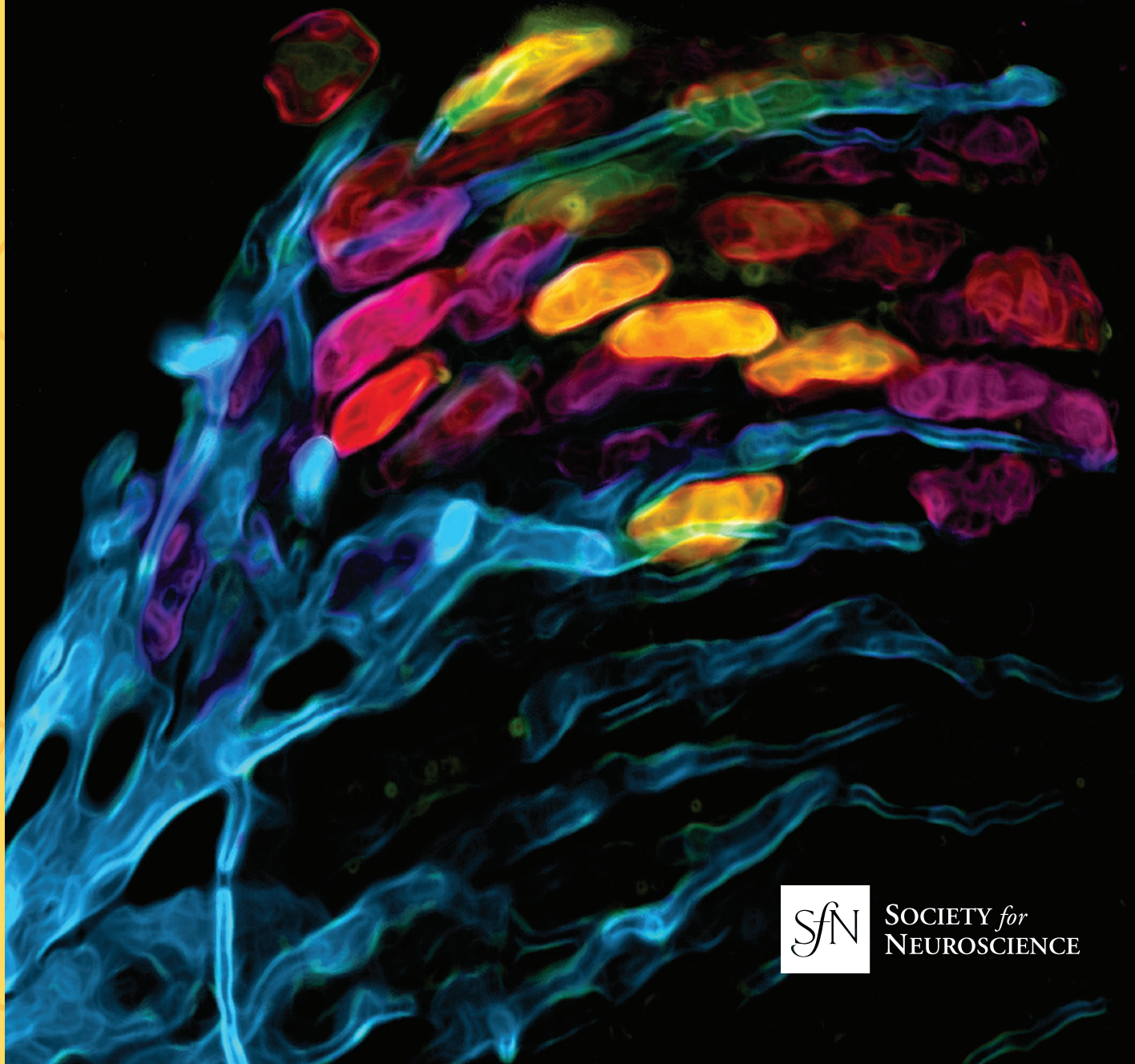


FY 2015 ANNUAL REPORT

**INVESTING IN**  
Global Scientific  
Venues



SOCIETY *for*  
NEUROSCIENCE

# INVESTING IN Global Scientific Venues

The Society for Neuroscience invests in global venues that promote the sharing of great science. The annual meeting provides a place for neuroscientists to come together to discuss developments in the field, while *The Journal of Neuroscience* and *eNeuro* publish a broad array of high-quality research. Neuronline encourages scientific learning and dialogue year-round, and *BrainFacts.org* communicates the importance of neuroscience to the public. All are available via the SfN.org homepage.



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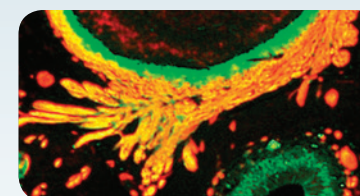
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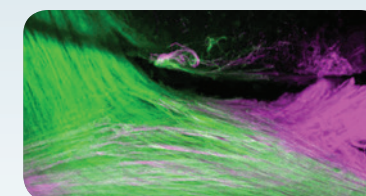
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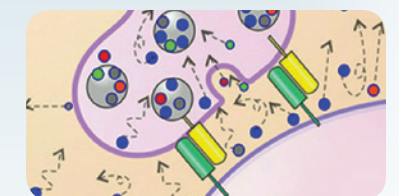
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# MESSAGE FROM THE President

## Supporting Global Scientific Venues and Advocacy

We are in a time of rapid technological and scientific advancement but challenged by long-term pressures on funding and by a changing landscape of career opportunities that especially affects our younger members. Recognizing these pressures, the Society for Neuroscience has focused its attention on the scientific venues that allow our members to share their work, develop and enhance their professional skills, access training opportunities, and interact with one another. At the same time, the Society is exerting a significant effort to educate policymakers and to encourage greater research investment. Personally, I continue to meet with members of the U.S. Congress and to work toward increased research funding through SfN's partnerships with Research!America and the Coalition for Life Sciences.

SfN has embraced its role as a global organization in partnership with diverse national and regional neuroscience groups. The Society's scientific venues — the annual meeting, *The Journal of Neuroscience*, *eNeuro*, Neuronline, and *BrainFacts.org*, among others — have global reach and deliver significant value to SfN members, no matter where in the world they live and work. SfN has also supported advocacy for research funding by providing guidance and backing to many international partners.

### New Venues for Sharing Science

SfN's newest additions, *eNeuro*, an open-access online journal, and Neuronline, a members-only home for learning and discussion, debuted this past year as a result of strategic investments made by the Society in recognition of the evolving needs of our membership

worldwide. Both projects further SfN's mission by connecting scientists from around the globe in ways that allow them to interact and learn from one another to advance the understanding of the brain and nervous system.

Since its launch at Neuroscience 2014, *eNeuro* has published a growing range of high-quality papers from leading scientists. *eNeuro* responds to important needs that have been identified by SfN members. The journal accepts a wide array of content, including negative results and failures to reproduce prior studies. Such articles can have great importance for scientists but previously could too rarely find a home. In addition, *eNeuro* offers a fast, innovative double-blind review process, thus reducing the risk that biases, often unconscious, will affect the outcome of review. Under the guidance of its editorial board, *eNeuro* is intended to become a beacon for neuroscience publishing.

The new Neuronline, which launched in April 2015, adds greatly to the value of SfN membership by providing exclusive professional development opportunities, scientific discussions, and training to our members. This new platform provides neuroscientists at all career stages with access to hundreds of articles, videos, and webinars, as well as allows them to engage in discussions with their peers around the world.

### Continued Success for Established Venues

*eNeuro* and Neuronline have joined a strong lineup of already established and respected SfN venues that share great science: the annual meeting, *JNeurosci*, and *BrainFacts.org*.

SfN's annual meeting continues to serve as the premier global event for the sharing of neuroscience research and discoveries. More than 31,000 neuroscience researchers, clinicians, and advocates from more than 80 countries traveled to Neuroscience 2014 in Washington, DC, last November to attend lectures and symposia, share their work, and explore professional development and networking opportunities.

Meanwhile, *The Journal of Neuroscience* remains, in aggregate, the most cited journal in the field, exhibiting an impressive depth and breadth in the papers it publishes. With continued strong submissions of high-quality manuscripts, *JNeurosci* is enhancing its reputation for excellence built by its current and previous editors while simultaneously working to enhance the editorial process so that *JNeurosci* can continue to shine in a very competitive publishing environment.

*BrainFacts.org*, SfN's main scientific communications vehicle to the public, experienced substantial growth in its third year, with nearly 7 million page views and 3 million users from around the globe. As interest in the brain continues to grow, *BrainFacts.org* allows the Society to engage public audiences by providing accurate, interesting neuroscience information to those interested in learning more about this important topic.

In addition to its main scientific venues, SfN supports a variety of other advocacy, training, and public outreach activities. During my term as SfN president, I have focused on efforts to increase awareness about the importance of scientific rigor and replicability, which have emerged as critical issues for our enterprise, and to advocate for science

research funding. For example, SfN widely distributed a new set of research practices to support training about scientific rigor, and will host a related short course and symposium at the 2015 annual meeting. On the advocacy front, SfN received the advocacy community's highest award from Research!America this year recognizing its efforts in the fight for science funding, and we continued our successful annual Capitol Hill Day event and our strong partnerships with the International Brain Research Organization and the Federation of European Neuroscience Societies on international advocacy efforts.

### Volunteers: Our Most Valuable Resource

The creation of *eNeuro* and the new Neuronline and the sustained success of SfN's other scientific venues would not have been possible without devoted volunteer leaders. From SfN's Council and committee members to the reviewers and editors for SfN's two journals, our volunteers are tireless in their support of the Society and its mission. Thousands of members give their time and energy to ensuring that SfN's programs and services meet the needs of our diverse membership and the field. We cannot thank them enough.

In this challenging and exciting time for neuroscience, SfN is committed to providing our members around the world with strong scientific venues that give them the resources they need to excel and to connect with one another. With the support of SfN, I believe we can all work together to advance understanding of the brain and nervous system and improve health for people worldwide. Serving as SfN president has been an honor, and I thank you for your engagement with SfN.

