diagnosed when she was in the early stages of raising her family and establishing her career," Simpson remembers. "Her most debilitating symptoms weren't readily observable — fatigue, cognitive fog — but I saw what a big impact they had on her quality of life." Simpson was struck by this complex, often silent disease and its effect on people who tend to be young and otherwise healthy when diagnosed.

"I find it the most fascinating field in neurology, learning how the body can attack itself," she says.

After she graduated from college in 2010, Simpson started her first MS research project, examining how MS and similar central nervous system conditions affect quality of life. Simpson wrote a master's degree thesis about that research and then earned a medical degree from the University of Maryland School of Medicine in 2017.

During her residency at Johns Hopkins Hospital, Simpson began seeing patients newly diagnosed with MS, and she's continuing that as part of her three-year Society research fellowship.

"It gives me exposure to how different providers treat MS," she says. "It helps me understand the diagnosis and treatment not only of MS, but also other diseases that mimic MS."

During her fellowship, Simpson is working on disease-modifying therapies (DMTs) — including analyzing common reasons why certain medications are chosen or discontinued. "My goal is to develop comprehensive prediction models for DMT selection," she says.

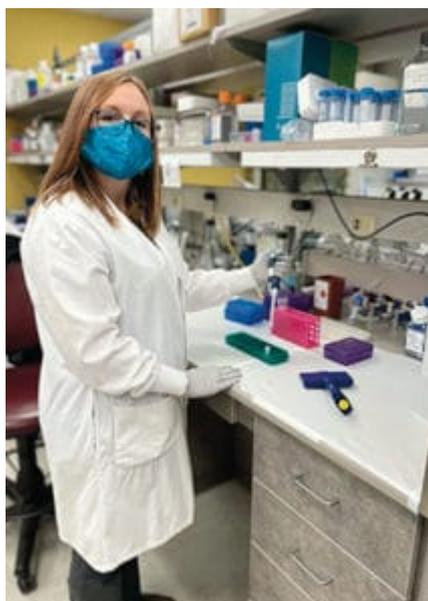
Simpson is also learning how to carry out clinical trials for new MS drugs and is hopeful this will eventually include medications that can rebuild parts of the nervous system and reverse MS symptoms.

"Ultimately, I envision a career in which I can design and lead clinical trials on novel therapeutics that will change the trajectory of disability and disease outcomes in MS — particularly in people with progressive forms of the disease," she says.

Monica Langley, PhD: How our inner and outer environments affect MS

For Monica Langley, PhD, the path leading to a career in MS research has been circuitous.

After majoring in biological sciences at the University of Wisconsin-Parkside, Langley earned a PhD in toxicology from Iowa State University in 2011. Toxicology is the study of how chemical substances affect people, animals or the world around us. On the surface, it doesn't seem to have much to do with MS. But Langley has carved out a scientific focus that examines how environmental and metabolic factors can influence MS disease risk and progression.



Monica Langley, PhD

Langley became drawn to MS research as part of her overall interest in neurological diseases. When she was growing up, her stepfather had a spinal cord injury. She saw very few treatments for neurological injuries and a need for more research to help develop treatments.

As a graduate student at Iowa State, Langley began her research into the link between toxicology and neurological diseases, focusing on Parkinson's disease. Now, as part of her three-year postdoctoral MS Society research fellowship at the Mayo Clinic in Rochester, Minnesota, Langley is looking at how to repair myelin — the protective sheath around nerves that's destroyed or damaged by MS.

"I think myelin regeneration is one of the more feasible repair approaches in people with MS," she says.

Research shows that myelin is damaged by inflammation in the brain or spinal cord. Remove the inflammation, and the theory is that it's easier for myelin to repair itself. Meanwhile, obesity, which promotes inflammation in the body, has also been shown to influence the central nervous system. And high-fat diets can lead to inflammation and obesity, creating a circular effect.

Langley's current research looks at how high-fat diets in rodents contribute to the loss of myelin cells. She says these types of diets may also influence disability and MS disease progression. In addition, she's published several papers about her research, including one in the *Journal of Neuroscience* in October 2021.

