

SAINS SCIENCE

علوم پاڤه CIÊNCIA

ZNANOST 과학 سائنس

WETENSCHAP NAUKA VĚDA

WISSENSCHAFT العلم CIENCIA

գիտություն SIYANSI သိပ္ပံ HAY

TIEDE BİLİM TEADUS SAINS বিজ্ঞান

VIDENSKAB 科學 ၓ၅၆၇၈၉၀၁၂၃၄၅ Ἐπιστήμη

հայն LASYANS 과학 TUDOMÁNY VÍŚINDI ԵՄ

SAIDHEANS SCIENZA ZINĀTNE SCIENCE MOKSLAS 科学

WĚSSENSCHAFT វិទ្យាសាស្ត្រ SAENSE XJENZA AGHAM

วิทยาศาสตร์ สູຕິນຖັ ພິພິທະພັນ ຍາອາ ວິທະຍາ VITENSKAP HAMUT'AY

WETENSKAP ԾիճճաՅ VETENSKAP KHOA HỌC ISAYENSI SAYANSI

VEDA သိပ္ပံ വിज्ञान SAINS SCIENCE علوم پاڤه CIÊNCIA ZNANOST

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ISAYENSI SAYANSI VEDA သိပ္ပံ വിज्ञान SAINS SCIENCE سائنس CIÊNCIA ZNANOST

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TUDOMÁNY VÍŚINDI ԵՄ SAIDHEANS SCIENZA ZINĀTNE MOKSLAS

科学 WĚSSENSCHAFT វិទ្យាសាស្ត្រ SAENSE XJENZA AGHAM SCIENCE

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WETENSKAP ԾիճճաՅ SCIENCE VETENSKAP KHOA HỌC

LEVERAGING OPPORTUNITIES *for* SCIENCE IN UNPREDICTABLE TIMES

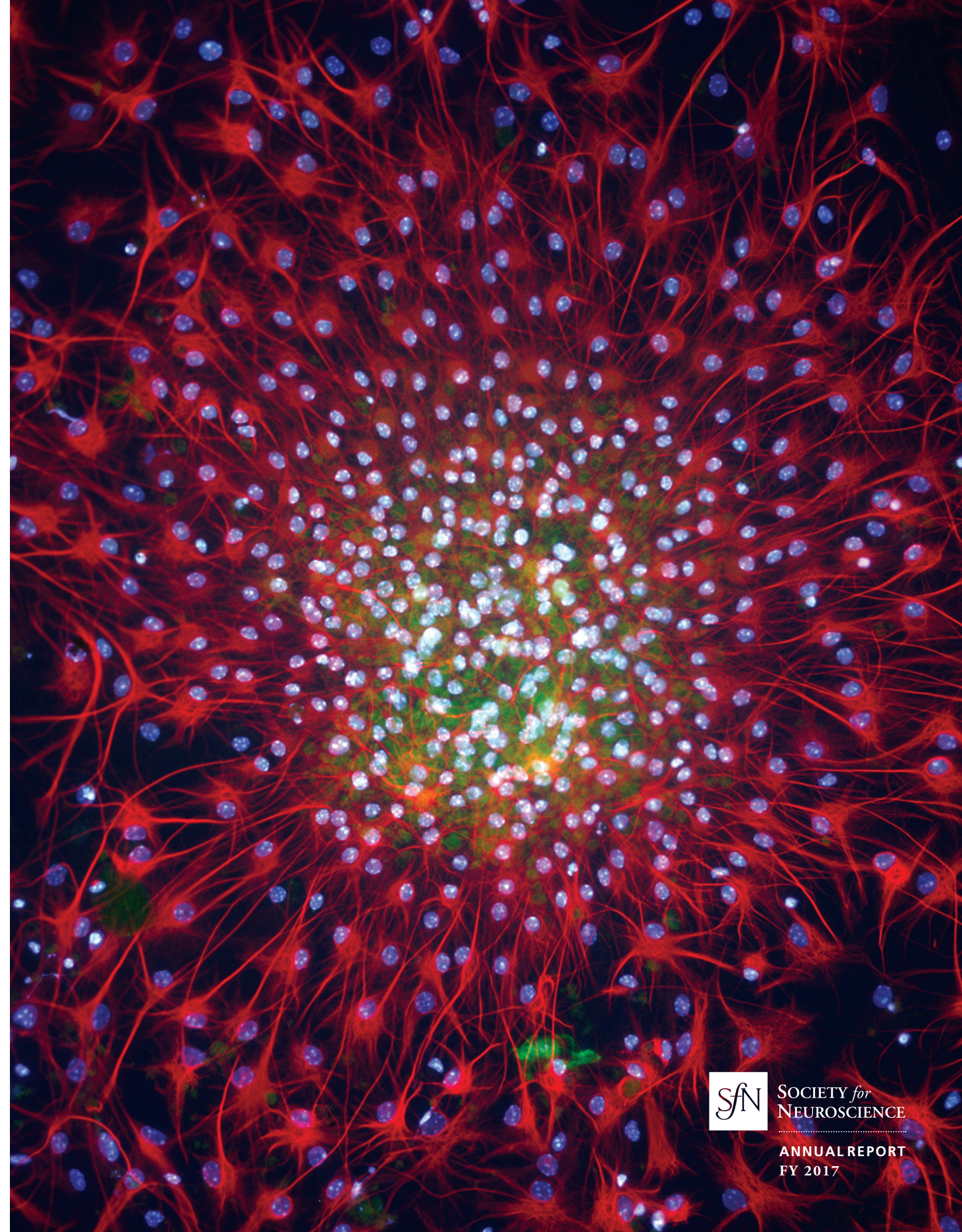


SOCIETY *for*
NEUROSCIENCE

ANNUAL REPORT
FY 2017

“SfN remains deeply committed to its core value of supporting, engaging, and welcoming diverse voices and scientific exchange between scientists of all nationalities. That core value is not going to change.”

.....
HOLLIS CLINE, *SfN Past President*



SOCIETY *for*
NEUROSCIENCE

ANNUAL REPORT
FY 2017

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 and 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.

COVER: Differentiated astrocytes expressing glial fibrillary acidic protein (red), migrating outward from a neurosphere after treatment of neural precursors with bone morphogenetic protein 4. Nuclei are stained blue.

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SCIENCE *in* PROGRESS

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

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EXPLORING HOW SENSORY EXPERIENCE SHAPES THE DEVELOPING BRAIN / 20

NEUROGRID: A POWERFUL TOOL FOR BASIC RESEARCH / 26

Leveraging Opportunities for Science in Unpredictable Times

THE SCIENTIFIC COMMUNITY AND ITS ADVOCATES HAVE COME TOGETHER THIS YEAR IN AN UNPRECEDENTED INTERNATIONAL SHOW OF SUPPORT FOR SCIENCE AS WE FACE A CLIMATE OF UNCERTAINTY AND VOCAL SKEPTICISM OF THE VALUE OF SCIENCE AND DISCOVERY.



Eric J. Nestler, SfN President

Scientists increasingly are making their voices heard and translating the importance of the scientific endeavor to our society, as evidenced by the more than 1 million people in 600+ cities around the world who came together to March for Science in April. With our community of scientists, institutions, and organizational partners around the globe, the Society for Neuroscience is a vital part of this movement, leveraging opportunities to promote and advance neuroscience.

With enthusiastic support from the SfN Council, the Society made significant strategic investments in fiscal year 2017 to grow our programs in ways that help address the challenges facing the field and its nearly 37,000 members worldwide. This report offers an update on SfN’s evolving programs and activities focusing on the annual meeting, scientific journals, public outreach, and advocacy, and I encourage you to visit SfN.org often to learn more and find out how to get involved.

ELEVATING INNOVATIVE PROGRAMS FOR A GLOBAL MEMBERSHIP

SfN’s annual meeting and scientific journals continue to serve as a strong foundation for both the Society and the field at large. More than 30,000 members of the global neuroscience community gathered in San Diego for Neuroscience 2016, where the diversity of attendees and research showcased the increasingly interdisciplinary and international nature of basic and clinical neuroscience. All neuroscientists, regardless of their background, their age, their country, etc., are welcome at the annual meeting, thereby ensuring inclusive scientific discourse and interactions that strengthen the field.

Meanwhile, *JNeurosci*, SfN’s flagship journal, expanded to meet the changing needs of its authors and the publishing environment, while *eNeuro*, SfN’s rapidly growing open-access journal, experienced tremendous growth in its second full year. Both journals are committed to

promoting high-quality science while also striving to improve our authors’ publishing experience.

Supporting members at all career levels in their professional development goals remained a priority for the Society in FY 2017. SfN created a variety of new online offerings, including a daylong virtual conference on glial cells, which allowed members around the world to take part in career development and scientific training regardless of where they live or work. Neuronline, SfN’s members-only home for learning and discussion, also added hundreds of new online resources this year that members can access on demand.

