

# Commemorating 50 Years of Global Exchange

1969–2019





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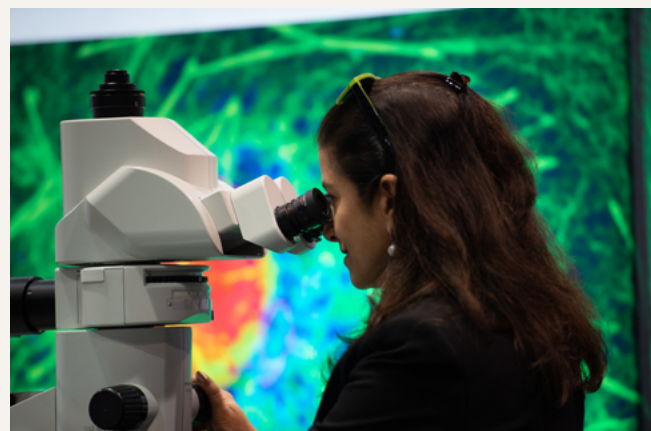
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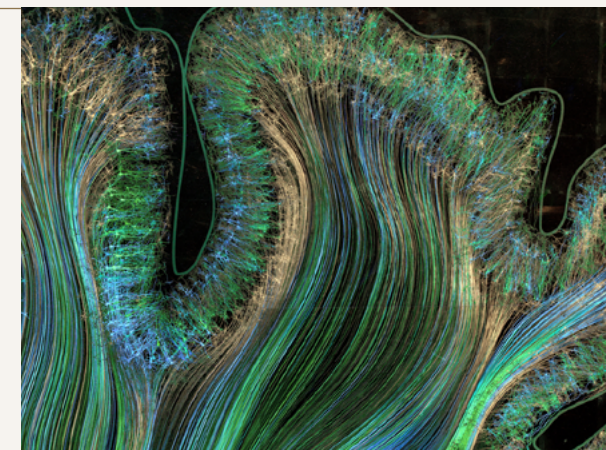
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# Message from the President



**BARRY EVERITT**  
SfN president

In the 12 months that comprise SfN FY 2020, the COVID-19 pandemic has driven a revolution in all aspects of our work, from how neuroscience is performed in the lab to how results are shared with the community – a new aspect of the constantly evolving field of neuroscience. As we have all been adapting our professional and personal lives to the life-saving public health measures of social distancing, mask-wearing, and working from home, SfN has been adapting as well.

SfN is well positioned to succeed in our digital-first world. Professional development opportunities have been offered online since 2013, and virtual conferences began in 2016. Even the space left by the cancellation of Neuroscience 2020 will allow us to build on the lessons learned over the years and apply them to the creation of the brand new SfN Global Connectome: A Virtual Event in January 2021. SfN will be poised to support scientific exchange in the face of a pandemic and all the short and long-term challenges that it brings.

After all that has happened in FY 2020, I value the opportunity this Annual Report offers us to reflect on what we, as members of the Society, have accomplished in the face of daunting challenges.

## Greater Access

Neuroscience 2019 served as an opportunity to celebrate SfN's 50th anniversary. Multiple special sessions offered opportunities to review where the field has been and where it is going. One highlight was the annual Celebration of Women in Neuroscience Luncheon, which featured a panel consisting of SfN Past Presidents Huda Akil, Carol Mason, and Carla Shatz. Another was the large-scale digital art experience Neuro Space, which took visitors on a technology-based evolution of how scientists view neurons, from Cajal's early work to current research. This collaboration with ARTECHOUSE, a 21st century art institution based in Washington, D.C., was created by a group of SfN scientists led by SfN Secretary John Morrison working with a group of artists led by L.A.-based media designer, artist, and spatial thinker Refik Anadol.

As the field of neuroscience has changed over 50 years, so has the SfN annual meeting. Neuroscience 2019 introduced the Science Knows No Borders program. The program provided opportunities for scientists who have been denied a U.S. travel visa to present their research and engage with their colleagues

## MESSAGE FROM THE PRESIDENT

at the meeting. Neuroscience 2019 also debuted a new photography and recording policy that enabled presenters to share their presentation material with attendees under a Creative Commons license (CC BY 4.0). And to ensure a safe and respectful environment for all attendees, the SfN Code of Conduct expanded its list of explicitly prohibited behaviors and was distributed broadly to all attendees.

Efforts to increase access extend to SfN's two journals, *JNeurosci* and *eNeuro*. Both journals now comply with Plan S, the international funder mandate for open access. Addressing the barrier of cost, *JNeurosci* eliminated its submission fee in July 2020. To increase readership, SfN launched an Author Outreach initiative to provide authors with guidance on how to promote their manuscripts. Media outreach via SfN's Weekly Journal Highlights, which are emails to journalists about manuscripts of interest to the public, have resulted in hundreds of news articles and coverage in global outlets. These efforts contributed to a 2% and 12% increase in manuscript submissions in FY 2020 to *JNeurosci* and *eNeuro*, respectively.

### An Adaptive Community

Starting in March when the near-global lockdown began to reshape our world, SfN Council began meeting virtually every month. Our focus was to determine the impact of the pandemic on our members and SfN as an organization. The decision

with the greatest impact on members and SfN concerned the fate of the annual meeting. Over the course of an uncertain spring and summer, it became clear that the in-person meeting could not take place in Washington, D.C. SfN announced the cancellation of Neuroscience 2020 in early August.

In order to ensure continuity of SfN's programs and decision-making at a time of great financial constraint and, importantly, to oversee the execution of what was the Neuroscience 2020 program, Council and our Program Chairs have agreed to extend their terms of service by one year.

With lockdowns and social distancing requirements in place to contain the growth of COVID-19 cases for much of the year, virtual resources and approaches became more important than ever. Institutional Program members saw their benefits expanded to enable any trainee within their department access to unlimited content on Neuroonline, SfN's learning and discussion website. Neuroonline relaunched in 2019 with a new look, a History of SfN podcast, and additional content focused on supporting women and underrepresented minorities. For example, SfN organized an internationally well-attended Black Lives Matter webinar on Neuroonline in July, and a follow-up live chat in September, for Black panelists to speak about the challenges diverse neuroscientists face within the field.



## MESSAGE FROM THE PRESIDENT

## Sharing Neuroscience

Now in its eighth year, *BrainFacts.org* continues to deliver scientifically accurate and engaging information about the brain to the public. Built on founding support from SfN, The Kavli Foundation, and the Gatsby Charitable Foundation, the list of *BrainFacts.org* funding partners continues to grow with the addition of the Dana Foundation in 2020.

Also supporting the website are three new members of the editorial board: Charles Jennings, Sabine Kastner, and Kelley Remole. To appeal to new audiences, the types of content on *BrainFacts.org* continue to expand with the introduction of animations and ICYMI (In Case You Missed It) news roundups.

Sharing the value of neuroscience with policymakers has enabled favorable funding for the field. Both NIH and NSF received significant budget increases in FY 2020, as did the Veterans Affairs (VA) Medical and Prosthetic Research Program, which recently joined SfN's legislative portfolio. Beyond funding, several members of the U.S. Congress made public statements in support of the field. These successful outcomes were made possible in part by SfN's NeuroAdvocates, members who dedicate time to engage in the legislative process. Partnerships with other international societies like the International Brain Research Organization (IBRO), the Federation of European Neuroscience Societies (FENS), and the Canadian Association for Neuroscience (CAN) help extend advocacy initiatives in support of brain research across the world.

## Together Toward an Undefined Future

2020 will be remembered as an inflection point in human history. Many longstanding practices in our individual days and wider cultures have faded away – some possibly never to return. Many people in our lives – that perhaps we once took for granted – will be joyfully embraced when it is safe to do so.

As the world evolves toward its undefined future, I take great comfort in knowing how much we, as a society of neuroscientists, have collectively accomplished in these difficult times. Through our support for each other, we will emerge as a community more accessible, creative, and diverse than ever before.



**BARRY EVERITT**  
SfN president

# Neuroscience 2019 Celebrates 50 Years of SfN, Lowers Barriers to Access

A network of 27,832 attendees and 486 exhibitors from 75 countries assembled in Chicago for Neuroscience 2019.

## 50th Anniversary Encourages Reflection and Trailblazing

SfN celebrated the 50th anniversary of its founding in 2019, and Neuroscience 2019 hosted sessions reflecting on the Society's past, present, and future of neuroscience. The annual Celebration of Women in Neuroscience Luncheon featured a panel consisting of Huda Akil, Carol Mason, and Carla Shatz — each an accomplished female neuroscientist who also served as a past SfN president — that discussed the advancements women have made in the field over the last 50 years and what still needs to be done to increase gender equality.

A part of celebrating SfN's anniversary, and new to the annual meeting, was a digital art experience called Neuro Space. Designed by ARTECHOUSE and Refik Anadol, the specially crafted physical space projected the progress of visualizing a pyramidal neuron from Santiago Ramón Y Cajal's drawings to microscopic imaging. Overwhelmingly popular, a second digital art installation exploring the life of a human neuron will debut at the 50th annual meeting.

video here



## ADVANCING SCIENTIFIC EXCHANGE

**Promoting Accessibility and Respect**

SfN's annual meeting strives to welcome and be accessible to everyone. In 2019, several new and existing policies combined to make the meeting an inviting experience to the entire neuroscience community.

Travel restrictions prevented some neuroscientists from entering the U.S. The Science Knows No Borders (SKNB) program, introduced for Neuroscience 2019, offered a means for abstract authors denied a U.S. travel visa to present their research and engage with their colleagues at the meeting through poster, nanosymposium, symposium, and

“[The annual meeting] is a learning experience that you couldn't get anywhere else. It is the largest neuroscience conference in the world, and it is one of the best places to be if you're really looking at moving onto the next step for education.”

**CARRINA APPLING**, research assistant,  
California State University of Bakersfield

minisymposium sessions. SKNB participants with poster presentations provided their poster electronically to SfN, which then printed the poster. Volunteers hung the poster on its designated poster board amongst its peers. Participants with oral presentations provided their slides with audio narration, which was downloaded onto flash drives and provided, again by volunteers, to the moderator of the session to play at the designated time. The positive response from both participants and volunteers ensures that SKNB will continue as needed.

As the scientific culture shifts toward more open exchange of data, Neuroscience 2019 offered attendees the option to share their research with others under a [CC BY 4.0](#) international license. This Creative Commons license allowed attendees to photograph and record posters and presentations for later use or derivatization, provided the original authors give permission and are credited. Authors indicated their preference for or against sharing with clear iconography.

The Neuroscience 2019 mobile app delivered new features to help attendees navigate the meeting and connect with each other. Users could select a specific meeting room in McCormick Place Convention Center and receive walking directions. The in-app ability to create digital business cards allowed users to exchange information with other attendees and message them through the app.

## NEUROSCIENCE 2019

**27,832**  
ATTENDEES

**75**  
COUNTRIES

**486**  
EXHIBITORS

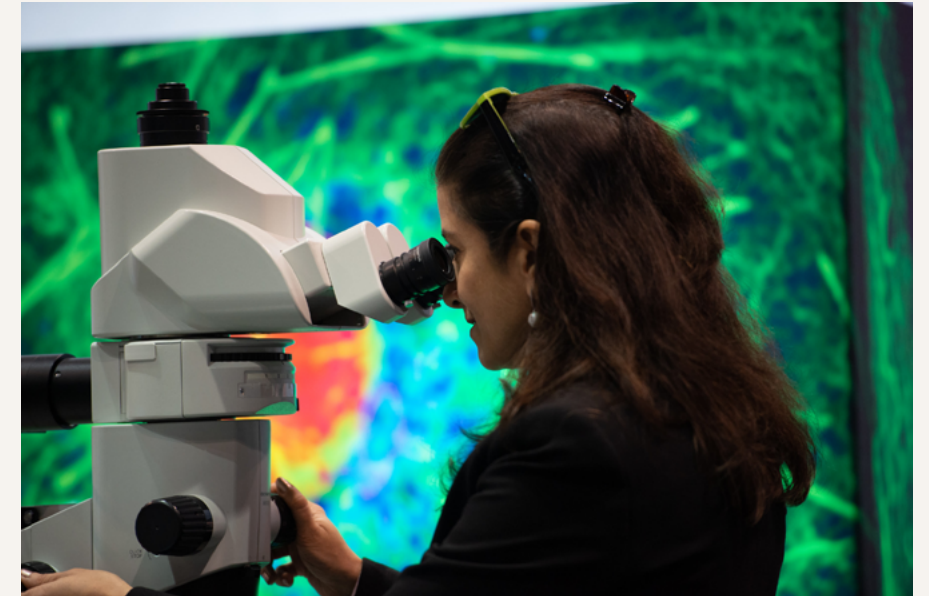
## ADVANCING SCIENTIFIC EXCHANGE

“My favorite part has been the poster presentations where I feel so good to see so many people of my own age and such a diverse group being so excited about what they’re doing. And it just motivates me to do more and not feel alone.”