  
Steven Hyman  
PRESIDENT

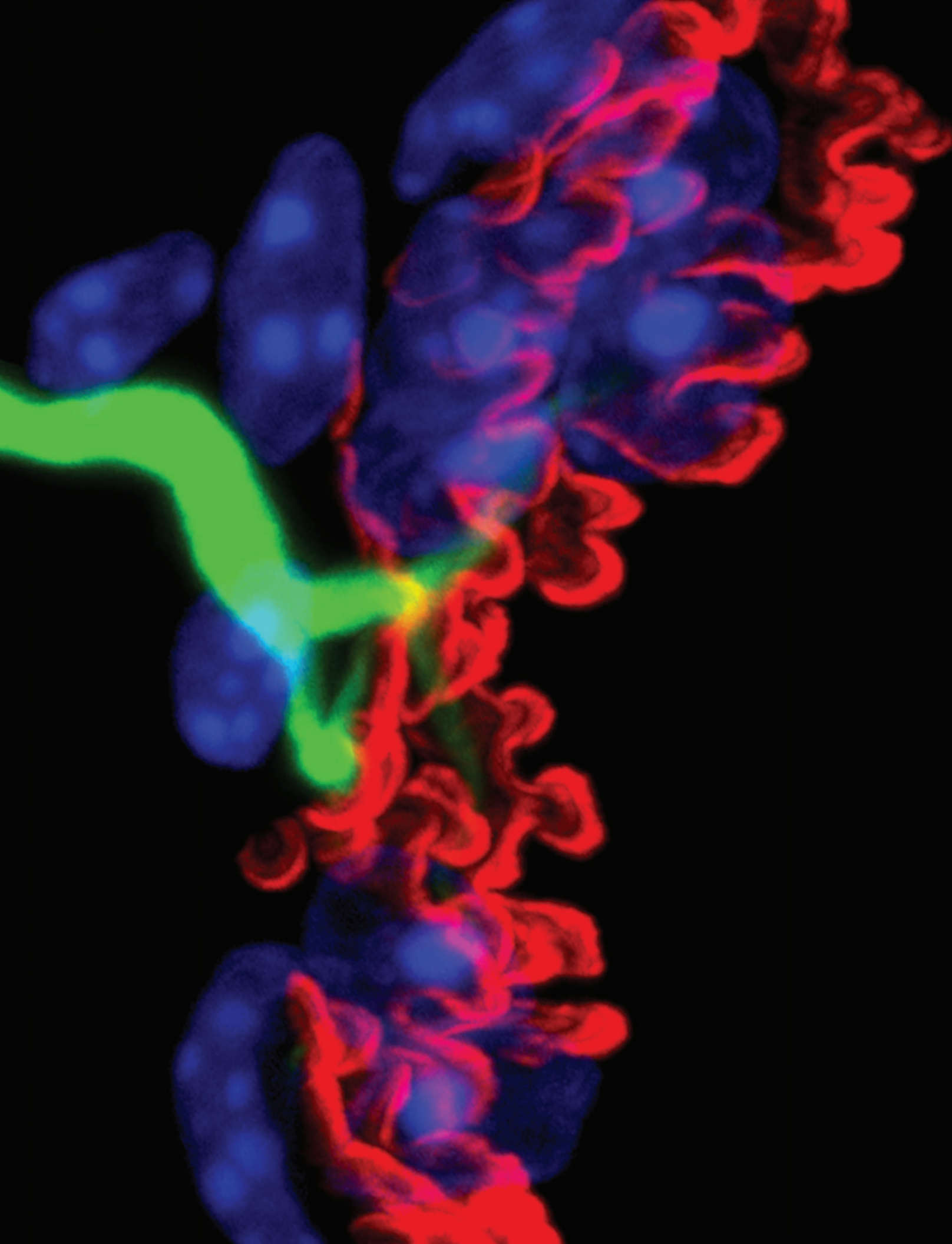
## SfN Mission

**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.

**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.

**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.

**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.



# Advancing SCIENTIFIC EXCHANGE

## Neuroscience 2014: Connecting Around Great Science

As SfN's most well-established and principal scientific venue, the annual meeting is unparalleled in its extensive and varied possibilities for learning from leaders in the field, sharing and discussing research, and exploring professional development opportunities. For 44 years, SfN has provided its members with a place to

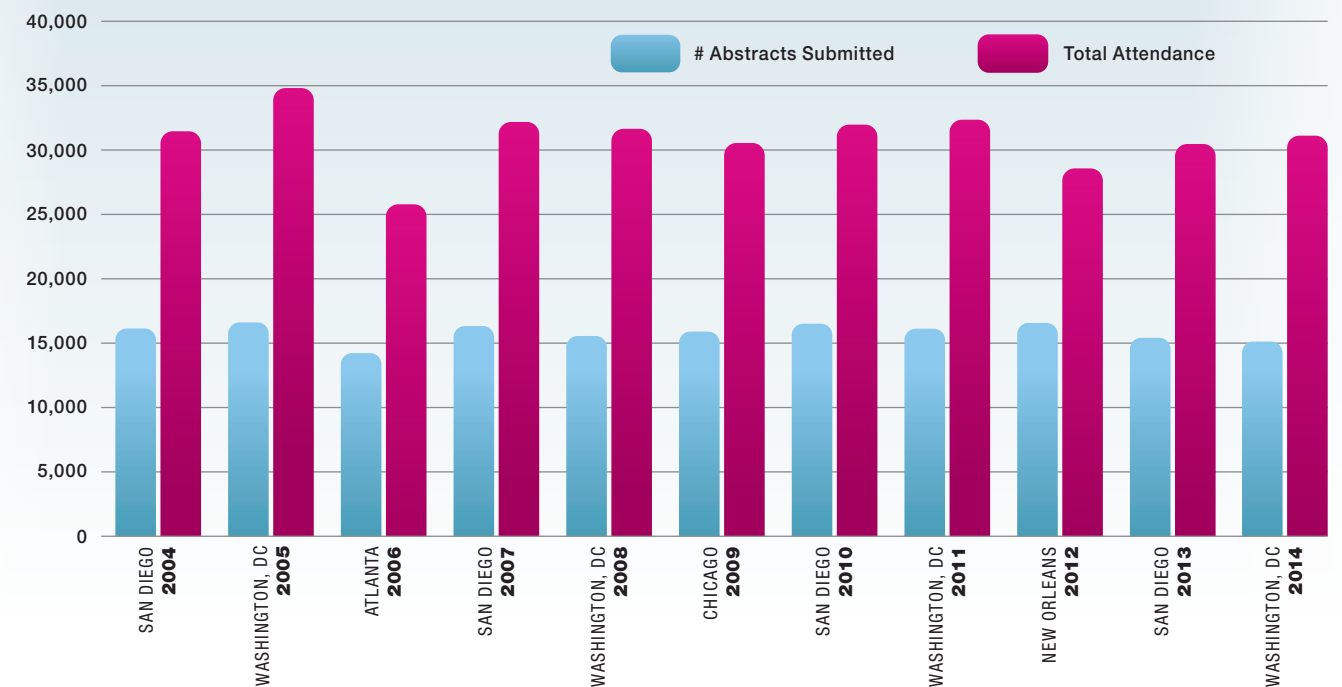
come together to discuss the developments within this broad and diverse field. Last November, more than 31,000 neuroscience researchers, clinicians, and advocates from 84 countries traveled to Washington, DC, for Neuroscience 2014, the world's largest meeting focused on scientific discovery related to the brain and nervous system.

### Successful Scientific Programs and Events

Neuroscience 2014's program featured more than 15,000 poster presentations, 13 special lectures, and 52 symposia and minisymposia, which covered topics including novel methods and technology development, disorders of the nervous system, improving animal

## STRONG SCIENCE SUSTAINS VALUE FOR GLOBAL NEUROSCIENCE

Strong attendance and abstract submission numbers at Neuroscience 2014 demonstrate the value of SfN and the annual meeting to the neuroscience community.





Neuroscientists informally share their research between events at SfN's annual meeting.



Neuroscience 2014 featured more than 15,000 poster presentations covering a broad range of science including novel tools and methods, brain disorders, cognition and behavior, and cellular mechanisms.

models of neuropsychiatric disorders, and advances in cortical development, among many others. In the Exhibit Hall, meeting attendees were able to visit with the 535 companies, publishers, and organizations that displayed an array of publications and products and demonstrated new neuroscience tools and technologies.

The annual Dialogues Between Neuroscience and Society lecture features a speaker whose work touches on brain function and the diversity of human experience. For the 2014 lecture, noted chef, restaurateur, and *Top Chef* contestant Bryan Voltaggio prepared culinary treats for a panel of neuroscientists to sample while discussing the rich sensory experience that takes place every time we eat. This experience is made possible by the brain, which shapes perception of taste and smell, and seals the meal to memory. Voltaggio described how he uses alluring smells, colors, textures, and flavors to tease and deceive the senses. "In a dining experience, you touch on all five major senses," Voltaggio said. "Taking them and playing with them and trying to figure out a way to trick them is fun and exciting." The

panel of neuroscientists analyzed their expectations and sensations as they sampled a variety of dishes, including mock oysters, smoked salmon, and mushroom porridge. Learn about the science of taste in the Science in Progress article on page 10, and watch the complete Dialogues lecture at [SfN.org/dialogues](http://SfN.org/dialogues).

The Public Advocacy Forum examined "Implications for Science Funding in an Era of Global Brain Initiatives," with insights from knowledgeable field experts. Panelists discussed the future of science funding as researchers increasingly turn to new funding sources, including the private sector, nonprofits, and crowdfunding.

Many other Neuroscience 2014 events also looked to the future of the field. Scientists on the Animals in Research Panel discussed the ramifications of new tactics by animal rights groups and their implications for researchers around the globe who work with animal models. Trevor Robbins chaired the Empirical Approaches to Neuroscience and Society Symposium, "Improving Animal Models of Neuropsychiatric Disorders," which focused on ways to advance

collaboration and development within the field to achieve more effective translation from animal models to the clinic. Acknowledging the growing attention to scientific rigor and reproducibility of research, the "Enhancing Reproducibility of Neuroscience Studies" symposium, chaired by former NINDS Director Story Landis, summarized common causes of poor reproducibility, addressed related training issues, and described actions agencies and journals can take to improve reliability.

### Robust Professional Development Opportunities

Neuroscience 2014 offered a variety of professional development and networking activities for neuroscientists at every career stage. Hundreds of neuroscientists took advantage of full-day training opportunities, including the Neurobiology of Disease Workshop on stroke recovery and two short courses on advances in multineuronal monitoring of brain activity and brain-scale, automated anatomical techniques.

The Meet-the-Expert Series gave attendees the opportunity to talk with

respected neuroscientists about their research and accomplishments and ask questions about their careers. The popular Careers Beyond the Bench workshop helped neuroscientists explore career trajectories outside of academia, while other workshops tackled topics such as the mentor-mentee relationship, communicating science to the public, responsible conduct and publishing, and more. In addition, the Graduate School Fair connected interested students with program faculty, advisers, and representatives from schools with neuroscience programs.

### New Tools for Sharing Science

SfN's mobile tools, the Neuroscience Meeting Planner and Neuroscience 2014 app, allowed users to easily navigate the thousands of posters and events at the annual meeting. The expanded curated itineraries for 2014 let attendees select relevant posters, symposia, lectures, and networking events related to specific topical tracks such as addiction research, psychiatric disorders, spinal cord, synapses, and visual cognition and perception.



Thousands of scientists discuss their latest research with colleagues during poster sessions at the annual meeting.



**31,250**  
ATTENDEES

**15,115**  
SCIENTIFIC ABSTRACTS

**22**  
LECTURES

**52**  
SYMPOSIA AND  
MINISYMPOSIA

**535** EXHIBITORS

ATTENDEES FROM  
**84**  
COUNTRIES

**45**  
PROFESSIONAL DEVELOPMENT  
AND NETWORKING EVENTS

The annual meeting provides a place for neuroscientists from around the globe to come together to discuss the latest developments covering the breadth of the field.

The dynamic posters used technology to create a more interactive presentation experience. Using 55-inch screens, 90 dynamic poster presenters showed multimedia content, such as videos and graphics, to help explain their research.

As part of its efforts to increase the value of membership and better reach members throughout the year, SfN is

using the new Neuronline to expand the audience for resources and events in an increasingly digital world. For example, recordings of certain annual meeting events — including the Neurobiology of Disease Workshop, Meet-the-Expert Series, and professional development workshops — are available to members year-round on Neuronline.

### Strong Media Coverage

A near-record 249 credentialed media and public information officers registered for Neuroscience 2014, signaling significant interest in science news coming out of the meeting. The press program included 10 news conferences and a *Hot Topics* book featuring more than 100 newsworthy abstracts, both of which showcased great science for those reporting for a wide variety of audiences. Twenty-three percent of the media coverage came from international outlets across 51 countries, with the largest concentrations outside the U.S. coming from Europe and Asia. The record 3,132 news hits generated from the annual meeting demonstrate the expansive reach of the event and the public's sustained interest in brain science and health.

## SfN's Commitment to Science Publishing

SfN's scientific journals, *The Journal of Neuroscience* and *eNeuro*, are both built upon the Society's commitment to excellence, rigor, and breadth in scientific publishing as well as SfN's mission to advance understanding of the brain and nervous system. SfN possesses a strong reputation as a respected society publisher, and all editorial decisions at SfN's journals are made by working scientists and based on scientific rather than commercial factors. Furthermore, scientists who publish their research in *JNeurosci* and *eNeuro* are investing in SfN's nonprofit programs worldwide that enhance and serve the field.

Each SfN journal provides a different author experience, allowing researchers to choose the venue that best fits their needs. Beginning in 2015, both journals implemented the Creative Commons Attribution 4.0 International (CC-BY) license, which allows for the free, unrestricted reuse of material from the journals for both commercial and noncommercial purposes, as long as attribution is provided. This license change benefits researchers by allowing them to reuse and adapt material from SfN's journals for purposes other than just nonprofit use. In addition, many funders require that authors who receive money from them publish their research with a CC-BY license. This change will also benefit the field, as content from *JNeurosci* and *eNeuro* can now be used in for-profit educational materials, such as textbooks, at no charge.

