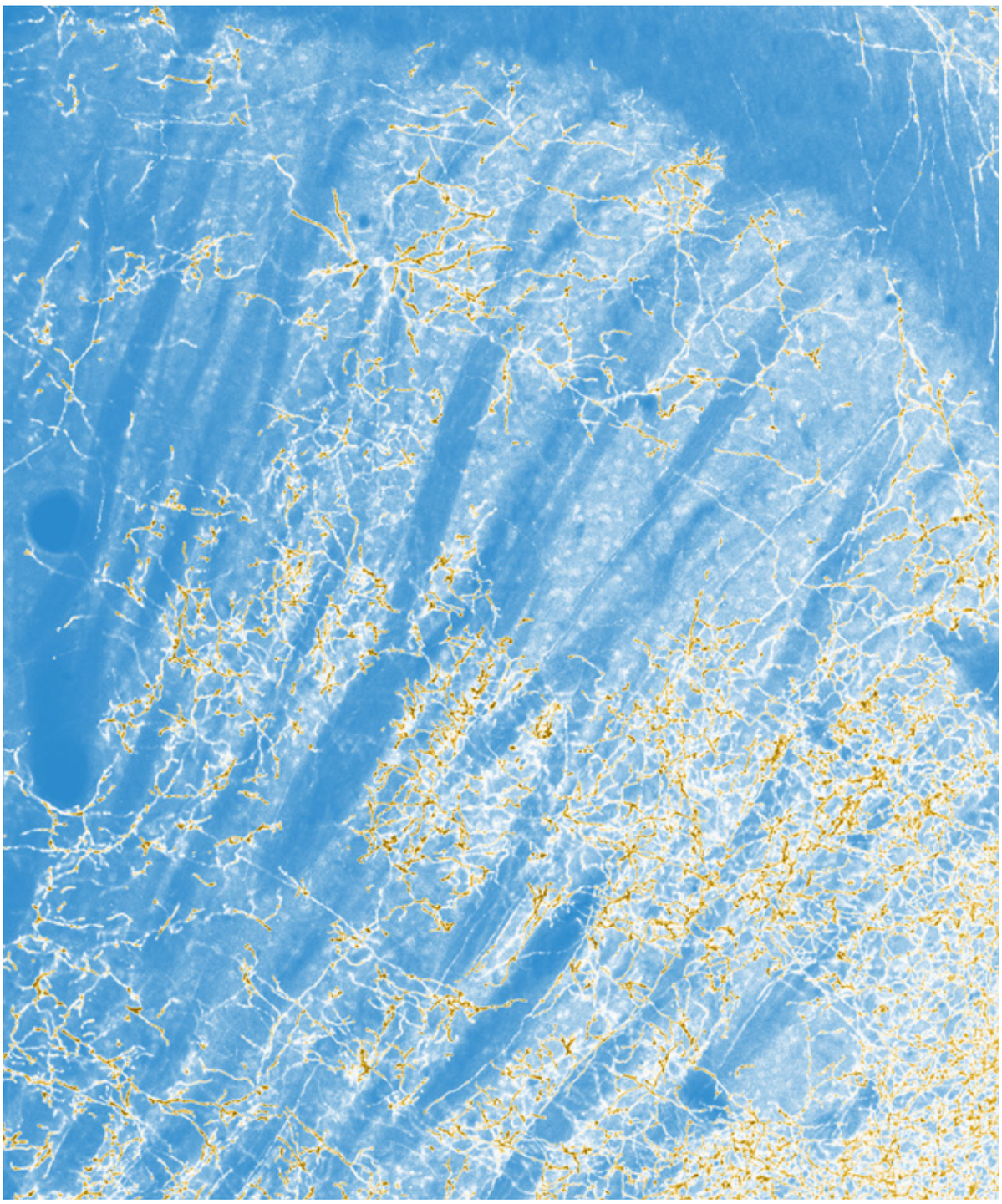
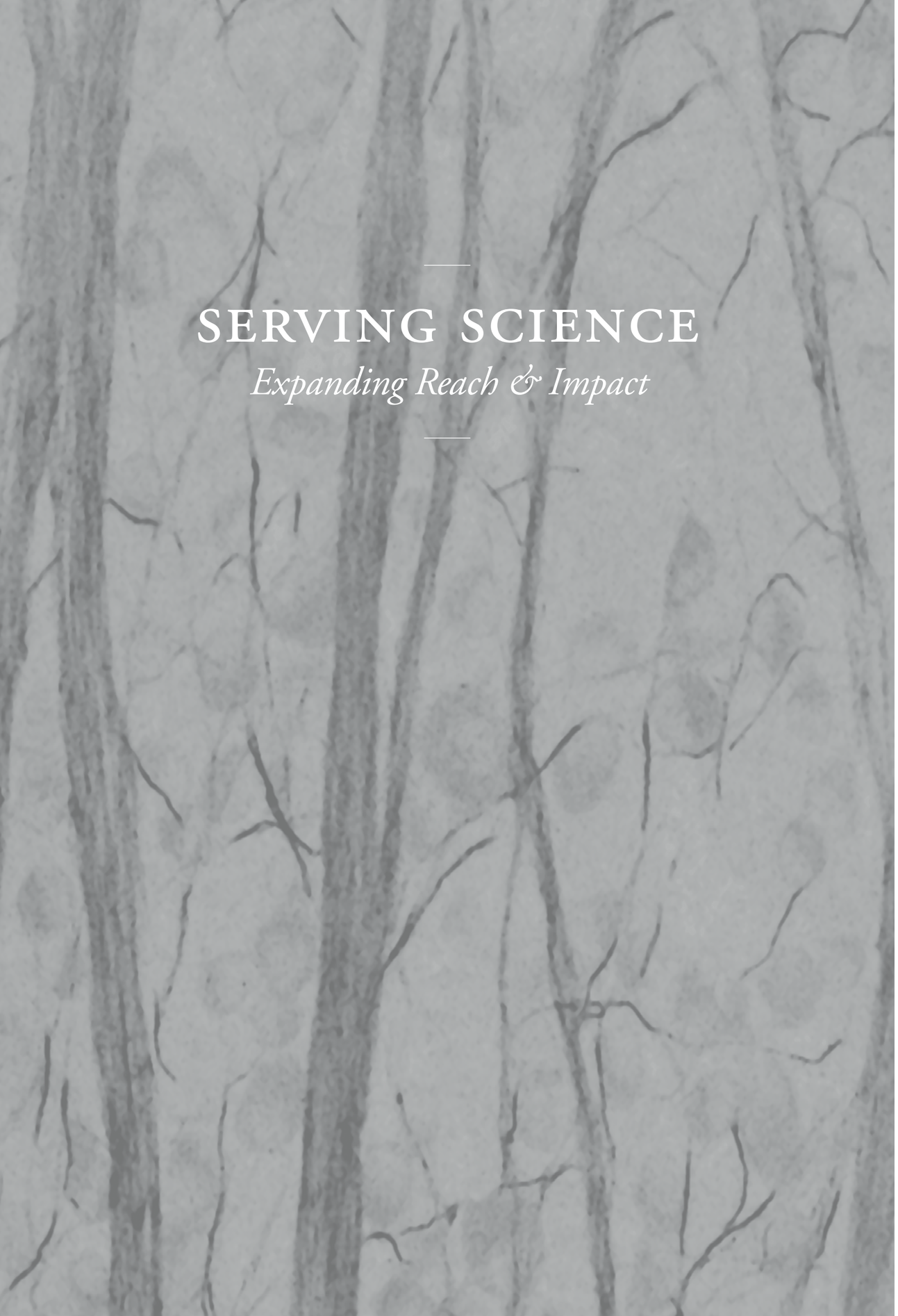
ANNUAL | FY 2016 | REPORT

SERVING SCIENCE

Expanding Reach & Impact



SfN SOCIETY *for* NEUROSCIENCE



SERVING SCIENCE

Expanding Reach & Impact

SfN MISSION

Advancing the Understanding of the Brain & Nervous System

ADVANCING SCIENTIFIC EXCHANGE

Advance the understanding of the brain and the nervous system by bringing together scientists of diverse backgrounds, by facilitating the integration of research directed at all levels of biological organization, and by encouraging translational research and the application of new scientific knowledge to develop improved disease treatments and cures.

SUPPORTING THE NEUROSCIENCE COMMUNITY

Provide professional development activities, information, and educational resources for neuroscientists at all stages of their careers, including undergraduates, graduates, and postdoctoral fellows, and increase participation of scientists from a diversity of cultural and ethnic backgrounds.

EDUCATING & ENGAGING THE PUBLIC

Promote public information and general education about the nature of scientific discovery and the results and implications of the latest neuroscience research. Support active and continuing discussions on ethical issues relating to the conduct and outcomes of neuroscience research.

ADVOCATING FOR THE FIELD

Inform legislators and other policymakers about new scientific knowledge and recent developments in neuroscience research and their implications for public policy, societal benefit, and continued scientific progress.

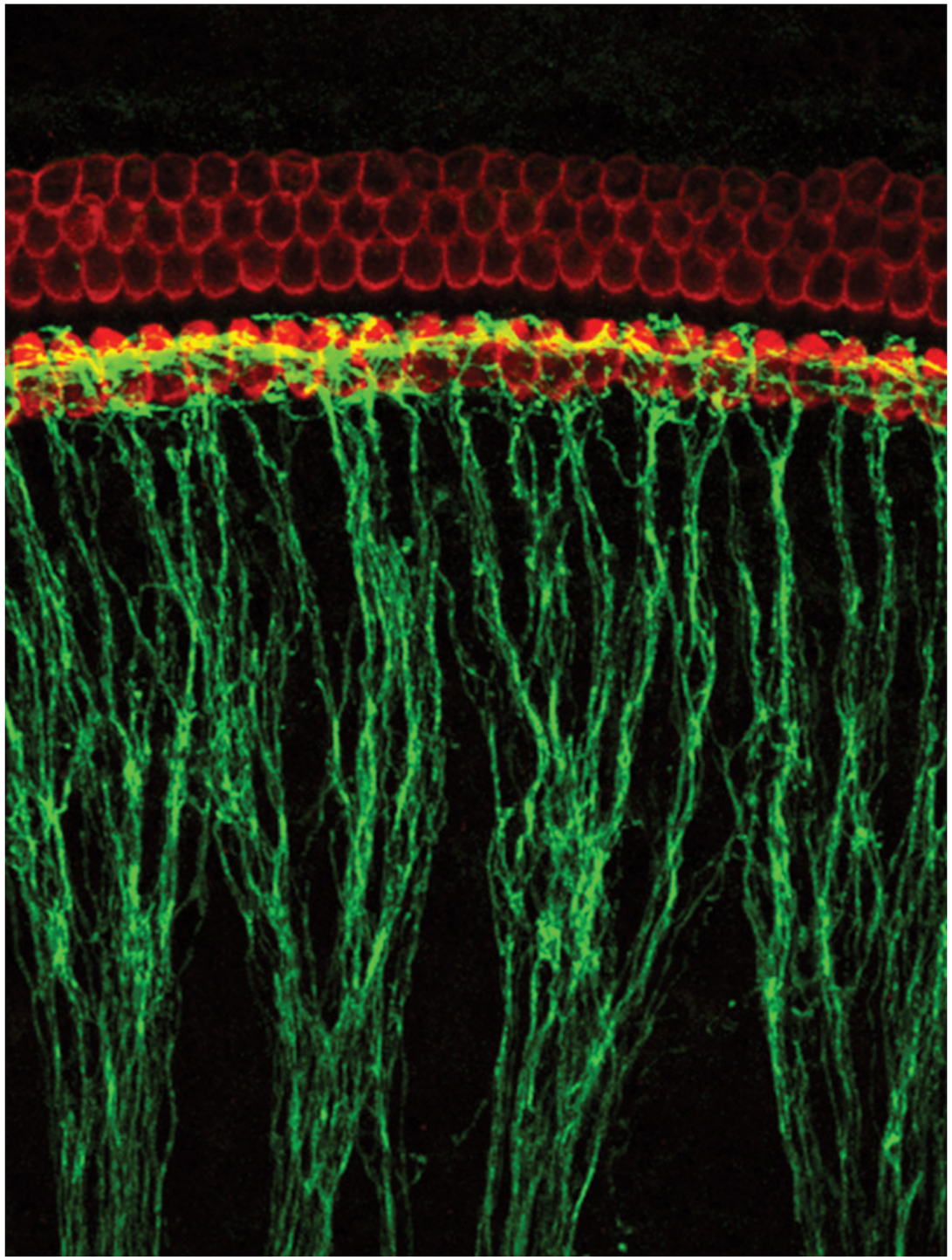


Fig. 1

Nerve fibers (green) from the brainstem of a neonatal mouse project to hair cells (red) in the cochlea.

SfN Annual Report FY 2016: Table of Contents

Science in Progress

These articles explore the potential of neuroscience research and its impact on the world around us.