ESCALATING ADVOCACY EFFORTS TO SUPPORT THE FIELD

SfN’s expanding advocacy programs and partnerships in FY 2017 reflect the increased desire of our members to engage with their policymakers to urge robust funding for biomedical research and favorable scientific policies grounded in facts. The Society focused on creating an ever-stronger U.S. advocacy voice for neuroscience, including efforts to engage and train members in grassroots advocacy, develop neuroscience “champions” in Congress, and enhance advocacy communications.

SfN worked with local neuroscientists in targeted congressional districts and states to cultivate relationships with their lawmakers and raise the profile of neuroscience within Congress. The Society also sought to make it as easy as possible for all of its members to engage in advocacy year-round by providing guidance on effective strategies for communicating the importance of federal funding for science. In addition, SfN partnered with national and global scientific organizations on a range of efforts, such as supporting increased funding for research, endorsing the March for Science, and opposing policies that would hinder global scientific collaboration, which is essential for the advancement of the field.

RESHAPING BRAINFACETS.ORG FOR GREATER ENGAGEMENT

When people connect with science in their everyday lives and understand more fully that scientific research is the key to finding solutions to our public health crises, such as the United States’ skyrocketing opioid epidemic and the mounting prevalence of Alzheimer’s disease, they actively support research funding. Since its launch more than five years ago, *BrainFacts.org* has contributed to building knowledge of neuroscience by disseminating accurate, compelling information about the brain.

In FY 2017, SfN began work on a *BrainFacts.org* redesign, which debuted in fall 2017, to enhance engagement through more interactive content and storytelling with an audience-centric focus. With ongoing support from founding partners, The Kavli Foundation and the Gatsby Charitable Foundation, and new investment from the Wellcome Trust, *BrainFacts.org* provides multifaceted opportunities for non-scientists to learn about the brain, growing respect for neuroscience and highlighting its remarkable promise.

THANK YOU TO A DIVERSE COMMUNITY OF VOLUNTEERS

SfN members are an exceedingly diverse global community of individuals at all ranks in academia and industry, all working toward the greater goal of understanding the brain and nervous system. I feel honored to have had the chance to serve as the leader of such a passionate and dedicated group of neuroscientists. Without you and your commitment to our field, the many accomplishments that SfN achieved this year would not have been possible. Thank you to all of the volunteers who donated their valuable time to the Society and to advancing the field of neuroscience. ///

Eric J. Nestler
ERIC J. NESTLER
President

ADVANCING SCIENTIFIC EXCHANGE

SfN ANNUAL REPORT / FY 2017 / Advancing Scientific Exchange

Neuroscience 2016: A Venue for International Collaboration

DESPITE THE SCIENTIFIC, FUNDING, AND POLITICAL CHALLENGES FACING NEUROSCIENTISTS AND THE SCIENCE COMMUNITY AS A WHOLE, NEUROSCIENCE 2016 REAFFIRMED SFN'S COMMITMENT TO THE FREE EXCHANGE OF IDEAS AND GLOBAL COLLABORATION IN SCIENCE.

“I love going to SfN’s annual meeting because it gives you a bird’s eye view of the field ... so that when you fly home to your nest you’re inspired to work on the most exciting research.”

ELISE PIAZZA

*Postdoctoral Fellow at the Princeton
Neuroscience Institute*

SfN’s annual meeting continues to support these core ideals, as evidenced by the 30,303 attendees at Neuroscience 2016, more than 9,500 of whom came from outside the U.S., representing 76 countries. Recognizing the immense value of face-to-face time with their colleagues from around the world, these neuroscientists traveled to San Diego to exchange knowledge on the most recent discoveries in the field.

In convening this global neuroscience community, SfN’s annual meeting exemplifies the benefits of international collaboration, connecting both individual scientists and scientific communities in order to inspire and create opportunities for future research.

The increasingly interdisciplinary and global nature of neuroscience is reflected in the research, the programs, and the attendees at SfN’s meeting each year. Scientists from across

the neuroscience field can be found walking the poster floor, browsing the Exhibit Hall, and chatting in the corridors of the convention center. As the meeting continues to grow, it evolves to meet the needs of SfN’s members and the field.



The Neuroscience 2016 poster floor was a hub for conversation and collaboration among neuroscientists, nearly one-third of whom came from outside the U.S. to attend the annual meeting.

LEFT: Green fluorescent protein in red, green, and blue (RGB) cones in the zebrafish retina are restrictively expressed by a rainbow enhancer.



The annual meeting's scientific sessions are designed to encourage scientific exchange and provide scientists at all career levels with the chance to explain their work as well as learn about the work of colleagues.

REORGANIZED MEETING THEMES AND TOPICS

A significant reorganization of the annual meeting themes and topics took effect for Neuroscience 2016, with a goal of more equally distributing abstracts across the themes to reflect the scientific breadth of the field. SfN's Program Committee recognized that in recent years' meetings, more presentations gravitated toward disease-related themes, and committee members set out to address this imbalance.

With this reorganization, the Program Committee also strove to provide opportunities on the

poster floor and in session rooms to encourage collaboration among scientists working in related areas. For example, scientists who study basic developmental neurobiology and neurodevelopmental disorders now have their abstracts under the same theme, "Development," while a new theme, "Motivation and Emotion," integrates research on mechanisms of motivational behavior with work on mechanisms of drug addiction. Overall, this reorganization of themes and topics is intended to achieve greater balance and better integration between basic science and disease-related sessions.

NEW CLINICALLY ORIENTED OFFERINGS

In order to enhance the value of the meeting for clinician-scientists at all levels, SfN debuted new sessions at Neuroscience 2016 geared toward students in MD/PhD and PhD programs who are involved in disease-oriented research: Basic-Translational-Clinical Roundtables and a Meet-the-Clinician-Expert session. The roundtables aimed to integrate basic, translational, and clinical aspects of a disease or disorder, with particular emphasis on new developments, controversies, or updates. In addition, continuing medical education (CME) credits were available for these well-attended sessions.

The Meet-the-Clinician-Expert session, designed to be an informal exchange between a clinician-researcher and trainees, focused more on professional development, with the expert describing his or her research techniques and accomplishments. This informal, personal setting gave attendees a behind-the-scenes look at the expert's work and a real-world glimpse of the career trajectory of a prominent, clinically oriented neuroscientist, with plenty of opportunity for dialogue and exchange with attendees.

TECHNOLOGY ENHANCING THE MEETING EXPERIENCE

For attendees at the world's largest meeting about brain science and health, prioritizing events and organizing schedules can be an overwhelming experience, especially for those attending for the first time. SfN launched a new-and-improved Neuroscience Meeting Planner, or NMP, to help attendees leverage the wealth of events at their fingertips.

The new platform includes an updated interface and improved search functionality, with a "recommendations" feature that suggests related sessions for users based on what they have added to their itineraries. In addition, the NMP divides professional development workshops into different tracks for attendees to easily identify sessions of interest. Last year's tracks were career paths on and off the bench, career skills, funding, and teaching neuroscience. The NMP syncs with the annual meeting mobile app, helping attendees to create and manage their schedules on the go.

Curated itineraries, a part of the NMP, proved to be a popular feature among attendees again in 2016. Designed to help attendees focus on specific areas of research (selected by the Program Committee) and navigate sessions related to these topics, the itineraries include relevant posters, symposia, lectures, and social networking events.

A SOURCE FOR NEUROSCIENCE NEWS

In addition to connecting scientists with the latest neuroscience discoveries, the annual meeting serves as a major source of neuroscience news for the media. Attracting 234 journalists and public information officers, Neuroscience 2016 generated more than 350 original stories, including coverage in NPR, *The New York Times*, *The Huffington Post*, and *The Guardian* as well as in respected scientific publications including *Nature*, *Scientific American*, and *Science* magazine. SfN's nine press conferences and *Hot Topics* book helped to generate this global media interest in the exciting discoveries from the field. ///



In the Neuroscience 2016 Exhibit Hall, scientists learned about and saw demonstrations of the latest research tools and techniques available to the field.

"I really enjoyed not only meeting new neuroscientists and talking about science in general but also knowing that when I leave this conference, I'll have a really good opportunity to continue to have these interactions and to be a part of something bigger."

LORRAINE HORWITZ
Graduate Student at the University of Michigan



NEUROSCIENCE ²⁰¹⁶

BY THE NUMBERS

/////

The annual meeting is an incredible opportunity for neuroscientists from across the globe to collaborate and join forces to propel research forward.