### **JNeurosci: Continued Excellence**

As SfN's flagship publication, *JNeurosci* embodies the Society's dedication to creating global scientific venues that promote the sharing of excellent neuroscience covering a broad range of disciplines. Thanks to the seven years of dedicated service of outgoing

Editor-in-Chief John Maunsell, *JNeurosci* continues to maintain the excellence and breadth for which it is known, and it remains the most-cited journal in the field. That legacy of excellence will continue under its strong editorial board. *JNeurosci* is working to update certain aspects of the editorial process so that it will continue to stand out in a very competitive publishing environment.

Research published in *JNeurosci* reaches the global neuroscience community, as the audience stretches across more than 140 countries and its website received more than 13 million page views in 2014. Papers submitted to *JNeurosci* receive fair and unbiased consideration by distinguished reviewers from around the world. To take advantage of the journal's strong editorial board, the new editorial processes encourage more collaboration among editors and reviewers. This enhanced engagement will help meet the editor's goal of providing improved feedback to authors. *JNeurosci* has fast review and publication times, with an average of 31 days from submission to first decision and an average of 46 days from acceptance to publication.

*JNeurosci* has also introduced two new features that aim to advance the field through new ideas and discussion. One feature, Techsights, provides overviews of technical developments of wide relevance in neuroscience, including where the field stands with the technology now and where it's going. These can describe new technological advances, ongoing efforts, or new techniques that have not yet been used outside the author's own lab. As technology is rapidly changing, Techsights will help keep *JNeurosci* readers aware of all the ongoing technological developments. The second feature, Dual Perspectives, consists of two short articles that describe complementary and/or opposite views

on a subject matter or debate of broad interest in neuroscience, written by the major proponents of each view.

*JNeurosci* maintains its status as a trusted source for news about brain research. In FY2015, coverage of *JNeurosci* was seen in more than 7,000 articles in a wide variety of print and online media outlets around the world. Highlights of this media coverage included stories in *The Huffington Post*, *The New York Times*, *Time* magazine, BBC, National Public Radio, *The Daily Mail*, *The Guardian*, Yahoo! News, and *The Washington Post*.

### **eNeuro: Starting Strong**

Since its launch last November at Neuroscience 2014, *eNeuro* is emerging as an important global venue for sharing neuroscience discoveries. Faced with an evolving publishing landscape, SfN recognized that its members and the neuroscience community as a whole would benefit from the establishment of an online, open-access journal dedicated solely to neuroscience and published by a respected, nonprofit entity. With the Society's strong reputation for neuroscience publishing, the SfN Council supported the creation of *eNeuro* through SfN's strategic investment fund, which allows investment in key growth opportunities that support members and promote the field in the long term.

Under the guidance of Editor-in-Chief Christophe Bernard and its editorial board, *eNeuro* is expanding definitions of discovery by accepting a wide array of content covering a broad range of excellent science. In addition to original research, *eNeuro* accepts studies on negative results, failures to reproduce, new tools and methods, as well as theories and concepts, all of which contribute significantly to advancing understanding of the field.

*eNeuro* also provides an innovative publishing experience, offering a fair, fast, and transparent review by

The Society reaches hundreds of thousands of people worldwide through its scientific publications.

eNeuro

JNeurosci  
THE JOURNAL OF NEUROSCIENCE



13,338,176

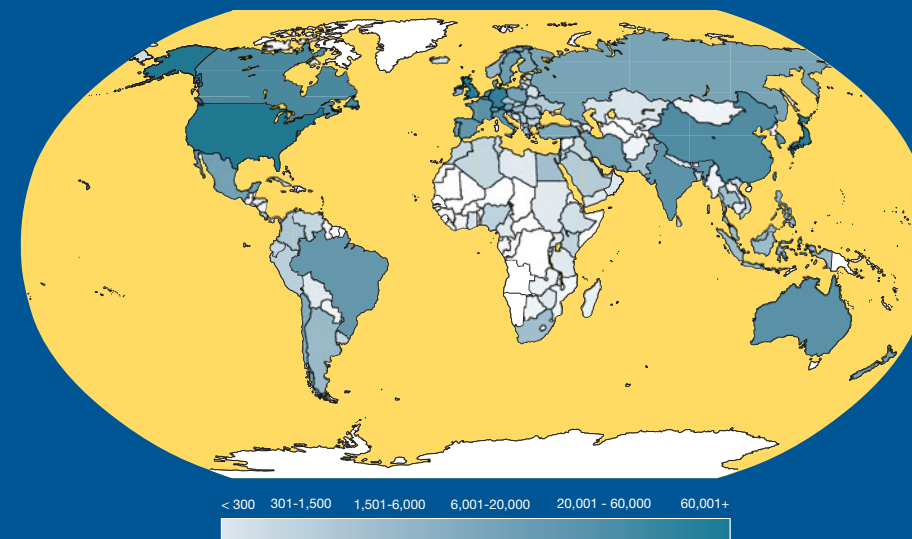
PAGE VIEWS



1,648,304

UNIQUE VISITORS

### GLOBAL HEAT MAP: PUBLICATION REACH



ARTICLE SUBMISSIONS FROM

48

COUNTRIES



READERSHIP SPANS

144

COUNTRIES



241 EDITORS FROM 22 COUNTRIES

working scientists. The editorial board demonstrates the global nature of the publication, with scientists from 13 countries and four continents. Authors have the opportunity to suggest the editor to handle the peer review of their manuscript and to participate in a double-blind review process, in which authors and reviewers are anonymous to each other. Once reviewer consensus is reached, authors receive a fact-based synthesis of reviewer comments explaining why their work was accepted or rejected, and that review is published with the accepted article. *eNeuro* encourages authors to submit significance statements as well as images, video, and audio for an engaging, interactive reader experience.

Rather than publishing articles by issue, *eNeuro* releases manuscripts immediately upon acceptance so that the research is available to the field as soon as possible. Readers can sign up for customized alerts that let them know when their preferred topics and article types are published.

Earlier this year, *eNeuro* joined the National Library of Medicine's PubMed Central (PMC) database, which allows the public to freely access full-text articles from participating journals. Depositing *eNeuro* articles into PMC not only gives more people access to the research, thus expanding the journal's reach and visibility, but it also helps authors to comply with the requirements of some funding agencies, including NIH, to post their final peer-reviewed journal manuscripts on PMC.

Going forward, *eNeuro* intends to serve as a venue for exploring and testing new ideas in scientific publishing that advance the field. The editor-in-chief aims for *eNeuro* to build a reputation for scientific excellence consistent with everything the Society for Neuroscience does in the field and envisions *eNeuro* being a beacon for open-access neuroscience journals.

# Exploring the SCIENCE OF TASTE

Can the taste of your favorite food transport you back to childhood? Former *Top Chef* contestant and restaurateur Bryan Voltaggio thinks so. At Neuroscience 2014, Voltaggio offered his philosophy on cooking: Make original dishes that still carry all of the emotional weight of the classic foods used as inspiration. The goal “is to create a memorable experience, and one that connects not only me to the diner, but also the diner to a time, or a place, or a memory,” Voltaggio said.

In striving to create this culinary experience, Voltaggio takes advantage of a peculiar feature of our brain that ties the flavor of food to intense emotional memories. During the Dialogues Between Neuroscience and Society lecture, an annual event that explores how neuroscience intersects with the world around us, Voltaggio served up tasty treats to a panel of neuroscientists and discussed the role the brain plays in the rich sensory experience that takes place every time we eat.

## The Basics of Taste and Smell

Voltaggio and other chefs engage all of the basic senses in order to create a rich dining experience. But two of those senses, taste and smell, play the largest roles. Taste and smell are both senses that react to chemicals in food, and the oral and nasal cavities are directly connected, so it’s no surprise that the two senses are closely linked. When these senses work together to identify chemicals in food or drink, we develop what we know as flavor. Flavor is a sensation that uses many senses at once — an amalgam of



Noted restaurateur and former *Top Chef* contestant Bryan Voltaggio creates a smoked salmon dish for a panel of neuroscientists to sample during his Dialogues Between Neuroscience and Society lecture at Neuroscience 2014. Voltaggio explained his creative process in developing meals and the role the brain plays when we eat a meal.

taste, texture, temperature, and smell of whatever it is we are eating.

When you take a bite of something like fresh-baked bread, the taste buds on your tongue and mouth collect information about the chemical makeup of that dish. Each taste bud is made up of around 50 to 100 cells called gustatory receptor cells. When these cells are activated, they send signals to an area of the brain called the cerebral cortex, which makes us conscious of the perception of taste.

Taste buds can differentiate between the five basic tastes: salty, sweet, sour, bitter, and umami (a savory taste found in foods like mushrooms or steak). While these are important building blocks for our

understanding of flavor, eating would be pretty boring if we could only pick up on five varieties of food. That is where smell comes into play.

The human olfactory system has more than 12 million smell receptors located throughout the nose and nasal cavity. These receptors collect odor molecules from the air and send electrical signals to a small structure in the brain called the olfactory bulb to be processed. Humans have 450 different types of smell receptors, each of which can detect slightly different smell molecules. Typically, what we think of as a single smell or flavor contains many types of discreet smell molecules, and there are millions of potential combinations. It’s this sense that can really tell

the difference between store-bought sauce and your grandmother’s closely guarded secret recipe.

## Remembrance of Flavors Past

Smell’s role in flavor is the reason that food has such a strong potential for calling up memories. Though the processes behind involuntary memories are somewhat mysterious, it seems to be related to the relative locations of some key brain structures. The olfactory bulb is located very close to the amygdala, an area involved in emotional learning. The olfactory nerve is similarly close to the hippocampus, one of the most important

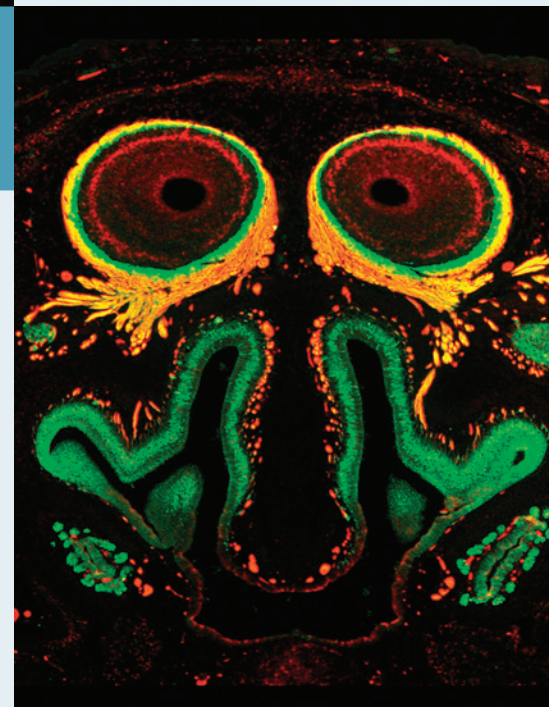
brain structures for memory.

The many connections between the olfactory system and the regions responsible for emotion and memory tie these experiences together. In fact, these areas are so closely related that studies have found that damage to areas of the brain responsible for memory can also harm one’s ability to smell.

While scientists know that emotional memories are encoded in the brain for longer periods of time, they are unclear as to the exact mechanisms behind this. However, it is clear that this ability has an evolutionary benefit.

Consuming food is always a gamble — wild berries or vegetables that our ancient ancestors gathered could easily be poisonous, and many foods go rancid quickly. Our brains mitigate this risk through the long storage of emotional memories. If you become sick after consuming a particular type of food, that flavor can cause disgust or nausea every time you try to eat it again. This is called taste aversion, and it can last for years, reducing the possibility that you’ll make the same mistake twice.