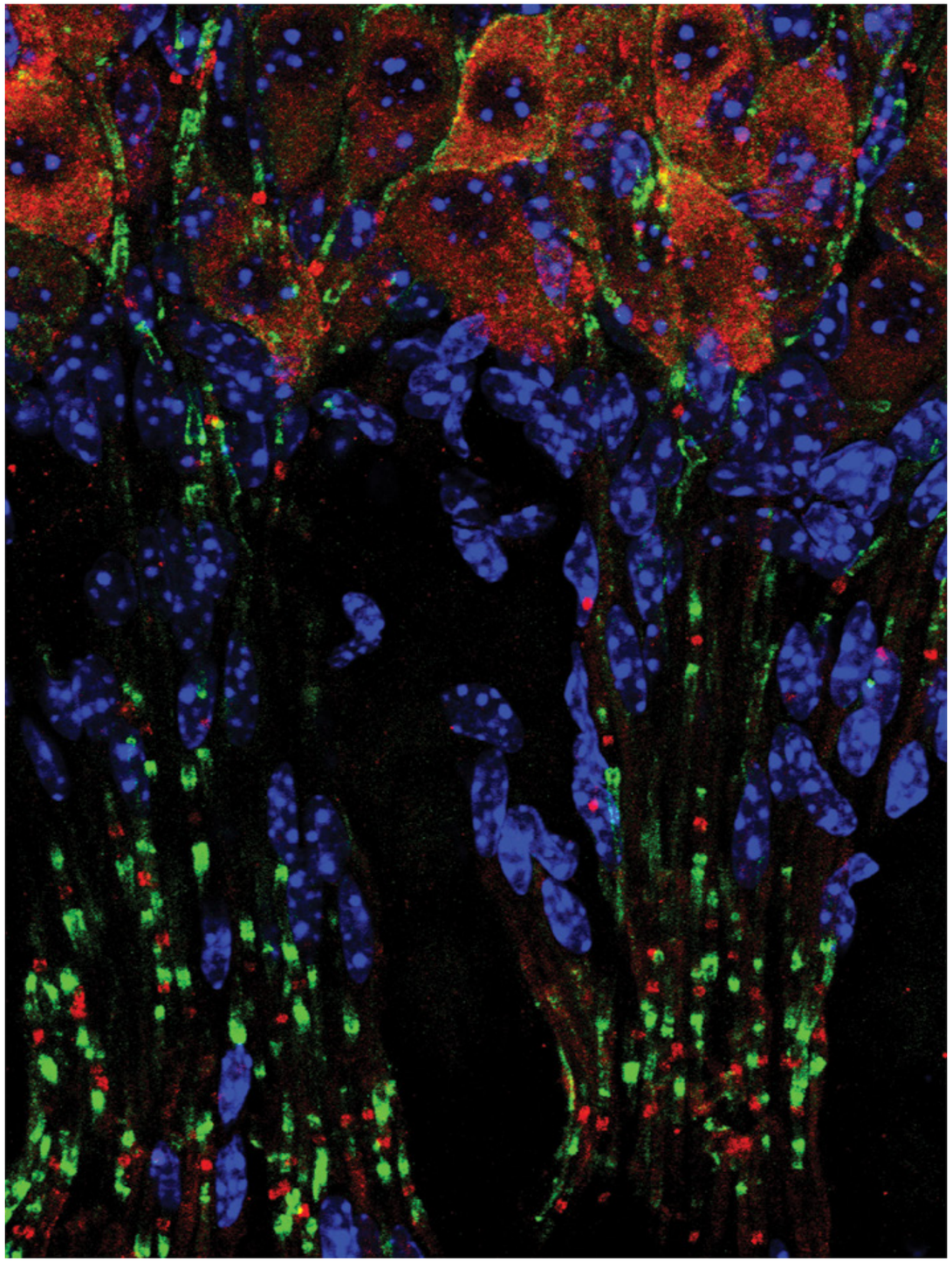


Fig. 2

Different types of potassium channels (green and red) cluster in distinct regions of cultured spiral ganglion neurons.

Message From the President: Serving Science, Expanding Reach & Impact

Just as the neuroscience field has evolved tremendously over the past 47 years, so too has the Society for Neuroscience. Today, SfN is rapidly expanding the reach and impact of its programs to serve a highly diverse, global, multidisciplinary field.

Hollis Cline, SfN president

This dynamism keeps pace with the evolving needs of the neuroscience community by helping scientists share their excellent research, enabling members to develop their skills and careers, advocating aggressively for science funding and animal research around the world, and engaging the global public about exciting brain science. In 2016, SfN is also embracing new technologies and data systems to make its programs more accessible to the entire community, improve communications, and share science more effectively.

The neuroscience field is making extraordinary strides to expand knowledge about the brain despite challenges that strain individual researchers and the larger research ecosystem. On the one hand, new scientific discoveries and tools are revealing insights — and also more questions — about the incredible organ that we study. Governments around the world are showing greater levels of support for brain research initiatives, and new waves of the world's brightest young minds are drawn to study the most complex biological structure in the universe, giving me great hope for the future.

At the same time, funding pressures, regulatory burdens, animal rights extremism, and uncertain futures for young trainees challenge us all and our ability to realize the full potential of our field. Moreover, like the broader scientific community, we have much work to do to ensure full participation of women and minorities in our field and scientific rigor in our methods.

SfN's programs, values, and advocacy advance the field on all of these topics, serving nearly 38,000 members worldwide. This report offers an overview of SfN's programs, and I encourage you to visit SfN.org regularly to learn more and take part in these programs.

SHARING GREAT SCIENCE AND CREATING LEARNING PLATFORMS

In FY 2016, SfN created increased value for members and the field. Our annual meeting in Chicago drew 29,000 researchers, clinicians, advocates, and exhibitors, with more than a third of scientific attendees from outside the U.S. *eNeuro*, SfN's open-access journal, thrived in its first full year, joining SfN's flagship publication, *JNeurosci*, as a venue for outstanding research across the broad range of neuroscience. Scientists who attend the annual meeting and publish in SfN journals are investing in the future of the field, as the Society's nonprofit programming supports the global neuroscience community.

This programming includes scientific training, professional development, and career opportunities to meet the evolving needs of SfN's members throughout their careers. After a successful first year, the new Neuronline — SfN's members-only home for learning and discussion — now features an extensive library of more than 550 articles, videos, webinars, and other resources on research methods, careers beyond the bench, mentoring tips, diversity in the field, and more. SfN continues to develop this exclusive content and networking, which members worldwide can easily access online.

SUPPORTING NEUROSCIENCE THROUGH ADVOCACY AND OUTREACH

From right: SfN President Hollis Cline talks with U.S. Rep. Jan Schakowsky, former SfN President Carol Mason, and Walter Koroshetz, deputy director of the National Institute of Neurological Disorders and Stroke, at the Advocacy Reception at SfN's annual meeting.

SfN also supports its members and the field by encouraging an informed public and knowledgeable policymakers who understand the vital nature of neuroscience and its contributions to uncovering pathways to solve public health challenges. SfN serves as an aggressive and consistent advocate for greater research funding in the U.S. and around the world, and also works to protect and convey the importance of animal research. In addition, the Society disseminates accurate, compelling information about "the universe between our ears" to a global audience through *BrainFacts.org*, a public information initiative guided by SfN that topped 10 million page views in 2016.

During my time as SfN president, I stressed the particular importance of communicating with elected officials about the need to fund basic science research as well as the necessity of responsible animal research. I also emphasized that greater efforts in science diplomacy — such as the building of relationships with international colleagues — can not only benefit the scientific enterprise, but also international diplomatic relations that strengthen nations and collaborations.

SFN IS STRONGER THANKS TO OUR COMMUNITY

As SfN president, I've greatly enjoyed the opportunity to contribute to the Society's goal of advancing the field I love. None of this would be possible without my fellow members who have volunteered time as councilors, committee members, journal editors, science advocates, and more. Your service to SfN and its mission ensures that the field remains a strong, vibrant community ready to tackle the challenges and opportunities ahead, including securing robust funding for research that will unlock the mysteries of the brain. I thank you for this opportunity to serve and strongly encourage all neuroscientists to get involved with SfN for the benefit of both your own career and the future of the field.

Hollis Cline, president

Enhancing Scientific Rigor

"SfN is uniquely positioned to bring together neuroscientists, funding agencies, and publishers to think deeply about this problem, brainstorm solutions, and influence the dissemination of those solutions across the field."

— **Rita Balice-Gordon**, scientific rigor training module organizer

SfN continues to take the lead in addressing the issue of scientific rigor in neuroscience.

Science only succeeds in advancing knowledge and improving human health when scientists consistently apply the highest research standards. Recently, reports documenting lower-than-expected replication rates have raised questions about the self-correcting nature of science. SfN is serving the field with efforts to strengthen scientific rigor — including experimental design, statistical analysis and reporting, and scientific communication.

SfN convened the Scientific Rigor Working Group in 2013 — led by Council members Emanuel DiCicco-Bloom of Rutgers University and Oswald Steward of the University of California, Irvine — to recommend proactive strategies to improve scientific practices. Their work resulted in "Research Practices for Scientific Rigor," a foundational guideline for both trainees and experienced researchers to reference and use as the basis for conversation, training, and practice.

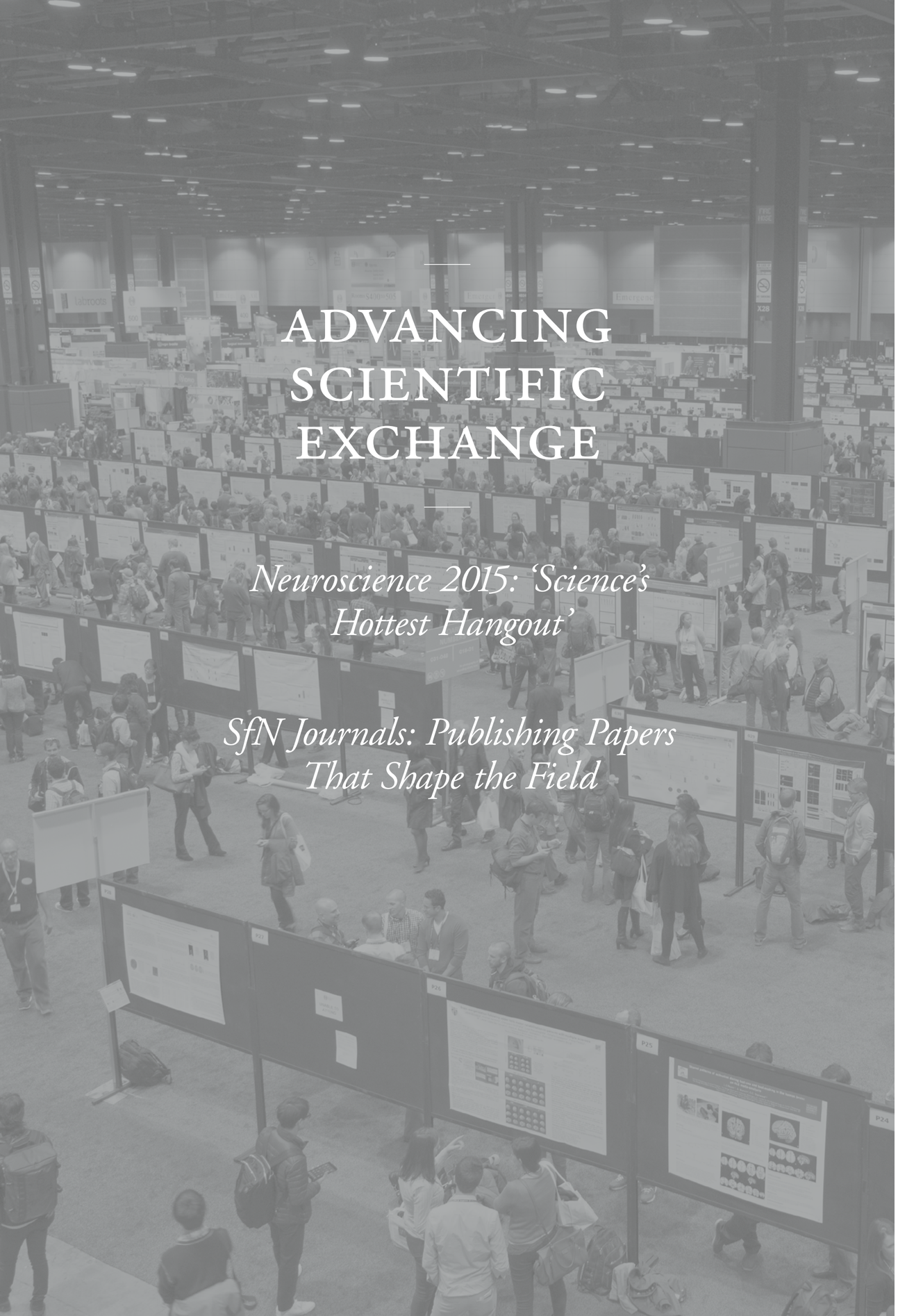
The Society's publications took up the charge this year as *JNeurosci* Editor-in-Chief Marina Picciotto and *eNeuro* Editor-in-Chief Christophe Bernard participated in a webinar and Twitter chat focused on how to peer review a manuscript and *eNeuro* published an editorial and two commentaries on scientific rigor.

The Society also partnered with the National Institute on Drug Abuse and leading neuroscientists to offer the series "Promoting Awareness and Knowledge to Enhance Scientific Rigor in Neuroscience." This series kicked off at Neuroscience 2015 with a professional development workshop "Tackling Challenges in Scientific Rigor: The (Sometimes) Messy Reality of Science." The project is funded under a grant as a part of NIH's Training Modules to Enhance Data Reproducibility and is available to all on Neuronline.

The series features six training modules composed of webinars, curated reading lists, Q&As, and group discussions addressing various aspects of scientific rigor, including planning experiments and data collection, minimizing bias in experimental design and execution, post-experimental data analysis, and data management and reporting.

The project culminates at Neuroscience 2016 with the workshop "Meeting Expectations: NIH Review Criterion on Scientific Rigor," organized by Cheryl Sisk of Michigan State University.