**RAKESH NANJAPPA**, graduate student,  
State University of New York

Alongside these efforts to make Neuroscience 2019 more accessible to authors and attendees, SfN and its volunteer leadership worked to ensure the environment and culture at the annual meeting was respectful to all. SfN’s updated Code of Conduct labeled any racial, sexual, gender, or other harassing behaviors as unacceptable. To drive the message home, the policy was distributed to all attendees, displayed prominently in McCormick Place, and shared frequently on social media.

As part of SfN’s efforts to promote the inclusion of diverse communities within annual meeting programming, the next annual meeting’s program will be guided by a new Diversity and Inclusion Working Group of the Program Committee. The volunteer SfN members serving on the working group are charged to increase inclusion of diverse groups of people in annual meeting programming.



Nearly 500 exhibitors displayed the latest lab technologies in Neuroscience 2019’s Exhibit Hall.

### Press Coverage Brings Neuroscience to the World

Guided by the Public Education and Communication Committee, the press program for Neuroscience 2019 generated 11 press conferences featuring abstracts of interest to the general public. With 176 registered journalists and public information officers from 12 countries, the scientific program at Neuroscience 2019 received coverage in high-profile and international media outlets, including NPR, *The New York Post*, *Forbes*, *Elemental*, *The Guardian*, *Scientific American*, *Science News*, and *Science* magazine. Over 160 original English-language articles featured content from Neuroscience 2019.

The SKNB program received high-profile coverage, including a segment on the NPR radio program *All Things Considered* and substantial positive social media attention. Thanks to SfN’s new recording policy, the NPR story included audio interviews with poster floor presenters for the first time.



# SfN Journals: By Scientists, For Scientists

Throughout FY 2020, *JNeurosci* and *eNeuro* continuously published groundbreaking research in neuroscience while embracing innovation to provide a balanced, open, and rigorous publishing experience.

## New Editors, New Features

Run by scientists for scientists, the editorial boards for both journals strive to represent the breadth of the field. In FY 2020, *JNeurosci*'s editorial board welcomed six new reviewing editors: Farran Briggs, Jonah Chan, Anita Lüthi, Linda Overstreet-Wadiche, Kate Wassum, Ralph Nixon, and Aidan Horner. Gavan McNally replaced Paul Kenny as senior editor. *eNeuro* engaged 19 new reviewing editors.

This year, new features offer tools for researchers and celebrate the work of authors published throughout SfN's history. In September 2019, *eNeuro* introduced the Open Source Tools and Methods article type, providing detailed instructions for low-cost, plug-and-play tools and techniques. This novel format regularly provides readers a range of new tools for their research.

In its first non-mini Review article, *JNeurosci* surveyed the last two decades of SynGAP research and its multifactorial role regulating neuronal function. In January 2020, the

journal featured a special collection celebrating SfN's 50th anniversary. Including articles by established leaders in the field as well as early career researchers, the 50th Anniversary Collection looks back on five decades of development of both neuroscience and SfN. In 2021, *JNeurosci* celebrates its 40th anniversary of publishing high-quality neuroscience research. Special retrospective features will look back at the journal's history and the pivotal research it has published.

*JNeurosci* launched Annual Spotlights in early 2020: small yearly collections of research articles that best represent the strength and quality of *JNeurosci*'s offerings from the previous year.

## Meeting the Needs of Authors

Many authors find that shifting funding requirements and the need to amplify one's work complicate the publishing landscape. Responding to author input, *JNeurosci* and *eNeuro* streamlined the publishing experience, providing guidance to help authors reach their audience.

## ADVANCING SCIENTIFIC EXCHANGE

“...We knew that *eNeuro* is very highly regarded. I like that the journal is open access, and now I consider both *The Journal of Neuroscience* and *eNeuro* as Society journals for future publications.”

**SUPRATIM RAY**, associate professor,  
Centre for Neuroscience, Indian Institute  
of Science, India

In 2019, SfN simplified the submissions process for *JNeurosci*, allowing authors to submit a single PDF, including formatting from other journals. *JNeurosci* continues to address cost barriers. It has reduced or waived publication fees for authors in developing countries and removed submission fees in July 2020. These steps reflect SfN’s commitment to reducing barriers to access and increasing the inclusivity of the most cited and trusted journal in neuroscience.

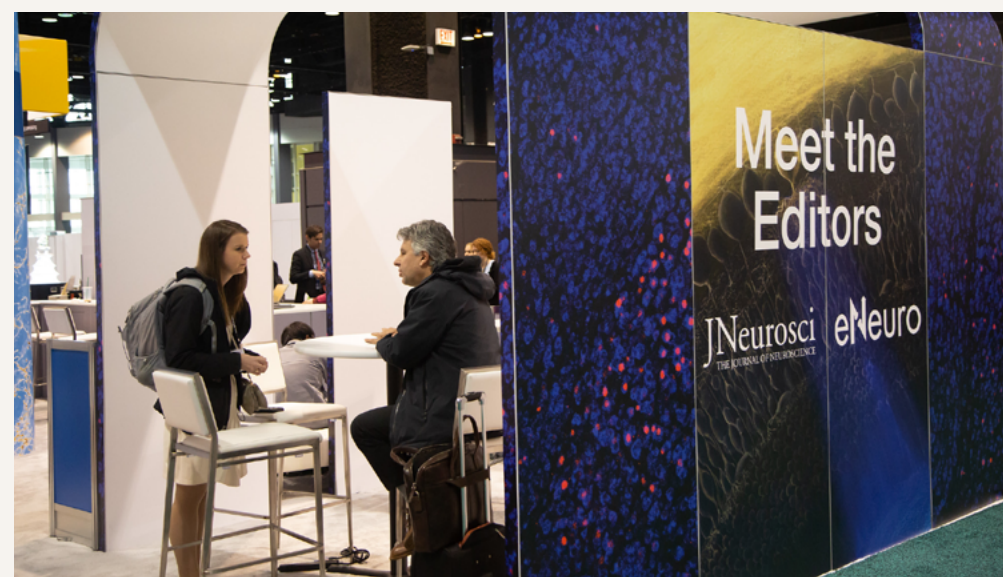
In 2020, *JNeurosci* made policy updates to allow authors to comply with Plan S, the international funder mandate for open access. Updates to the standard *JNeurosci* author license allow authors to deposit final, accepted manuscript files — including peer review revisions — into open access institutional repositories at any time. All articles are

published under a CC-BY license allowing for open reuse and sharing with attribution.

This support at all stages of publication continues to attract authors. In FY 2020, *JNeurosci* received 2,580 submissions, up 2% from the previous year, with an acceptance rate of 27%. *eNeuro* submissions increased 12% from 443 in FY 2019 to 496 in FY 2020, including 115 papers transferred from *JNeurosci*.

## Reaching New Audiences

Authors reach a wide audience publishing in SfN journals. In FY 2020, 5,186,847 and 508,844 visited *JNeurosci* and *eNeuro* online respectively. *JNeurosci* remains the most-cited neuroscience journal, with 167,114 citations, while





## ADVANCING SCIENTIFIC EXCHANGE

“For the first time in my 30-year career, I wrote the staff a thank-you letter saying that I have never had such a good review experience.”

**NANCY FORGER**, professor, Neuroscience Institute,  
Georgia State University

*eNeuro* continues to grow in readership, increasing by 32% over FY 2019.

The Society promotes new research to the press year-round. SfN’s Weekly Journal Highlights, emails highlighting the latest research published in both journals, have resulted in 391 news articles. The “Significant Neuroanatomical Variation Among Domestic Dog Breeds” paper by Hecht et al. was picked up by 159 news outlets since its publication in September 2019, earning the paper the highest Altmetric score for a *JNeurosci* manuscript to date.

In August 2019, SfN launched the Author Outreach initiative to help authors promote their research. SfN staff provide authors guidance on how to contact their institution’s communications staff, effectively leverage Twitter to share

their work with peers, and write lay summaries of their research for public consumption.

SfN’s journals encourage their sizable audience to promote author work through their websites and social media. *JNeurosci* and *eNeuro* have added Featured Research pages to their sites, promoting published research using author-written lay summaries. The *eNeuro* blog has grown to 11,879 readers in FY 2020, featuring short overviews of papers, lists of most-shared papers, researcher interviews, and the new “Snapshots in Neuroscience” series, featuring artwork from authors. The SfN journals’ Twitter account (@SfNJournals) directed over 8,000 followers to *eNeuro* and *JNeurosci* in the past year.

167,114  
CITATIONS

With 167,114 citations, *JNeurosci* remains the most-cited journal dedicated to the study of the brain and nervous system.

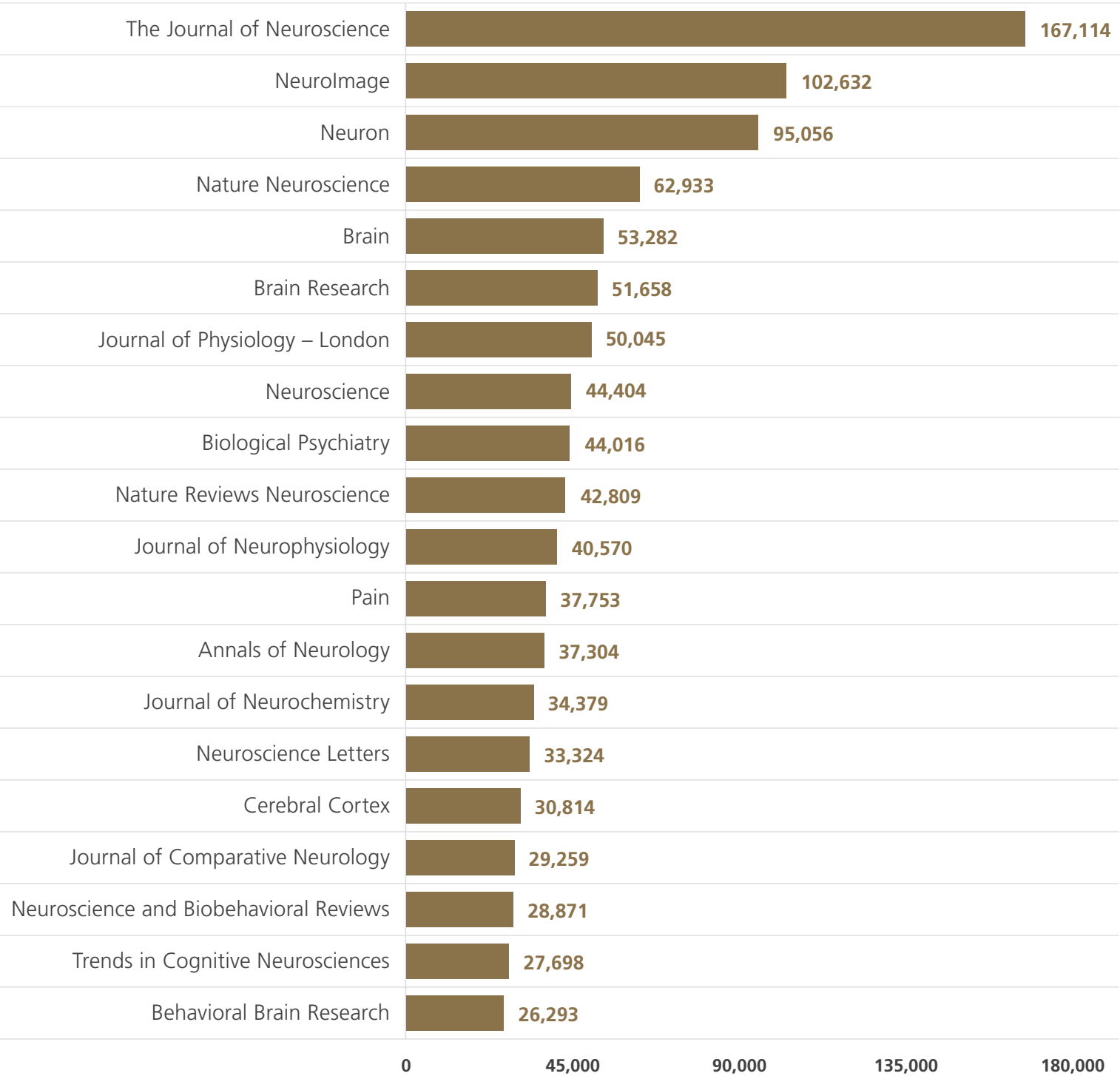
ADVANCING SCIENTIFIC EXCHANGE

Improving Rigor

SfN journals’ leadership are addressing the ongoing issue of scientific rigor. In August 2019, *eNeuro* launched a new initiative encouraging authors to add estimation statistics to their analyses when appropriate. Editor-in-Chief Christophe Bernard collaborated with SfN’s Foundations of Rigorous Neuroscience Research program, a National Institute of Neurological Disorders and Stroke (NINDS)-funded initiative to enhance the rigor and reproducibility of research. This effort led to a webinar discussing the importance of analyses in experimental design. *JNeurosci* Editor-in-Chief Marina Picciotto and the journal’s editorial board published a series of editorials focused on robust experimental design. Together, these efforts help maintain the community’s trust in the published content of the Society’s journals.