Langley's research could potentially lead to new medications that could counterbalance the effects of a high-fat diet or obesity on the development of MS and disease progression. In the future, she'd like to operate her own lab that would study how other metabolic and environmental factors, such as high blood pressure or exposure to pesticides, contribute to MS and other neurological diseases.

Clinical fellows

In 2003, the Society launched its clinical fellowship program to encourage more neurologists to specialize in MS care. Today, these postdoctoral fellowships are one of the few sources of MS clinical training.

MS clinical fellows are mentored by multidisciplinary healthcare teams that specialize in MS. The fellowship provides a year of intensive education and training directly with patients.

"MS clinical fellowships ensure consistency across programs and that fellows are being trained by the best MS specialists in the country," says Hope Nearhood, the Society's director of MS information and resources in advocacy and healthcare access.

Ghazal Lashgari, MD: A personal mission to fight implicit bias

Ghazal Lashgari, MD, didn't see many people with MS while growing up. "My first encounter

with the disease was with my anatomy professor when I was 18. She used a cane, and I heard she had MS," Lashgari recalls. "The scary part for me was that three years later, she was using a wheelchair. I saw how debilitating this disease is."

Growing up in Iran with a mother who is a clinical psychologist and a father who's a general surgeon, Lashgari says it was natural for her to contemplate a career in medicine. But she wasn't drawn to neurology and MS until further in her studies.

"At age 5, I wanted to be a plastic surgeon, so I could fix my parents' skin when they became old," she says with a laugh.

In Iran, college and medical school is combined into a seven-year program. But Lashgari always knew the future of her medical education would include specialty training outside of Iran. The question was, what kind of training? During her basic science classes in college, Lashgari was drawn to neurology and immunology. Then, after she graduated, she learned that one of her best friends had been living with MS.

"I had no idea he had MS. I thought of MS as what my teacher had and didn't realize how well you can live with this disease," she says. "I saw MS as a field where a lot of research is being done, with a lot of new medications. It wasn't the disease I had seen years ago."

Today, Lashgari views MS as a disease that's 50% ambiguous and 50% hopeful. "The ambiguity provides motivation to find an answer, and the hope is what makes me want to continue."

In 2014, Lashgari joined the neurology department at Massachusetts General Hospital and Harvard Medical School as a research fellow. After that, she was an intern and resident in the neurology department at Ochsner Clinic Foundation in New Orleans. In July 2021, she began a Society clinical care fellowship in neurology at Cedars Sinai Medical Center in Los Angeles.

"I'm learning from the best in the field," she says. "My main focus is seeing patients and helping them in every way, including everything they think affects their life."

Every day I feel more confident that I can answer patients' questions about their symptoms and their futures."

During her fellowship, Lashgari is also participating in research with her mentors into imaging biomarkers, focusing on identifying MRI lesions specific to MS at an earlier stage. "People with less typical lesions don't get diagnosed early, so they don't get started on medication early," she says.

In the future, Lashgari wants to be an advocate for women with MS. Often, their symptoms are initially attributed to stress or psychological issues rather than MS, she says. "I want to look and see if there's a difference between men and women in terms of initial symptom presentation and time to referral for an MRI. If such a thing exists, I want to bring that to

everyone's attention."

Lashgari also wants to identify and reduce implicit bias regarding ethnicity, education level, socioeconomic status and other factors that can affect how seriously a physician takes an initial presentation of a patient with MS.

And Lashgari hasn't forgotten her native country. "I want to offer the expertise I gain during this fellowship to help educate neurologists back home," she says. "MS care has improved in Iran over the last 15 to 20 years, but I don't know of any established MS fellowships there."

Gina Perez Giraldo, MD: Working with the underserved at home and abroad

Growing up in Medellin, Colombia, during the drug wars, Gina Perez Giraldo, MD, learned how to be strong at an early age. She learned the value of leaders who can change the world. And she learned how important an education is for helping the people around her.



Gina Perez Giraldo, MD

"I am a witness of the positive impact that a doctor can have in such communities," she says.