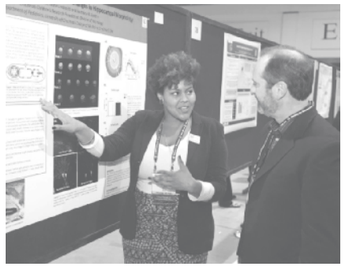
"These efforts will strengthen the scientific enterprise and improve public recognition of the self-correcting nature of science," SfN Past President Steven Hyman said. "Attention to scientific rigor is something we owe to our field, our funders, and especially to our students."



ADVANCING SCIENTIFIC EXCHANGE

Neuroscience 2015: 'Science's Hottest Hangout'

Every year, tens of thousands of neuroscientists meet at SfN's annual meeting to form what one reporter called the "global epicenter of brain science."



At Neuroscience 2015, thousands of researchers presented scientific posters on topics covering the breadth of neuroscience.

Among the attendees are "Nobel Prize winners, the director of the National Institutes of Health, and scores of researchers regarded as the international rock stars of neuroscience," NPR's Jon Hamilton wrote about Neuroscience 2015, which took place last November in Chicago.

SfN's annual meeting showcases the incredible breadth of neuroscience and the tremendous impact brain research has on society's health and well-being. At Neuroscience 2015, 29,033 attendees from 77 countries assembled to discuss new discoveries, hear from leaders in the field, explore professional development opportunities, and connect with colleagues.

The annual meeting features extensive programming in the field's many disciplines, providing researchers the ability to both focus on their specialty and gain a broad understanding of the entire field. Scientists also have the opportunity to expand the reach and impact of their own research by sharing and discussing it with the large contingent of international attendees at the meeting.

ENHANCED PROGRAMMING TO MEET MEMBER NEEDS

Each year SfN seeks to enhance the value of its annual meeting programming to meet the evolving needs of its members and the field. A major programmatic focus that began to take root at Neuroscience 2014 and has continued into future meetings is scientific rigor — the consistent application of the highest standards in research methodologies, including experimental design, statistical analysis and reporting, and scientific communication. At the 2015 meeting, SfN hosted a new short course on optimizing experimental design, a symposium on proper use of statistics, and a professional development workshop on the challenges of scientific rigor. For more information on SfN's scientific rigor activities, please see page 7.

SfN also added value for clinician-scientists at Neuroscience 2015 by introducing a clinical neuroscience special lecture and curated itinerary, which groups scientific sessions and networking events related to a specific topic. This trend will continue for Neuroscience 2016 with the addition of a Meet-the-Clinician-Expert session and three Basic-Translational-Clinical Roundtables.

Reflecting SfN's commitment to both environmental stewardship and the attendee experience, the Society improved its digital options for accessing scientific program content, making meeting navigation easier and reducing the number of printed program books. The online Neuroscience Meeting Planner and mobile app help attendees manage their event schedules, follow curated itineraries, and find the presentations that interest them. An on-site mobile app tutorial session and a mobile app helpdesk assisted attendees in taking advantages of these digital offerings.

SfN's annual meeting provides a sense of community, allowing neuroscientists to connect one-on-one with peers to share their research.

PROFESSIONAL DEVELOPMENT FOR ALL CAREER LEVELS

The annual meeting offers an array of professional development and networking activities for neuroscientists at all career stages. The Neurobiology of Disease Workshop, funded by the National Institute of Neurological Disorders and Stroke, celebrated its 35th anniversary at Neuroscience 2015 with a full-day training on the study of human brain malformations and potential pathways to therapeutics. Other professional development and networking opportunities included:

- **Short courses on stem cells and reprogramming technologies, the impact of human genetics in neurobiology, and experimental design and data reproducibility**
- **Meet-the-Expert sessions with respected neuroscientists discussing their work and careers**
- **Professional development workshops on topics such as mentoring, communicating science, and finding research funding**
- **A Graduate School Fair for students interested in neuroscience programs**
- **SfN-sponsored socials for connecting with peers in various specialty areas**

"I get a sense of energy just being at this conference, and I think it makes me that much more excited to get back to my experiments. I always come back from the meeting with momentum and a sense of purpose."

—**Iboro Umana**, MD/PhD student at the University of Chicago

SfN recorded many of these professional development events and is posting them on Neuronline throughout the year, increasing the value of membership and extending the reach and impact of the annual meeting.

REACHING THE GLOBAL PUBLIC THROUGH NEWS MEDIA

In addition to the NPR article, Neuroscience 2015 received coverage in major news outlets including *The Huffington Post*, *The Guardian*, and *Business Insider*, as well as *Scientific American* and *Nature*. Many of these stories focused on research presented in SfN's 10 press conferences and its *Hot Topics* book of newsworthy scientific abstracts. In addition, about 25 percent of the more than 2,000 news hits came from international outlets, demonstrating the global interest in and impact of the annual meeting.

LOOKING AHEAD: NEW THEMES AND TOPICS

At Neuroscience 2015, SfN's Program Committee unveiled a significant reorganization of the annual meeting's themes and topics structure, effective beginning with Neuroscience 2016. This update followed extensive discussion by the Program Committee and reflects two goals: 1) to distribute abstracts more evenly among themes and 2) to encourage greater scientific collaboration across related fields. The committee evaluates and refines the themes and topics annually to ensure they are representative of the field.

NEUROSCIENCE 2015 BY THE NUMBERS

29,033 ATTENDEES FROM 77 COUNTRIES

50 SYMPOSIA & MINISYMPOSIA

16 PDWs & NETWORKING EVENTS

14,977 SCIENTIFIC ABSTRACTS

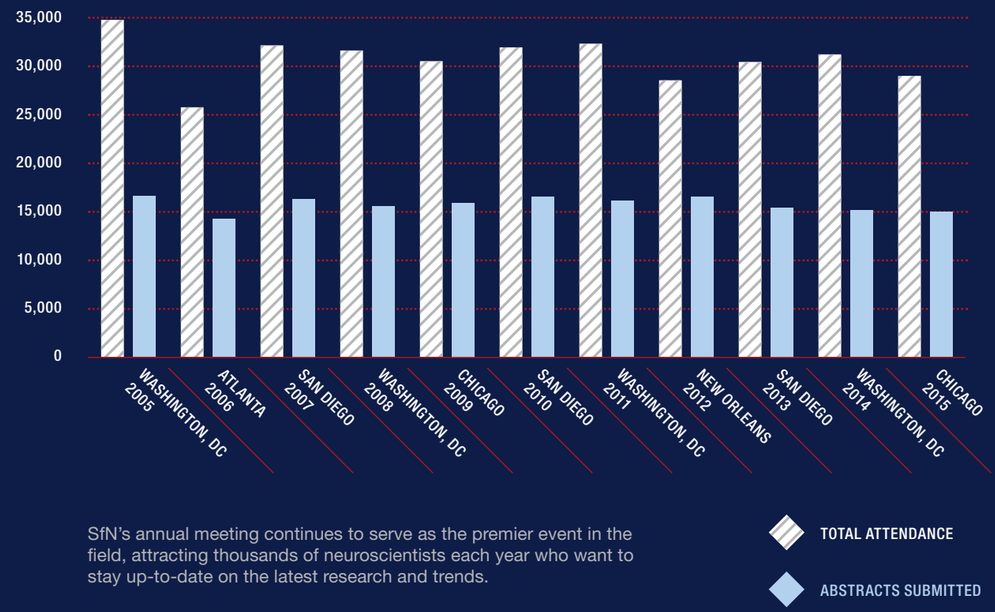
87 DYNAMIC POSTERS

515 EXHIBITING COMPANIES

"This is the science meeting that attracts the largest number of scientists of any one, and it's amazing to see the things that are happening all up and down the hallways and the conference rooms and the poster sessions at this gathering."

—**Francis Collins**, NIH Director

EXCELLENT SCIENCE SUSTAINS VALUE FOR GLOBAL NEUROSCIENCE



SfN's annual meeting continues to serve as the premier event in the field, attracting thousands of neuroscientists each year who want to stay up-to-date on the latest research and trends.

SfN Journals: Publishing Papers That Shape the Field

The Journal of Neuroscience, SfN's flagship publication, and *eNeuro*, SfN's open-access journal, provide researchers with two great options for publishing their work to achieve maximum impact.

*"At **The Journal of Neuroscience**, we really want our papers to make solid contributions that move the field forward. We want to change how our readers think about important problems in neuroscience."*

— **Marina Picciotto**, *JNeurosci* Editor-in-Chief

With their international audiences, SfN's journals have a powerful reach that enables important discoveries to gain momentum and strength. In addition, scientists who publish in SfN journals are also investing in the field, as the Society's programs support the global neuroscience community.

Scientific publishing faces an array of opportunities and challenges as the field works to determine how best to take advantage of evolving digital technologies. As a publisher of two high-quality scientific journals, SfN is embracing this changing environment and innovating in ways that ensure SfN can meet the publishing goals of its members and the field.

Both SfN journals strive to publish rigorous research that covers the broad spectrum of neuroscience, so authors can feel confident in choosing the journal that best fits their needs. To assist authors in publishing their work in the most suitable SfN journal, the Society launched a manuscript transfer system in January 2016. If a paper is not right for *JNeurosci*, then the author can request their work be submitted to *eNeuro*, and if a paper requires too many additional experiments, which *eNeuro* limits, then the author could elect to have their work transferred to *JNeurosci*.

The editors-in-chief of *JNeurosci* and *eNeuro* are committed to communicating and collaborating with the field to make certain SfN's journals are providing the best peer-review and publishing experience possible.

THE JOURNAL OF NEUROSCIENCE: EVOLVING WITH THE FIELD

JNeurosci is working to implement fresh ideas while leveraging the journal's numerous strengths. The journal is guided by Editor-in-Chief Marina Picciotto, who was appointed to a five-year term in 2016 by the SfN Council, at the recommendation of a search committee. Its readership spans the globe, ensuring the published science is widely disseminated and realizes its full potential for influencing the field. The journal is also committed to reflecting the breadth of the neuroscience community through its Editorial Board, which has members representing the broad range of neuroscience disciplines. This diversity of voices helps *JNeurosci* maintain a thorough review process that also puts the science in the public domain as quickly as possible.

The Editorial Board and Picciotto are actively innovating and recently evaluated the journal's editorial processes to identify opportunities for improvement. Because the Editorial Board is made up of working scientists who actively publish their own research, they understand the needs and expectations of authors.

Among its many goals, *JNeurosci* is working to find better ways to communicate with authors, present data and provide metrics for authors, create more transparency in the review process, and develop outlets for the discussion of neuroscience topics not being addressed elsewhere. For instance, *JNeurosci* is adding two new features: Progressions, follow-up articles on highly cited papers to see "where are they now," and Viewpoints, topical reviews that cover a current topic of interest in neuroscience. As the journal moves forward with these changes, Picciotto has begun to regularly communicate with *JNeurosci*'s readership and authors about the changes via monthly editorials, social media, and other digital communications.

eNEURO: A GROWING JOURNAL FOR STRONG SCIENCE

eNeuro celebrated its first anniversary in November 2015 after a successful year of growth. The journal published 85 papers in its first year, more articles than any other open-access neuroscience journals published in their first years. As *eNeuro* grows, it is starting to achieve greater global reach and reflect the broad neuroscience community.

Under the guidance of Editor-in-Chief Christophe Bernard, SfN designed *eNeuro* as a venue for experimentation in the scientific publishing arena. In addition to publishing high-quality original research papers, *eNeuro* accepts negative results, failures to reproduce, replication results, reviews, method papers, brief communications, and commentaries. These types of articles contribute significantly to advancing understanding in the field, and the neuroscience community benefits from *eNeuro* providing this content a respected and visible home for discussion and debate.

eNeuro features a fair and fast review process that aims to create a satisfying and constructive experience for authors. The journal uses an innovative double-blind review process in which authors and reviewers are anonymous to each other. *eNeuro* limits requests from reviewers for additional experiments and provides authors with a synthesis review explaining why their work was accepted or rejected. *eNeuro* also employs a rapid-publication model, in which studies are posted online immediately after acceptance.

Recently, Bernard has conducted various communications efforts about the journal, including writing editorials and leading a webinar for SfN members on the review process. In its second year, *eNeuro* is expected to continue to flourish and grow its reputation as a venue for high-quality neuroscience research.