30,303

ATTENDEES FROM
77 COUNTRIES

850

SCIENTIFIC
SESSIONS

559

EXHIBITORS

17,300

TIMES HASHTAG
#SFN16 USED
ON TWITTER

234

REGISTERED
MEDIA

9

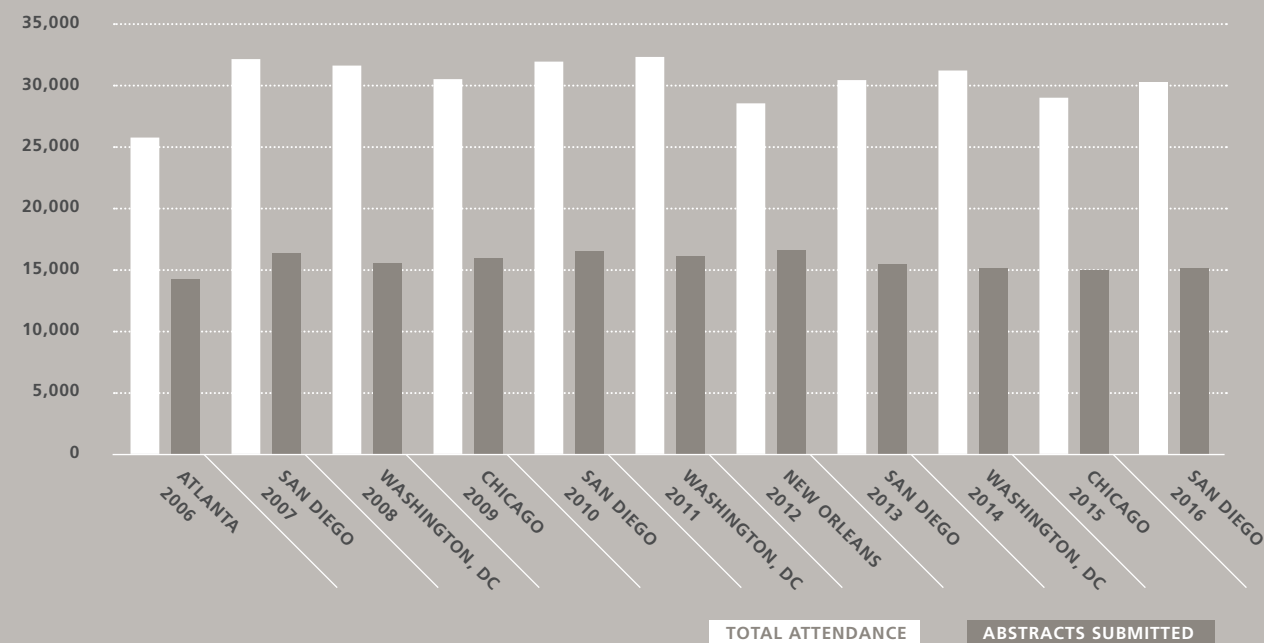
PRESS
CONFERENCES

15

PROFESSIONAL
DEVELOPMENT
WORKSHOPS

106

AWARD & PRIZE
WINNERS



LEFT: The Neuroscience 2016 poster floor buzzed with energy over the five days of the meeting, as more than 15,000 researchers showcased their science and shared discoveries.

SfN Journals: Facilitating and Accelerating Discovery

IN ALIGNMENT WITH ITS MISSION TO ADVANCE THE UNDERSTANDING OF THE BRAIN AND NERVOUS SYSTEM, SFN PROVIDES SCIENTISTS WITH TWO HIGHLY RESPECTED, PEER-REVIEWED JOURNALS IN WHICH THEY CAN REPORT THEIR WORK TO THE FIELD.



JNeurosci and *eNeuro* support this mission with their own unique strengths and approaches, which are continually evolving to meet the publishing needs of today's neuroscientists while also striving to improve authors' experience from submission to publication. Both journals have devised and implemented new policies and initiatives to accomplish these goals.

JNEUROSCI CONTINUES TO BUILD ON A STRONG FOUNDATION

SfN's flagship scientific publication, *JNeurosci*, maintained one of the highest impact factors among core neuroscience journals, according to a recent study analyzing trends in the literature from 2006 to 2015. Editor-in-Chief Marina Picciotto and the *JNeurosci* Editorial Board are dedicated to evaluating and employing new opportunities in order for the journal to maintain its reputation as a home for high-quality science.

"I believe that we all want *JNeurosci* to continue as a leader in neuroscience publishing and remain a place we want to send our strongest work," Picciotto wrote in her first editorial. She acknowledged that this would require "new approaches, some of which might fail, and [finding] new ways to represent data, facilitate peer review, and evaluate the strongest science."

To that end, *JNeurosci* has recently implemented numerous new features and policies. In October 2016, the journal upgraded its web platform, combining an improved reading experience with the capability for rapid publication and hosting extended datasets. Papers are now published online ahead of print about two weeks after acceptance.

JNeurosci holds the research it publishes to the highest standards of scientific rigor and requires full reporting and review of statistical analysis used in experiments. To further demonstrate the journal's commitment to reproducibility in science, *JNeurosci* updated its statistical reporting guidelines in March 2017 to ensure consistency in this reporting. The journal now requires a description of "Experimental Design and Statistical Analysis" at the end of the Materials and Methods section in every paper.

JNeurosci also introduced two new types of feature articles designed to facilitate discussion around controversial findings in neuroscience and explore how initial findings have been advanced since publication. In "Progressions" articles, authors reflect on their seminal research published in *JNeurosci*, including the identification of the fusiform

face area in 1997. With "Dual Perspectives," the journal provides a forum for authors to share their scientific interpretation—sometimes opposing, sometimes complementary—of a particular issue in neuroscience, such as whether sleep is more about remembering or forgetting.

Finally, the submission fee is now waived for manuscripts whose first and last authors are members of SfN, in recognition of the tremendous support they provide to the Society.

eNEURO ESTABLISHES ITSELF AS A LEADING OPEN-ACCESS NEUROSCIENCE JOURNAL

eNeuro, the Society's online-only open-access journal covering all areas of neuroscience, has experienced tremendous growth in just over two and a half years. Submissions to the journal more than doubled from 2015 to 2016, as has traffic to its website. The wider public is also taking note of research from *eNeuro*; a paper published in January reporting evidence of brain plasticity in adolescent roundworms that might parallel indecisiveness in human teenagers was the subject of an interview on Public Radio International's Science Friday.

eNeuro is committed to the rapid dissemination of strong science and has already published more than 400 papers. The journal is able to quickly publish a large volume of high-quality research thanks, in part, to its constructive approach to peer review. Rather than rejecting outright papers that do not meet its high standards, *eNeuro* provides authors with a detailed explanation of what their paper needs to become suitable

for publication. "For the first time, I felt like the editor was actually my advocate and was trying to help us get it published," said author William Stacey, an associate professor of neurology and biomedical engineering at the University of Michigan. "It was a shockingly pleasant experience."

eNeuro also strives to be an educational resource for the scientific community. Editor-in-Chief Christophe Bernard believes many of the problems with the peer-review process stem from the fact that most scientists are not explicitly taught how to review a manuscript. *eNeuro* addresses the lack of peer-review training by organizing webinars that teach this important skill. The first two webinars in the "Tricks of the Trade" series provided an overview of how to peer review a manuscript and how to review a modeling paper.

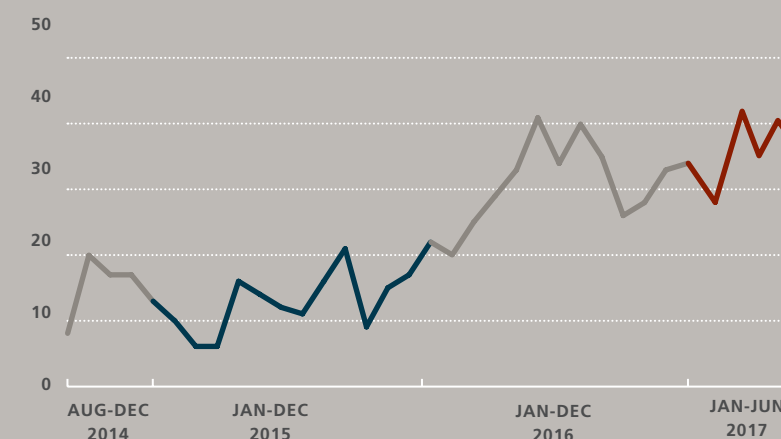
Bernard says that evaluating the work of others is a skill and time commitment that should be recognized, noting in an editorial, "Yes, I am a scientist, but I am a reviewer too, and proud of it." *eNeuro* enables researchers to take credit for the papers they have reviewed by documenting them in their ORCID profile (this also applies to *JNeurosci*).

eNeuro is advancing neuroscience by providing authors with an innovative venue for reporting their findings—whether they are new, confirmatory, or negative—to the field and to the public. Check out a new video on *eNeuro.org* to learn more about what authors and reviewing editors love about *eNeuro*.

To keep up with the latest neuroscience research and updates from SfN Journals, follow @SfNJournals on Twitter, like SfN on Facebook, and sign up for *JNeurosci* and *eNeuro* alerts. ///

UPWARD TREND IN eNEURO SUBMISSIONS

810 SUBMISSIONS SINCE LAUNCH IN AUGUST 2014 THROUGH JUNE 2017



Neuroscience's Responsibility to Global Mental Health

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Despite the undeniable global impact of mental health issues, the societal stigma associated with them means less weight is often given to these problems than to other brain disorders. Globally, 23 million people suffer from schizophrenia, 44 million from bipolar disorder, and more than 300 million from depression. Still more suffer from anxiety, alcohol and drug abuse, and post-traumatic stress disorder.