In a rapidly changing world, high-quality, accessible science is invaluable. As the neuroscience community embraces the future, *JNeurosci* and *eNeuro* remain dedicated to providing a home for the diverse research advancing the field.

Neuroscience Journals Total Citations in 2019





# Pain Pathways Guide Researchers Toward a Safer Morphine

Researchers seek to stop pain in its tracks.

Lurking in the shadows of the coronavirus pandemic, an unrelenting epidemic of opioid addiction rages on, fueled in no small part by a plentiful supply of illicit, powerful, and highly addictive synthetic opioids. The American Medical Association warned in May 2020 that the COVID-19 pandemic was driving overdoses as people couldn't get the treatment they needed to overcome addiction. Underlying this tragedy is the fact that medicine currently lacks the tools to ameliorate pain without the risk of addiction.

As scientists work to develop new effective, non-addictive therapies, they are focusing on the basic biological pathways that allow our bodies to sense pain. At the beginning, feeling pain relies on a set of proteins embedded in the cell membrane that open and close to control the rush of calcium into nerve cells. In fact, all our movements, thoughts, senses, and memories, our heartbeats, and our ability to speak, depend upon the function of these protein gates to propel signals through the neuron and trigger the release of neurotransmitters and pass the signal along to other neurons. Diane Lipscombe, a neuroscientist at Brown University, has

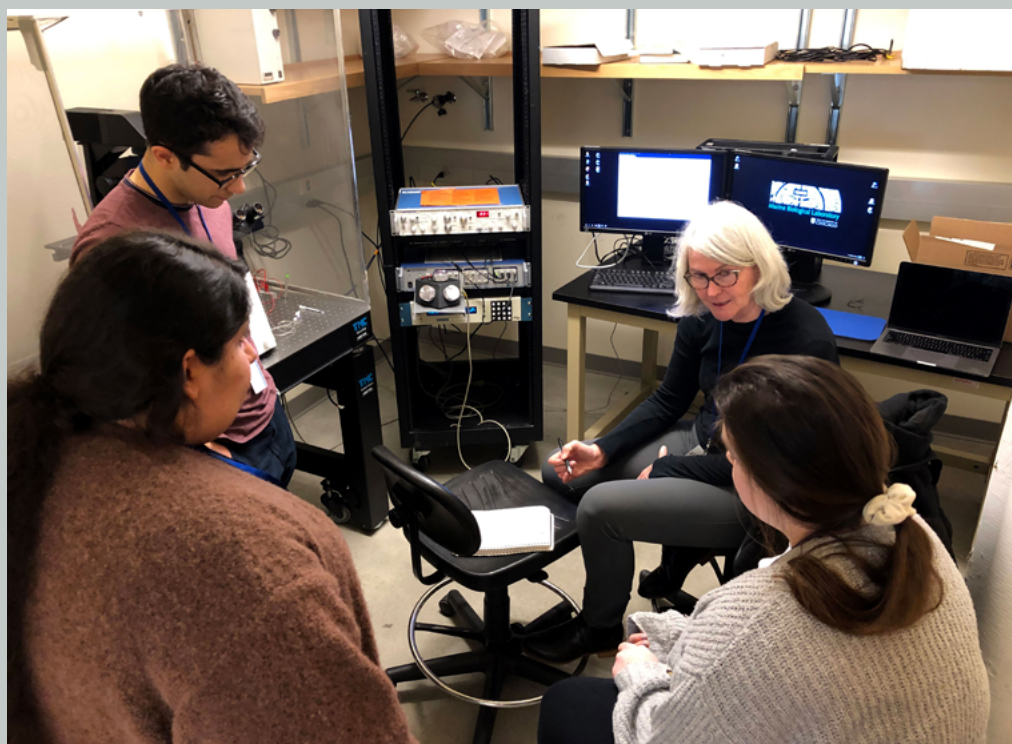
devoted decades to teasing apart the myriad forms of these protein gates called calcium ion channels and exploring how they define a neuron's activity.

"Calcium ion channels are at the beginning of the formation of signals in the nervous system," says Lipscombe, the Society for Neuroscience's past president, who has homed in on a particular type of calcium ion channels, the N-type voltage-gated calcium channels 2.2 and referred to in brief as the 2.2 channels, because this sub-type predominates in the nerve terminals of pain-sensing neurons.

"In [pain receptors], we have identified a unique form of the 2.2 channel, and it has properties that just make sense," she says. This type of channel is particularly responsive to opioids, for instance. "The calcium ion pathways across cells are therefore important sites for new drug development."

Since antiquity, we've relied on the blunt tool of opioids to quell pain. Morphine, and all opioids, work in part by stopping 2.2 channels from opening. They successfully silence pain

## \* SCIENCE IN PROGRESS



In her Brown University lab, Diane Lipscombe (second from right) explores calcium ion channel signaling with her team.

receptors but also cause addiction. A chronic pain medication called Prialt offers an analogous trade-off. It can interfere with pain-relaying calcium channels in the spinal cord but only if we accept an increased risk for hallucinations and confusion. An ideal pain therapy would shutter only the calcium ion channels in the body's pain network without affecting those responsible for everything else.

"What you probably want to go for is something that's somewhat preferential so it is effective at inhibiting pain signaling without shutting down the rest of the brain," says Bruce Bean, a neurobiologist at Harvard.

That's where Lipscombe's work cataloging the enormous diversity of calcium ion channels comes in. Every 2.2 channel

springs from identical genetic information housed in our DNA. Hundreds to potentially thousands of forms of this channel may exist in mammalian nervous systems. Each arising from cellular machinery knitting together that genetic information in a subtly different way.

It's a strategy employed across the nervous system during neuronal differentiation, maturation, synapse formation, and more. Lipscombe suspects ensembles of specialized calcium ion channels may differ by brain area, with cerebellum channels tending to act a bit different from thalamus channels, for instance.

This is possible because of the way genetic information directs the production of proteins in our cells. DNA acts as



## \* SCIENCE IN PROGRESS

a set of biological blueprints. In order to create the proteins, which do most of the work in the cell, the instructions held in the DNA double helix are transcribed into an RNA copy — a single strand of genetic information. From there, the cellular machinery reads the transcribed information, translates it, and assembles proteins.

This seemingly straightforward process contains a wrinkle known as alternative RNA splicing. The instructions for making many proteins don't reside in one continuous string of DNA. Instead, coding regions of DNA called exons are interspersed with non-coding regions called introns. During the production of the RNA copy, or messenger RNA, the cell removes introns and splices the exons together to create a template for producing the proteins. Subtle variations in the way exons are spliced together can dictate how the proteins work.

This is notably true for the 2.2 channels involved in pain that Lipscombe studies. Her team recently discovered how the mechanism of alternative RNA splicing plays a role in the chronic pain pathology associated with peripheral nerve injury.

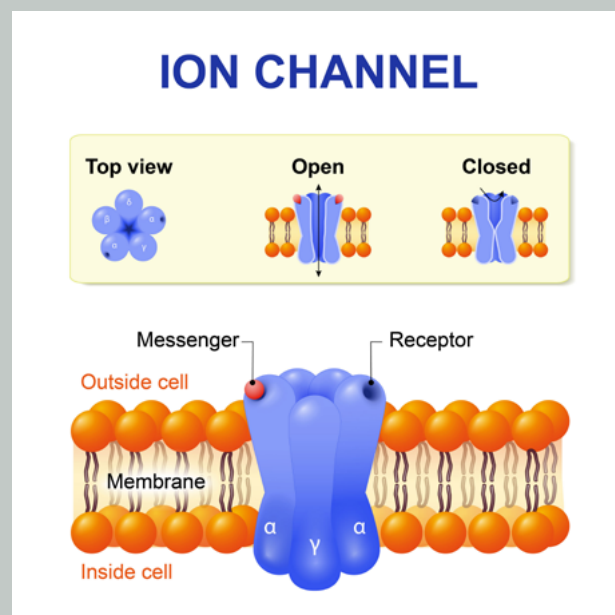
The team focused on the gene encoding a protein that is the functional core of the 2.2 channel called *Cacna 1b*. In pain-sensing neurons called nociceptors, one way of splicing

together this genetic information gives rise to a 2.2 channel known as e37a, which enhances the pain-relieving activity of morphine. Combined in another way results in a channel known as e37b, which is less capable at quelling pain in response to morphine. What's more, somehow following a nerve injury, the nociceptor ramps up production of the e37b form of the channel, reducing the ability of morphine to relieve pain.

The team scoured publicly available databases looking for proteins capable of binding either DNA or messenger RNA at the point where the instructions drive the production of either morphine-sensitive e37a or morphine-resistant e37b. What they found was an abundant and ubiquitous protein that binds DNA. This protein is responsible for regulating how genes are expressed. It works basically by identifying small stretches of DNA sequences, binding to that DNA, and helping those regions stay open and available for the cellular machinery to get to work producing RNA and making protein.

The entire process of protein production can be ramped down or even silenced if the DNA is tagged with a molecule comprised of a carbon atom and three hydrogen atoms, known as a methyl group, that acts like a stop sign. Lipscombe and her team found that the morphine-sensitive e37a form

## \* SCIENCE IN PROGRESS



Ion channels act as gates, opening to pass a signal across a membrane in response to a specific messenger.

predominated in nociceptor neurons when the associated DNA lacked methyl groups. However, when the e37a region of DNA included these methyl group stop signs, the e37b form appeared.