— **Christophe Bernard**, *eNeuro* Editor-in-Chief

*"**eNeuro** welcomes a wide range of impactful science. For example, by publishing important null results and failures to reproduce, **eNeuro** is helping the field to optimize research spending and resources."*

JNEUROSCI READERSHIP FOR 2015

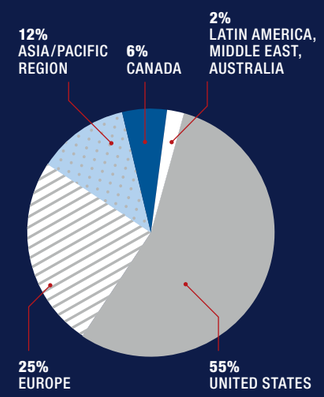
229
COUNTRIES & TERRITORIES

12.5M
PAGE VIEWS

*"We were very impressed with the constructive, deep, and helpful tone of the reviews. This separates **eNeuro** from other publishing venues."*

— **Ana Solodkin**, *eNeuro* author and associate professor of anatomy & neurobiology at University of California, Irvine

eNEURO SUBMISSIONS FOR 2015



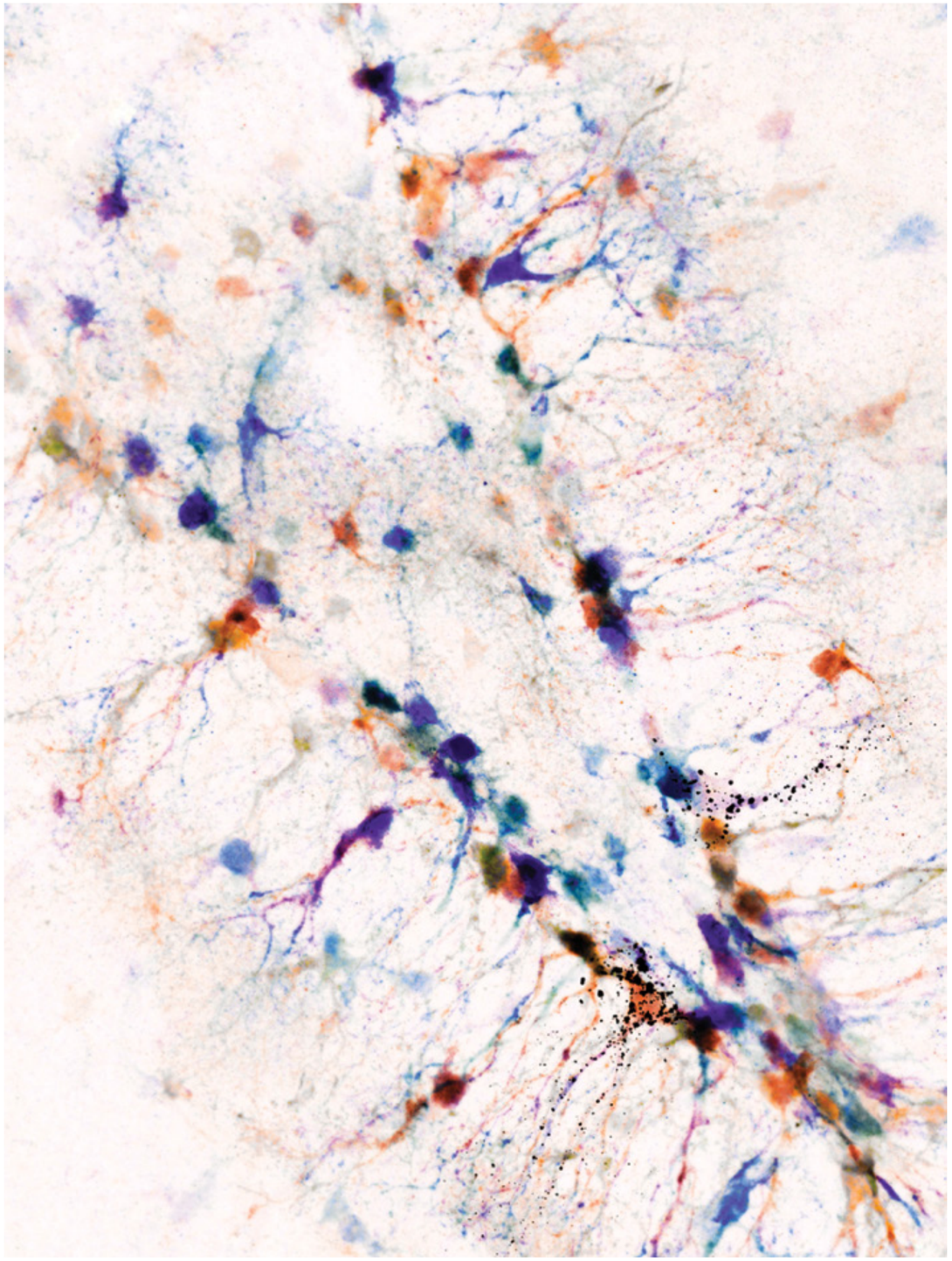


Fig. 3

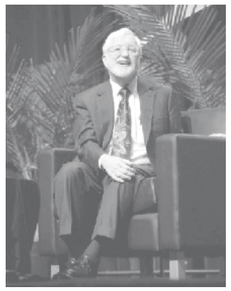
Stem cells (cells with black dots) in the hippocampus of an adult mouse have the potential to differentiate into many different kinds of neurons.

SCIENCE IN PROGRESS

NEUROLAW

Combining Neuroscience & Criminal Justice

The number of U.S. judicial opinions citing neuroscience more than doubled in the seven years from 2005 to 2012, according to an analysis in the *Journal of Law and the Biosciences*. As neurolaw — a segment of criminal justice concerned with neuroscience — enters the courtrooms of America at a remarkable pace, judges are still determining how, whether, and when to support brain science in the courtroom.



Jed Rakoff
U.S. District Court Judge

U.S. District Court Judge Jed Rakoff, for one, is cautious. In a featured lecture at Neuroscience 2015, Rakoff, a founding member of the MacArthur Foundation Project on Law and Neuroscience, described what he saw as "considerable ambivalence and skepticism by judges toward neuroscience."

While appreciating the benefits and progress made in brain science, such skepticism was well-earned over several generations as once-accepted aspects of brain science were later debunked: Phrenology, eugenics, and frontal lobe lobotomies all were presented as accurate science in 20th century, with disastrous results in the courts. As Rakoff put it, "they've been burned before."

He was particularly circumspect about applying brain science in individual cases, noting the high stakes involved for a defendant. However, he said that growing understanding of general neuroscience principles can shape public policy around crime. But to do so, neuroscientists must educate judges and the general public on both the merits and potential limitations of our current understanding of the brain.

FALSE MEMORIES

Eyewitness testimony can hold great weight in the courtroom. A victim or bystander of a crime seems like an excellent source of information, and a single witness is often enough to send a defendant to jail.

However, thanks to modern neuroscience, we now know that eyewitness testimony is relatively unreliable. Memory researchers have unveiled many factors affecting the accuracy of long-term memories. A victim of a night-time mugging may not be able to identify facial features because of low lighting, and stress negatively affects the ability to accurately recall details. Identifying faces from memory, especially faces that are a different race, has proved more difficult than originally thought.

Even someone who got a good look at an assailant can have their memory altered over time. Neuroscientists now understand that the act of recalling a memory reconsolidates it, effectively becoming a new memory. Over time, this reconsolidation can alter details, like a game of telephone. Even the most traumatic events are altered when recalling memories. In a study of New York City residents one year after 9/11, their memories of the event differed in 40 percent of the details.

Memory researchers now advise that even though eyewitness testimony is a valuable source of information, it is almost never perfectly accurate. By translating their work for the public, neuroscientists could change the landscape of the courtroom dramatically, simply by upending this commonly held notion about eyewitnesses.

THE FUTURE OF DRUG POLICY

Although Rakoff remains skeptical of the value of neuroscience in dictating individual outcomes, he praised its potential role in setting and reforming public policy. Brain science illuminates the driving forces behind human behavior, criminal or otherwise, which is highly relevant to the court system.

Over the past several decades, the American prison population has grown by more than 500 percent, driven largely by drug arrests. Because policies such as mandatory minimums give judges little choice in whether to send drug users to prison, understanding drug addiction and its treatment is among the most pressing issues in U.S. criminal law today.

The modern science of addiction calls these policies into question. Taking drugs is associated with significant changes to a structure of the brain called the prefrontal cortex, which is responsible for impulse control and affects the ability to control cravings. While it's not known whether addiction causes these brain changes or the changes just make addiction more likely, addressing addiction requires thoughtful evidence-based treatment.

Rakoff and prominent neuroscientists argue for a system that would replace punitive measures with rehabilitation programs firmly based in neuroscience. Researchers have treated addiction as abnormal brain function for several years now, and rehabilitative practices are improving. Treating addiction as a disease from which a person can recover leads to better health outcomes and recidivism rates.

Neuroscience can play an important role in defining the future of criminal justice. Modern brain science has the potential to alter our understanding of issues as diverse as the sentencing of minors, the effects of solitary confinement, lie detection, and even the nature of responsibility. As Rakoff explained, scientists have a responsibility to get involved and push forward good science to help improve these practices and to create a more effective and just body of law.

Neuroscience can play an important role in defining the future of criminal justice.

SUPPORTING THE NEUROSCIENCE COMMUNITY

Lifelong Learning Across the Career Arc

A Diverse & Global Membership

In an increasingly global and diverse field, the Society for Neuroscience advances brain science by serving as a professional hub for neuroscientists, providing scientific training, professional development, and career opportunities, as well as connections to an international community of colleagues.

"Neuronline provides SfN members with exclusive access to hundreds of career development resources on-demand from their homes, offices, or labs."

— **Michael Lehman**, chair of SfN's Online Programs Steering Committee

SfN continually seeks new ways to expand the value of membership to meet the evolving needs of its nearly 38,000 members, who represent all levels of the neuroscience career lifecycle, from senior scientists to postdocs and students. The Society also reflects the global nature of the neuroscience community, with more than 40 percent of members located outside the U.S.

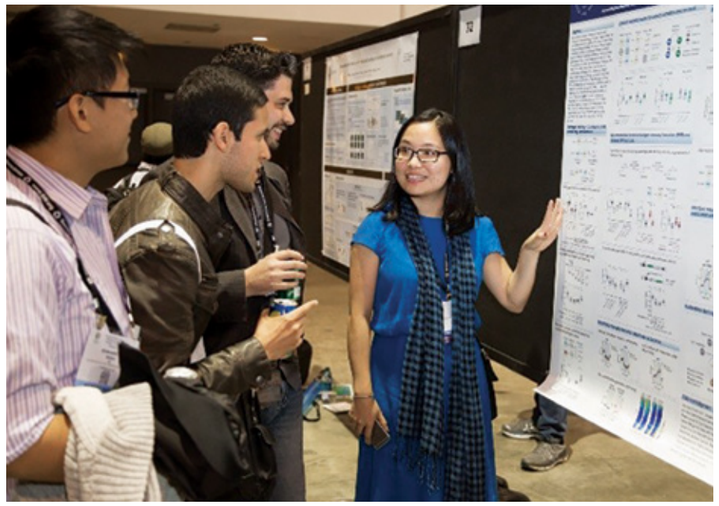
YEAR-ROUND SCIENTIFIC TRAINING AND PROFESSIONAL DEVELOPMENT

To serve its expansive membership, SfN has significantly increased its focus on creating online resources and programs that scientists can take advantage of year-round from their homes and institutions at their convenience. Much of this digital content lives on Neuronline, SfN's members-only home for learning and discussion. Neuronline features hundreds of professional development and scientific training resources as well as discussion forums enabling members to network with colleagues from around the world.

Neuronline publishes a steady stream of resources — produced by SfN and seven content partners — and hosts webinars and live chats. In fact, SfN's webinar program has continued to double each year since SfN's first webinar in 2012. At the end of FY 2016, Neuronline had about 550 pieces of content on topics such as careers beyond the bench, mentoring, diversity in the field, and more. Neuronline will continue to grow its content with more videos and written articles, as well as the addition of a podcast series and a virtual scientific conference on new insights into glial cells.

SfN is committed to providing scientific training for neuroscientists at all career stages, and the Society recently formed the Neuroscience Training Committee to better focus on lifelong learning across the career arc. The committee seeks to support neuroscience departments and programs and address topics critical to the future of the field, including workforce policy and scientific rigor.

As roughly 40 percent of SfN members are students and postdocs, one priority for the committee is increasing programming for trainees to prepare them for neuroscience careers across the field. For example, in 2015, SfN held four webinars for student audiences, including one on how to find graduate school funding and another on different types of master's degree programs. SfN will continue to develop trainee programming and disseminate it via Neuronline.



SfN provides a variety of training and networking opportunities for young neuroscientists eager to share their science and learn from mentors and peers.

"Diversity is important because it brings about different perspectives. No matter what your background is, no matter where you live, where you're from, we all have something to contribute to the field of neuroscience."

— **Joyonna Gamble-George**, Neuroscience Scholars Program Fellow and graduate student at Vanderbilt University

Scientific rigor has also been a major focal point recently in the scientific training arena — not only for SfN but for the entire neuroscience field. SfN is hosting training modules on scientific rigor that reside on Neuronline with associated resources, allowing users to easily navigate through this clearinghouse of scientific training content. To learn more about SfN's efforts on scientific rigor, please see page 7.

SfN also provides training opportunities for high-achieving young neuroscientists from around the globe through its Latin America Training Program (LATP) and its funding of trainee participation in international conferences hosted by the Federation of European Neuroscience Societies, the International Brain Research Organization, and the Japan Neuroscience Society. In 2015, 88 young investigators from across Latin America and the Caribbean participated in online training activities as a part of LATP, which is funded primarily by the Grass Foundation, with supporting funding from SfN and others. In addition, with generous donor support, 15 of these scientists received stipends to attend SfN's annual meeting and with generous donor support, take part in a three-week, in-person scientific training course in Mexico.

CONNECTING DIVERSE AND GLOBAL COMMUNITIES

The success of the field requires the inclusion of varied voices, and SfN aims to advance this goal with its award-winning Neuroscience Scholars Program (NSP), targeted resources and programming specific to increasing women in neuroscience, and partnership with other scientific diversity programs.

NSP provides support for neuroscience trainees from diverse and underrepresented backgrounds through intensive mentoring and professional development resources. Currently, 169 trainees participate in the program, and 27 have been selected as NSP fellows. The fellows receive enrichment funds for career development opportunities as well as financial support to attend SfN's annual meeting, giving them the chance to present scientific abstracts and network with colleagues in person. In addition, SfN partners with the National Research Mentoring Network in order to increase learning and mentoring for scientists of diverse backgrounds.

SfN is also dedicated to increasing awareness about issues facing women in neuroscience and recently launched two toolkits as part of this effort. These members-only resources educate audiences about implicit bias and effective recruitment and evaluation strategies to increase diversity among faculty. The 30-minute, turnkey presentations incorporate compelling data and real-life success stories and live on Neuronline along with a collection of supplemental resources supporting women in neuroscience. While SfN creates valuable resources such as these toolkits, the Society's chapters and institutional program (IP) members serve vital roles in personalizing and distributing these resources at a local level.