Perez Giraldo graduated from medical school in Medellin in 2013 and worked with refugees and other underserved populations in Colombia. But she was drawn to neuroimmunology and, specifically, MS.

"I really like how the MS field is linked to both basic sciences and clinical practice. It relies a lot on a patient story and physical exams," she says. "An MS specialist and neuroimmunologist can have a life-changing effect on patients' lives."

Perez Giraldo is also encouraged by the rapid growth in MS research and treatment. "It's exciting, complex and intellectually challenging," she says. "I feel inspired by the advances in

the understanding of the disease and treatments that have been achieved in such a short period of time, and also the extraordinary potential of research because so much is still unknown.”

Perez Giraldo came to the United States in 2017 to do her neurology internship and residency at the University of Oklahoma. She’s now in the midst of a Society clinical care fellowship in MS and neuroimmunology at Northwestern University.

“I chose Northwestern because it has very comprehensive MS care,” she says. In Northwestern’s busy MS clinic, she works with four attending physicians, a pediatric neurologist, a neuroinfectious disease doctor and a neurorehabilitation specialist. She sees up to 35 patients a week, which gives her both comprehensive diagnosis and symptom management training.

“I’ve learned a lot about how it’s not only having the disease but also managing the symptoms, which can be very challenging,” she says. “I aim to learn about symptom management and be able to improve their quality of life.”

As a native Spanish speaker, Perez Giraldo also wants to cross language barriers and advocate for her Hispanic/Latinx patients. “I’m aware of the healthcare disparities with minorities. I have seen how poor access to care has led to disability in many patients with MS, and especially those who have a language barrier,” she says.

Ultimately, Perez Giraldo wants to work at a university hospital as a leader in MS research and clinical training for doctors worldwide and as a representative for women and minorities.

“Working with disadvantaged populations is a social commitment for me, as it reminds me of my experience in my own country,” she says. Giraldo notes that the telemedicine training will help her provide specialized care to patients in rural areas or who can’t afford in-person clinic visits.

Shuvro Roy, MD: Improving public policy for people with MS

Shuvro Roy, MD, is only 30 years old, but his life has already been a legacy of service.

When he was in college at Ohio State University, he started an international nonprofit dedicated to providing clean water to communities worldwide.

As chief resident at the University of California, Los Angeles, he worked to improve access to care for neurology patients, including boosting enrollment in clinical trials, shortening appointment wait times, expanding the use of telemedicine and reducing health insurance barriers for people of color.



Shuvro Roy, MD

“My program director nicknamed me Tony Stark due to my passion for innovation and because of my reputation as an ‘agent of change,’ as he described it,” Roy says.

Roy has also served on several MS leadership forums and participated in the American Academy of Neurology’s Neurology on the Hill Conference in 2020, discussing healthcare public policy with legislators.

“I have come to appreciate how those living with MS need physicians who can not only help address this wide spectrum of disease but also navigate the increasingly dynamic challenges their conditions present in the framework of our healthcare system,” he says.

MS patient advocacy is a focus of Roy’s clinical fellowship at The Johns Hopkins MS Precision Medicine Center. Along with working in the center’s new safety-monitoring clinic for people undergoing infusion therapy, Roy is a part of research projects designed to make patient care easier and more effective.

One of those projects is developing an MS smart form that’s built into a patient’s medical record. It tracks information like relapses, lesion locations, medication history, lab tests, and MRI changes, which are often not readily available to all of a patient’s healthcare providers.

Roy became drawn to MS patients during his residency at UCLA. “I met people who were afraid of losing their identity, afraid that MS would have a hold over their life and their future,” he says. “There are such a wide variety of challenges for people with MS that we need to address. I realized that this was something I could apply myself to, that I could spend my life doing.”

With the recent explosion in MS research and treatments, training MS clinical specialists is more important than ever, Roy says.

“The MS Society clinical care fellowship is critical because it allows you to become intimately familiar with patient care, the new drugs available and the unique properties of each medication,” he says.

“It’s an opportunity to learn from the titans in the field and do research with them.”

Vicky Uhland is a writer and editor in Lafayette, Colorado.