Mental health problems can lead to untimely death, especially for young people. Suicides account for 800,000 deaths a year, or one death every 40 seconds—more than malaria or breast cancer—and many mental and behavioral disorders typically arise during young adulthood. “It’s the young people who should be living a life free from disability, who should be contributing to society socially, economically. They carry the burden of mental disorders,” said Shekhar Saxena, director of the Department of Mental Health and Substance Abuse at the World Health Organization (WHO).

Neuroscientists have a role to play in making mental health a priority and seeking solutions to society’s global mental health challenges, Saxena said during his Neuroscience 2016 Dialogues Between Neuroscience and Society Lecture, “Global Mental Health and Neuroscience: Challenges and Opportunities.” Because it is naturally intertwined with mental health, neuroscience has far-reaching potential to contribute to prevention and treatment of mental disorders and promotion of mental health.

INVESTING IN TREATMENT

Despite the consequences, nations rarely invest in their citizens’ mental health. A survey of 21 nations found that minimally adequate treatment was available to only 22.4 percent of those who suffer from depression in high-income countries, 11 percent in middle-income countries, and less than 4 percent in low-income countries. Just 1 percent of the world’s economic resources goes to mental health, according to WHO’s Mental Health Atlas.

“There is a large gap between the burden and the budget,” Saxena said. “Even high-income countries devote only 5.1 percent of their ... total health budget [to] mental health, and this proportion goes down very rapidly as we go from upper-middle to lower-middle to low income.” On average, low-income countries allot only 0.5 percent of their already limited health budgets to mental health.

Yet mental health disorders perpetuate and incur enormous costs: According to a study conducted by the World Economic Forum at the Harvard School of Public Health, costs associated with treatment of mental illness amounted to \$2.5 trillion in 2010 and are expected to reach \$6 trillion by 2030.

While some high-income nations, such as those in Scandinavia, and some middle- and low-income countries, such as Ethiopia and Sri Lanka, have done rather well in treating mental health disorders, Saxena cautioned that all nations are “developing” when it comes to treating mental health.

Neuroscientists have a role to play in making mental health a priority and seeking solutions to society’s global mental health challenges.

COLLABORATING SOLUTIONS

Saxena believes collaboration—institutional, national, and international—is the way forward, and he touted two efforts in this vein:

- WHO’s Mental Health Action Plan for 2013 to 2020, which aims to strengthen effective leadership and governance for mental health; provide comprehensive, integrated, and responsive mental health and social care in communities; and strengthen research for mental health
- United Nations’ 2030 Agenda for Sustainable Development, which, among many other goals, calls for reducing the premature mortality rate from noncommunicable diseases, including neurological disorders, by one-third by the year 2030 through promotion of mental health and well-being

Saxena emphasized the strong need for increased interdisciplinary collaboration between neuroscience and mental health. “I still see separate departments,

separate journals, separate conferences, and separate funding sources. How long will we continue with that?” he said. “The collaboration seems to be improving, but much more is needed, not only in a few countries but in all countries.”

Furthermore, collaboration must become more inclusive, as even positive collaboration efforts often leave many groups out of the decision-making process. “More than 90 percent of scientific studies are from and about high-income countries,” Saxena said. “This can be—and is—a real impediment to science.”

Above all, he noted that improved communication could help to attain increased public, private, and philanthropic investment in mental health and neuroscience initiatives. Citing prioritization of research investment through a focus on public health, Saxena noted the importance of increasing public awareness of the power of brain research to find solutions to mental health problems. “There has to be a better balance between discovery and translation into practice of what we know,” he said.



“There has to be a better balance between discovery and translation into practice of what we know.”

SHEKHAR SAXENA

Director of the Department of Mental Health and Substance Abuse / World Health Organization

SUPPORTING THE NEUROSCIENCE COMMUNITY

SfN Supports Members Worldwide in Advancing Their Careers

THE SOCIETY CONTINUES TO EMBRACE THE PRINCIPLES THAT IT WAS
FOUNDED UPON AND THAT ITS MEMBERS VALUE: THE OPEN EXCHANGE
OF SCIENTIFIC IDEAS, GLOBAL SCIENTIFIC COLLABORATION, AND THE
IMPORTANCE OF EVIDENCE-BASED DECISION-MAKING.

“Attendees reported
that they learned
much more than they
ever expected about
the many critical roles
that glia play.”

LESLIE TOLBERT

*SfN Virtual Conference Organizer and
Regents' Professor in the Department of
Neuroscience at the University of Arizona*

The ability to connect with an international community of colleagues is perhaps more important than ever before. With nearly 40 percent of its 37,000 members located outside the United States, SfN facilitates global collaborations in a multitude of ways and continuously seeks innovative ways to provide year-round support and value to members no matter where they live and work.

A common thread in this year's activities is new online offerings making scientific training, professional development, and career opportunities accessible to members around the globe. In fall 2016, SfN sponsored its first-ever virtual conference, “The Other Brain Cells: New Insights Into What Glial Cells Do.” This members-only event was a resounding success, with advance registration of nearly 2,600 attendees. The conference, composed of eight sessions from 10 experts, included traditional lectures, a panel presentation, and a meet-the-expert Q&A. The event

was then available for on-demand viewing to members for six months via Neuronline, SfN's members-only home for learning and discussion.

With more than 770 pieces of content, Neuronline continues to serve as a robust online source for neuroscience training and professional development for scientists at all career stages. In addition to the virtual conference, an eight-episode podcast series called “The Perils of Publishing” launched in January 2017, and in spring 2016, SfN switched its webinar model to a members-only approach, ensuring that online learning continues to build member value. Following this change in approach, SfN has seen registration numbers climb and interest in webinars grow.

SCIENTIFIC RIGOR TAKES CENTER STAGE

SfN is committed to ensuring that neuroscientists are trained in the best research practices, including considerations of experimental design,

LEFT: Nuclei (blue), beta III tubulin (green), and N-cadherin (red) compose this neural rosette, a type of pluripotent stem cell that has the potential to differentiate into many types of neurons.

“The obstacles facing women in science who are applying for promotion and tenure can be daunting. Therefore, implementing effective strategies for improvement is key.”

TANEA REED
Associate Professor at Eastern Kentucky University and SfN volunteer who led the creation of the Promotion and Tenure Toolkit

data analysis, and transparent reporting to improve the reproducibility of research. Through grant funding provided by NIH, SfN developed a collection of educational tools, openly available on Neuronline, to aid the community in conducting more rigorous research.

These tools include a six-part series of webinar training modules featuring expert perspectives, case studies, and best practices for addressing issues of scientific rigor; background reading and post-webinar discussion guides that build on the webinar topics; recordings from two SfN annual meeting workshops, including one about how to address the new NIH requirements for rigor and reproducibility; and a set of related resources.

SUPPORTING A DIVERSE COMMUNITY OF SCHOLARS

Because SfN strongly values diversity and global collaboration in neuroscience, the Society strives to support scientists from around the world with programs to aid in their

professional development. SfN’s longstanding Neuroscience Scholars Program (NSP), for example, offers underrepresented graduate students and postdoctoral researchers two years of mentoring, networking, professional skills development, and educational programming. To grow the value of the program, SfN hosted its first NSP hybrid conference, consisting of in-person and online participants, in July 2017. This new pilot event, “Preparing the Next Generation of Neuroscience Leaders,” provided NSP participants with two days of targeted programming on publishing, public speaking, creating a professional profile, grant writing, and finding funding opportunities.

The Latin American Training Program is another SfN effort aimed at the development of young scientists, who will contribute to future discoveries in the field. In 2016, LATP provided 128 early-career neuroscientists from Latin America and the Caribbean with invaluable online training and networking opportunities. Fifteen



Neuroscientists in all career stages have access to invaluable opportunities for scientific learning and professional development at the annual meeting and throughout the year on Neuronline.



SfN provides substantial value year-round to its members from all over the world through in-person and online networking and training opportunities.

of these high-achieving young scientists were also selected to take part in a three-week, in-person scientific training course in which they attended classes led by respected neuroscientists, participated in laboratory exercises, and received training on professional development topics. LATP is primarily funded by the Grass Foundation, with additional support from the International Brain Research Organization (IBRO), SfN emeritus member John Simpson, each year’s host institution, and SfN.

SfN also encourages diversity in the field through the work of its Women in Neuroscience Subcommittee (WiNS). Among key activities this year were additional installments of the Increasing Women in Neuroscience Toolkits, which provide

strategies to mitigate obstacles that female neuroscientists may face during recruitment, hiring, promotion, and evaluation. SfN released the third and fourth installments, “Improving Faculty Climate” and “Promotion and Tenure,” in spring 2017. The toolkits live on Neuronline with a collection of supplemental resources for supporting women in neuroscience.