SfN's 158 chapters worldwide facilitate activities such as local neuroscience conferences and Brain Awareness Week events. The Society is committed to supporting its chapters, and in FY 2016, SfN allocated more than $100,000 for chapter activities and established a Neuronline community forum dedicated to chapters, allowing them to connect with one another to discuss best practices and ideas for local events.

SfN provides neuroscientists from a diversity of backgrounds and from countries around the world with opportunities to connect with one another — both in person and online. Through SfN's programs, chapters, and Neuronline forums, neuroscientists form relationships with peers, develop a support network, and learn from experts in the field.

SfN also facilitates effective connections in the neuroscience community between employers and job seekers through the NeuroJobs Career Center. In FY 2016, more than 850 employers posted jobs seeking candidates from SfN's NeuroJobs pool of about 7,500 job seekers.

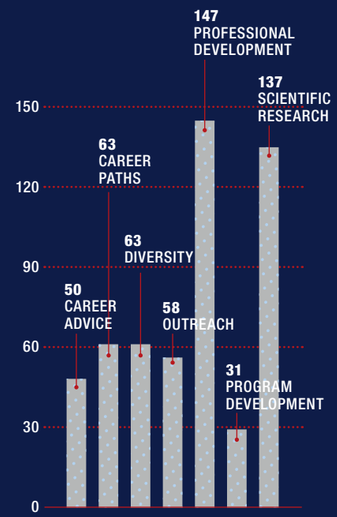
"SfN recognizes that diversity fuels excellence in science, and our programs seek to spark conversations about the global diversity of women's experiences, raise awareness of gender inequality, and develop possible strategies to fight against it."

— **Mara Dierssen**, chair of SfN's Women in Neuroscience Subcommittee

SfN is committed to diversity in neuroscience, including increasing awareness about the challenges women face in the field. The Society's Celebration of Women in Neuroscience event at the annual meeting brings together women to discuss solutions to these issues.

NEURONLINE CONTENT

As of July 2016, Neuronline featured 549 pieces of content in the form of articles, podcasts, webinars, and videos. Below is a breakdown by topic.



CONNECTING ON SOCIAL MEDIA

SfN maintains a strong social media presence to communicate and interact with its members.

38K
TWITTER FOLLOWERS

157K
FACEBOOK LIKES

6.9K
LINKEDIN FOLLOWERS

150K
YOUTUBE VIEWS

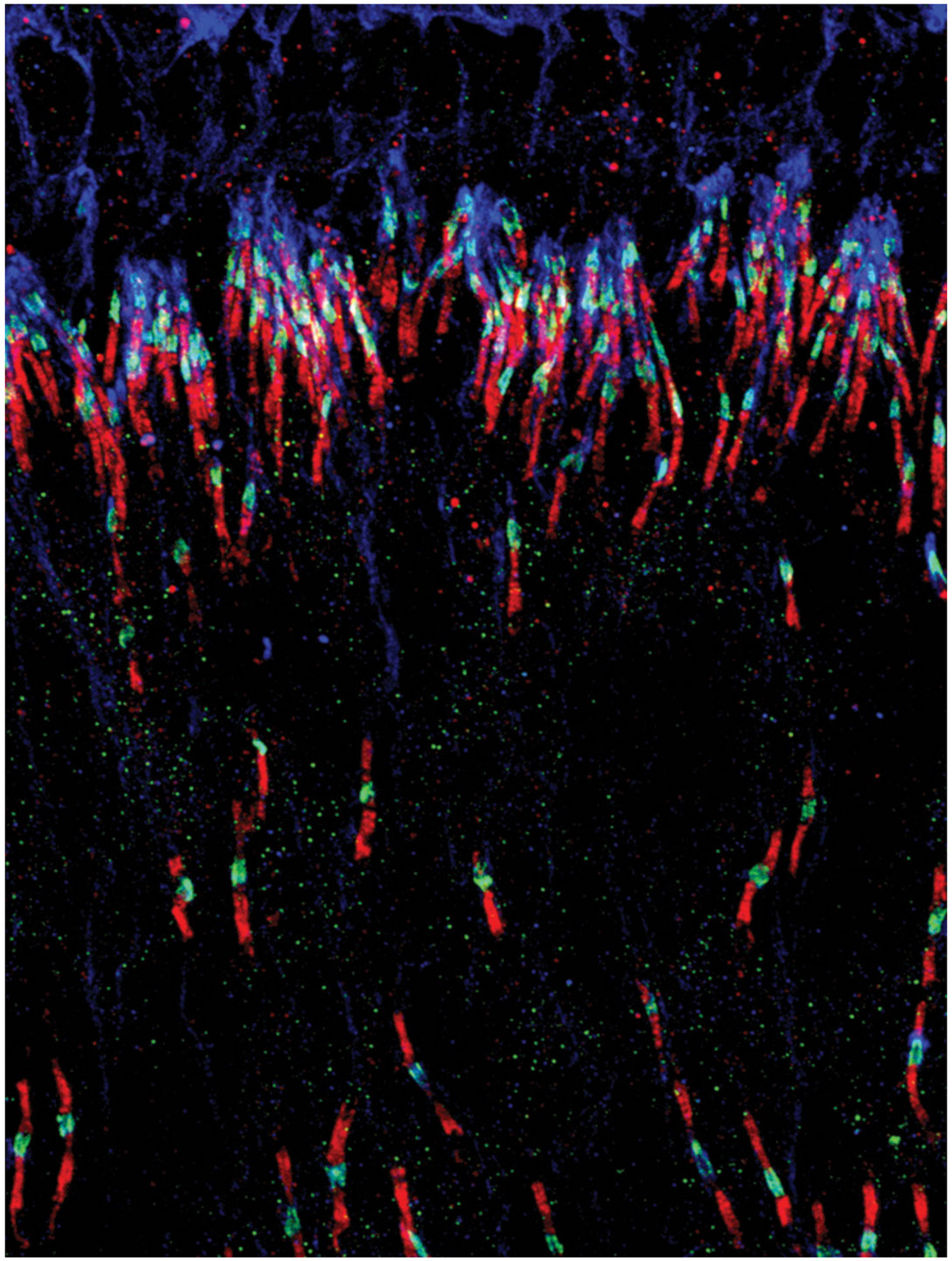


Fig. 4

Aided by certain proteins (blue), sodium channels (green) cluster in precise locations along rat auditory nerve fibers.

SCIENCE IN PROGRESS

FINDING NEEDLES IN HAYSTACKS

Genetics & Mental Disorders

While neuroscience is making strides in understanding mental illness, the almost-unfathomable complexity of the human brain makes the challenge great and each step of progress hard won. But today's researchers are developing new tools and strategies in this important human endeavor.

The first successful treatment for psychosis arose from a moment of serendipity. In 1952, Henri Laborit was searching for medications to calm patients prior to surgery. The drug he chose to explore, chlorpromazine, worked so well he recommended it to his colleagues in psychiatry, who found that it diminished the hallucinations and delusions of schizophrenia. This discovery spawned the development of dozens of similar drugs. But more than 60 years later, the seemingly intractable nature of schizophrenia has produced a treatment stalemate — almost all accepted medications alter the same aspect of brain chemistry as chlorpromazine and do not touch schizophrenia's disabling cognitive impairments. None of them alter the course of the disease.

Efforts to unlock the molecular underpinnings of schizophrenia — as well as other neurological disorders that emerge early in life like autism and bipolar disorder — have been stymied because living human brain tissue is rarely available for research and animals models, while useful, imperfectly mimic the disease.

Today, scientists are looking elsewhere — to patients' genes. Knowing schizophrenia, autism, and bipolar disorder run in families, researchers are unraveling the genetics of these disorders, offering new clues about the molecular mechanisms and suggesting novel avenues for treatment.

"The clue that had always been sitting there was that these disorders were highly heritable," says Steven Hyman, immediate past president of the Society for Neuroscience and director of the Stanley Center for Psychiatric Research at the Broad Institute. "The challenge has been that these illnesses are not caused by changes in one or a few genes, but by many small tweaks in a very large number of genes."

Each gene variation represents only a small genetic "nudge" toward a disease, rather than a hard shove. Possessing a genetic variant linked to schizophrenia doesn't guarantee a person will get the disease, and not every person with schizophrenia will have the same combination of genetic variants. Because of that, one study may identify a certain group of genes that contribute to schizophrenia, while a separate study of a different group of people may implicate a somewhat different set of genes.

"When you're looking for needles in haystacks, the only way to succeed is by studying many tens of thousands of people," Hyman says. Between the late 1980s and early 2000s, scientists made many attempts to find these genes, "but the technology was just not up to the challenge." Part of that was due to the high cost of genome sequencing, where scientists determine the exact order of DNA's chemical "letters." Sequencing the first human genome, which was completed in 2003 as part of the Human Genome Project, cost $3 billion.

But now, owing to the success of the Human Genome Project, scientists can sequence the entire human genome for about $1,500, making it feasible to study a lot of people. And, they can scan an entire genome for particular genetic variants quickly and simply with DNA microarrays. A glass slide about the size of a postage stamp, a DNA microarray contains millions of DNA fragments arranged in a checkerboard pattern. After extracting DNA from blood or saliva, scientists apply it to the chip. If a person's DNA matches a DNA fragment on the chip, they will bond, and by determining the genetic sequences that match, scientists can learn about a person's risk for developing schizophrenia or other disorders.

Technological advances and decreased cost have already revealed some of the genes behind schizophrenia. In 2009, scientists found the first evidence linking specific genes to schizophrenia. In 2014, the Schizophrenia Working Group of the Psychiatric Genomics Consortium — a worldwide collaboration of scientists that included researchers at the Stanley Center — combined all available data from genetic studies of schizophrenia and found 108 places in the genome that contribute to schizophrenia.

Scientists at the National Institute of Arthritis and Musculoskeletal and Skin Diseases prepare a DNA microarray for processing.

In 2016, researchers at the Stanley Center found one of the genes most strongly linked to schizophrenia encoded an immune protein that helps brain cells remove weak connections, or synapses. This process, called synaptic pruning, helps refine the brain's wiring during development, and the finding suggests this process may go awry in people with schizophrenia.

While this discovery might lead to new treatments in the future, it's a process that takes decades, Hyman says. "But we have our first informative, actionable clues, which come from genetics." The genes and the mechanisms behind the diseases — the needles in a haystack — are slowly beginning to come into view.

When you're looking for needles in haystacks, the only way to succeed is by studying many tens of thousands of people.

EDUCATING & ENGAGING THE PUBLIC

BrainFacts.org: Growing Neuroscience Knowledge

Inspiring Curiosity About the Brain

Enhancing public understanding of the brain is a pillar of SfN's mission and vital for the field in order to ensure continued support and investment in neuroscience research.

"The public is hungry for information about the brain, and we as neuroscientists have a responsibility to share our knowledge."

— **John Morrison**, *BrainFacts.org* Editor-in-Chief

SfN brings neuroscience to the forefront of society through an array of dynamic efforts, including publishing compelling content on *BrainFacts.org*, participating in Brain Awareness Week activities and science conferences, and engaging with the media. By connecting with a wide cross-section of audiences, SfN advances public knowledge of neuroscience around the globe and cultivates increased impact of brain research across society.

EXPANDING A GLOBAL AUDIENCE FOR *BRAINFACTS.ORG*

BrainFacts.org engages with millions of people about the great progress — and even greater potential — of this extraordinary field. As a trusted source for information on the brain, the award-winning website acts as a starting point for the public's interest in neuroscience to take root and expand. The product of a partnership between The Kavli Foundation, the Gatsby Charitable Foundation, and SfN, *BrainFacts.org* exposes visitors to a wealth of scientifically vetted content, including articles, videos, blog posts, images, interviews, podcasts, and educator resources.

BrainFacts.org continues to grow in content and reach, hitting more than 10 million page views since its launch in 2012 and with about 46 percent of the site's more than 5 million users from outside the U.S. In 2015, *BrainFacts.org* increased production and publication of original content by 50 percent. The site added new content partners — the American Brain Coalition, People Behind the Science, and BioInteractive — and doubled the amount of content published from its 19 formal and informal content partners.

In an effort to provide a richer experience for users, *BrainFacts.org* also began expanding its multimedia content. In addition to publishing video and audio stories from content partners, *BrainFacts.org* started producing original podcasts, webinars, and videos. The first podcast, "Sweet Talk: The Brain and Sugar," quickly became one of the site's most popular pieces, and the first video, "Appetite, Obesity, and the Brain," created a more engaging experience that resulted in viewers staying on the site for longer. In addition, *BrainFacts.org* hosted live webinars on new BRAIN Initiative technologies, the neuroscience of pain, and Brain Awareness Week (BAW), all of which garnered high interest on the site.

BrainFacts.org also worked to increase audience engagement by implementing new features on social media, including using Twitter GIFs to add animation to posts and polls to directly interact with followers. Looking toward the future, *BrainFacts.org* will continue to pursue new ways to increase its audience through use of multimedia and other tools such as YouTube.

BrainFacts.org received two awards in FY 2016 for making valuable contributions to society and education. The Silver Award from the American Society of Association

Executive's (ASAE) Power of A Awards recognized SfN's use of its unique society resources to solve problems and spur innovation through *BrainFacts.org*. The second award came from the Multimedia Educational Resource for Learning and Online Teaching (MERLOT), an international community of faculty and institutions collaborating to increase the quantity of high-quality online teaching materials. *BrainFacts.org* won the 2016 MERLOT Biology Classics Award, which recognizes outstanding peer-reviewed online resources, solidifying the site's role as an authoritative source of information about the brain and nervous system.