But what started as a survival technique has become an additional way to enjoy our food, as we are able to recall positive emotional memories associated with food, not just negative ones. When Voltaggio served his panelists mock oysters, a dish that simulates the taste, smell, and texture of the mollusk, he wasn’t just playing with expectations. He was exploiting a byproduct of our evolution to evoke all the oysters that came before and create a truly memorable meal.

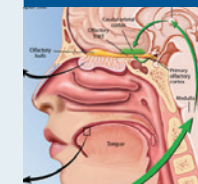


This image may look like a carnival mask, but it actually shows the key structures mammals use every time they smell. The “mouth” is the nasal cavity of a mouse, which is lined with specialized odor-sensing cells (in green). These cells signal to the olfactory bulbs — the round “eyes” in the image.

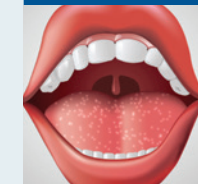
## RELATED CONTENT ON BrainFacts.org



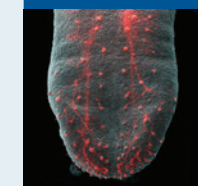
**Video: Bryan Voltaggio — Food for Thought**  
brainfacts.org/FoodforThought



**Taste and Smell**  
brainfacts.org/TasteandSmell



**Smithsonian Video: How Do Taste Buds Work?**  
brainfacts.org/TasteBuds



**A Matter of Taste**  
brainfacts.org/MatterofTaste

More information about the science of taste is available at [BrainFacts.org](http://BrainFacts.org), a public information initiative of The Kavli Foundation, the Gatsby Charitable Foundation, and the Society for Neuroscience.

# Supporting the NEUROSCIENCE COMMUNITY

The Society for Neuroscience delivers value to its members by offering exciting opportunities for students and professionals in the neuroscience community. SfN provides key tools for learning and venues for sharing great science that help neuroscientists grow and excel in their careers. The Society works continually to enhance member value and meet the needs of developing neuroscientists and established scientists. SfN serves as a global hub for nearly 40,000 members in 98 countries, and about 40 percent of SfN members live and work outside the United States. SfN's membership includes neuroscientists at all career stages, with students and postdoctoral trainees totaling 40 percent of members.

A particular area of emphasis for the Society has been expanding its use of online content — including multimedia, social media, and webinars — to allow our global membership to learn from and interact with SfN programs year-round. One way SfN is expanding the breadth of its programs is by making information available to members on an on-demand basis through the newly launched Neuronline. This learning and discussion platform allows SfN to better serve its global membership, giving neuroscientists access to hundreds of professional development and scientific training resources and enabling them to engage in conversa-

tions with their peers around the world. By providing year-round programming and networking opportunities, SfN can help bridge the gap for members geographically as well as between annual meetings. In FY2016, SfN plans to increase the number of resources for members, as well as expand the ways that members can receive those tools. The Society will collect qualitative and quantitative data from our efforts in order to evaluate member interests and needs and adjust our programs and services accordingly.

## Professional Development Resources at All Career Stages

SfN helps its members forge successful careers with an array of resources, and the Society recognizes that neuroscientists' needs vary by membership type and career stage. SfN's dynamic and varied career and education programs aim to support all individuals who are engaged in neuroscience so they can advance science and their own careers.

At Neuroscience 2014, SfN offered a diverse slate of professional skills and

career development events, including interactive workshops and seminars that highlighted experts in the field and provided best practices for publishing science, seeking and applying for funding, forging professional and mentoring relationships, managing and excelling in a career, teaching neuroscience, and retaining a diverse faculty. "Career Development Topics: A Networking Event" yielded record attendance and facilitated important discussions between trainees and senior scientists. With standing room only, the Careers Beyond the Bench workshop drew a crowd of trainees and senior scientists who were looking at potential career opportunities. To achieve wider dissemination of these annual meeting professional skills and career development sessions, the Society expanded its efforts to record and produce videos based on this content, leveraging the new Neuronline.

Outside the annual meeting, SfN is growing its offerings of webinars, online discussions, and video content, while



The annual meeting provides ample opportunities for neuroscientists at all career stages to engage with and learn from their colleagues, including at professional development workshops, networking events, and socials.

also noting particular areas of member interest that could be the focus of future content. Professional development webinars — with topics ranging from creating an individual development plan to internationalizing a neuroscience training program — look to serve both individual members and Institutional Program members. The webinars are

also recorded and posted on Neuronline to magnify their reach and impact.

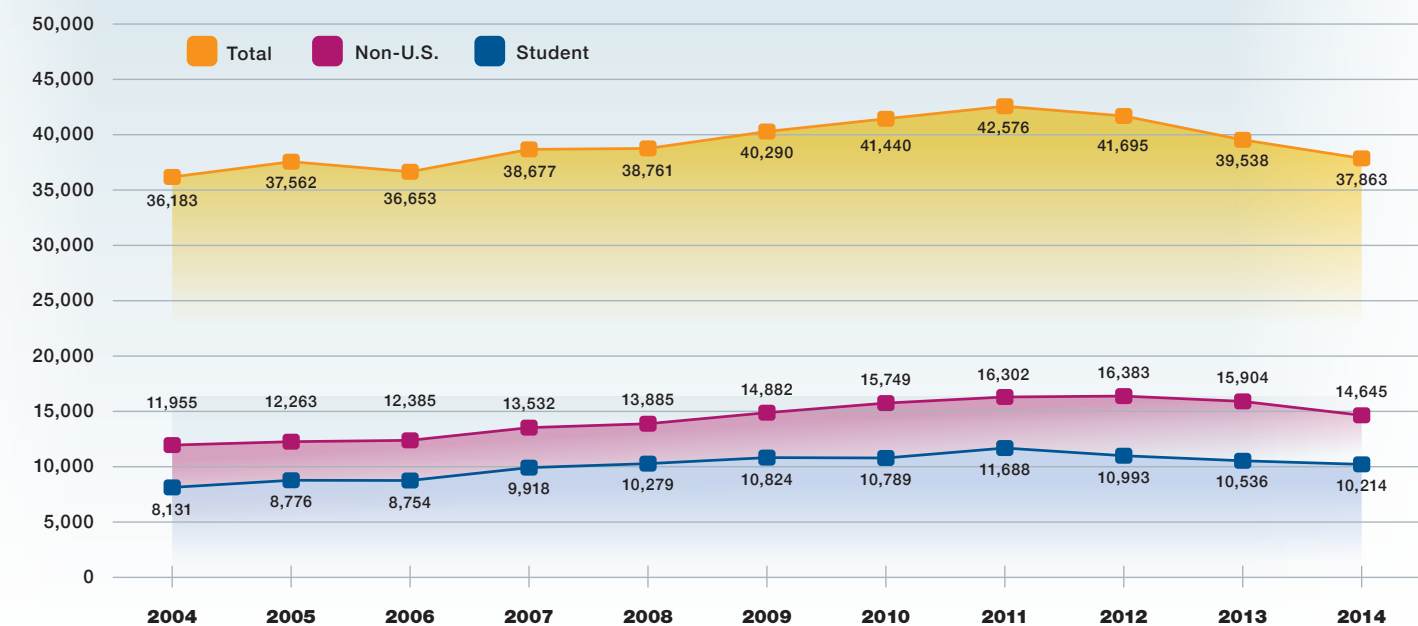
Through Neuronline, the Society has also made great strides in developing a cohesive venue for members to collaborate and make professional connections. With dozens of conversation threads to join, members can network and learn from one another. Additionally,



SfN offers a wide variety of professional development and scientific training opportunities both during the annual meeting and year-round online. For example, the Neurobiology of Disease Workshop takes place each year at the meeting and a follow-up webinar and the recorded session are hosted on Neuronline.

## A DIVERSE AND GLOBAL MEMBERSHIP

SfN membership continues to showcase the diverse and global nature of the field. SfN works hard to ensure that neuroscientists from around the world and at any career stage can benefit from SfN programs and activities.





SfN maintains a strong social media presence, which the Society uses to communicate and interact with its members, including informing them of professional development opportunities available on Neuronline and at the annual meeting. SfN grew its brand on Twitter and Facebook in FY2015, approaching 100,000 Facebook “likes” and 25,000 Twitter followers.

SfN also facilitates member career advancement through its NeuroJobs Career Center. In FY2015, more than 750 employers posted jobs seeking candidates from SfN’s pool of nearly 8,000 job seekers. The site also features resources to help candidates with resume writing and job interviews.

### Fostering Diversity in the Field

The world needs a highly skilled neuroscience workforce to meet the demands of the next century. SfN recognizes that diversity is critical to that growth and creates programming to support and advance this strategic goal. In FY2015, SfN continued to focus on serving the needs of women and underrepresented minorities in science through high-quality programs.

Building on the work of the NSF-funded Department Chair Training to Increase Women in Neuroscience (IWIn) project, SfN produced a toolkit that focuses on four themes: implicit gender bias, recruitment and selection, climate, and promotion and tenure. These easily adaptable resources, available on Neuronline, can be used by neuroscience departments and programs, as well as SfN chapters, to promote women and diversity in the field. In addition, SfN hosts webinars on key topics of interest, such as the June webinar “Tips to Survive and Excel as a Woman in Neuroscience,” as well as annual meeting programming such as the Diversity Fellows Poster Session and Celebration of Women in Neuroscience Luncheon.



SfN’s award-winning Neuroscience Scholars Program provides career development opportunities for underrepresented and diverse minorities, including the chance to present their science at the annual meeting.

The Neuroscience Scholars Program (NSP), which is designed to enhance career development and professional networking opportunities for underrepresented and diverse graduate students and postdoctoral fellows, received full five-year funding from the National Institute of Neurological Disorders and Stroke. NSP has expanded to include a new associates program designed to allow for additional high-achieving trainees to benefit from year-round online programming and community building. It also features a robust mentoring component, including an Individual Fellow Support Network, which provides each NSP fellow with a dedicated peer adviser and a senior mentor. In FY2015, NSP served a total of 137 fellows and associates and was honored with the American Society of Association Executives’ Summit Award, the highest award in the association field, recognizing the Society’s valuable contributions on the local, national, and global level and its ability to produce innovative, effective programs that advance the field, with specific attention paid to expanding diversity.

### Global Engagement on a Local Level

While the Society excels at providing broad-reaching programs that are relevant to its wide member audience, SfN relies on its partners — especially its Institutional Program (IP) members and chapters throughout the world — to tailor these programs to fit the needs of their local constituencies. SfN strongly supports its IP members and chapters, as they are key to increasing opportunities for sharing science and field-wide accomplishments with colleagues, the public, and policymakers in their local areas as well as the broader neuroscience community. The Society facilitates local engagement with its 141 chapters worldwide and provides valuable resources to assist chapters with engaging their members on educational and advocacy topics. In FY2015, more than \$100,000 was allocated for chapter activities and events.

SfN also works with international partners to provide training opportunities for high-achieving students around the world. In its first year, SfN’s Latin American Training Program (LATP),



The Graduate School Fair allows students to meet face-to-face with representatives of university neuroscience programs.

which builds on the historic success of the Miledi Program, engaged 73 associates in a yearlong online program. The associates participated in professional development and scientific webinars, as well as collaborative online discussion. Additionally, 15 of the associates were selected, based on the merit of their application, to attend a three-week scientific program at the Universidad Nacional Autónoma de México in Querétaro. The second programmatic year, which will begin in FY2016, received 30 percent more applications, underscoring the value and prestige of the program.

SfN is committed to funding trainee participation to international conferences to ensure these developing neuroscientists are exposed to the broad spectrum of neuroscience research and given the opportunity to collaborate with peers to further their own work and the field. In FY2015, SfN helped 19 trainees attend the Federation of European Neuroscience Societies (FENS) Forum and the Japanese Neuroscience Society Annual Meeting.

### Maintaining a Leading Edge in Training

The field of neuroscience is on the cusp of revolutionary advances, driven by new knowledge, novel tools, and growing inter- and trans-disciplinary integration across the physical, life, and social sciences. The Society has been exploring ways to realize the potential of those advances, including how the field can engage a diversity of disciplines and specialties; deploy a growing range of sophisticated tools and technologies; work within a common set of ethical boundaries and scientifically rigorous methodologies; and strike the right balance of skills, roles, and functions.