NEW TOOLKITS FOR EARLY-CAREER SCIENTISTS
The future of the field depends on current neuroscience trainees, and as such, the Society works to develop programming and resources to support younger members. For example, SfN is creating a series of Career Skills Toolkits to help trainees and early-career neuroscientists master the soft skills

necessary for professional success. A newly convened working group conceptualized three toolkits on the topics of management and team building, communication, and personal performance. The toolkits, specifically created for use by Institutional Program members (neuroscience departments and programs) and SfN’s chapter network, which comprises more than 150 chapters around the world, are housed on Neuronline and contain 30-minute, turnkey PowerPoint presentations, along with additional resources such as articles and case studies to spur discussion. The Leadership, Management, and Team Building Toolkit was released in spring 2017, and the others will follow at six-month intervals. ///

Exploring How Sensory Experience Shapes the Developing Brain

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The human brain is immensely complex, comprising billions of neurons and trillions of neuronal connections. Neuronal behavior produces our thoughts, feelings, and actions, and yet how neuronal activity and organization determine our experience of the world has been a challenging question to answer.

Experiments in the 1960s and 1970s first began to illuminate how neuronal activity and organization produce our complex visual perception of the world. A pioneering study in 1959 launched the Nobel Prize-winning collaboration between David Hubel and Torsten Wiesel, who used the then-new electrophysiological technique of recording the activity of single neurons to reveal the pattern of organization of cells that process vision and how this organization gives rise to visual perception. Both of them later served as presidents of SfN.

Hubel and Wiesel demonstrated that visual experience early in life has long-lasting effects on the structure and function of the brain's visual processing system. They discovered that when an animal lacked vision in one eye during a critical developmental period, neurons in the primary visual cortex expanded into the regions that normally would have received input from that eye. This showed that the brain's cortex changes during development in response to experience and highlighted the importance of sensory input during critical periods of development.

From their studies, Hubel and Wiesel inferred that the structure and function of brain connections is highly dynamic during development. At the time, however,

there was no way of visualizing those dynamics in real time. This made it difficult to decipher the molecular and cellular mechanisms underlying experience-dependent changes in the brain.

Hollis Cline, SfN past president and professor at the Scripps Research Institute, has unlocked some of the secrets of how experience changes connections in the brain. Cline studies the development of the visual system in *Xenopus* tadpoles. One advantage of studying these animals is that they are transparent in the early stages of their lives, allowing researchers to peer into their brains to see individual neurons.

Using this model system combined with technological advances such as *in vivo* imaging with high-resolution microscopy, Cline has demonstrated a range of effects of visual experience on the development and plasticity of the visual system. For instance, Cline's group showed that brain connections grow and withdraw in a matter of hours and days during development. Projections from neurons called dendrites allow neurons to send signals to other cells. Growing dendrites produce many branches, and as new branches grow, they form connections, called synapses, to other neurons.

"We saw that there is a constant dynamic, with branches in these complex trees adding and retracting at a rapid rate," Cline said. "A tiny fraction of those newly added branches are stabilized and persist. Prior to taking these time-lapse images, we would never have guessed this would be the process by which a cell would grow and develop these extremely elaborate dendritic branches."

Visual experience early in life has long-lasting effects on the structure and function of the brain's visual processing system.

Cline's research revealed that both new dendrites and new synapses are transient, with some growing stronger but many more than expected withering away. She has also contributed data that show that the general principles of brain development demonstrated in vertebrate animal models hold true in humans.

Experiments such as Cline's have been essential for testing ideas about how the developing brain builds and maintains new connections as an animal is exposed to different sensory information. Research like this also has a lot to tell us about what happens when something goes wrong during brain development.

"Brain circuit formation is absolutely fundamental to animals and people being able to grow and learn and carry out motor tasks," Cline said. "If the brain doesn't grow, then none of these things happen."

A tragic example of disrupted brain circuit formation is the recent epidemic of Zika virus, which infects and kills brain cells in fetuses, causing microcephaly. Understanding how the brain grows could have implications for Zika virus as well as for neurodevelopmental diseases such as autism spectrum disorders.

While unique experimental models and technological advances in imaging and manipulating the brain are yielding insight about which Hubel and Wiesel could only speculate, many neurodevelopmental diseases are still not well understood. Scientists like Cline hope that unraveling the core deficits of these diseases at a cellular and molecular level will lead to better treatment options.

"The kinds of research we have done and the contributions that we have made to brain science would have been impossible without an experimental model like *Xenopus* tadpoles," Cline said, "but unless we as scientists continue using a range of experimental systems that allow us to address questions of interest, we're going to slow down our own progress."



DAVID HUBEL AND TORSTEN WIESEL, WINNERS OF THE 1981 NOBEL PRIZE IN PHYSIOLOGY OR MEDICINE FOR THEIR DISCOVERIES CONCERNING INFORMATION PROCESSING IN THE VISUAL SYSTEM.

EDUCATING AND ENGAGING THE PUBLIC

The Story of Neuroscience Is the Story of What Makes Us Human

AS SCIENCE FACES UNPRECEDENTED SCRUTINY, THE NEED TO “EXPLAIN THE BRAIN” GROWS EVER MORE URGENT TO ENSURE THAT CITIZENS AROUND THE WORLD CONTINUE TO SUPPORT INVESTMENT IN NEUROSCIENCE RESEARCH.

“Neuroscience touches people’s lives. It’s not this arcane subject matter that is inherently difficult to explain. You just have to make the effort to move past the jargon and explain why they should care.”

JOHN MEITZEN

Assistant Professor at North Carolina State University and winner of the 2016 Next Generation Award for his outstanding public outreach contributions

SfN provides multifaceted and engaging opportunities for non-scientists to learn about the field and the latest developments and discoveries. From participating in Brain Awareness Week and science education conferences to crafting compelling content for *BrainFacts.org*, SfN is building the awareness and respect for neuroscience that fuels the promise of the field.

TELLING THE STORY OF NEUROSCIENCE THROUGH BRAINFACTS.ORG

BrainFacts.org, a public information initiative of The Kavli Foundation, the Gatsby Charitable Foundation, and SfN, has attracted substantial interest since its launch in May 2012, demonstrated by its more than 7.5 million users and 14.5 million page views. In 2017 alone, the site experienced a 7 percent increase in active engagement compared to the previous year. Reaching a global audience, 44 percent of its users come from outside the United States, with

the largest share from the United Kingdom, Canada, India, Australia, the Philippines, Brazil, South Africa, Pakistan, and Malaysia, respectively.



SfN works to engage with the public throughout the year about the nature of scientific discovery and the importance of understanding the brain in order to solve public health challenges.

LEFT: Nodes of Ranvier (green) are found along the myelinated axons of neurons and allow action potential, or electrical signal, to travel down the axons of these neurons more quickly.



Through outreach activities such as Brain Awareness Week and the newly reimagined *BrainFacts.org*, SfN seeks to boost neuroscience understanding and awareness for people of all ages—from young elementary school students to senior citizens.



Building upon such widespread interest, SfN launched a redesigned *BrainFacts.org* in October 2017 after more than a year of planning. This reimagining of *BrainFacts.org* engages users in a self-directed journey through the brain and nervous system. With significant strategic funding support from SfN Council, the *BrainFacts.org* relaunch focused on enhancing content delivery and storytelling in order to present an inclusive, educational account of the narratives behind neuroscience. In addition, thanks to grant support from the Wellcome Trust, site visitors now have the opportunity

to explore an interactive 3-D model of the human brain and to discover “Neuroscience Core Concepts”—the fundamental principles that everyone should know about the brain and nervous system—through animations and interactive elements.

In FY 2017, the *BrainFacts.org* audience most sought out information on brain anatomy and development. A video produced from a Brain Awareness Week webinar titled “The Human Brain” was the most accessed content, followed by a Research & Discoveries publication on neurogenesis and

the Brain Basics Quiz, an SfN staff-produced educator activity. *BrainFacts.org* continues to promote content from its well-respected content partner institutions and organizations and secured three additional content partners in FY 2017: Howard Hughes Medical Institute, RIKEN Brain Science Institute, and Knowing Neurons, a neuroscience education website.

Social media also continued as an important site outlet, with nearly 38,000 Facebook followers and more than 28,000 followers on Twitter. SfN leveraged every tool available to the platforms, creating photo slideshows, videos, polls, and interactive images to encourage neuroscience awareness and exploratory learning.

With ongoing support from founding partners, The Kavli Foundation and the Gatsby Charitable Foundation, *BrainFacts.org* continued to develop captivating narratives, images, graphics, videos, animations, and exciting interactives about the wonders of the brain.

**CONNECTING WITH THE PUBLIC
AROUND NEUROSCIENCE**

Now more than ever, it is important for SfN and its members to reach out to and engage with non-scientists in local communities. These personal connections are an effective way to help people understand the importance of neuroscience research and how it improves lives.

Brain Awareness Week (BAW), launched 20 years ago by the Dana Alliance for Brain Initiatives, brings together scientists, students, and communities for an annual global celebration of the brain. SfN provides

resources to local chapters, schools, and scientists interested in organizing educational events during this week and throughout the year. For BAW 2017, SfN hosted a webinar on *BrainFacts.org* demonstrating how the brain reacts to the environment through our senses. This webinar not only directly engaged the public to increase brain knowledge but can also be used as a teaching tool when SfN members do their own outreach.

Additionally, SfN directly encourages public interest in neuroscience through support for the Brain Bee and Brain Awareness Video Contest. SfN hosts the DC Regional Brain Bee each year as well as provides support to the U.S. and World Brain Bees, including organizing laboratory internships for the winning students. For SfN’s video contest, participants create engaging videos that make a facet of neuroscience more accessible to the public. The first place winner receives a free trip to SfN’s annual meeting, and all of the winning videos

are available on the *BrainFacts.org* YouTube channel.