ADVANCING PUBLIC OUTREACH AND ENGAGEMENT

To help inform the public about the benefits of neuroscience research, each year SfN takes part in several outreach efforts and events, the largest of which is Brain Awareness Week (BAW). Launched by the Dana Alliance for Brain Initiatives, BAW is a worldwide celebration that brings together scientists, students, and communities to foster greater public interest in brain science and health. SfN promotes BAW by providing online resources to local SfN chapters, schools, and scientists interested in organizing educational events.

For BAW 2016, SfN hosted a webinar on *BrainFacts.org* to teach the public about human and animal brain anatomy. The webinar served as an interactive BAW experience for those who did not have a local event to attend or who wanted to supplement their events with additional activities. In addition, SfN's annual Brain Awareness Video Contest encouraged participants to create videos that explain a facet of neuroscience in an engaging and accessible way, and the winning videos are available on *BrainFacts.org*. SfN also hosts the D.C. Regional Brain Bee each year and acts as a sponsor of the U.S. and International Brain Bees. These neuroscience competitions for secondary school students aim to inspire them to pursue careers in biomedical research.

"Participating in outreach activities is vital for all scientists. My favorite activities are judging the Brain Bee, mentoring Science Olympiads, and running demonstrations at the USA Science and Engineering Festival. I've enjoyed each of these experiences for the unique ways they've taught me to relate to different audiences."

— **SfN volunteer Crystal Lantz**, postdoctoral fellow at the University of Maryland

Throughout the year, SfN members and staff also attended several conferences across the U.S. to spread the importance of neuroscience education. At the National Science Teachers Association National Conference, SfN's neuroscientist volunteers demonstrated hands-on activities and gave out resources that teachers could use to educate students about the brain. SfN also sponsored a workshop, "The Truth Behind Brain-Based Learning," led by Janet Zadina, an assistant professor of neurology at Tulane University. The workshop focused on debunking common neuroscience myths and is available on *BrainFacts.org*.

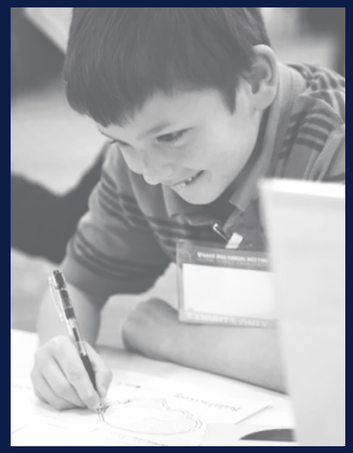
At the USA Science & Engineering Festival and the American Association for the Advancement of Science's (AAAS) Family Science Days event, SfN volunteers interacted with teachers, students, and the science-interested public by demonstrating some of the *BrainFacts.org* educator resource activities to promote neuroscience outreach.

NEUROSCIENCE IN THE NEWS

SfN also engages with the media as another avenue to inform the public about neuroscience and important news in the field. Media outlets around the world rely on SfN, *JNeurosci*, *eNeuro*, and *BrainFacts.org* to deliver information on the latest discoveries about the brain and their implications for public health. SfN communicates with the media frequently to provide expert member sources for neuroscience-related articles and to promote research coming out in SfN journals.

JNeurosci continues its long history as a reliable source of news about the brain, with nearly 7,000 news hits in FY 2016 in a wide variety of print and online media outlets around the world, including Bloomberg, *Scientific American*, CBS News, CNN, *The Huffington Post*, *The Daily Mail*, *Time* magazine, and more. And, as the world's largest event about brain science, SfN's annual meeting attracts hundreds of reporters and results in thousands of news hits around the globe about science debuting at the meeting.

SHARING NEUROSCIENCE WITH STUDENTS



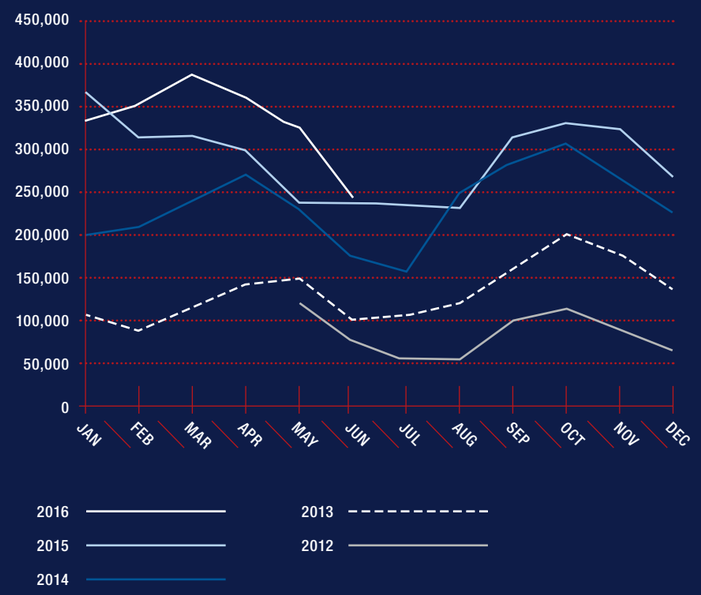
At the AAAS Family Science Days event, a young boy excitedly traces a picture by only looking in a mirror, discovering his brain's ability to quickly learn this challenging new task.

SfN members volunteer at events like Family Science Days in an effort to share their passion for neuroscience with young students and the public.

"Engaging with the public helps promote global understanding of neuroscience, inspires curiosity about the brain, and motivates future generations of potential scientists."

— **Charles Yokoyama**, member of SfN's Public Education and Communication Committee

BRAINFACTS.ORG MONTHLY PAGE VIEWS



BRAINFACTS.ORG BY THE NUMBERS

10.6M
PAGE VIEWS

5.3M
USERS

46%
OF USERS FROM OUTSIDE THE U.S.

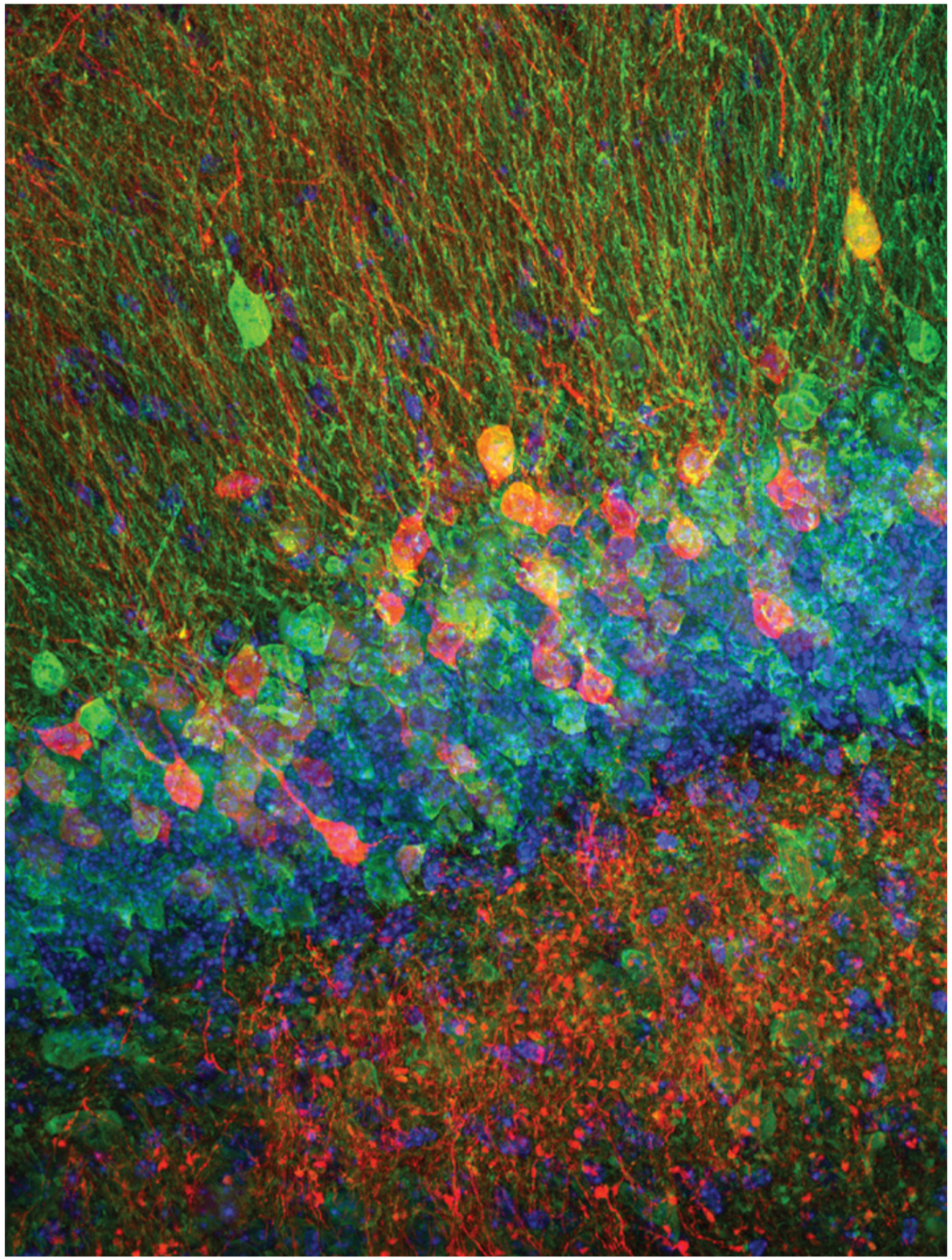


Fig. 5

New neurons (green and pink) arise in the dentate gyrus of an adult mouse.

SCIENCE IN PROGRESS

EXPLORING THE BRAIN'S GPS

Memory & Cognition

It's sometimes difficult to remember we once found our way without GPS. But we did. And, we still do. Whenever we explore a new city, walk in the dark, or travel a well-worn path, we rely on a network of specialized neurons deep within our brains to generate and maintain a cognitive map of our world. Efforts to tease apart that sophisticated network served as the basis for the 2014 Nobel Prize in Physiology or Medicine, even as scientists continue to explore the brain's navigation system.

"If we want to navigate, we have to have a way of knowing where we are going and how fast," May-Britt Moser told an audience at Neuroscience 2015 during her Presidential Special Lecture. "We have different types of cells that react to different aspects of space."

A SENSE OF PLACE

In 1971, John O'Keefe, then at McGill University and now at University College London, discovered the first component of the brain's GPS in the rat hippocampus — an area of the brain critical for memory. O'Keefe recorded the activity of single neurons as the animals roamed freely in their enclosure. He found certain neurons only fired when an animal moved through a particular spot of the enclosure. Naming these neurons "place cells," he posited that the hippocampus housed the brain's internal map of space where place cells represent an animal's current location as well as those visited in the past.

The discovery of place cells fundamentally changed the understanding of the hippocampus from a structure dedicated solely to declarative memories to one also critical for navigating in space. Two scientists visiting O'Keefe's lab in 1996 would build on that work.

ON THE GRID

Place cell activity alone couldn't account for the rat's ability to learn how to traverse its environment. O'Keefe's mentees, Edvard Moser and May-Britt Moser of the Kavli Institute for Systems Neuroscience at the Norwegian University of Science and Technology, explored this problem after discovering that place cells functioned even after disrupting part of the hippocampal neural circuit. Reasoning that the spatial signal arises elsewhere, the researchers also studied freely roaming rats, recording individual cells from a region of the brain with direct connections to the hippocampus: the entorhinal cortex.

Like place cells, some of the recorded cells were active in certain places and then fell silent. Unlike place cells, the entorhinal cortex cells only fell silent for a bit and then became active again. It wasn't until the team increased the size of the enclosure that it became clear that the cells became active at precise, repeating intervals. The activity of each individual cell formed a grid made out of regularly spaced triangles, much like a Chinese checkerboard. Discovered in 2005, "grid cells" have also been found in mice, bats, monkeys, and humans.

"This cell knows exactly where to be active and where to be silent," May-Britt Moser said, noting they seemed to create a set of very stable reference points for navigating specific environments. And, because grid cells serve as an input to the place cells, the Mosers' team speculated the grid cell is deciding about distances in the environment. John O'Keefe, Edvard Moser, and May-Britt Moser won the Nobel Prize in 2014 for their discoveries of place cells and grid cells.

THE BRAIN'S COMPASS AND SPEEDOMETER

While place cells and grid cells are vital to creating an internal map, that map needs information that all GPS systems need in order to truly help us navigate — the direction in which we are moving and how fast we are doing it.

In 1984, James Ranck of the SUNY Downstate Medical Center described the first "head direction cells," neurons outside the hippocampus and entorhinal cortex that fire in response to the direction a rat is facing. In 2006, the Mosers' team found "head direction cells" in the entorhinal cortex where they could interact with grid cells. The group then identified a set of cells in the same area of the brain that discerned the edges of an environment, which they named "border cells."

Finding cells to discern an animal's speed took creativity: The Mosers' team built a mini bottomless "Flintstone" car on a track. Rats would run toward a chocolate treat at a speed set by researchers. They found cells in and around the entorhinal cortex that fired faster when the rat was running more quickly and slowed down as the animal reduced its speed. The way these "speed cells" fired in concert with the speed of the animal was so consistent that researchers could determine the speed of the animal just by looking at the recordings from about a half dozen of the animal's speed cells.