In addition to the established efforts of the Committee on Neuroscience Departments and Programs and the Professional Development Committee, two working groups — one focused on scientific rigor and the other on workforce and training — have been working to engage trainees and established scientists alike on these issues.

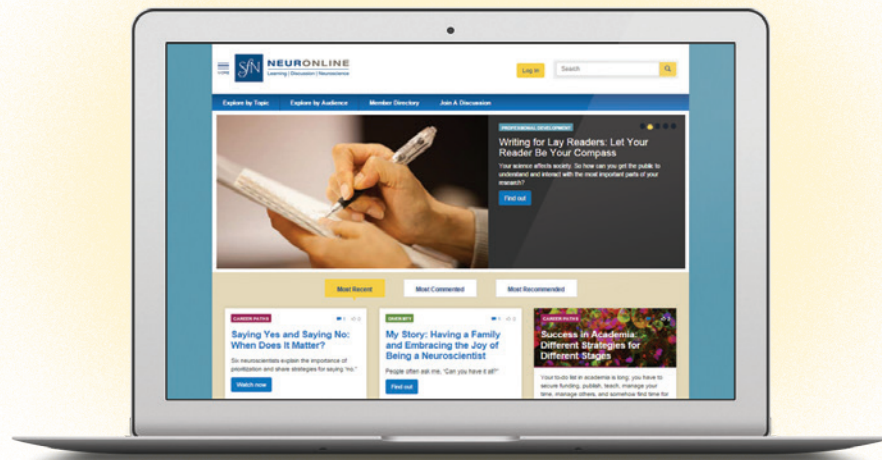
In April 2015, SfN released “Research Practices for Scientific Rigor: A Resource for Discussion, Training, and



SfN is strongly committed to the advancement of women in neuroscience. The annual Celebration of Women in Neuroscience Luncheon in 2014 featured former FENS President Marian Joëls as the keynote speaker.

Practice,” a tool for neuroscientists at all career stages and a framework for SfN’s activities moving forward. Planned Neuroscience 2015 activities include a new short course on responsible conduct of research viewed through the lens of scientific rigor and a professional development workshop exploring practical examples of the challenges and solutions in conducting rigorous science. The working group also supported relevant programming at Neuroscience 2014, including the Empirical Approaches to Neuroscience and Society Symposium, “Improving Animal Models of Neuropsychiatric Disorders,” and an NIH-led symposium, “Enhancing Reproducibility of Neuroscience Research.”

SfN is also engaging in several activities to acquire an understanding of the biomedical and neuroscience workforce and gather qualitative input from the neuroscience community. These include conversations with relevant SfN committees, as well as the broader neuroscience community, which will be integrated with existing quantitative data on the biomedical workforce to inform future training policy and programs.



## Introducing the New Neuronline

In FY2015, SfN launched a new initiative to enhance and encourage scientific dialogue and provide easily accessible professional development resources for members at every career stage. Neuronline, a members-only, one-stop home for learning and discussion, is a strategic investment developed in response to the SfN Council's mandate to serve the membership as a "leading online provider of professional development and training resources."

Neuronline content focuses on professional development, scientific training, advocacy, and other resources for the field. Neuronline also serves as the home for SfN's member discussion, building on the previous *NeurOnLine* forums and creating an improved user experience for those looking to connect with colleagues and others in the field. In addition to open forums, Neuronline encourages commenting on content, a new option meant to further engage members in discourse.

Since the launch in late April 2015, the initial use of and reaction to Neuronline has been overwhelmingly positive. Members and volunteers have noted the value of content, the ease of navigation and discovery, and the streamlined process for participation in discussion. Since launch, Neuronline has had 25,365 users and 67,959 page views.

The Neuronline project was guided by the Online Programs Advisory Group, co-chaired by Councilors Edvard Moser and Catherine Bushnell. This advisory group directed the research and development of the project, focusing on the needs of a worldwide membership. Neuronline offers written articles, videos, webinars, and podcasts, and is accessible on all devices, including phones, tablets, and laptop and desktop computers.

SfN's investment in this newest global scientific venue significantly furthers the Society's important strategic trajectory with regard to its digital programs.

Neuronline positions SfN to:

- Help members and other neuroscientists worldwide benefit from quality programming and networking throughout the year and across the career life cycle.
- Provide a cost-efficient, highly visible, modern, and scalable global platform for continued expansion of SfN-led programs.
- Ensure greater awareness of and access to a growing range of novel content from the field and partner organizations.
- Leverage SfN's core organizational resources, strengths, and knowledge to serve the field more effectively.

Neuronline's editorial calendar and direction are guided by the Online Programs Steering Committee. The committee works closely with a number of other key SfN committees to make certain that developing programs keep in mind digital distribution on Neuronline and that content remains vibrant and relevant to members at various career stages. The Global Membership Committee oversees the activities of the steering committee, ensuring that value for members is at the forefront.



As of August 2015, Neuronline featured 265 pieces of content in the form of articles, podcasts, webinars, and videos. Below is a breakdown by topic:

**CAREER ADVICE:**  
**32**

**CAREER PATHS:**  
**40**

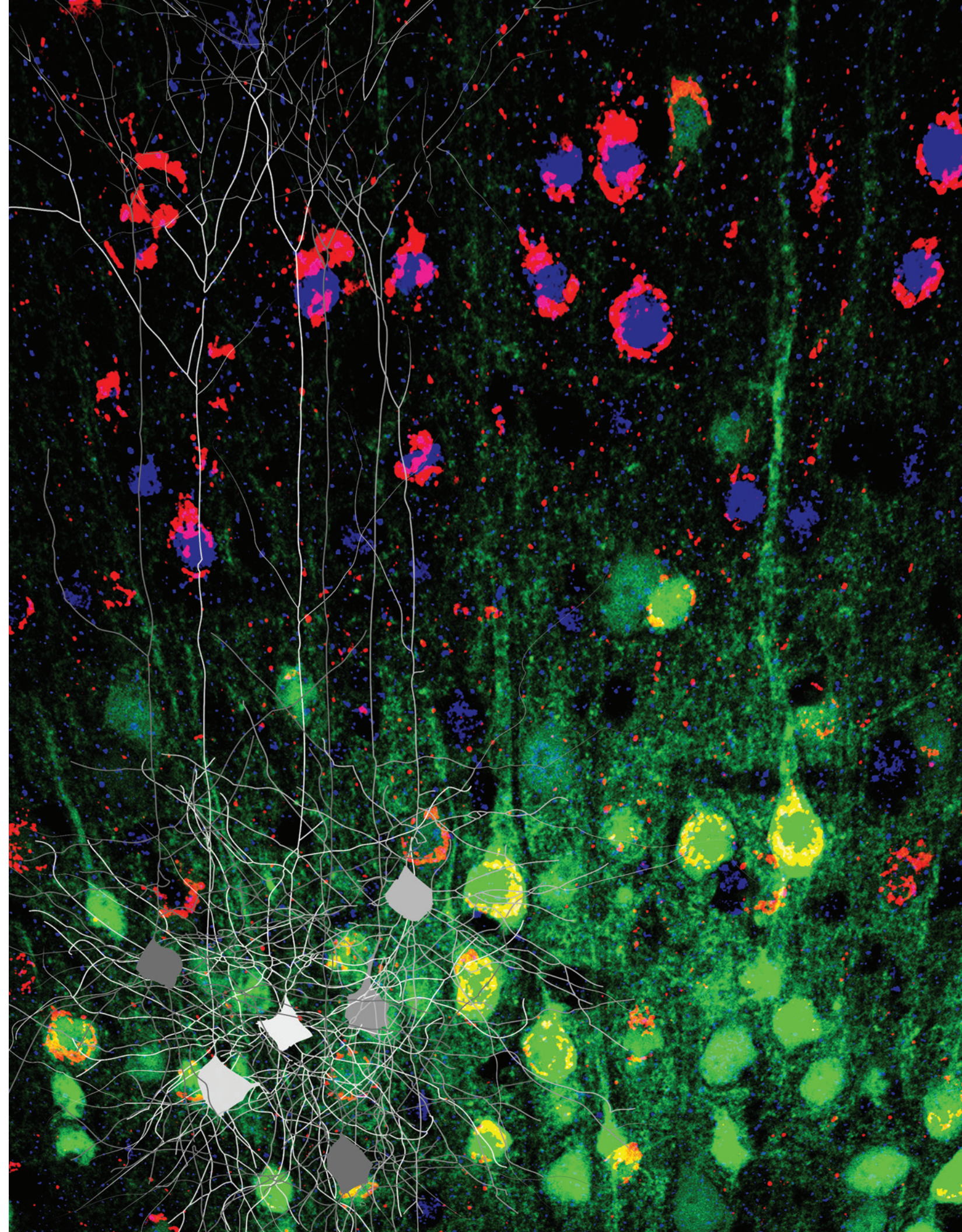
**DIVERSITY:**  
**46**

**OUTREACH:**  
**18**

**PROGRAM DEVELOPMENT:**  
**12**

**PROFESSIONAL DEVELOPMENT:**  
**79**

**SCIENTIFIC RESEARCH:**  
**38**



# Insights Into the VISUAL SYSTEM

Each of our eyes has a slightly different view of the world around us. Putting these two pictures together depends on the complex wiring that connects the eyes to the brain.

This wiring includes cells called retinal ganglion cells, which receive information from the eyes' light-sensing cells (photoreceptors) and extend fibers (axons) into the brain. These nerve fibers, which form the optic nerves, transmit information from each eye to the same *and* opposite sides of the brain, enabling binocular vision.

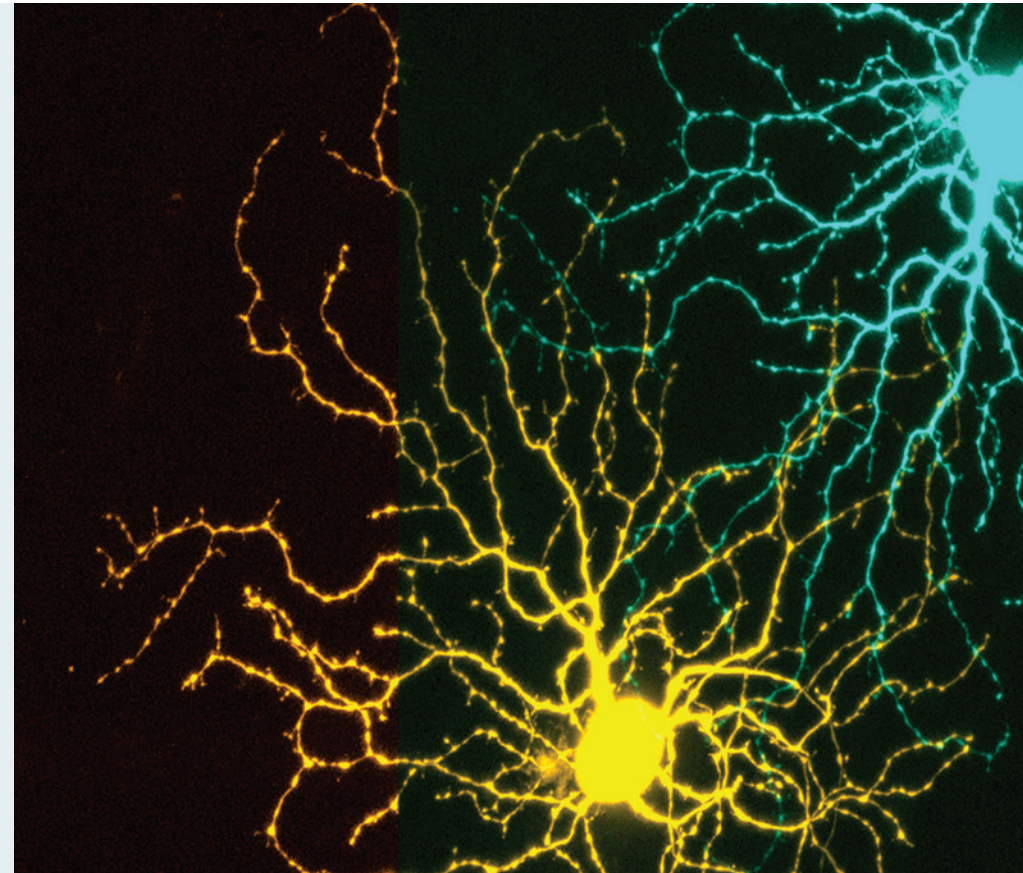
The axons find their way to the brain during embryonic development. Understanding the factors that guide growing axons — or block their paths — could help scientists regrow nerves injured by stroke or trauma or those lost in blinding diseases like glaucoma.