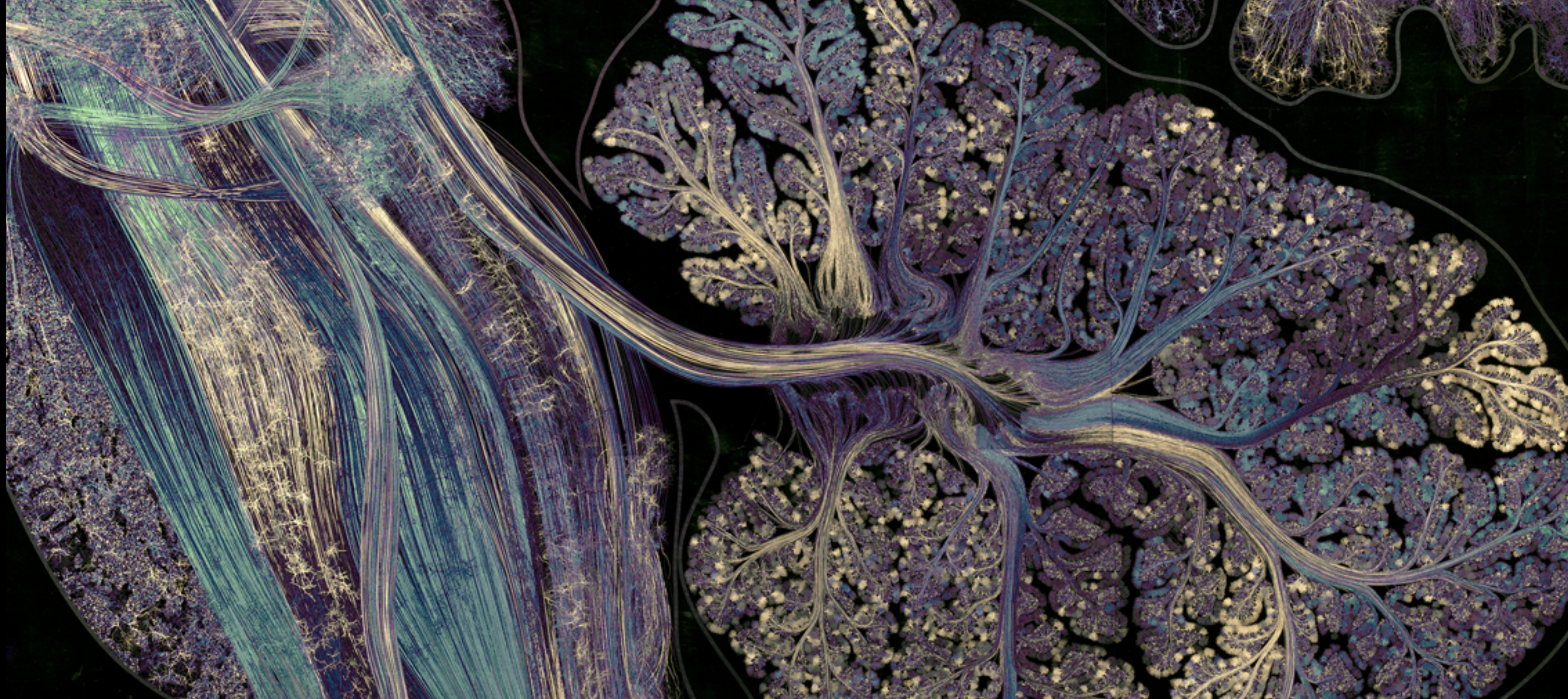
In a mouse model of nerve injury, the researchers discovered that while the e37a DNA started out unmethylated, over time the region was tagged with methyl groups, which stymied production of the e37a form and bolstered the production of the morphine-resistant e37b form. This mechanism could be at the root of neuropathic pain — pain caused by nerve injury.

Lipscombe suggests that a deeper understanding of how methylation patterns produce different calcium ion channels could someday lead to the development of more targeted pain killers. Such a compound could feature fewer, less severe side effects, such as intense addiction.

“It’s a novel direction,” Bean says. “It’s not anything that anyone would have thought about until her work started on this.” However, Bean maintains Lipscombe’s work is important beyond any drug development because it shows how complex ion channels can be.

Lipscombe agrees that exploring basic science has benefits outside the immediate development of new drugs. Just as geneticists cracked the code of how DNA serves as a blueprint, she hopes to continue drilling down into how the methylation drives identical genetic blueprints to develop site-specific variations. “If we can get at the code, then we can start to make predictions” about what kind of channel might get produced in a specific region of the nervous system, opening a new world of possibilities.





“Celebrating 50 years of discoveries at Neuroscience 2019 was a marvelous experience. Progress has been stunning – and the next generation ensures that the best is yet to come.”

DIANE LIPSCOMBE, SfN past president



# An Ever-Present Foundation for Neuroscientists

As the key venue for the global neuroscience community, SfN supports over 36,000 neuroscientists around the globe in their scientific and professional development.

## Rigorous Neuroscience

The Society supports the work of its members at every career stage to produce rigorous, reproducible neuroscience. Through a three-year grant awarded by the National Institute of Neurological Disorders and Stroke (NINDS), SfN has developed the Foundations of Rigorous Neuroscience Research (FRN) program, which provides resources to promote the conduct of rigorous research including appropriate laboratory practices and professional activities. FRN builds upon an earlier three-year, National Institute on Drug Abuse-funded program titled Training Modules to Enhance Data Reproducibility, which also supported the creation of numerous training resources.

Maintaining high standards of rigor is a community-wide responsibility and grant co-PIs Oswald Steward and Lique Coolen and the Neuroscience Training Committee reached out to the community through a survey to weigh in on important topics and submit suggestions for speakers. SfN's

Neuroscience community provided additional opportunities for members to weigh in, as did a live online chat with the co-PIs. Based on that feedback, the co-PIs authored an article outlining the goals of the program. Neuroscience 2019 featured a professional development workshop to address collaborative and team science contributions in the academic hiring and tenure processes. SfN unveiled a collection of FRN-related online resources that will include additional expert perspectives and resources over the first three years of programming.

## Digital Professional Development and Scientific Training

Neuroscience, SfN's platform for year-round digital learning and discussion, relaunched in the fall of 2019. The new site facilitates navigation and features a podcast format, developed to celebrate SfN's 50th anniversary. Titled History of SfN: 50th Anniversary, the podcast series highlights interviews with current, past, and future SfN leaders

## SUPPORTING THE NEUROSCIENCE COMMUNITY

“I think that if you’re interested in joining a larger community and getting information that can draw on different, diverse experiences within neuroscience... Neuronline is the perfect place to do that.”

**CHARLES YOKOYAMA**, executive director, International Research Center for Neurointelligence, University of Tokyo, Japan

discussing groundbreaking moments in the Society’s growth. A new interview series, Entrepreneurial Women Combining Neuroscience, Engineering, and Tech, identified four female neuroscientists who have succeeded in the combined fields of neuroscience, engineering, and technology — a historically male-dominated area of research.

SfN’s effort to provide year-round scientific training and professional development resulted in three virtual conferences in FY 2020. September 2019 featured “Next Generation Human Disease Models in Neuroscience,” exploring how leaders in the field are using cellular reprogramming methods to understand the genetic, molecular, and cellular underpinnings of neurological disorders. In January 2020, the professional development virtual conference “Power Dynamics in Training and Research Environments: Strategies for Success” explored power dynamics and provided strategies for fostering a positive

work culture. The April 2020 virtual conference “Epigenetics in Neurobiology” introduced major concepts in the field and discussed new research findings. Accompanying scientific training virtual conferences were lightning talks, five-minute videos summarizing the models, methods, and research performed in each speaker’s lab.

In partnership with the Federation of European Neuroscience Societies (FENS), Neuronline hosted the article Postdocs Share: Moving from Europe to the United States to help both societies’ members successfully navigate a common professional — and personal — transition. FENS also hosted the Neuronline webinar, Toward Novel Therapies in Psychiatry: Zooming into Brain-Periphery, Dysfunction & Crosstalk, to discuss the connection between neuronal circuits and underlying psychiatric disorders. FENS members continue to have special access to FENS-created content hosted on Neuronline.

## SUPPORTING THE NEUROSCIENCE COMMUNITY

“I think SfN will always be a cornerstone of the neuroscience community.”

**SARAH CLARK**, instructor, University of Maryland School of Medicine

### Trainee Opportunities

A record number of applicants from 45 countries competed for the Trainee Professional Development Award (TPDA), which offers outstanding graduate and undergraduate students and postdoctoral fellows complimentary registration and a travel stipend to attend the SfN annual meeting. Neuroscience 2019 saw 192 TPDA recipients, who not only presented abstracts at the meeting but also benefitted from access to year-long professional development and specialized learning opportunities on Neuronline.

These awards were made possible by contributions from SfN Council, donations from individual SfN members to the Friends of SfN Fund, and grants and contributions from the Burroughs Wellcome Fund, Novartis, Sanofi, and the Nancy Rutledge Zahniser Fund.

With funding from NINDS Office of Programs to Enhance Neuroscience Workforce Diversity, led by Chief Michelle Jones-London (second from right), NSP Co-Directors Julio Ramirez and Gina Poe (far right) led the NSP Leadership Conference in 2019 facilitated by SfN staff member Ava Onalaja (left).



The new Leadership Development Program (LDP) assembled its first cohort at Neuroscience 2019, kicking off a two-year pilot exploring a year-long professional development experience for trainees. With financial support from SfN and the Dana Foundation, 15 of the top graduate student and postdoctoral fellow TPDA recipients were selected as trainees. LDP members gathered in February 2020 at SfN headquarters in Washington, D.C., for a three-day workshop focused on teamwork, inclusion, leadership, and strategic thinking.

The two-year online Neuroscience Scholars Program (NSP) once again expanded its programmatic offerings for underrepresented graduate students and postdoctoral researchers with a second summer leadership conference in Washington, D.C., in 2019. This in-person gathering provided



## SUPPORTING THE NEUROSCIENCE COMMUNITY

two days of programming featuring leadership foundations, personal and scientific promotions, and grant writing skills, while creating additional opportunities for professional development, networking, and community building. NSP scholars also enjoyed a new platform to connect with each other via a Neuronline community tailored specifically for the program. The NSP is supported by a five-year grant to SfN from the National Institute of Neurological Disorders and Stroke (NINDS).

In response to lab closures resulting from the COVID-19 pandemic, SfN's Institutional Program (IP) expanded benefits for its members. Any trainee associated with an IP member program received unlimited access to articles, videos, and webinars on Neuronline. Access to the library of resources helps to ensure trainees could continue their training and professional development even while prevented from working in the lab.

Active in over 20 countries, SfN chapters connect their local neuroscience communities to the general public. The SfN 50th Anniversary Chapter Video Challenge asking “why is brain science so important?” saw the Michigan Chapter win the contest, which was judged by recent Brain Bee participants. SfN chapters expanded in 2019 with the approvals of chapters in Afrabia; Kingston, Jamaica; Rio Grande Valley; and Sun City, AZ.



Over 100 programs presented at Neuroscience 2019's Graduate School Fair, giving early career scientists a chance to connect with institutions.

# The Discovery That Led to the First Specific Treatment for Postpartum Depression

Basic research in mice turned into a “Eureka!” moment in the lab of Jamie Maguire.

Jamie Maguire in a way stumbled onto the origins of pregnancy-related depression while investigating a type of epilepsy in the mid-2000s. As part of a UCLA team overseen by neuroscientist Istvan Mody, she and her colleagues were studying a strain of mice with certain impaired receptors that would have otherwise helped balance the brain at just the right level of activity. As they bred the mice, the team ran into trouble. After giving birth, the mouse mothers neglected and cannibalized their offspring — in mice, that’s a sign of despondent and dysfunctional behavior that may indicate relevance to human depression.

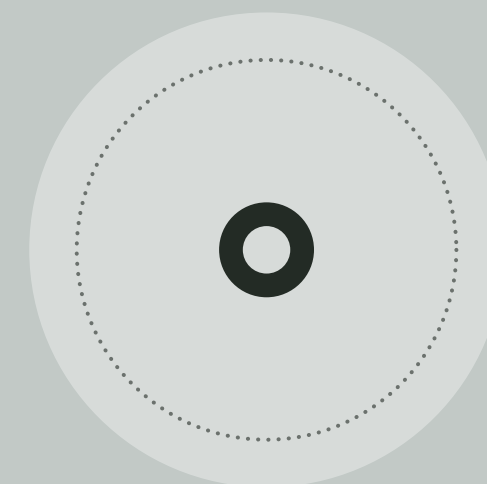
Pregnancy is a time of great change and little is known about how the brain shifts as a result. We know that 80% of women report some version of the “baby blues” during early motherhood. But for some 10 to 20% of these women, those mood changes become an acute and all-encompassing sadness known as postpartum or peripartum depression. The

troubled mice launched experiments that helped Maguire triangulate depression, stress, and pregnancy, leading to the first FDA approved treatment for postpartum depression.

“A lot of times on the basic science side, you work your whole life on something and never see it go into the clinic. It’s been incredible,” Maguire says, “to hear these stories about patients getting better.”