In addition, SfN members and staff traveled around the U.S. to leverage opportunities for neuroscience education at in-person conferences. At the National Science Teachers Association conference, SfN’s neuroscientist volunteers demonstrated hands-on activities and distributed resources for teachers to bring neuroscience to K-12 classrooms. While there, SfN also sponsored a workshop, “How the Teen Brain Learns,” to increase educators’ understanding of the mechanisms of learning and memory. At Family Science Days, hosted by the American Association for the Advancement of Science, SfN volunteers connected with teachers, families, and the science-interested public by demonstrating some of the *BrainFacts.org* educator activities, which are free and open for SfN members to use in their own outreach events. ///



Ben Walker, moderator of the DC Regional Brain Bee, sponsored by SfN, shows a brain to students, who later had the opportunity to hold it.

NeuroGrid: A Powerful Tool for Basic Research

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Of the approximately 50 million people worldwide who suffer from epilepsy, as many as 40 percent cannot quell their seizures with daily medication. In such difficult cases, brain surgeons can attempt to excise the source of the trouble while inflicting minimal damage on the rest of the brain. Identifying the area of neural tissue that is generating the abnormal signals that spread and cause seizures, however, is often a challenge.

The current approach is to surgically place arrays of electrodes on the surface of the brain or even to sink wire electrodes into the cortex in order to track and map neural activity. Although surface electrodes are mounted onto flexible material and the wires of penetrating electrodes are fine, these implants can irritate the patient's brain over days of neural recording in the hospital.

Neuroscientist and past Brain Prize winner György Buzsáki sought a better approach to long-term recording of brain activity from inside the skull. Intrigued by the possibilities offered by electrodes made from soft, conducting polymers, he recruited Dion Khodagholy, an electrical engineer who was working with one of the leading investigators of this new material, to join his research group at New York University School of Medicine.

The team developed a new neural recording device that is thinner than plastic wrap and easily conforms to the undulating shape and pulsing surface of the human neocortex. Called NeuroGrid, the device is composed of tiny electrodes made from the polymer PEDOT:PSS. A sheet a little larger and much thinner than a standard U.S. postage stamp can hold 240 electrodes. The new

device could even be tucked into grooves in the brain to reach areas inaccessible with the thicker and more rigid surface electrodes currently in use.

NeuroGrid captures the electrical activity of nearby brain cells, which surgeons rely on for mapping healthy and diseased neural tissue. In trials with patients undergoing surgery for epilepsy, NeuroGrid successfully recorded characteristic electrical patterns associated with particular anesthetics as well as an expected quieting of neural activity following aberrant discharges associated with epilepsy.

“We have shown that NeuroGrid recordings can be as good as those from existing devices. They provide the same information to the neurologist, with less discomfort to the brain,” Buzsáki said. “The patient will benefit.”

Because the polymer electrodes and connected gold and platinum wire are all embedded in a thin film of parylene, a biocompatible material already approved and used for long-term medical implants in humans, NeuroGrid can be left in place to monitor activity over time. So far, NeuroGrid has been used to record activity for up to 30 minutes during surgery in the brains of seven patients, and for as long as 10 days in rats. Future versions could possibly be left in place for even longer periods in a “closed loop” system designed to detect and respond to pathological patterns or to read neural activity for the purpose of controlling a brain-machine interface, such as a robotic limb.

Because of the small size of the NeuroGrid electrodes (25 micrometers, or about the size of an individual

NeuroGrid captures the electrical activity of nearby brain cells, which surgeons rely on for mapping healthy and diseased neural tissue.

neuron), they can be placed more closely together than their metal counterparts can be. They're clustered tightly into groups of four called tetrodes that are sometimes able to pick up signals from the same neuron. By comparing signals arriving at each component of a tetrode, the team can tease apart the electrical activity of multiple individual neurons and match their activity with more widespread patterns of electrical signals.

The next iterations of NeuroGrid will be packed with more electrodes—up to a thousand in high-density islands—in order to increase the resolution of the recordings, Buzsáki said. With higher resolution,

diagnosis of the focal points of seizures could be even more precise.

NeuroGrid is among the new technologies funded by the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative, which aims to bridge scales from atoms to behavior to reveal how cells and circuits interact at the speed of thought. Future experiments with NeuroGrid could eventually help to link the activity of single cells to brain function, leading to a more comprehensive understanding of how the activity of individual neurons contributes to collective brain dynamics including perception, thought, and action.



AN EARLY NEUROGRID, PLACED ON AN ORCHID PETAL TO ILLUSTRATE ITS CONFORMABILITY.

ADVOCATING FOR THE FIELD

Communicating the Importance of Funding in Driving Discovery

IN THE FACE OF AN UNCERTAIN POLITICAL ENVIRONMENT IN THE UNITED STATES AND AROUND THE WORLD, THE INTERNATIONAL SCIENTIFIC COMMUNITY HAS BANDED TOGETHER TO COMMUNICATE THE IMPORTANCE OF ROBUST FUNDING FOR RESEARCH.

“There has never been a more important time to improve our science communication skills. Even if it’s just one conversation, we should all make an effort to step away from the sidelines and share our work.”

MICHAEL WELLS
*SfN Early Career Policy Ambassador and
Postdoctoral Fellow at the Broad Institute of
MIT and Harvard University*

Without predictable and substantial government investment in biomedical research, scientific advancement and the resulting progress toward solving public health problems would not be possible. To ensure continued progress, the Society for Neuroscience and its members dedicated significant time and resources in FY 2017 to expanding advocacy efforts that inform policymakers and the public about the economic and societal benefits that directly result from robust funding of biomedical research.

In the U.S., targeted advocacy efforts by SfN and many partner organizations aided in securing strong congressional support for biomedical research. When Congress passed the FY 2017 federal budget in May, the National Institutes of Health, the largest funder of biomedical research in the world, saw a \$2 billion increase in its budget, to \$34.1 billion.

Looking forward, SfN will continue to engage in advocacy efforts that urge Congress to sustain its strong investment in biomedical research and reject any proposed cuts to this important work.



Every year, SfN members meet with lawmakers on Capitol Hill Day to highlight advances in neuroscience and advocate for strong national investment in research to help drive basic, translational, and clinical neuroscience forward.

LEFT: Pro-Neuregulin 1 (type I) protein collects into finite points (white dots) on the cell body and nearby dendrites of hippocampal neurons.

“SfN, IBRO, and these other organizations play a critical role in the coordination, the sharing of knowledge and information, so that individuals in different countries don’t try to reproduce the wheel. We learn from each other, and we exploit that and build on that and science moves faster.”

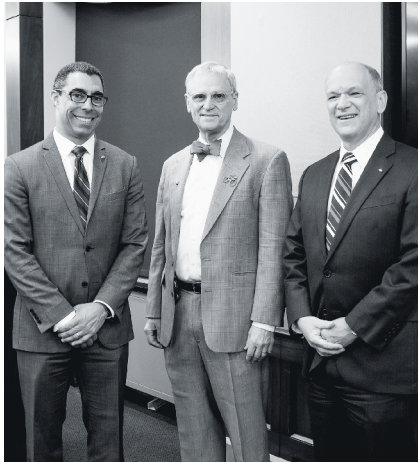
DOUGLAS MUNOZ

SfN Government and Public Affairs Committee Member and Professor at Queen’s University in Canada

GROWING MEMBER ADVOCACY ENGAGEMENT IN STRATEGIC AREAS

Recognizing SfN members’ desire to engage in advocacy during this unique period, the Society strategically invested in significantly expanding its efforts in FY 2017, with a specific focus on growing a strong advocacy presence in key geographic areas. As the first phase in a long-term plan, the Society began working directly with SfN members in six locations: New York, Houston, San Diego, Baltimore, southwest Ohio, and Lehigh Valley in Pennsylvania. These areas represent congressional districts or states that are hubs for biomedical research, have lawmakers from both parties on committees that deal with science-related issues, and/or already have an active neuroscience advocacy community.

The Society worked with leading scientists in these areas to identify, recruit, and mobilize other local SfN members to promote neuroscience research and cultivate relationships



LEFT TO RIGHT: SfN Government and Public Affairs Committee Chair William Martin, U.S. Rep. Earl Blumenauer, and SfN President Eric Nestler met on Capitol Hill Day to discuss why public funding is critical for biomedical research.

with lawmakers, with the goal of creating a stable of champions for neuroscience and biomedical research within Congress. Local members in these areas have met with elected officials and their staff, hosted lab tours, and written op-eds to voice their support for neuroscience research. In the future, SfN will continue to add more targeted locations and to partner with local members to grow SfN’s grassroots base.

ENGAGING DIRECTLY ON CAPITOL HILL

Grassroots advocacy leaders and SfN’s Early Career Policy Ambassadors (ECPA) were among the 40 SfN members who attended the Society’s 11th annual Capitol Hill Day in March 2017. They visited 54 congressional offices in Washington, DC, to share the importance of their neuroscience research with lawmakers and to advocate for strong federal funding for biomedical research.