## Visualizing Development

SfN Past President Carol Mason has devoted her research career to learning how neural circuits form in the brain, and her work has revealed how the growing axons of retinal ganglion cells find their way to the correct brain targets.

The journey the axons make is not a straight shot, and they encounter many obstacles along the way. One of these occurs at the optic chiasm, where the optic nerves from each eye meet. At this juncture, the axons from each eye diverge, with some fibers crossing over to the other side of the brain and the rest continuing to targets in the same hemisphere.

In collaboration with Pierre Godement in the 1990s, Mason studied retinal axon growth cones, the tips of growing axons whose finger-like



Retinal ganglion cells receive signals from the retina's light-sensing cells and send the information to the brain for processing. These cells are destroyed in glaucoma, leading to progressive vision loss.

extensions search for the right synaptic targets. After staining retinal ganglion cells in the embryonic mouse brain, Godement filmed the axons as they grew out from the eyes. While all of the retinal axons grew toward the optic chiasm midline, those that did not cross over made a sharp turn and rerouted to the same side of the brain. Moreover, all of the growth cones repeatedly inched forward and retracted before finally crossing through or turning back, suggesting that something in the optic chiasm barred their entry.

Mason's later research illuminated the factors that direct these behaviors. She found that proteins in the optic chiasm bind to receptors on the axonal tips, triggering a cascade of events that either permits growth or prevents the axons from going forward. While all of the growing axons face this molecular barricade, the fibers that cross over are somehow able to overcome it.

In humans, half of the axons from each eye will cross over to the opposite side of the brain, enabling binocular vision.

"We need to understand how these axons develop normally if we're going to recapitulate growth after injury," Mason said.

## Catalyzing the Search for Cures

Glaucoma, which occurs when the axons of retinal ganglion cells are damaged, is the second leading cause of blindness worldwide, according to the World Health Organization. While it is possible to slow the progression of the disease, there are currently no cures. The retinal ganglion cells ultimately die if their axons are damaged, and the resulting vision loss is permanent.

However, in 2013 the National Eye Institute (NEI) launched the Audacious Goals Initiative (AGI) with the aim of catalyzing research that could lead to

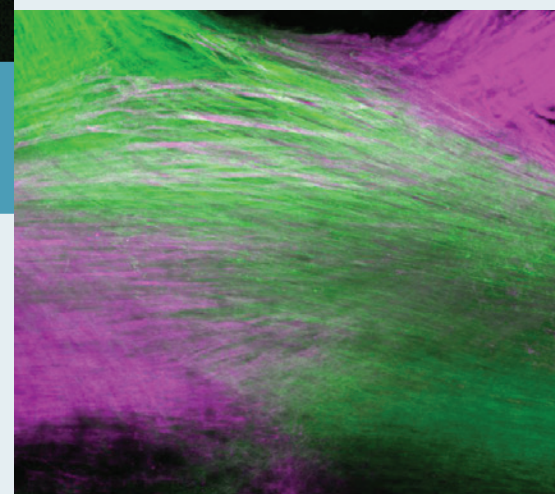
cures for glaucoma and other blinding diseases. Over the next 10 to 15 years, the AGI aims to restore vision in these eye diseases by regenerating the retina's photoreceptors and retinal ganglion cells. The AGI is also focusing on identifying ways of reconnecting axons of injured retinal ganglion cells.

One strategy to prompt proper axon growth and regeneration after injury involves understanding the timing of visual system development. Through her recent research, Mason has learned that the retinal ganglion cells that do not cross the brain's midline are born during a smaller window of time and express a distinct set of genes that control their differentiation.

"This is exciting because if we're going to direct stem cells or even actual retinal ganglion neurons to become one type of cell or another, we need to know the steps and the molecules that direct them," Mason said.

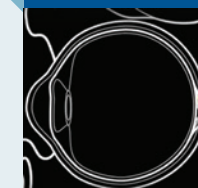
Other researchers in the field are learning about genes that encourage axon growth in the developing nervous system. These genes are shut down in adults but could be stimulated to make axons regrow, she said.

The results of the Audacious Goals Initiative could offer hope to the millions of people affected by stroke, injury, and diseases like glaucoma. They will also have broad implications for the field of neuroscience: "The visual system has not only been a great system to study in terms of learning how we see and how the circuits are set up, but it's also produced a lot of insights into how we can get any neuron in the central nervous system to regrow," Mason said.

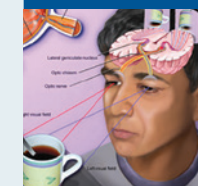


Fibers from retinal ganglion cells of each eye diverge to either side of the brain at the optic chiasm. By understanding what guides growing axons during the formation of this path, scientists hope to learn how to direct both the regeneration of injured retinal ganglion cell axons and the growth of stem cells that will replace cells destroyed in blinding diseases.

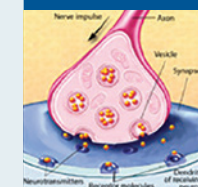
## RELATED CONTENT ON BrainFacts.org



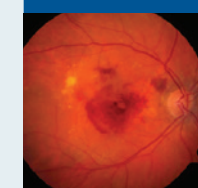
**The NEI Audacious Goals Initiative Video: Developing New Treatments for Eye Disease**  
brainfacts.org/  
NewTreatmentsForEyeDisease



**Vision: Processing Information**  
brainfacts.org/  
VisionProcessingInformation



**Making Connections**  
brainfacts.org/MakingConnections



**Macular Degeneration: Searching for a Treatment**  
brainfacts.org/  
SearchingForATreatment

More information about the visual system is available at [BrainFacts.org](http://BrainFacts.org), a public information initiative of The Kavli Foundation, the Gatsby Charitable Foundation, and the Society for Neuroscience.

# Educating and Engaging THE PUBLIC

SfN continues to raise the profile of neuroscience with the public, policymakers, and elected officials. Through the many resources available on *BrainFacts.org*, support and participation in Brain Awareness Week, outreach to the media, and the dedication of an engaged group of advocates, SfN is broadening its reach to a large population interested in neuroscience. Significant achievements in FY2015, including SfN's award-winning advocacy work, provide a solid foundation for continued growth in outreach to an increasingly global community. Going forward, SfN will look for ways to help global partners train their advocates, provide opportunities to interact with lawmakers at home, and increase public awareness of the importance of neuroscience research.

## Reaching a Global Audience Through *BrainFacts.org*

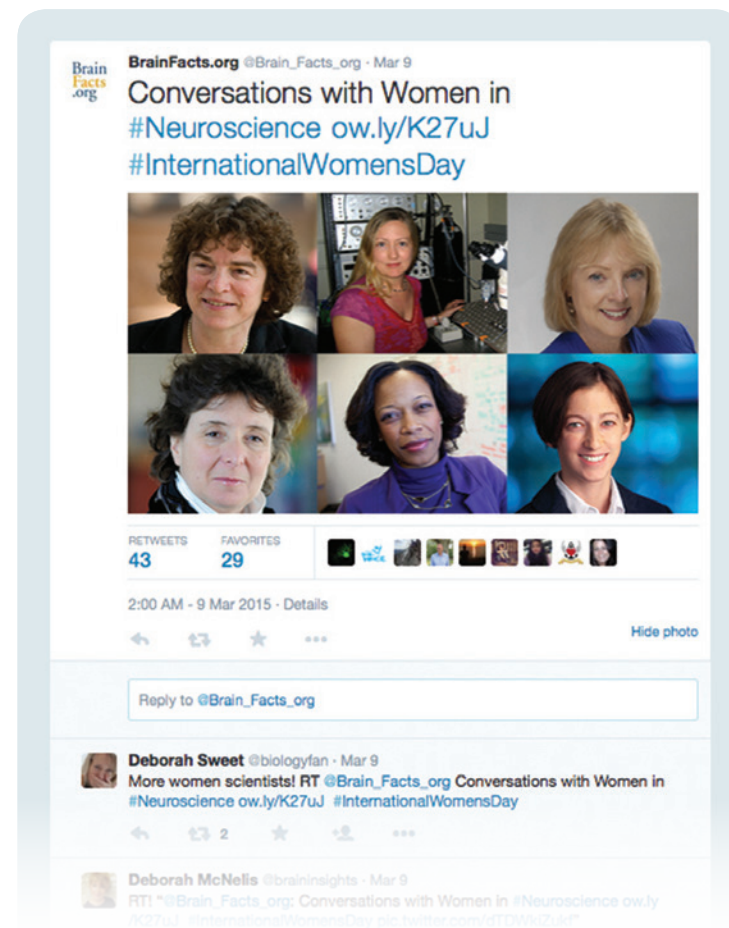
A sustained partnership between SfN, The Kavli Foundation, and the Gatsby Charitable Foundation produces the widely visited public information initiative *BrainFacts.org*, which celebrated its third anniversary in FY2015. Since the site launched in 2012, more than 3 million users have visited *BrainFacts.org*, with about 46 percent from outside the U.S. *BrainFacts.org* exposes visitors to accurate, relevant information about basic neuroscience

and emerging discoveries, serving as a valuable educational resource while simultaneously communicating the importance of neuroscience to society. SfN expects *BrainFacts.org* to continue to grow and flourish, as it has already surpassed 7 million individual page views and the average number of monthly visits to the site nearly doubled from 2013 to 2014.

Additionally, the *BrainFacts.org* social media presence has more than 40,000 followers. One of the most

popular posts from FY2015, "Conversations With Women in Neuroscience," highlighted the contributions of women to neuroscience on International Women's Day in March. More than 6,600 people viewed this original content to learn about the important work of seven female scientists.

Guided by an international editorial board, *BrainFacts.org* posted more than 130 new articles, podcasts, images, and resources in FY2015. Some of these resources came from



This *BrainFacts.org* tweet highlighting original SfN content about the important work of seven female scientists was one of the site's most popular social media posts.



Benjamin Walker (far left) served as the moderator for the 2014 DC Regional Brain Bee, which is hosted by SfN and tests local students' knowledge about the brain and nervous system. The DC winner, Soren Christensen (second from the right), went on to win the national championship.

*BrainFacts.org*'s four new content partners: the National Eye Institute, the National Science Foundation, the Coalition for Life Sciences, and the Smithsonian Digital Studio. *BrainFacts.org* now counts 16 formal and informal content partners.

## Increasing Engagement With the Public

In addition to *BrainFacts.org*, SfN engaged in a number of outreach efforts to help inform the public of the benefits of neuroscience research. SfN participated in Brain Awareness Week (BAW), a partnership with the Dana Alliance for Brain Initiatives to foster greater public interest in brain science and health. From March 16 to 22, SfN helped celebrate the 20th anniversary of BAW by posting a collection of materials addressing a variety of popular brain-related topics, such as

learning and memory. SfN's fifth Brain Awareness Video Contest, in which contestants work with a member of the Society to produce an educational video about the brain, resulted in 36 videos. Particularly noteworthy, SfN received seven international videos from as far away as Romania and Israel. The winning videos are available on *BrainFacts.org*.