The observations about the melancholic mouse mothers focused Maguire’s attention on what set these animals apart: by design, certain receptors in their brains called GABA type A, which keep some neurons from firing too often, didn’t work. Messing with this “inhibition” contributes to the overfiring of epileptic seizures, as the group [reported in 2005](#). In Mody’s lab, the GABA(A)-less mice generally acted normal until giving birth, then they experienced bouts of extreme stress. Later experiments conducted after Maguire established

100%



80%

Women who report some version of the “baby blues” during early motherhood

10-20%

New mothers who experience an acute sadness known as postpartum or peripartum depression

## \* SCIENCE IN PROGRESS

her lab at Tufts University in 2010 showed that disabling another critical player in the GABA system — a protein transporter called potassium-chloride cotransporter 2 (KCC2) — produced similarly stressed-out mother mice.

Maguire now believes pregnancy puts the brain in a precarious position. It ramps up the production of neurosteroid chemicals, which encourage the calming effects of the GABA system and limit stress by making a circuit known as the hypothalamic–pituitary–adrenal axis, or HPA axis, less responsive. At the same time, however, the number of GABA(A) receptors plummets to keep the brain from growing too lethargic. Keeping stress in check requires the brain to carefully balance neurosteroid production with the number of GABA(A) receptors.



Immediately after a mouse mother gives birth, neurosteroid levels plummet. Maguire’s mice, with their disrupted GABA(A) receptors, couldn’t compensate for this upset balance and grew overwhelmed. Similar events may leave humans in a more fragile state too. “A delay in recovery or failure to recover those [GABA(A)] receptors could create this period of vulnerability,” Maguire says.

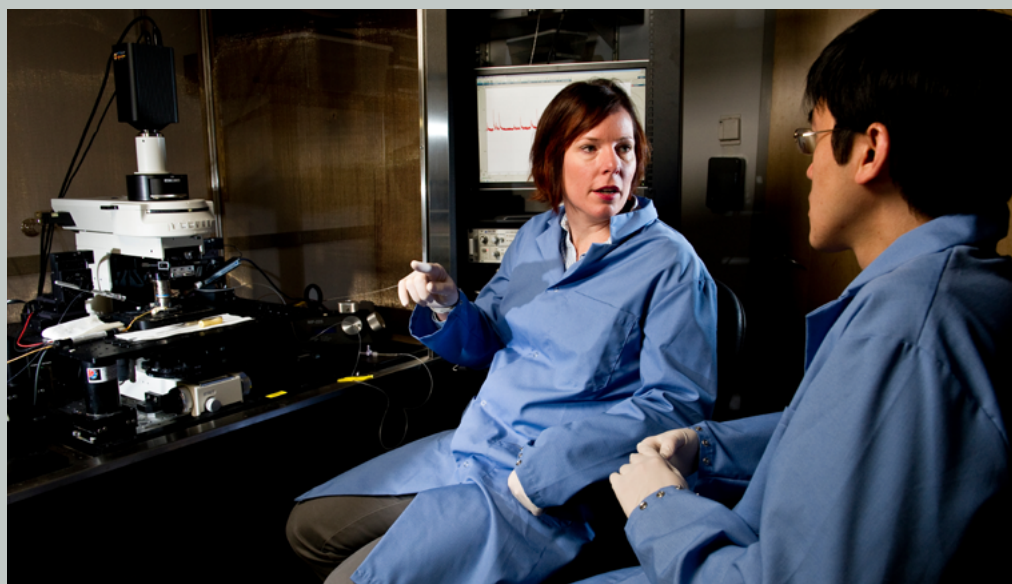
Clinical trials backed up her theory. A company called Sage Therapeutics saw Maguire’s work in mice and ported it to humans: developing an intravenous injection to increase neurosteroid — allopregnanolone, possibly restoring neural balance and giving the mother’s brain more time to fire up her GABA system.

Results were dramatic. Self-reported symptoms of depression fell by nearly 70%, according to a Sage Pharmaceutical funded study published in 2017, while depression symptoms in a placebo group lessened by about 50%.

The FDA approved the medication, Zulresso (brexanolone), in 2019, making it the first treatment targeting postpartum depression. Doctors have long prescribed standard medications, but — perhaps because postpartum depression has its own unique cause — effectiveness varies. And where most treatments take weeks to lift a patient’s spirits, an infusion of allopregnanolone works in days.



## \* SCIENCE IN PROGRESS



Jamie Maguire's research into postpartum depression resulted in the first drug targeting the condition.

For Maguire, who serves on the company's scientific advisory board, hearing firsthand reports of how her lab research has led directly to swift improvements for patients is especially meaningful. "They say it's like night and day," she says. "People talked about it and I was getting chills."

Other neuroscience researchers in maternal mental health cheer the fruits of Maguire's lab work. "You see huge reductions in depressive symptoms," says Liisa Galea, a neuroendocrinologist at the University of British Columbia. "It's really quite amazing."

Galea calls pregnancy a "perfect storm" for depression, when neural changes conspire with a phase of life that brings great joy, but much stress as well. The fact that merely bringing women into the hospital for even Zulresso's placebo treatments helped so much is telling, she suggests, and wonders whether society could help head off depression early by paying more attention to the person after their pregnancy.

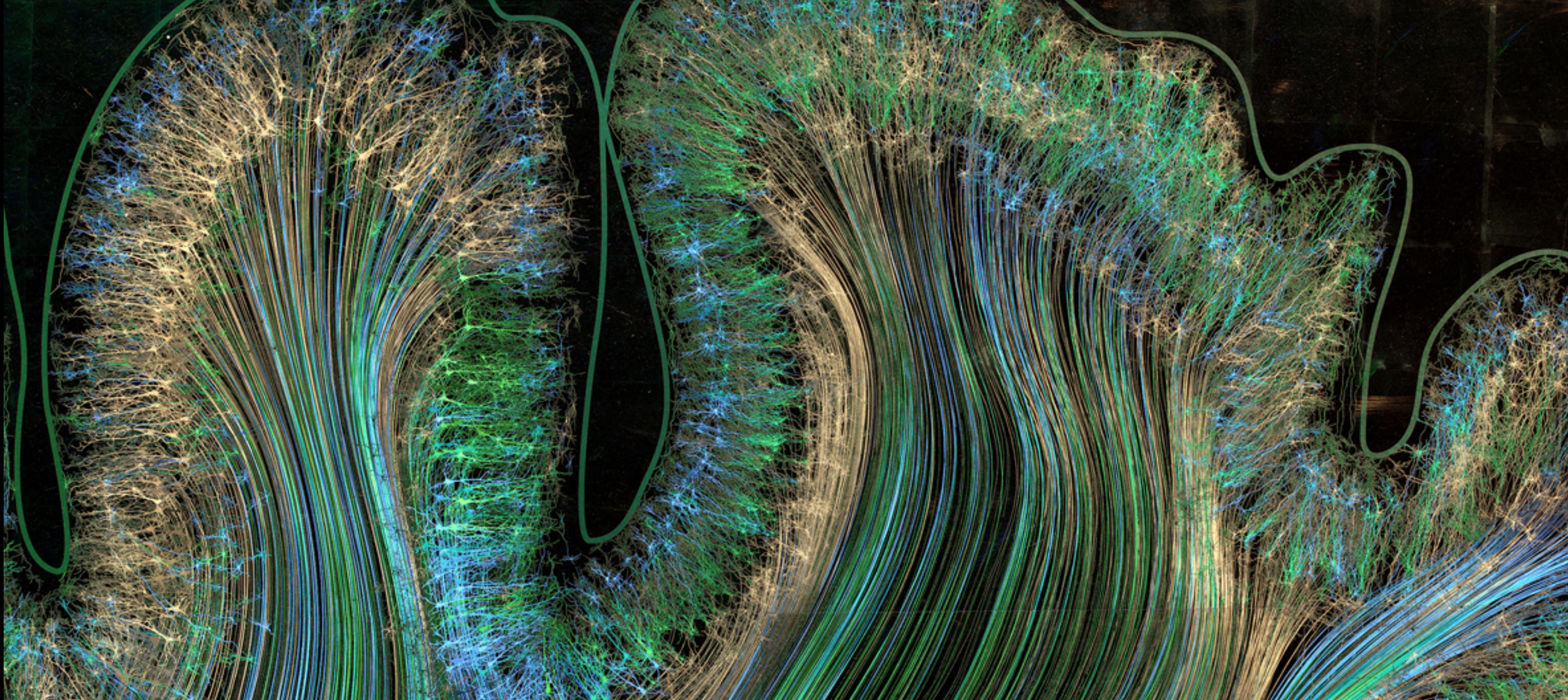
Jodi Pawluski, a neuroscientist at the University of Rennes in France, sees Zulresso as an exciting treatment option for postpartum depression. She praises Maguire for pulling off such influential research without support from major federal funding agencies, emphasizing that neuroscience of maternal mental health is a severely underfunded field.

Now Maguire is taking the bedside medication back into the lab, this time to study depression in general. The treatment disappears from the body in days, but its protection lasts for weeks — a hint that it somehow creates an enduring neural stability. "We have a really nice, clinically effective tool that works very fast," she says. But, "what does that tell us about the underlying neurobiology of depression?" While Maguire understands better than most how postpartum depression differs from standard depression, she hopes that the disorders' similarities could lead to breakthroughs helping those suffering from either one.

70%

In postpartum women receiving an intravenous injection to replace the missing neurosteroid, self-reported symptoms of depression fell by nearly 70 percent





“This year and its required social distancing has made clear how our personal connections and professional communities strengthen us every day. I hope gathering for SfN Connectome and Neuroscience 2021 will restore and enthuse us all.”

BARRY EVERITT, SfN president



## EDUCATING AND ENGAGING THE PUBLIC

# Offering Trustworthy Neuroscience to the Public

In a world awash in information, *BrainFacts.org* strives to be the trusted source of accurate and compelling content about the brain. Since its founding in 2012, *BrainFacts.org*'s growing audience and list of partners have demonstrated its value.

## New Leaders and Partners

*BrainFacts.org* owes its scientific accuracy to the prominent neuroscientists who serve on its editorial board. Three new members joined in 2019 offering their diverse backgrounds and experiences to *BrainFacts.org*: Charles Jennings, executive director of the Romney Center for Neurologic Diseases and Program for Interdisciplinary Neuroscience at Brigham and Women's Hospital; Kelley Remole, senior director of programs at Columbia University's Zuckerman Institute; and Sabine Kastner, professor of psychology and neuroscience at the Princeton Neuroscience Institute at Princeton University. They join Editor-in-Chief Richard Wingate, Associate Editor Charles Yokoyama, and others in guiding the site as it produces scientifically valid and engaging content in a world where the desire and need for accurate science news is greater than ever.



Outreach events give students and the public a chance to interact with neuroscientists eager to share their passion for the brain.



## EDUCATING AND ENGAGING THE PUBLIC

With initial support from founding partners The Kavli Foundation and the Gatsby Charitable Foundation, SfN launched *BrainFacts.org* eight years ago. Following a site redesign and relaunch in 2017, the founding partners have remained steadfast in their support. Other organizations joined the *BrainFacts.org* effort with strategic grants. The Lundbeck Foundation is in the middle of a five-year grant supporting core funding to *BrainFacts.org*. The Stanley Center for Psychiatric Research supported three years of mental health content. This year, the Dana Foundation became the newest funder to support *BrainFacts.org* with a three-year core funding grant.

“When you do outreach, you’ll be contented with the fact that you are helping to make the world a better place by educating your community about how to keep a healthy brain.”

**POLYCARP UMUNNA NWOHA**, lecturer, Department of Anatomy and Cell Biology at Obafemi Awolowo University and president of SfN’s Owerri, Nigeria Chapter

### Website Draws Growing Users, Social Media Following

Since its launch, 12 million users have interacted with *BrainFacts.org*, with nearly half residing outside the U.S. Visitors to the site engage with multiple content formats, the list of which continues to expand. Cognitive research tells us that humans absorb information best through stories. As such, *BrainFacts.org* employs narrative across all content formats from animations such as [Why You Get Brain Freeze](#) to Image of the Week items. In celebration of SfN’s 50th anniversary, *BrainFacts.org* launched a new content series of “Brain Bytes,” which showcase essential facts about neuroscience. Also new this year are “Patient Diagnosis” quizzes designed to test knowledge garnered from the *Brain Facts* book and ICYMI (In Case You Missed It) news roundups.