Michael Wells, one of 10 participants in SfN’s yearlong ECPA program that educates early-career researchers about science policy and how to become effective advocates, successfully spread the reach of this year’s event well beyond Capitol Hill. Wells, a postdoctoral fellow at the Broad Institute of MIT and Harvard, took over the Twitter handle of Passion Pit, a band whose account boasts more than 227,000 followers. Thousands of people joined the Twitter discussion about mental health issues and the importance of science research funding.

INCREASING SFN’S VISIBILITY ON KEY ISSUES

In the first six months of 2017, SfN crafted a record number of advocacy-related statements, op-eds,



U.S. Rep. Suzanne Bonamici studies a brain during a neuroscience-focused event on Capitol Hill. SfN serves as a unified voice for its members in bringing important neuroscience funding and policy issues to the attention of lawmakers.

articles, and letters, demonstrating to its members that the Society is in alignment with their desire for increased focus on and commitment to policies that support science. In addition to releasing statements urging robust federal funding of biomedical research, SfN joined the Federation of European Neuroscience Societies (FENS) and the International Brain Research Organization (IBRO) in a statement opposing the administration’s immigration executive order, stating that it poses a threat to the advancement of the scientific enterprise, which is made stronger when scientists around the globe engage with one another.

SfN also endorsed the March for Science, alongside partners FENS, IBRO, and the American Association for the Advancement of Science (AAAS). During this unprecedented global event on April 22, 2017, SfN members joined more than 1 million marchers at over 600 events across 66 countries, bringing into the public eye the essential role of scientific research and global scientific collaboration for human health and progress.

SfN also continued its efforts to promote the responsible use of animals in research, including hosting a dynamic panel at Neuroscience 2016 on how to engage institutions in publicly communicating about animal research and providing comments

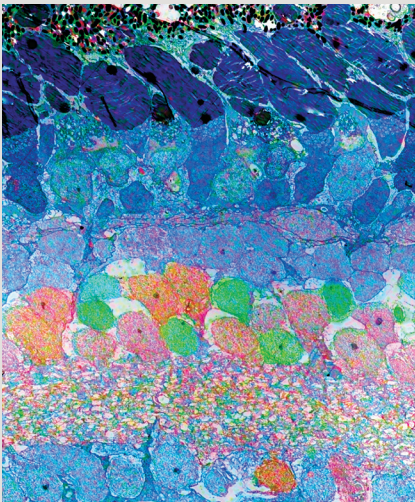
underlying the recent final opinion from the European Commission’s Scientific Committee on Health Environmental and Emerging Risks (SCHEER) on the need for nonhuman primates in biomedical research.

In addition to the joint efforts with SfN’s international advocacy partners outlined above, the Society continues to participate in IBRO’s Global Advocacy Initiative and to support Global Advocacy Seed Grants, which have provided nearly \$131,000 to neuroscience groups across the globe over the past two years to help fund local events that increase awareness of and support for neuroscience in ways that are culturally sensitive and regionally relevant. ///

Investing in Our Mission

THE SOCIETY FOR NEUROSCIENCE PRIDES ITSELF ON THE ABILITY TO LEVERAGE ITS FINANCIAL STRENGTHS TO INVEST IN THE FUTURE OF THE NEUROSCIENCE FIELD. THROUGHOUT FY 2017 SFN CONTINUED TO EMPHASIZE THE IMPORTANCE OF ENHANCING ITS MISSION TO SUPPORT THE SCIENTISTS WHO CONDUCT, TEACH, AND ADVOCATE FOR NEUROSCIENCE RESEARCH.

SfN’s financial health remained sound in FY 2017, allowing the Society to leverage historical strengths to deploy financial resources in support of its mission. The Society continues to dedicate increased funds to training, education, and public-facing outreach programs to provide enhanced value to SfN’s global membership while balancing expected revenues and expenses.



Ultrastructural transmission electron microscope image of a portion of the *Xenopus laevis* (African clawed frog) retina, with colors overlain to reveal GABAergic (red) and glycinergic (green) amacrine cells in the inner plexiform layer.

SfN finished FY 2017 on a positive note, generating a net operating surplus of nearly \$2 million before investment income. Moreover, this accomplishment was achieved after adding a robust set of initiatives in the form of the Strategic Opportunities Fund. Of SfN’s major revenue drivers, the annual meeting and scientific journals continued to provide strong revenues, while membership revenue and income from the SfN headquarters building remained strong. SfN’s revenue exceeded \$32 million in FY 2017. Dedicated financial planning by the SfN Council allows the Society to maintain a reserve portfolio, which surpassed \$71 million as of June 30, 2017.

INVESTING IN STRATEGIC OPPORTUNITIES

The Society actively invests in strategic programming that engages and supports its members worldwide. To that end, in summer 2016, the SfN Council created the Strategic Opportunities Fund to invest in high-level, high-visibility projects that enhance value for SfN members. Council has dedicated \$5.5 million

over a three-year period (FY 2017-19). Leadership identified five primary areas as initial priorities for strategic investment in the first year of the fund. Each year SfN will re-evaluate the areas and allocated funds based on strategic priority and the potential for reach and impact for the Society and the field.

- 1. **BRAINFACTS.ORG REDESIGN**
In October 2017, SfN launched a redesigned BrainFacts.org that embodies an audience-centric approach, including new interactive elements such as a 3-D brain, which allows users to explore the different parts of the brain and understand how it functions.
- 2. **STRENGTHENED ADVOCACY EFFORTS**
With the goal of amplifying its members’ voices in support of federal science funding in the U.S. and globally, SfN is engaging and training members to boost grassroots advocacy, developing neuroscience “champions” in the U.S. Congress, and intensifying its advocacy communications efforts.

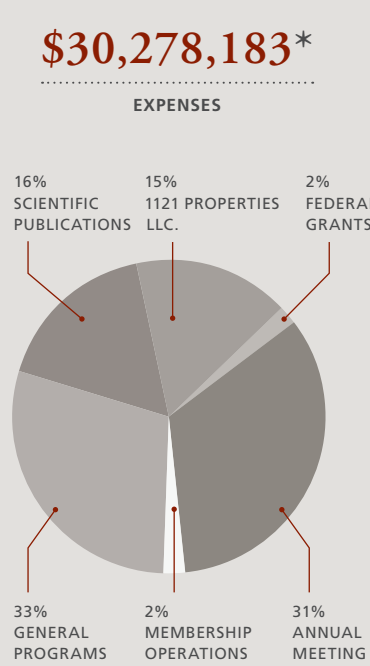
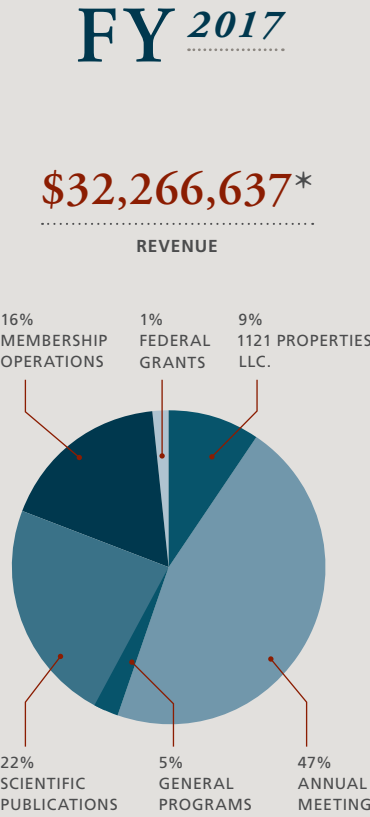
- 3. **INVESTMENT IN MARKETING AND COMMUNICATIONS**
SfN is working on a redesign of SfN.org, scheduled to launch in summer 2018. The revamped website will feature improved navigation and streamlined content that reinforces the value and programming associated with SfN membership and the Society’s commitment to advancing the field.
- 4. **EXPANDED SCIENTIFIC TRAINING RESOURCES**
SfN’s newly commissioned Working Group on Neuroscience Training is focused on expansion of the Society’s scientific training resources for the global neuroscience community at all career stages.
- 5. **DATA MANAGEMENT AND ANALYSIS**
SfN is improving its capacity to leverage business intelligence tools for data-informed process improvement, program development, and predictive analytics, to better serve the needs of members.

SUPPORTING NEUROSCIENCE TRAINEES
Acknowledging challenging economic times for scientists, the SfN Council dedicated \$100,000 for Trainee Professional Development Awards for young scientists interested in attending Neuroscience 2017, in Washington, DC. This infusion of funds allowed SfN to double the number of trainee awards to more than 200. These awards provide promising young researchers from around the world the opportunity to present a scientific abstract,

meet peers and network with senior scientists, and participate in the wealth of learning at the annual meeting. Recipients receive complimentary registration, along with a \$1,000 award for recipients based at North American institutions or a \$2,000 award for those outside North America.