SfN also connected with students and educators through its participation in the DC Regional Brain Bee and the National Science Teachers Association (NSTA) annual meeting. SfN maintained a booth at the NSTA meeting to distribute neuroscience materials to the more than 10,000 educators in attendance. The Society also hosted the regional Brain Bee competition in Washington, DC, which produced the U.S. national champion, Soren Christensen. SfN is proud to

partner with the Brain Bee by helping the national and international winners find laboratory internships where they can learn from mentors and experience firsthand what it's like to do neuroscience research. Finally, the national Science Olympiad champions from Fullerton, Calif., were guests of SfN at Neuroscience 2014.

## Advancing Neuroscience Through the News Media

As public interest in brain science grows, SfN works with the media to ensure the public is provided with accurate information about brain research. SfN coordinates with scientists around the world to share their important work in a way that is understandable for lay audiences. News outlets such as *The New York Times*, *Time* magazine, *The Washington Post*, and BBC News look to SfN, *The Journal of Neuroscience*, and *eNeuro* as reliable sources of information on the brain. SfN regularly connects members of the press with experts across the field to shed light on complex issues and developments in brain science. Members of the media are also actively engaged with emerging news about brain science and health at SfN's annual meeting. Roughly 250 reporters and public information officers registered to cover Neuroscience 2014, resulting in a record 3,132 news clips related to the meeting, nearly a quarter of which were from countries outside the U.S.

## Engaging Scientists in Advocacy

Because of another challenging year for research funding in FY2015, SfN's efforts to advocate for and on behalf of biomedical research remain a top priority. Federal funding under the restrictive "sequestration" model continued to put a strain on research funding from the National Institutes of Health and National Science Foundation.



Turkish children show off their brain drawings during Brain Awareness Week. SfN chapters around the world participate in this weeklong global celebration to increase public awareness about the brain.



Past SfN President Carol Mason participates in the Zuckerman Institute's Community Brain Expo at Columbia University during Brain Awareness Week.



SfN President-elect Hollis Cline (right) discusses the importance of funding for scientific research with U.S. Rep. Earl Blumenauer during the Society's annual Capitol Hill Day.



On behalf of SfN, President Steve Hyman accepts the Paul G. Rogers Distinguished Organization Advocacy Award from Research!America, honoring SfN's long-standing commitment to advocating on behalf of science.

Neuroscience 2014's Public Advocacy Forum highlighted this by addressing science funding in an era of global initiatives such as the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative, the Human Brain Project, and others. Despite these fiscal challenges, SfN took significant action in bringing the challenges facing biomedical research to Capitol Hill.

For the ninth consecutive year, SfN members spent a day on Capitol Hill talking with congressional representatives about the importance of biomedical research and the achievements being made in neuroscience. Fifty-two SfN members, including two from outside the United States, took part in advocating for strong federal science funding. They started the day with remarks from Rep. Jerry McNerney (D-CA) about the importance of in-person constituent meetings and took part in 81 meetings with offices

from 26 states plus Washington, DC. Following these successful meetings, four members have already "taken the Hill home" and hosted their elected officials on laboratory tours to show them firsthand the exciting science being conducted around the country.

Included in the 52 members at Hill Day was SfN's third class of Early Career Policy Fellows. These 10 individuals, selected from competitive applications and ranging from undergraduates to early faculty, are the next generation of scientist-advocates. The

fellows learn how to become effective advocates for science and commit to conducting various advocacy projects at their home institutions.

In addition to engaging with individual members of Congress, SfN provided formal written testimony on science funding to multiple congressional committees. SfN President Steven Hyman presented live testimony to and answered questions from the House of Representatives' Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies. This special hearing served as a valuable opportunity to highlight the NSF's role in neuroscience research.

#### Global and Local Partnerships

SfN partners with many coalitions and organizations, both locally and globally, to advocate for robust science funding. In the U.S., SfN is working with Research!America on a wide range of legislative advocacy activities,

including federal appropriations for basic research and new proposals in Congress and NIH. In FY2015, Research!America honored SfN with the Paul G. Rogers Distinguished Organization Advocacy Award, highlighting the Society's long-standing commitment to advocating on behalf of science. SfN also continues its ongoing support for and collaborations with the American Brain Coalition, the Coalition for the Life Sciences, the National Association for Biomedical Research, and the Coalition for National Science Funding.

On the international scale, SfN's partnerships with the Federation of European Neuroscience Societies (FENS) and the International Brain Research Organization (IBRO) involve strong engagement through the use of advocacy grants and programs. The grants will be used to seed international advocacy opportunities in selected countries, promoting neuroscience on a global scale.

#### Supporting Responsible Animal Research

SfN supports the responsible use of animals in research and conducts public education on the importance of animals in research through venues such as *BrainFacts.org* and *SfN.org*. In the wake of public attacks by animal rights extremists, SfN championed the valuable contributions made through the use of animal models in research. For example, *Science* magazine published SfN's strong remarks in support of the responsible use of animals in research and denouncing the harassment tactics used by animal rights extremists. In addition, SfN stressed the importance of animal research in letters to members of Congress who questioned NIH activities. These letters were part of a broad effort to explain how responsible research using animals is carefully regulated and ultimately leads to life-improving and lifesaving breakthroughs.

## BrainFacts.org

3,381,242  
USERS

4,172,138  
SESSIONS

7,014,558  
PAGE VIEWS

54:46  
U.S. VS. NON-U.S.  
SESSIONS

Growing rapidly over three years, *BrainFacts.org* serves a large and global public audience with scientifically accurate information, delivered in an exciting and accessible way.

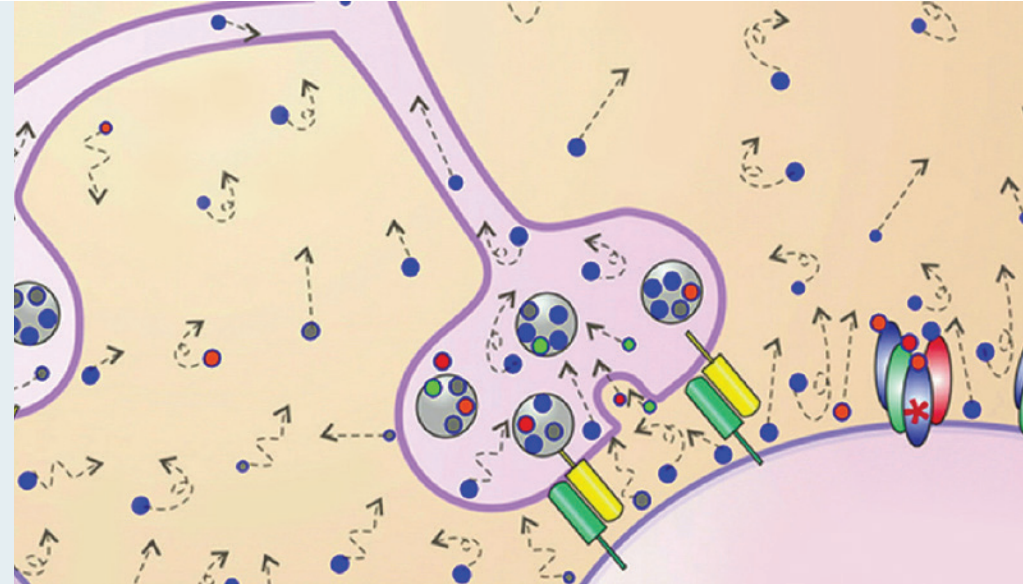
# Innovative Technologies FROM THE BRAIN INITIATIVE

Just over two years ago, the United States made a remarkable commitment to neuroscience when it launched the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative, pledging millions of federal dollars to support the development of new tools and technologies to study the brain. The announcement promised a bold approach to equip neuroscientists with new tools and important information that could not readily be gained through traditional grant making. Both Republican and Democratic lawmakers joined forces to ensure its initial funding.

The transformative potential for this ambitious project is beginning to come into view, and worldwide, nations are launching similar initiatives, all driven by the pressing need to understand the brain and help improve health outcomes. In the U.S., a wide range of federal agencies and private funders have taken up this charge, powered by a 10-year plan developed by leading neuroscientists. Working together, engineers, biologists, chemists, physicists, and others are able to develop and share tools and to tackle problems that until now have seemed intractable.

## Turning Neurons On and Off With Designer Molecular Switches

An important example of the BRAIN Initiative's early impact can be seen in an effort to develop more sophisticated genetic technologies that will enable researchers to target specific types of brain cells



A new type of imaging tool will help scientists to monitor how synapses function in real time by observing multiple types of molecules simultaneously. Neurons communicate via a variety of molecular interactions, with particles that have different optical properties. This platform will quantitatively image and characterize roles and functions of multiple types of molecules at individual live synapses at nanometer resolution.

and circuits, manipulate them, and ultimately clarify their specific roles in the brain.

Designer Receptors Exclusively Activated by Designer Drugs (DREADD) technology has revolutionized the way neuroscientists can tap into the brain's inner workings and could potentially provide therapeutic benefits. This tool involves engineered brain receptors that can only be activated by a particular type of small drug-like molecule that is not found naturally in the body. DREADD2.0 technology could help researchers understand how neurons within brain circuits work using animal models. While currently there are no plans to translate DREADDs into humans, this type of technology may have the

potential to one day help with treatment for certain brain disorders by changing neuron activity in a specific area of the brain.

## Tools Expand Potential for New Understandings

Scientists are leveraging novel technologies to enhance traditional tools and develop new ones that provide greater capacity to advance understanding of the brain. In recent years, a team of researchers developed a powerful new microscope that increases the field of view of a traditional microscope 100-fold (the difference between a 1980s television and the latest ultra-high-definition television is only about 25-fold). Using this tool, scientists have been able to

see neuronal signals as they happen in animal models, increasing understanding of the function of neural circuitry in the brain.

Improvements on this technology have allowed researchers to view individual neurons firing in two or more brain regions at once, showing how different areas of the brain work together to process information. Together, these new tools are enabling scientists to advance understanding of neurological disorders.

## Imaging the Brain in Motion

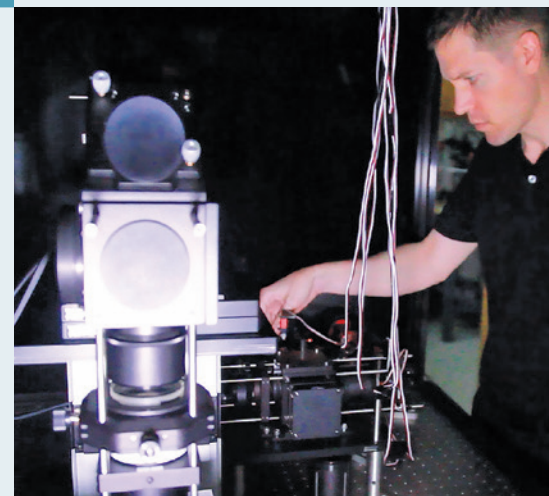
Additional powerful catalysts for BRAIN investment are imaging techniques that are enabling scientists to finally see and better understand the

functioning brain in action. Using new tools and nanotechnology, researchers can now glimpse how neurons communicate at the molecular level, using spatial and temporal resolution to view signaling across synapses.

In an effort to study the brain during complex movements, researchers are in the process of planning the world's first completely mobile molecular brain imaging system. Positron emission tomography (PET) imaging was selected as the best candidate for mobile imaging because, unlike other imaging modalities, which require a person's head to be entirely still while being scanned, PET can accommodate motion and still provide information about structures deep inside the brain. PET imaging uses a tiny amount of radioactive atoms to examine changes in brain function, including how various brain regions use different neurotransmitters.

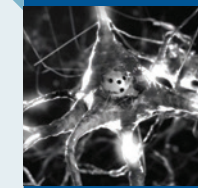
By designing a PET imaging system that could be worn as a backpack, researchers would not only be able to learn more about normal behaviors, such as walking, balancing, and navigating, but for the first time, they could see how different neurotransmitters are affected in brain regions in people with movement disorders such as Parkinson's disease.

As science moves forward, this and other pioneering research ultimately presents an opportunity to improve the lives of billions of people around the globe suffering from brain disorders like Alzheimer's and Parkinson's diseases, post-traumatic stress disorder, and traumatic brain injury.