Robust social media promotion feeds new users to *BrainFacts.org*. Facebook followers have climbed to over 43,000, while Twitter connects with over 38,000 followers. The website’s Instagram account is also attracting a growing audience.

### Evolving the Brain Bee and Neuroscience Outreach

SfN also brings neuroscience activities to in-person events. By hosting booths at educator conferences like the National Association of Biology Teachers, SfN can introduce key audiences to the wealth of classroom activities and teaching techniques available on *BrainFacts.org*.

## EDUCATING AND ENGAGING THE PUBLIC

“It’s so important for the broader neuroscience community to come together under the umbrella of Brain Awareness Week – to elevate neuroscience in the public sphere, giving more people more ways to engage, year after year.”

**KELLEY REMOLE**, senior director of programs,  
Mortimer B. Zuckerman Mind Brain Behavior Institute, NY

Since 2018, SfN has served as a governing partner for the International Brain Bee (IBB), a competition for secondary students from around the world to display their neuroscience knowledge. With questions derived from the *Brain Facts* book, competing at the IBB is the ultimate goal for students competing in regional and national Brain Bees. In FY 2020, SfN hosted the D.C. Regional Brain Bee. With the assistance of 29 local neuroscientists, 30 students, including two hearing-impaired students, competed for the honor to represent the D.C. region in the U.S. Brain Bee. Unfortunately, due to the coronavirus pandemic, both the U.S. Brain Bee and the International Brain Bee were cancelled or postponed, as were major outreach events including the USA Science and Engineering Festival.

The third week in March brought Brain Awareness Week (BAW). The brainchild of the Dana Foundation, BAW encourages neuroscientists from around the world to bring

hands-on demonstrations into diverse communities around their institutions. SfN hosted a webinar on *BrainFacts.org* titled The Artistic Brain: A Neuroaesthetics Approach to Health, Well-being, and Learning. As the pandemic drove the cancellation of many in-person BAW events, the webinar saw record-breaking attendance.

The annual Brain Awareness Video Contest offers an opportunity for neuroscience enthusiasts around the world to share their passion with the public. With an SfN-member sponsor, contest entrants submit an educational video about the brain and nervous system using creative formats like songs, skits, and animations. The 2019 first place video discussed multitasking and the region of the brain that enables it. The “people’s choice” winner, being the submission with the most likes at the close of the contest, was titled Why do adolescents go to sleep late?.

Scientists of all career stages, including those from the student group NWNoggin (pictured), shared their outreach achievements at Neuroscience 2019’s Brain Awareness Campaign Event.



# Taking a Human-Centered Approach to Artificial Intelligence

Concern for humanity guides Fei Fei Li's human-centered approach to AI.

The memory still makes Fei Fei Li smile: a group of high school girls, all from underrepresented populations, braiding each other's hair and chatting about deep learning neural networks. The girls were participants in AI4ALL, a program Li created to introduce young people to the field of artificial intelligence.

"It was just so human, and so beautiful," Li told her audience during the Dialogues Between Neuroscience and Society Lecture at Neuroscience 2019 in Chicago. She designed AI4ALL for future leaders in AI who might not have access to such an experience. "This technology is going to impact humanity's future and everybody at the steering wheel looked the same."

Concern for humanity guides Li's human-centered approach to AI. Three principles comprise her vision for the future of the field: AI should be developed with a focus on human impact, AI should augment and enhance humanity, and AI should be inspired by human intelligence.

Li has been a driving force in AI since she developed ImageNet, a database of 14 million annotated images used by researchers around the globe to train visual object recognition software. Its images are divided into categories like "amphibian," "food," "flower," or "geological formation."

"You show the algorithm a bunch of training data with labels — pictures of cats or dogs or chairs — and then the algorithm learns to match the pattern it sees with the label it's given," Li explained. The more information the database contained, the better the algorithm could recognize and identify images. According to Li, the idea was to "reboot the thinking of computer vision and machine learning using big data to drive the learning of object categories."

ImageNet's success lay with its yearly challenge. From 2010 to 2017, researchers around the world pitted their best algorithms against ImageNet to determine which could recognize 1,000 different everyday objects with better accuracy. The competition got interesting in 2012 when Geoffrey Hinton and



## \* SCIENCE IN PROGRESS



Fei Fei Li explains her human-centered approach to AI in front of the SfN membership at Neuroscience 2019.

his students won using an old family of algorithms known as convolutional neural networks.

“That result brought the classification error down in a surprisingly significant way,” Li recalled. “Since then, the results have steadily improved.”

Convolutional neural networks sparked a boom in the field. Since then, AI has worked its way out of the lab and into society. “It has not only entered daily life but also is driving the fourth Industrial Revolution,” Li noted. Knowing it will — and already does — have a big effect on humanity, Li turned her attention to human-centered AI and the three principles informing it.

Li’s first principle holds that AI should be developed with a focus on the human impact. In keeping with that principle, Li is reevaluating algorithms and eliminating machine-learning bias. While designing or training a program, humans may introduce unintended biases or prejudices. That can cause the algorithm to produce systematically prejudiced results.

Li’s team is reviewing ImageNet’s data for machine-learning biases, specifically in the people categories. Recently, they identified offensive categories like racial or sexual characterizations and proposed removing them from the database. Li also pointed to researchers re-examining law enforcement data to make the decision-making part of the AI system fairer. “We can use machine learning to turn a document of law enforcement that carries race information

## \* SCIENCE IN PROGRESS

through names, addresses, zip codes, and hair color, into a race blind document,” she explained.

Many people fear AI’s seeming power to one day take over the workforce or eliminate privacy. That’s where Li’s second principle comes in: AI must augment and enhance society. People can benefit from the way AI is deployed, for example by improving the limitations of the healthcare system.

Every year in the United States, more than 90,000 people die from hospital-acquired infections. Good hand hygiene is critically important to reducing these types of infections. So much so that to track clinicians’ hygiene practices, “hospitals hire human monitors,” Li noted. “You can imagine how expensive, erroneous, and subjective this process is.”

Even with all that effort, poor hand hygiene remains a common problem in hospitals. Li’s team designed a system using sensor technology and algorithms similar to those in self-driving cars. They recognized that an environment where humans are taking care of other humans presented significant complexity. The system created a three-dimensional reconstruction of the hospital and people’s activities. This technology can monitor for medical errors and hygiene practices, and alert doctors when they need to pay attention to hygiene practices. Whereas a person with a clipboard will get tired of the task, the AI system won’t fatigue.

Unlike those human monitors, however, AI doesn’t think like us. Li holds that AI should be inspired by human intelligence. For example, while a computer can identify the components in a picture, it can’t see the full context. Li explained, “You and I see a whole different story [in a picture]. We see emotion. We might predict what’s going to happen next.”

To develop AI that processes information more like we do, Li works with a large team of researchers that includes, among others, Dan Yamins, a professor of computer science and psychology, and Michael Frank, who studies language learning in children. The goal is to create machines that learn like humans.

“Human intelligence doesn’t develop by someone [showing babies] 1,000 objects with labels,” said Li. “Babies explore, they break things, they’re driven by curiosity. We developed an AI system that’s intrinsically motivated by curiosity.”

The team has imbued a computer algorithm, or artificial agent, with curiosity — a drive to seek novelty and explore its environment. Modeled as a baby silhouette in what looks a bit like a low-quality video game, the artificial agent first learns to swivel its head and look around. To compare the artificial agent to real humans, Frank has been working with preschool children and observing how they learn.

## \* SCIENCE IN PROGRESS

“Babies explore, they break things, they’re driven by curiosity. We developed an AI system that’s intrinsically motivated by curiosity.”

FEI FEI LI, co-director, Human-Centered AI Institute, Stanford University

“There’s a lot of AI out there that’s inspired generally by human kids and human learning, but there’s much less that’s been evaluated systematically with respect to whether its behavior looks like how kids learn. That’s what we’re doing,” Frank says. “We’re all hoping that this kind of exploratory and curious behavior might prove to be a really important driver of the synthesis between AI and cognitive science.”

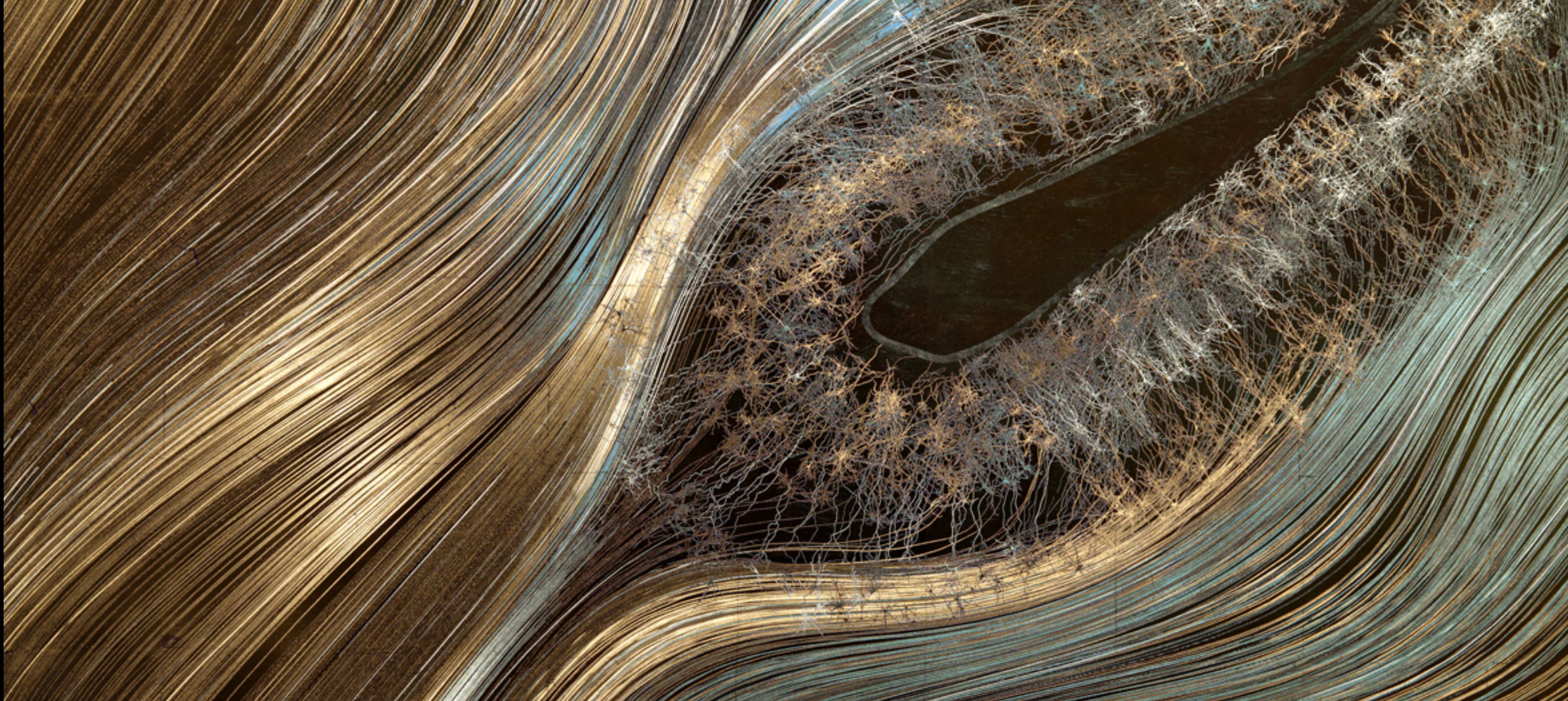
Early results show the artificial agent “goes through an early stage of understanding and then starts to focus on objects without anybody telling it to,” said Li. In other words, it seems to behave like a human baby. The team is exploring how to use some of the algorithm’s principles in robots.