A ROADMAP IN OUR HEADS

Researchers continue to discover compelling insights about the brain's GPS. For example, the Mosers' lab raised rats in a spherical enclosure lacking defined edges and, therefore, lacking input from border cells. Because grid cells develop later than place and border cells, they fail to function properly if rat pups don't learn about boundaries during the first 14 days after they open their eyes. These rats lose a critical part of their navigational repertoire.

The understanding of the navigational circuit is feeding back into some of the most difficult problems in neuroscience. The ability of the brain's internal map to adapt provides mechanisms by which we may consolidate our memories. And, because the entorhinal cortex is damaged early in the course of Alzheimer's disease, its critical role in navigation not only provides insight into why getting lost is one of the first symptoms of Alzheimer's, but offers new avenues for exploring and potentially ameliorating the disease.

"This is just an amazing story," May-Britt Moser told her audience at Neuroscience 2015. And one that promises to continue to capture the scientific imagination.

ADVOCATING FOR THE FIELD

The Fight for Robust, Sustained Funding

Responsible Use of Animals in Research

The growing fascination with the brain among the public and policymakers highlights the essential role of advocacy efforts worldwide.

"It was energizing to be a part of the process and to advocate for science in a way I've never done before, in a way that feels like it might actually make a difference. … I challenge every scientist to schedule at least one meeting in the next year with their representative to advocate for science funding."

—**Amanda Dettmer**, SfN Early Career Policy Ambassador, writing for the blog Speaking of Research

In the U.S. and elsewhere, this interest is driving efforts to increase support for neuroscience research, and early signs indicate that those activities are paying off. For example, after years of stagnant budgets in the U.S., including the disastrous sequestration budget of 2013, SfN and its members worked with other biomedical research advocacy partners to help reverse that trend, laying the foundation for a positive funding trajectory going forward.

Years of calculated and persistent advocacy by SfN and its partner organizations, such as Research!America, culminated in Republicans and Democrats in the U.S. Congress prioritizing biomedical research in a FY 2016 federal budget that:

- **Allocated an additional $2 billion for NIH — the strongest support for the agency since 2003.**
- **Increased NSF funding to $7.5 billion.**
- **Provided the highest investment in the BRAIN Initiative since the program's launch.**

Speaking about this budget and the importance of advocacy engagement, U.S. Rep. Tom Cole (R-OK) told an audience of advocates, including SfN, at the Research!America awards dinner where he was honored: "I know you... wonder whether or not it makes a difference as you educate members, and you talked about everything from personal stories to 'here's the economics of this year and the value of this to our society.' It made a difference."

The FY 2016 budget is a significant step toward getting biomedical research agencies on the path of robust, predictable funding, and SfN built on that momentum by advocating for strong federal funding levels in FY 2017, including a 10 percent overall increase for NIH funding and $8 billion for NSF. SfN President Hollis Cline submitted testimony to the committees overseeing NIH and NSF funding, noting, "It is time to return research to a trajectory of sustained growth that recognizes its promise and its importance for health and that will serve as a springboard for economic development."

Cline led SfN in taking that message directly to U.S. legislators in March for the Society's 10th annual Capitol Hill Day, where 52 SfN members from 20 states met with 71 congressional offices. Visiting legislators and communicating with Congress directly "just humanizes the whole process, humanizes the scientific endeavor," Cline said.

For the fourth year, 12 young neuroscientists in the Early Career Policy Ambassadors Program joined Cline and other SfN members at Hill Day. The yearlong ECPA program educates early-career researchers about science policy and how to become effective advocates. One of the ambassadors, Amanda Dettmer, described her experiences in a four-part series on the website Speaking of Research. In addition to advocating for funding, Dettmer focused her discussions with lawmakers on the impact of the closure of the NIH animal facility where she works, noting that early-career scientists and the next generation of researchers "must now re-evaluate their career plans."

SUPPORTING RESPONSIBLE USE OF ANIMALS IN RESEARCH

SfN continues to expand the reach and impact of its advocacy efforts on behalf of the responsible use of animals in research. The Society has engaged in ongoing conversations with NIH regarding the use of nonhuman primates in research and submitted a letter to the Australian government opposing a bill banning the importation of captivity-bred nonhuman primates. Further, SfN President Hollis Cline and Committee on Animals in Research Chair Mar Sanchez penned an op-ed in *The Hill* newspaper championing the critical importance of animals in neuroscience research.

As a longtime leader in advocating for responsible animal research, SfN maintains a set of resources online for institutions and scientists seeking to protect their work from animal rights extremists. In addition, the Animals in Research Panel at Neuroscience 2015 focused on reinforcing the value of animal research for public audiences.

CATALYZING INTERNATIONAL ADVOCACY EFFORTS

"It is of the utmost importance that organizations such as IBRO and SfN engage together in advocacy initiatives worldwide to sensitize decision-makers to the importance of maintaining strong financial support for neuroscience research."

— **Pierre Magistretti**, president of the International Brain Research Organization

As part of its international efforts, SfN supports the Global Advocacy Initiative led by the International Brain Research Organization (IBRO). In collaboration with organizations including the Federation of European Neuroscience Societies (FENS), the Japan Neuroscience Society, the Australian Neuroscience Society, and the Dana Alliance, the Global Advocacy Initiative aims to build support among key policymakers and opinion leaders worldwide for increased resources for research and public education concerning the brain and the nervous system.

As part of this initiative, SfN and other members contributed financial support for IBRO's first Global Advocacy Seed Grants. These grants fund programs emphasizing culturally relevant local content and programming along with global coordination and communication. Applications for the second round of Global Advocacy Seed Grants are under consideration, and IBRO expects to announce the grant recipients in fall 2016. The Society for Neuroscience will continue to collaborate on the international stage to build on the momentum created through the Global Advocacy Initiative and related programs and support its members around the world.

Finally, SfN continues to partner with the Canadian Association for Neuroscience and the Society's Mexico chapters to assist with advocacy efforts across North America. This support will help both groups engage in science advocacy and public outreach that raise the profile of neuroscience in Canada and Mexico.

CREATING AN ACTIVE ADVOCACY NETWORK

Joining SfN's Advocacy Network remains a key way for neuroscientists to learn about funding and policy news and to take action on these items. SfN's online tools help neuroscientists contact lawmakers, learn how to host lab tours (such as the successful tours at the University of Cincinnati and George Washington University), and prepare to speak to the public about the importance of supporting science.

SfN also encourages its Advocacy Network members to connect with one another, and in a first, the 2015 annual meeting featured a networking reception for scientists interested in advocating for the field. U.S. Rep. Jan Schakowsky (D-IL) addressed attendees on the importance of communicating to lawmakers the value of scientific research.

In response to SfN members' expressed desire to see the Society expand its advocacy activities, SfN is working with members at all careers stages on how to engage with policymakers as well as coordinating with partners, both in the U.S. and around the world, to drive home the importance of biomedical research funding.

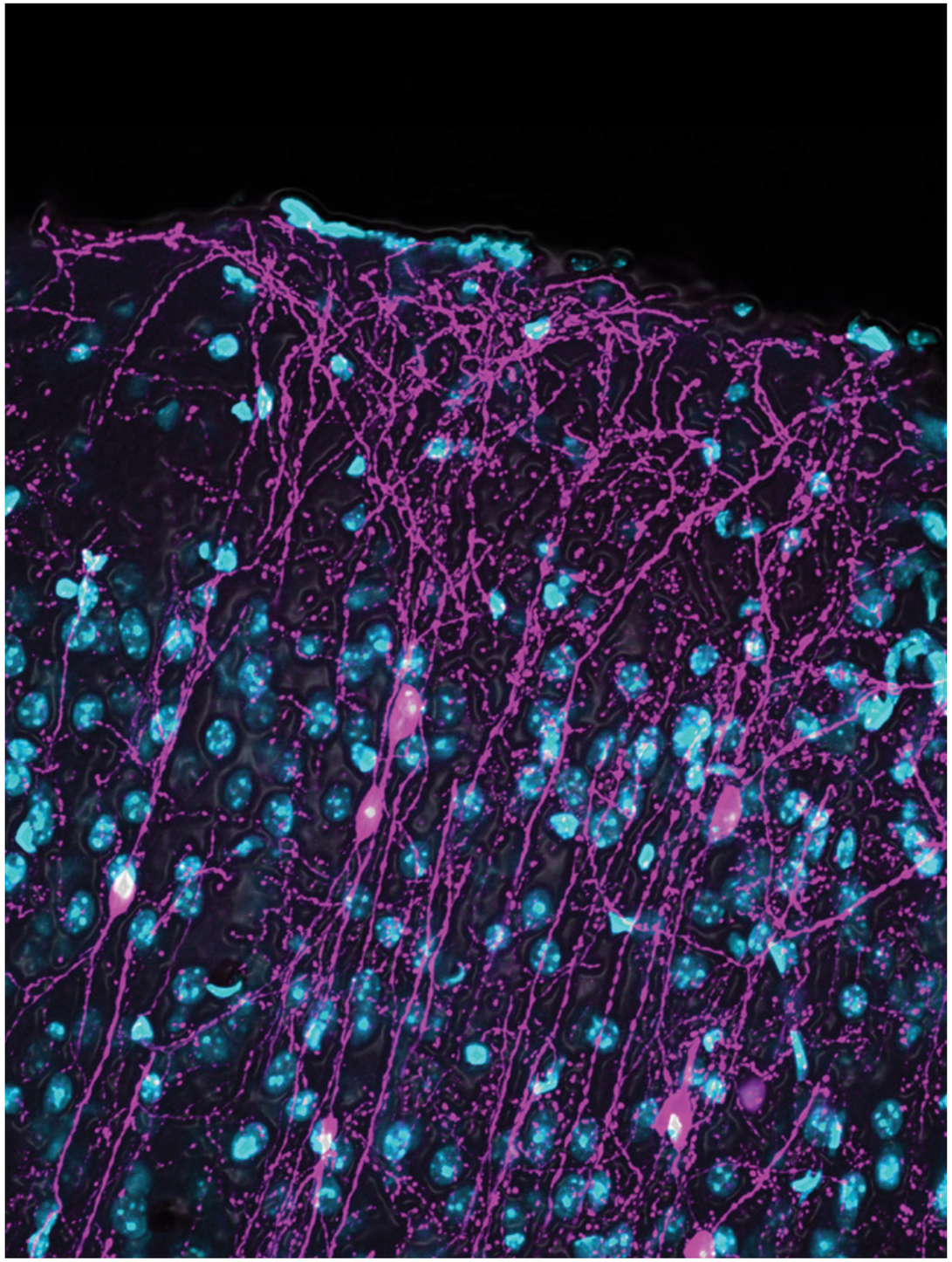


Fig. 6
Interneurons in the mouse somatosensory cortex.

Financial Highlights: Investing in Our Mission

Neuroscience progress happens discovery by discovery, year by year, creating a foundation of knowledge and understanding for future generations to build upon. Similarly, the Society works to pursue its mission and attend to its financial health, undertaking year-by-year decision-making to serve its members while balancing expected revenues and expenses.

"Your generous donations opened a door of opportunities for me, which helped me in developing skills that I need when I start my own laboratory."

— **Tahani K. Alshammari**, Trainee Professional Development Award winner and graduate student at the University of Texas Medical Branch

This careful attention supports SfN's long-term strategy to ensure it remains on a solid financial footing and allows successive generations of Society leaders to invest in programs and activities to meet evolving field needs. Although faced with continued uncertainty in scientific funding for its members around the world, SfN has maintained its financial strength. With wise expense management in the face of some revenue pressures, the Society ended FY 2016 with a net operating surplus of $1.4 million. Society leadership also began exploring ways SfN could potentially leverage its resources to invest in the future of the field and its members.

SCIENTIFIC VALUE, WISE INVESTMENT DRIVE FINANCIAL PERFORMANCE

Designed to meet the Society's scientific goals and serve the field, the annual meeting and SfN's two scientific journals are strong revenue sources for the Society. These programs and membership revenue contributed to SfN's FY 2016 total revenue of $27 million. These funds are redeployed to support other important mission-driven activity, including professional development and training programs for members, strong advocacy activity, and global outreach and education efforts. Additionally, funds from SfN's ownership of its headquarters building, which remains fully occupied, also support the Society's mission. In the face of volatility in the financial markets, SfN's reserve balance — established to protect the Society from a major, extended economic downturn or other significant event — performed solidly, reaching $57.7 million on June 30, with growth primarily due to transfers made to the reserves.

FLAT FEES, NEW PROGRAMS PRIORITIZE MEMBER NEEDS

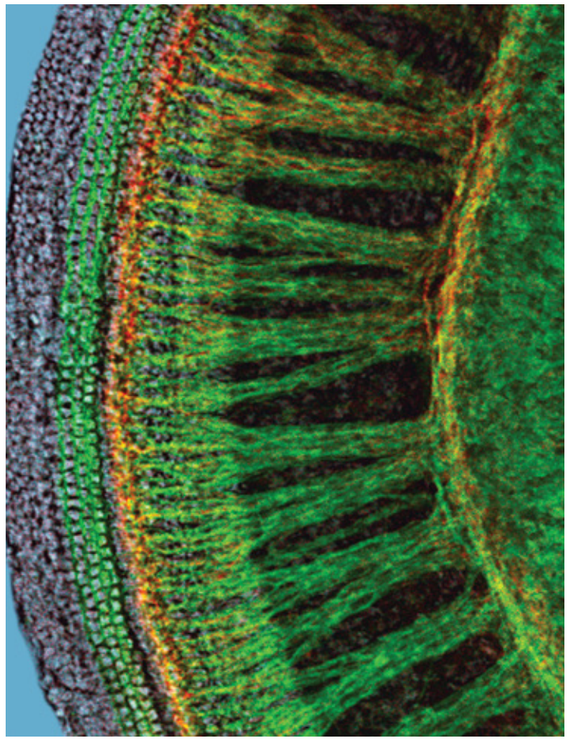
In light of continued financial strain for many scientists and to help build greater awareness about the value of SfN membership, the Society's leadership felt strongly about containing those fees that most affect members. Therefore, in calendar years 2017 and 2018, membership dues and journal publishing fees will remain flat at calendar year 2016 levels. In addition, to reward and encourage membership, the Society will maintain substantial discounts for members on major SfN programs, including journal publishing and annual meeting registration. SfN also introduced expanded members-only programming — several webinars and a virtual conference — to provide unique value for those who invest in the Society's programs through their membership.