These awards are also supported by the Friends of SfN Fund, SfN’s annual campaign fund, and contributions from corporate, private, and individual donors. The Friends of SfN Fund also supports education and outreach initiatives like BrainFacts.org and mission-centered activities in areas that have the greatest funding needs. In FY 2017, the Friends of SfN Fund received donations from hundreds of donors around the world totaling nearly \$65,000, nearly 23 percent more than the previous year’s revenue.

MAINTAINING GROWTH INTO THE FUTURE
Looking forward to FY18, in the second year of its Strategic Opportunities Plan, the Society will continue to realize innovative programs that serve members and the global neuroscience community. SfN will invest in tools and infrastructure to support its venues for scientific exchange, program development, and communications activities, with an eye toward increasing member engagement and value. SfN’s leadership maintains a forward-looking vision for responsible growth while continuing to engage in thoughtful future investment discussion, allowing the Society to continue its mission of advancing the understanding of the brain and nervous system. ///



* UNAUDITED

PHOTOGRAPHY CREDITS

PAGE 1

Differentiated astrocytes, expressing glial fibrillary acidic protein (red), migrating outwards from a neurosphere after treatment of neural precursors with bone morphogenetic protein 4. Nuclei are stained blue. Transplantation of such cells is neuroprotective in a mouse model of tauopathy. Image copyright 2010 Daniel Webber. Courtesy, with permission: Hampton et al., 2010, *The Journal of Neuroscience*, 30(30): 9973–9983.

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This image shows that a *rainbow* enhancer restrictively expressed green fluorescent protein in red, green, and blue (RGB) cones in the zebrafish retina. In zebrafish, RGB cones are structurally similar and unite into mirror-symmetric pentamers (G-R-B-R-G) by adhesion. This structural commonality and unity suggests that a set of genes is commonly and restrictively expressed in RGB cones but not in other cells; *rainbow* enhancers may represent a cis-regulatory mechanism that underlies such transcriptional regulation to ultimately define the functions of RGB cones, which largely constitute the beginning of the color vision pathway. Courtesy, with permission: Fang et al., 2017, *The Journal of Neuroscience* 37(11): 2834–2848.

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This image shows a neural rosette derived from a pluripotent stem cell. Apical localization of N-cadherin (red) is seen, with beta III tubulin (green) showing both polarized rosette cells, and non-polarized neuronal cells outside of the rosette. Nuclei are visualized with DAPI (blue). Courtesy, with permission: Coulthard, Hawksworth et al., 2017, *The Journal of Neuroscience*, 37(22): 5395–5407.

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Canadian-born American neurobiologist David Hunter Hubel and Swedish neurobiologist Torsten Wiesel, winners of the 1981 Nobel Prize in Physiology or Medicine for their discoveries concerning information processing in the visual system. (Photo by Ira Wyman/Sygma via Getty Images)

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The image shows spinal cord myelinated fibers immunostained with anti-βIV Spectrin antibody to label the nodes of Ranvier (green), anti-Caspr antibody to label the paranodal region (blue), and anti-Kv1.2 antibody to visualize the juxtaparanodal area (red). Nodes are specialized myelin-free structures required for action potential regeneration and transmission along myelinated axons. New work reveals that the cytoskeletal scaffolding protein Ankyrin G is critical for proper organization, maturation, and stability of the nodes of Ranvier. Courtesy, with permission: Saifetiarova et al., 2017, *The Journal of Neuroscience*, 37(10): 2524–2538.

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An early NeuroGrid, placed on an orchid petal to illustrate its conformability. Courtesy of Dion Khodagholy.

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Unprocessed pro-Neuregulin 1 (type I) accumulates as discrete puncta on the soma and proximal dendrites of cultured hippocampal neurons at contact sites, known as subsurface cisterns, between the somatic plasma membrane and the ER (white). Note that Neuregulin puncta are absent from axons (initial segments labeled with Ankyrin G, green) and more distal

dendrites (labeled with MAP2, magenta). In response to NMDAR activity pro-NRG1 is processed and released. Courtesy, with permission: Vullhorst, Ahmad et al., 2017, *The Journal of Neuroscience*, 37(21): 5232–5249.

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Ultrastructural transmission electron microscope image of *Xenopus laevis* retina, with colors overlain to reveal GABAergic (red) and glycinergic (green) amacrine cells with their processes in the inner plexiform layer, as well as glutamatergic (blue) excitatory cell classes, including bipolar cells and ganglion cells. Courtesy, with permission: Lee et al., 2012, *The Journal of Neuroscience*, 32(6): 2121–2128.

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In vivo confocal image stack of nearly the entire zebrafish retina showing the emergence of associations between Müller glia (orange) and cone photoreceptors (purple) in the outer plexiform layer. Courtesy, with permission: Williams et al., 2010, *The Journal of Neuroscience*, 30(36): 11951–11961.

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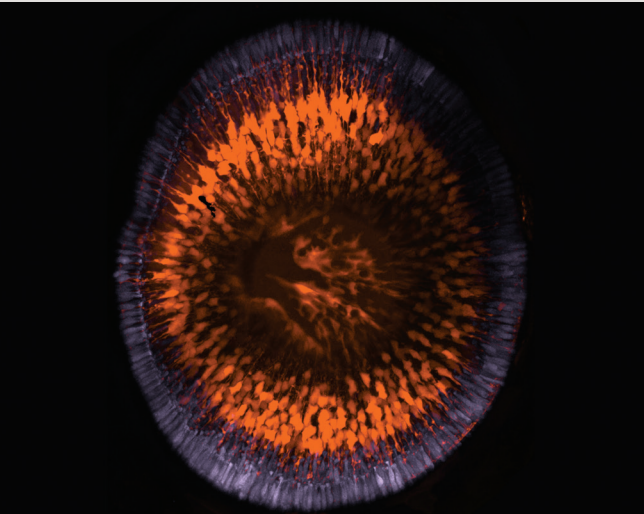
E15.5 mouse embryonic cortex subjected to in utero electroporation with plasmids encoding Dyrk1A-EGFP (green), BrdU labeling (blue), and immunofluorescence staining with Tbr2 (red). Courtesy, with permission: Yabut et al., 2010, *The Journal of Neuroscience*, 30(11): 4004–4014.

COVER OF AUDITED FINANCIAL REPORT

The hippocampal neuroepithelium of embryonic day 14.5 embryos was electroporated in utero with pCAG-RFP plasmid. Confocal images of the hippocampus were acquired 2 months later (on postnatal day 60). Transfected pyramidal neurons (red) were found in the CA3 and CA1 regions of this hippocampus. Cell nuclei were labeled with Hoechst dye (blue). Courtesy, with permission: Navarro-Quiroga et al., 2007, *The Journal of Neuroscience*, 27(19): 5007–5011.

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Associations begin to form between Müller glia (orange) and cone photoreceptors (purple) in the outer plexiform layer of the zebrafish retina.

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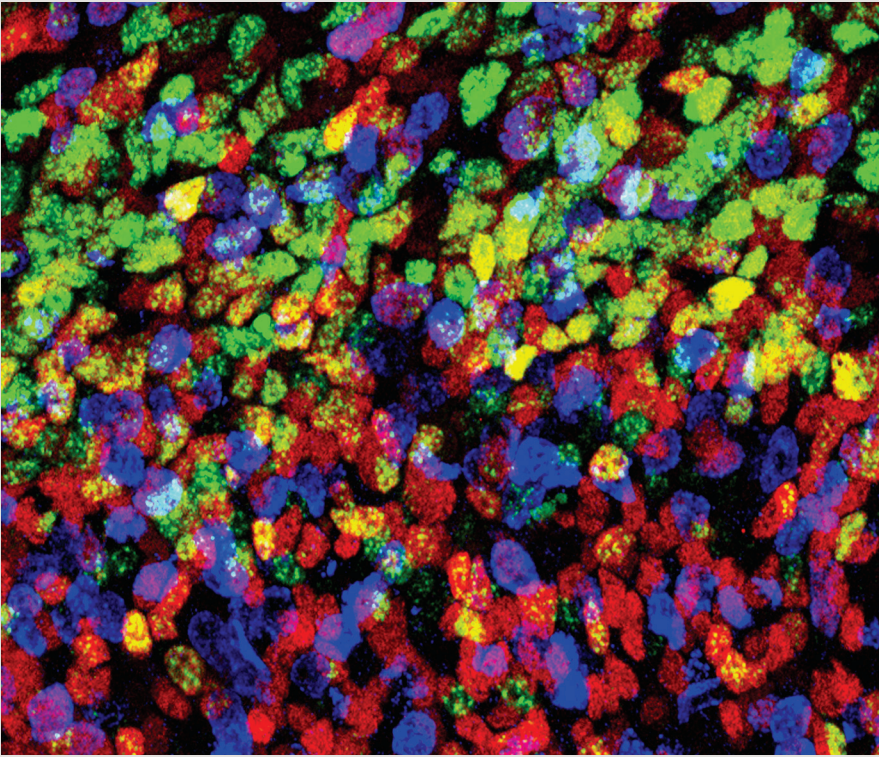
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The mouse embryonic cortex, subjected to in utero electroporation with plasmids.

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