Today’s robots are very good at doing one task over and over again, but when it comes to uncertain environments, they have difficulty. A curiosity-imbued algorithm may allow them to navigate their environments with more flexibility. Yamins points out the information generated from the AI algorithm could also improve our understanding of the human brain and cognition.

At one point in her talk, Li shared an Albert Einstein quote with her audience: “It has become appallingly obvious that our technology has exceeded our humanity.”

“The most important word or reminder Einstein has for us is the word humanity,” said Li, and she carries that reminder throughout her research, as she ushers in a new era of AI.





“Combining art and science with discernment enables the practitioner to describe the natural world in a way that seeps through the senses and touches our emotions.”

GREG DUNN, artist and neuroscientist



## ADVOCATING FOR THE FIELD

# NeuroAdvocates Rise to the Challenge

Working alongside a diverse and growing cadre of advocates, SfN flexed its advocacy muscles in FY 2020, expanding its legislative portfolio, notching several policy wins, and seeing longstanding policymaker relationships bear fruit.

## Policymaker Relationships Bear Legislative Fruit

Federal funding of neuroscience research saw major gains in FY 2020. NIH received a \$2.6 billion increase to \$41.7 billion, including \$500 million for the BRAIN Initiative, achieving the \$500 million yearly funding recommended in the BRAIN 2025 report. The NSF budget increased 2.5% over FY 2019 to a total of \$8.28 billion. The Veterans Affairs (VA) Medical and Prosthetic Research Program, a part of SfN's recently expanded legislative portfolio, garnered a \$21 million or 2.7% increase.

The economic stimulus bills passed in response to the COVID-19 pandemic included research funding to support the development of a vaccine. NIH received an additional \$1.78 billion, NSF \$75 million, and the Department of Defense \$3.8 billion for the Defense Health Research Program — another program recently added to the SfN legislative portfolio.

SfN worked with policymakers to publicly support neuroscience, with members of the U.S. Congress delivering statements to the House of Representatives. Representative Adam Kinzinger (D-IL) submitted a statement titled Recognizing the Work of the Society for Neuroscience. In it, Kinzinger calls SfN “an organization at the forefront of medical research,” and recognizes the size and value of the 2019 annual meeting in Chicago. Representative Brian Mast (R-FL) presented a floor speech titled “Together, We Can Save Lives.” In it, he references a lab tour at the Max Planck Florida Institute for Neuroscience, which SfN helped to coordinate in 2018.

## Training NeuroAdvocates Around the Globe

SfN members who engage with their policymakers fuel SfN's legislative accomplishments. Despite busy schedules, these NeuroAdvocates educated their representatives on the value of neuroscience and what it needs to remain a vibrant field.



Jaideep Bains of the Canadian Association for Neuroscience (left) and Laura Martin (middle) meet with congressional staff.

## ADVOCATING FOR THE FIELD

“After getting involved with SfN and learning a few simple techniques, I’m much more confident going into a room with staffers or Members of Congress and telling them about my research.”

**JOE LUCHSINGER**, PhD candidate,  
Vanderbilt University

SfN’s Government and Public Affairs Committee, Advocacy Key Contacts, and Early Career Policy Ambassadors (ECPAs) serve as the core of NeuroAdvocates. Key Contacts are members at all career stages represented by members of Congress who play an outsized role in funding federal research agencies. ECPAs, chosen through a competitive application process, are trainees and early career neuroscientists selected to engage in the policymaking process on Capitol Hill and at their home institutions. Among advocacy activities arranged in FY 2020, NeuroAdvocates hosted six lab tours for their representatives and spoke at one congressional briefing.

Offering new ways for SfN members to participate in advocacy, FY 2020 saw the launch of the NeuroAdvocate Challenge. Each month, SfN provides ways for members to engage in advocacy and be recognized.

SfN maintains partnerships with organizations across the globe to advocate for neuroscience worldwide. SfN completed a two-year extension of a Memorandum of Understanding (MOU) with the Mexico City Chapter to develop a culturally appropriate advocacy program. SfN also further extended agreements with the International Brain Research Organization (IBRO) to support the Global Engagement Initiative — a program to build support for brain research around the world — and the Federation of European Neuroscience Societies (FENS). A longstanding partnership with the Canadian Association for Neuroscience (CAN) was looking forward to organizing CAN’s first Parliament Day, similar to Hill Days in the U.S., before being delayed by the COVID-19 pandemic.



Former Government and Policy Affairs Committee member and active science advocate Mark Rasenick (left) meets with Rep. Jan Schakowsky (D-IL) during Capitol Hill Day.



## ADVOCATING FOR THE FIELD

**Hill Day Sees Members Training Members**

SfN's 14th Capitol Hill Day took place March 5, just weeks before the pandemic brought in-person advocacy in the U.S. to a halt. The event gathered 35 NeuroAdvocates, representing over 20 states plus the United Kingdom and Canada, to Washington, D.C., to speak with legislators about their research and the funding necessary to continue it. NeuroAdvocates met with almost 80 congressional offices and four congressional committees — including 15 meetings directly with elected officials. New this year, four Key Contacts who participated in the [Advocacy Training Program](#) served as trainers for Hill Day participants.

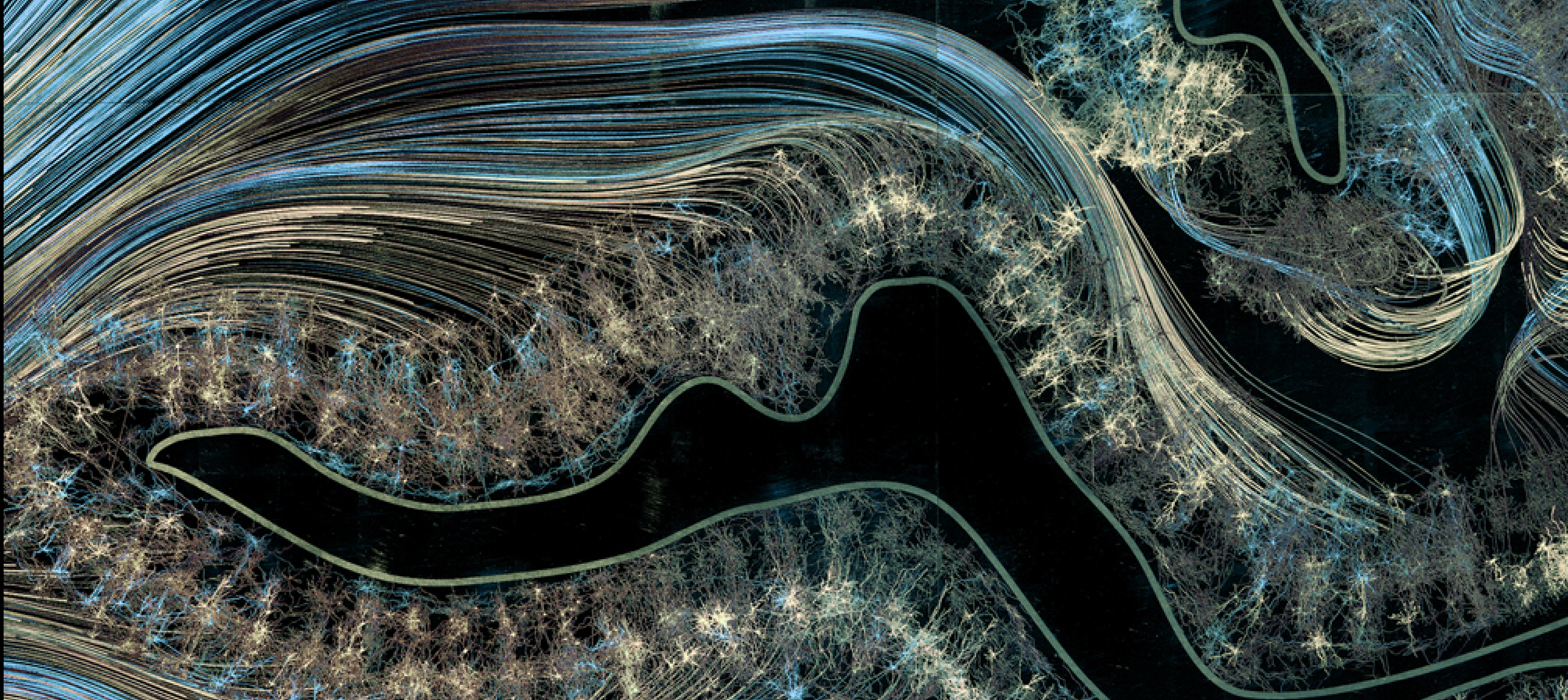
“One of the most important actions you could take as a neuroscience advocate is to not only talk to scientists about science but share your passion for science with the public.”

**KAREN L. JONES**, Trudy Schafer advocacy fellow,  
League of Women Voters of California

SfN President Barry Everitt submitted testimony to Congress asking lawmakers to increase appropriations for NIH and NSF in FY 2021. As the first SfN president from outside North America, the testimony highlighted the catalytic impact U.S. science policy and funding have on the progress of neuroscience around the world.

**Ensuring Ethical Animal Research**

What humanity knows about the human brain and behavior would be diminished without studying animals. SfN advocates for the responsible and ethical use of animals in research. As a part of a coalition of biomedical research organizations, SfN submitted draft report language to both the House and Senate for consideration in the FY 2021 NIH appropriations bills highlighting the vital role of animals in scientific research. Hill Day participants were prepared with animal research talking points, using real-world examples to educate policymakers about the necessity of animal models and the direct benefits such research has for improving patient outcomes. One example, also featured at the Animals in Research (AiR) Panel at Neuroscience 2019, was the development of [deep brain stimulation](#) to treat patients with Parkinson's disease and how that knowledge has extended into other therapeutics.



“Neuroscience has thrived by attracting inquiring minds from across scientific disciplines, and this collective creativity promises to transform our understanding of the brain in the years ahead.”

GINA TURRIGIANO, SfN president-elect

# Financial Stewardship in a Time of Change

Responsible financial stewardship remained key in FY 2020, made even more essential by the COVID-19 pandemic. As SfN continued carrying out its financial plan, the organization made adjustments as necessary to shore up its financial health and ensure SfN can continue to support members in scientific exchange as they collaborate, innovate, and advance the field. Through careful financial planning, the Society is best positioned to continue to serve the needs of members and the field.

## Budget Adjustments

Following discussion that began in spring 2019, plans to shore up the Society's finances in response to long-term volatility continued in FY 2020. Data indicated modest but sustained declines in membership and meeting attendance, a trend that meant SfN's expenses exceeded revenues by \$2 million in FY 2019. Pre-COVID data and trends indicated there is likely to be continued downward pressure in both membership and annual meeting attendance; uncertainty about COVID-19 exacerbated those projections of a recurring imbalance in SfN's budget.

While SfN's reserves remain strong, the Finance Committee and Council determined that over-reliance on reserves to compensate for structural budget deficits was not a sustainable long-term strategy and would not best serve the Society or its members. As a result, SfN Council took steps to maintain the forward-looking balance between revenue and expense. At their fall 2019 meeting, Council directed staff to cut \$1 million from the FY 2020 budget. At their spring 2020 meeting, the Finance Committee recommended an additional \$1.5 million in recurring cuts to the Society's ongoing budget, which were approved by Council at their spring meeting.

## COVID-19 Disruptions

COVID-19 pandemic-driven market volatility impacted SfN's investment portfolio, causing a hit to the portfolio funds, although the overall investment portfolio performance fared better than the general market performance. Noting that major changes to investments during times of volatility are generally unwise, SfN's Investment Committee continues to monitor the investment portfolio performance and make adjustments as required.

With SfN's abstract window moving from April/May 2020 to July 2020, SfN's planned revenue flow was disrupted. As a result, the Society applied for and was approved for a Paycheck Protection Program loan from the U.S. government. This funding went to support the continuity of the Society's business and payroll during the first portion of the COVID-19 pandemic disruptions.