OUTSIDE SUPPORT FOR THE SOCIETY'S MISSION

The Society also receives some financial support from external sources, including federal and private grants, corporate funders, and individual donations. SfN's annual campaign fund, the Friends of SfN Fund, continues to thrive, allowing SfN to support public education and outreach initiatives, as well as Trainee Professional Development Awards. These awards go to young neuroscientists so that they can attend the SfN annual meeting to present their scientific abstract, discover the latest research in the field, and network with senior scientists. In FY 2016, the fund received more than $52,000 from 707 donors in support of these key initiatives, a jump in the number of people giving from the previous year.

LOOKING TO THE FUTURE: RESERVE PERFORMANCE, PROGRAM INVESTMENT

SfN's leadership has long recognized the importance of protecting the Society from unforeseeable financial hardship, whether in the form of a long-term economic slowdown or a cancelled meeting due to weather or other calamity. For this reason, leadership established a prudent plan to develop necessary reserves. As SfN has now reached its reserve target, leadership has begun a thoughtful discussion of forward-looking reserve goals, member needs, and programmatic opportunities. In FY 2016, the SfN Council completed an assessment to confirm that the organization's potential liabilities were sufficiently covered and determined that up to $1.5 million annually could be deployed for investment in enhancing member programs. In the year ahead, the SfN Council will discuss possible strategies for investment and explore possible directions with the community.

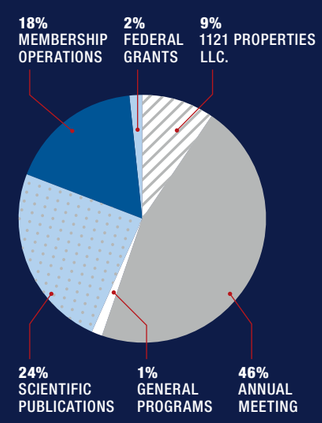


Sensory (green) and motor (red) neurons in the newborn mouse cochlea.

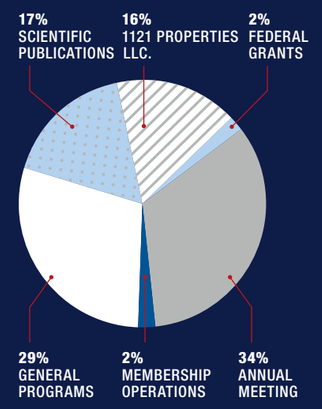
"In recognition of continued financial strain for many scientists, SfN will freeze individual membership dues and journal publishing fees for 2017 and 2018, allowing neuroscientists to continue taking advantage of SfN's many member benefits."

— **Michael Stryker**, SfN treasurer and chair of the Finance Committee

FY 2016 REVENUE: $29,768,389*



FY 2016 EXPENSE: $28,782,491*



*Unaudited

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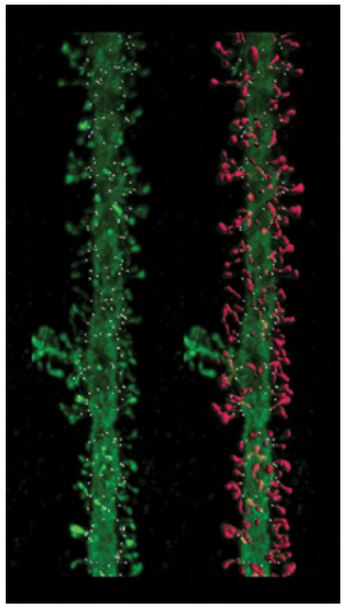

Dendrite from a human cortical neuron (left) and a 3D reconstruction (right) highlighting locations of dendritic spines (pink).

FRONT COVER: A confocal micrograph of a sagittal brain section showing the axonal projection from the external globus pallidus to the dorsal striatum in an Npas1-Cre mouse. Courtesy, with permission: Glajch et al., 2016, *The Journal of Neuroscience* 36(20): 5472–5488.

INSIDE COVER: Sodium channel immunofluorescence in axons of retinal ganglion cells. Bundles of labeled ganglion cell axons (vertical "tree trunks") run across the surface of the retina in this view of a flat-mount retina stained with a pan-specific sodium channel antibody. The intensity scale is inverted so that bright objects appear black. In addition, short segments of intense sodium channel labeling ("tree twigs") are found at the axon initial segments, between the axon bundles. More dimly labeled ganglion cell bodies ("tree leaves") can also be seen. The sodium channels at the initial segment are a distinct subtype, $Na_V1.6$, which is required for optimal repetitive firing of retinal ganglion cells. Courtesy, with permission: Van Wart and Matthews, 2006, *The Journal of Neuroscience* 26(27): 7172–7180.

PAGE 2: This cochlear epithelial whole mount from a neonatal mouse shows sensory hair cells (red) and olivocochlear efferent neurons lacking the protein adenomatous polyposis coli (APC, green). Input from olivocochlear efferents is necessary for the normal development of mechanotransduction in sensory hair cells. The loss of APC neonatally in these efferents leads to reduced hearing and abnormal afferent synapse development. Courtesy, with permission: Hickman et al., 2015, *The Journal of Neuroscience* 35(24): 9236-9245.

PAGE 4: Subunits of voltage-gated potassium channels are distributed differentially within functional microdomains of the auditory nerve. Kv1.2 subunits (green) localize to the somatic membrane and juxtaparanodes of spiral ganglion neurons, whereas Kv3.1b subunits (red) are apparent at nodes of Ranvier. Courtesy, with permission: Smith et al., 2015, *The Journal of Neuroscience* 35(32): 11221–11232.

PAGE 14: Nestin-GFP-expressing cells in the dentate gyrus of the adult mouse hippocampus, rendered using a depth-coding palette. A small proportion of Nestin-GFP-expressing cells coexpress the epithelial growth factor receptor (cells with black puncta). These cells are predominantly neurosphere-forming precursor cells. The adult hippocampus contains two phenotypically similar populations of quiescent neural precursors that are activated by different stimuli. Courtesy, with permission: Jhaveri et al., 2016, *The Journal of Neuroscience* 35(21): 8132–8144.

PAGE 15: Courtesy of Michael Lehman.

PAGE 20: Heminodes and nodes on auditory nerve axons in the cochlea are labeled with NaV1.6 (green), Ankyrin-G (blue), and Caspr (red) in the distal osseous spiral lamina of a 17-d-old rat. During postnatal maturation, axon initial segments are positioned adjacent to the habenula perforata (top). Courtesy, with permission: Kim and Rutherford, 2016, *The Journal of Neuroscience* 36 (7): 2111–2118.

PAGE 21: Courtesy of the National Institute of Arthritis and Musculoskeletal and Skin Diseases.

PAGE 26: Dentate granule cells in the hippocampus of an adult mouse that lacks TRIM9 ubiquitin ligase. These cells, labeled with red and green florescent proteins, exhibit occasional ectopic migration into the molecular layer. Courtesy, with permission: Winkle et al., 2016, *The Journal of Neuroscience* 36(18): 4940–4958.

PAGE 30: Courtesy of Pierre Magistretti.

PAGE 31: These vasoactive intestinal peptide (VIP)-expressing interneurons in mouse somatosensory cortex were targeted with a modified rabies virus system to label their brain-wide monosynaptic inputs. Many VIP-expressing interneurons exhibit a striking bipolar morphology, with primary neurites that run perpendicular to the cortical surface. Courtesy, with permission: Wall et al., 2016, *The Journal of Neuroscience* 36(14): 4000-4009.

PAGE 33: This differential-interference-contrast image overlain with fluorescence images shows sensory (green) and motor (red) neuron innervation in newborn mouse cochlea. By the day of birth, sensory projections from spiral ganglion neurons and motor neurons have extended from the brain to the organ of Corti through "fanned" radial bundles. While motor neuron axons terminate below inner hair cells at this stage, sensory neurons contact inner and outer hair cells. Courtesy, with permission: Druckenbrod and Goodrich, 2015, *The Journal of Neuroscience* 35(49): 16221-16235.

PAGE 34: Confocal microscope image showing an example of a labeled apical dendrite of the human neocortex. White dots represent the points of insertion of each individual dendritic spine in the dendritic shaft. 3D reconstruction of each individual dendritic spine is shown in red. Courtesy, with permission: Morales et al., 2016, *The Journal of Neuroscience* 34(30): 10078-10084.

PAGE 36: The image shows the close association between the processes of retinal microglia and presynaptic and postsynaptic structures in the retina. GFP-expressing microglia (green) located in the outer plexiform layer of the retina of a 2-month-old adult *CX3CR1*$^{GFP/+}$ transgenic mouse are in close physical contact with presynaptic axon endings from cone photoreceptors labelled with cone arrestin (red) and postsynaptic rod bipolar dendrites labelled with PKCα (blue). Courtesy, with permission: Wang et al., 2016, *The Journal of Neuroscience* 36(9): 2827–2842.

BACK COVER: This drawing by Santiago Ramón y Cajal, published in 1904, depicts the six layers of the mouse neocortex.

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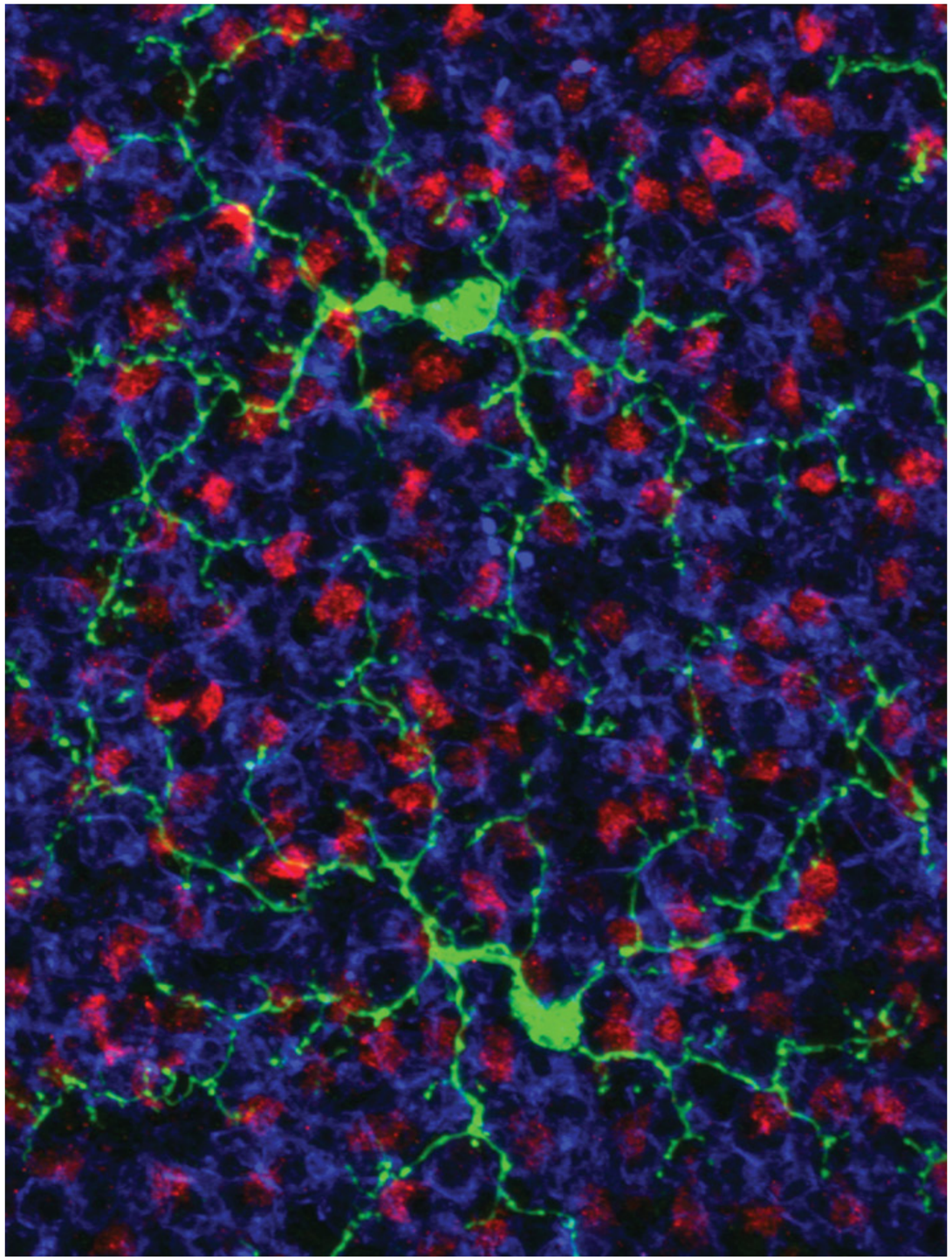

Fig. 7

Microglia (green) support synapses formed by axon terminals (red) and dendrites (blue) in the mouse retina.

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