## FINANCIAL AND ORGANIZATIONAL HIGHLIGHTS

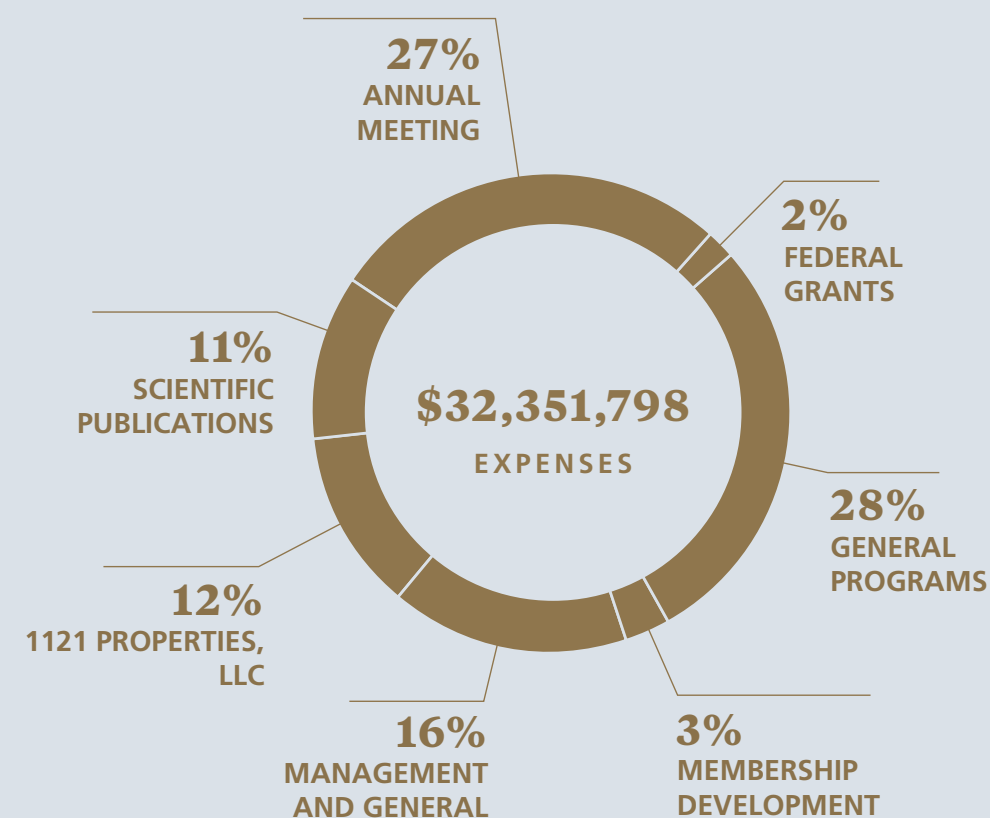
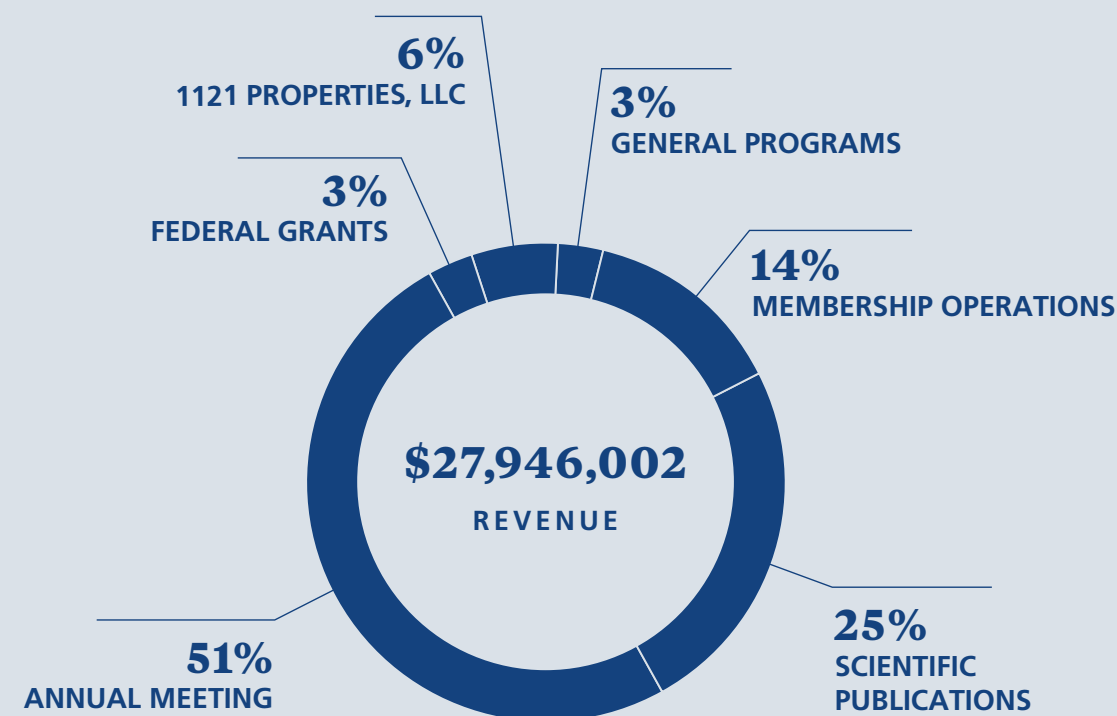
**Business Continuity Planning**

SfN has invested time and money in its business continuity planning, particularly in the last two years, and this paid off in spring 2020. When the COVID-19 pandemic very quickly changed how offices were set up around the world, SfN headquarters office was able to rapidly move to full-time telework without major disruption to day-to-day business. SfN's investment in infrastructure allowed business operations and meetings to move to a remote setup, including all spring committee meetings scheduled after March 13, and the spring Council meeting. The ability to move without major disruptions allowed SfN staff and volunteer leaders to focus on the important discussions, including major financial and programmatic decisions.

**Continued Infrastructure Investment**

The Society began major infrastructure updates in FY 2020 to ensure members can be best served. Moving the Society's database, known as an Association Management System, to a more modern system with enhanced capabilities to store, retrieve, organize, and protect data began in July 2019, with a planned completion date of February 2021.

Additionally, the content management system underlying the Society's three main websites (SfN.org, Neuronline, and *BrainFacts.org*) underwent an upgrade in late spring 2020 to ensure a more seamless user experience and keep the websites fully operational. Fixes and enhancements to search for all three websites were also completed in summer 2020, allowing users to more quickly and easily find content.



## FINANCIAL AND ORGANIZATIONAL HIGHLIGHTS

## Innovation and Growth

As part of an ongoing commitment to advancing the field in new ways, SfN continued to plan and execute innovative digital art experiences in FY 2020 in collaboration with ARTECHOUSE — a 21st century innovative art exhibition dedicated to showcasing the work of new media artists and producing cutting-edge art exhibitions that merge art, technology, and science. Premiering at Neuroscience 2019, Neuro Space took visitors through a technology-based evolution of how scientists view neurons as a meditation on the power of art to reflect those structures we have come to find through science — while also illuminating the vastness of what remains unknown. The Neuro Space exhibit brought together a group of scientists led by John Morrison of the University of California, Davis; and artists led by Los Angeles-based media designer, artist, and spatial thinker Refik Anadol. Building on the success of Neuro Space, ARTECHOUSE and SfN moved forward with the larger-scale Life of a Neuron exhibit that will combine a variety of digital resources with an in-person experience to celebrate the power and beauty of neuroscience, along with 50 years of SfN.

FY 2020 was also the inaugural year for the Leadership Development Program, funded with support from SfN and a three-year, \$150,000 grant from the Dana Foundation. The program was piloted as a year-round initiative to build the skills, knowledge, and confidence of trainees to perform as leaders and was well-reviewed by the inaugural cohort.

In FY 2020, SfN also received a \$1.3 million, five-year competitive grant from the National Institute of Neurological Disorders and Stroke (NINDS) to continue its flagship Neuroscience Scholars Program (NSP) through 2024. SfN was also the recipient of two endowments from The Grass Foundation, totaling \$825,000. These endowments will go toward restricted activities to support the Albert and Ellen Grass Lecture and the Donald B. Lindsley Prize in Behavioral Neuroscience in perpetuity.

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The Society for Neuroscience (SfN) gratefully acknowledges the generous donations to SfN from the following contributors in FY 2020 (July 1, 2019–June 30, 2020).

Donations to the Friends of SfN Fund support the Society’s mission of advancing the understanding of the brain and nervous system. Visit <https://www.sfn.org/Support-SfN> or contact [development@sfn.org](mailto:development@sfn.org) to learn more about the Fund and becoming a donor.

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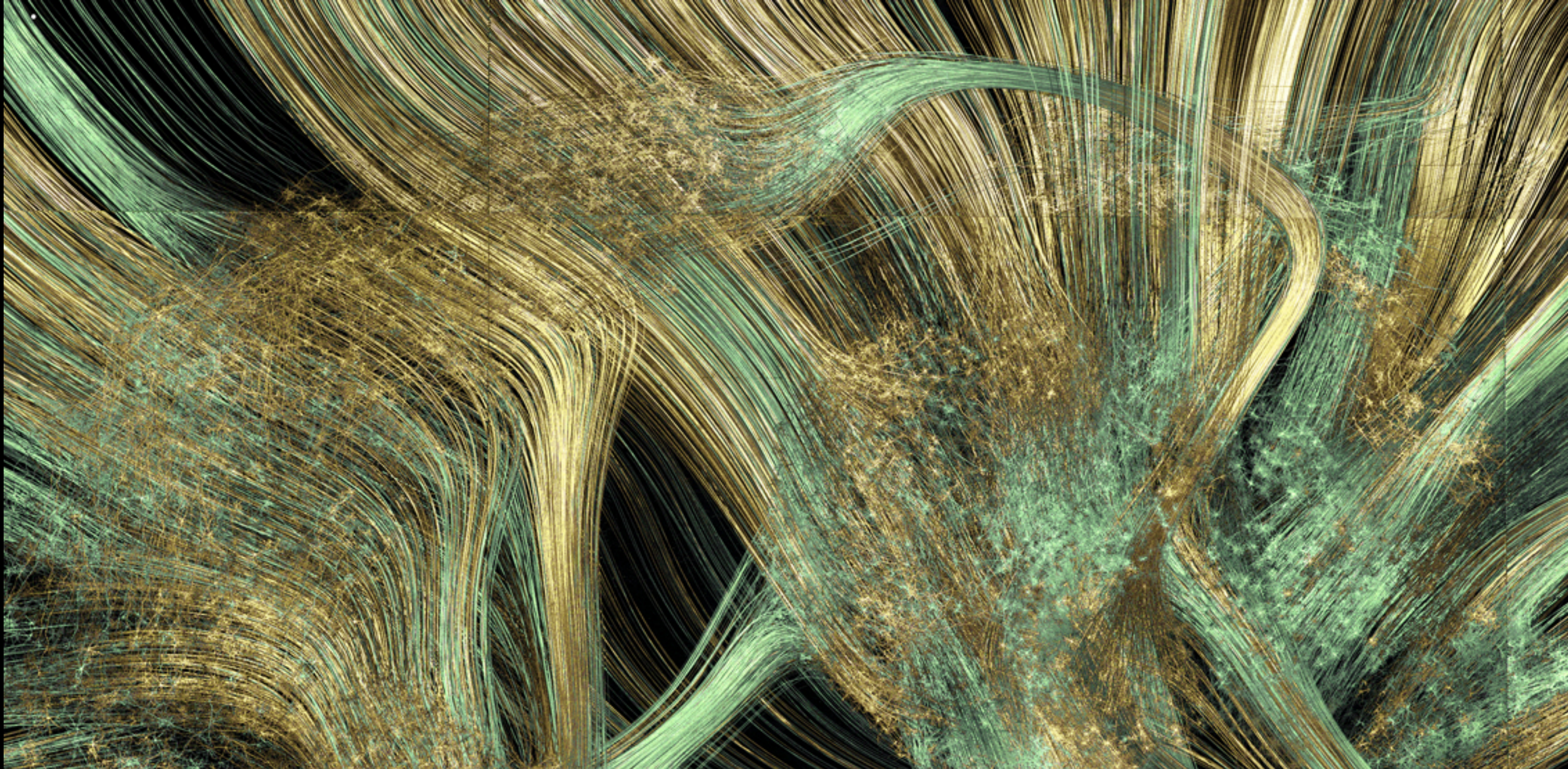
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