A specialized two-photon microscope is in development thanks to support from an NSF BRAIN EAGER grant. This laser-based imaging system can optically record neural activity with single-cell resolution in multiple brain areas simultaneously.

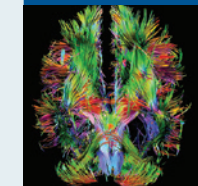
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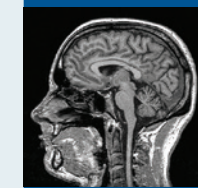
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More information about the BRAIN Initiative is available at [BrainFacts.org](http://BrainFacts.org), a public information initiative of The Kavli Foundation, the Gatsby Charitable Foundation, and the Society for Neuroscience, and from the NIH at [braininitiative.nih.gov](http://braininitiative.nih.gov).

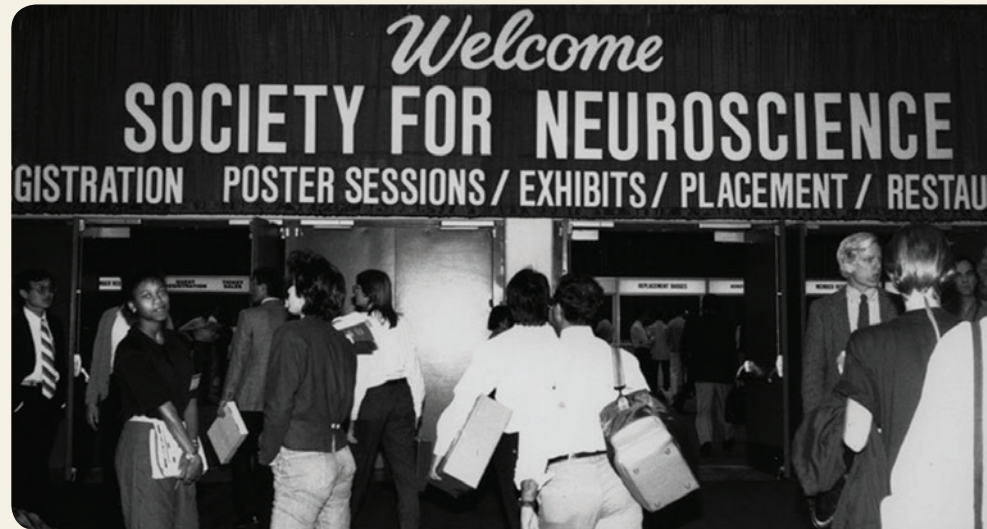
# GET TO KNOW THE HISTORY OF SfN

From its founding in 1969 to the present, the Society for Neuroscience has played a crucial role in the creation of neuroscience as a discipline as well as the continuing growth and development of the field. SfN brought together scientists from a variety of established disciplines under the common banner of neuroscience. You can learn about the founding of SfN and the field and the Society's first 25 years, from 1969-1995, through the History of SfN project at SfN.org.

The History of SfN project includes a visual timeline of significant SfN milestones, an essay that chronicles the stories and events from the Society's first 25 years, videos featuring many of SfN's past presidents discussing the growth of the Society, and artifacts such as pictures and documents from SfN's early years. Check out the photos accompanying this article for a few examples.

Past SfN President Larry Swanson initiated the History of SfN project in 2013 and it debuted at Neuroscience 2014. The project ensures that SfN's founding and its early contributions to the field are captured and documented for future generations. The SfN Council and past presidents helped guide the development of the project.

SfN partnered with a team of leading science historians from UCLA, which already had a strong neuroscience archival program, to write this history and create the multimedia collection of historical materials. The team sifted through SfN's archival material, UCLA's Neuroscience History Archives, and other sources, in addition to interviewing many SfN members and past presidents for their personal accounts of SfN's first 25 years.



**ABOVE:** About 13,000 attendees traveled to Phoenix for the 1989 annual meeting. **RIGHT:** Almost 1,400 scientists came to Washington, DC, in 1971 to share science and collaborate with their peers at SfN's first annual meeting. Since it began, SfN's annual meeting has proceeded to grow and expand over the years, and in 2014, more than 31,000 people attended the meeting. **BELOW:** A crowning achievement of SfN's Government and Public Affairs Committee was to gain federal recognition of the importance of neuroscience through the proclamation of the "Decade of the Brain," signed by President George Bush in 1989. To this day, SfN continues its strong advocacy efforts in the fight for science funding.



**LEFT:** Attendees check out booths on the Exhibit Floor at the 1994 annual meeting in Miami Beach. The Exhibit Hall at each annual meeting features companies, publishers, and other organizations displaying their publications, products, tools, and technologies.



**RIGHT:** SfN's member newsletter dates back to the birth of the organization itself. The first issue was published in April of 1970 with front-page articles about important SfN business: election results naming Vernon B. Mountcastle as the Society's first elected president, a progress report about the rapidly expanding Society, and an overview of the Council's January meeting. **FAR RIGHT:** *The Journal of Neuroscience*, now the most-cited peer-reviewed journal in the field, published its first issue in 1981. The Society has developed a reputation as a respected scientific publisher and in 2014 launched its second journal, *eNeuro*.



Learn more at

[SfN.org/About/History-of-SfN](http://SfN.org/About/History-of-SfN)

# Financial and Organizational HIGHLIGHTS

## Meeting Program Goals, Ensuring Financial Strength

In FY2015, the Society for Neuroscience achieved its many program goals and maintained its strong financial health. This balance is made possible by several factors, including a set of complementary financial strategies that involves careful budgeting, closely monitored expenses, and a prudent reserve policy, as well as wise investment in the SfN headquarters building and selective access to high-priority strategic funding. The SfN Council is also prudent and proactive in monitoring external trends and was particularly attentive to global research funding challenges in FY2015 that produced modest revenue “headwinds” for the Society. As a result, Council elected to make selected program reductions and modest price increases in some areas. At the same time, SfN also invested in two major strategic projects that will serve the field in future years — *eNeuro*, a new open-access journal, and the relaunch of Neuronline, a dynamic new online member program platform.

Based on preliminary (unaudited) figures, FY2015 consolidated net operating revenue totaled \$2.3 million on total revenue of \$31.2 million. Two of SfN’s leading venues for sharing emerging science — the annual meeting and *The Journal of Neuroscience* — maintained their exceptional scientific leadership, thereby ensuring



The Friends of SfN Fund provides support for young neuroscientists to attend the annual meeting, giving them the opportunity to present their science and network with professionals in the field.

they remained key financial foundations for the Society. Additional revenue was driven by substantial membership numbers; income from 1121 Properties LLC, SfN’s fully leased office building; grant support from NIH; and private grants, corporate support, and individual donations. External funding supported annual meeting activities, awards and prizes for established and emerging young scientists, and ongoing efforts such as public outreach, with support totaling \$1 million. The Society’s annual fund campaign also grew in 2015, and SfN thanks the more than 647 donors who provided

support for key initiatives.

The value of SfN’s long-term investments increased to \$53.5 million as of June 30. This was accomplished thanks to Society volunteer leaders who ensured SfN invested during the past decade in a prudent reserve policy to protect its ability to serve membership and meet financial obligations in case of a severe economic downturn. The portfolio’s growth reflected market performance, and the Investment Committee, composed of Society leadership and pro bono investment professionals, carefully guided the portfolio.

## Expanding Digital Offerings, Focusing on User Experience

With the new Neuronline as the emerging strategic home for learning and discussion, many of the year’s programmatic efforts focused on developing digitally optimized content. SfN tripled its webinar offerings, from producing seven in FY2014 to delivering 25 in FY2015 that reached more than 2,000 participants. With its carefully crafted taxonomy and clean interface, the new Neuronline serves to further expose members to content such as webinars, broadening the programmatic reach and impact of this content.

Additionally, SfN’s *Neuroscience Quarterly* member newsletter transitioned from print to a digital format that offers enhanced content such as videos, slideshows, and interactive elements. Members can now more easily access and share *NQ* content. The Society also increased its efforts in FY2015 to capture video at venues like

the annual meeting and Capitol Hill Day in order to provide valuable content for SfN’s digital communications.

Enhancing the mobile experience for members was another FY15 priority. As the final pieces of a larger, multiyear mobile strategy, both *BrainFacts.org* and SfN.org became responsive websites in August and January, respectively, while Neuronline relaunched fully responsive in April. All sites now respond dynamically to an individual’s screen size, whether that is a desktop monitor, laptop, tablet, or mobile phone. SfN also made several mobile enhancements to the Neuroscience 2014 and *Journal of Neuroscience* downloadable apps and the mobile-friendly *JNeurosci*, *eNeuro*, and NeuroJobs websites.

With so many resources focusing on digital and mobile, the Society has been examining ways to provide a more seamless online experience for members. One such effort will eliminate

the need for multiple usernames and passwords by providing a single sign-on for members to use Society services, from submitting journal manuscripts to accessing Neuronline. SfN also made improvements to online member profile pages, including auto-completion of university and institution entries, which streamlines the experience and standardizes entries to ensure cleaner records, thus enabling the Society to better serve its members.

There remains a continued focus on technology infrastructure to ensure the stability of websites and tech platforms during peak usage, as well as on the monitoring and improvement of systems and tools required to support member programs. Investments in technology enable the Society to keep pace with the changing needs of the digital landscape and perform the real-time analysis that helps SfN serve its global membership efficiently and effectively.



As part of SfN’s focus on developing more digital content, the *Neuroscience Quarterly* member newsletter transitioned to an online format that offers enhanced content such as videos, slideshows, and interactive elements.



# Photography Credits

**FRONT COVER:** Expression of Neurogenin3 (yellow) in ventral spinal cord progenitors (indicated by Nkx2.2 staining, purple) precedes neuronal differentiation (indicated by  $\beta$ III-tubulin staining, light blue). Neurogenin3 in the spinal cord restricts the development of the serotonergic system to the hindbrain. Courtesy, with permission: A. Carcagno, et al., 2014, *The Journal of Neuroscience* 34: 15223–15233.

**PAGE 1:** Thumbnails (L to R): Courtesy, with permission, F. Memi, et al., *The Journal of Neuroscience* 33(44): 17527-17537. Courtesy, with permission, Austen Sitko. Courtesy, with permission, Old Dominion University.

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**PAGE 4:** Intratelencephalic projection neurons (IT-PNs, red retrograde label) in mouse motor cortex express different proteins implicated in molecular control of neuron phenotype. The transcription factor Fezf2 (green transgenic GFP label) is expressed specifically by IT-PNs in layer 5A (red + green = yellow neurons), whereas, Cux1 protein (blue immunostain) is specific to layer 2/3 IT-PNs (red + blue). The dendritic reconstructions of Fezf2-positive IT-PNs are superimposed in gray to illustrate their unique morphology.

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**PAGE 11:** Coronal head section of an E16.5 Cxcr4-eGFP transgenic mouse, stained for GFP (green) and peripherin (red). Chemokine receptor CXCR4 is expressed in the olfactory epithelium, olfactory bulb, and peripherin-positive olfactory axons.

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**PAGE 17:** A mouse neuromuscular junction (NMJ) showing acetylcholine receptors (red), motor nerve (green), and nuclei (blue). These peripheral synapses are normally remarkably stable in adult animals, but they undergo dramatic changes in myasthenic disorders or aging.

Courtesy, with permission, A. Barik, et al., *The Journal of Neuroscience* 34(42): 13892-13905.

**PAGE 18:** This image shows dye-filled, genetically identified retinal ganglion cells (RGCs). Some RGC types are more likely than others to degenerate in the early stages of glaucoma, one of the leading causes of blindness. RGCs whose dendrites reside in the “Off” sublayer of the inner retina are particularly vulnerable.

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**PAGE 32:** This artistic rendering shows papaverine-induced ribosomal S6 phosphorylation in striatonigral and striatopallidal medium-sized spiny neurons. The original image showed triple-labeled nNOS-positive interneurons and phospho-rpS6 in Drd2-EGFP mice.

Courtesy, with permission, A. Biever, et al., *The Journal of Neuroscience* 35(10): 4113-4130.

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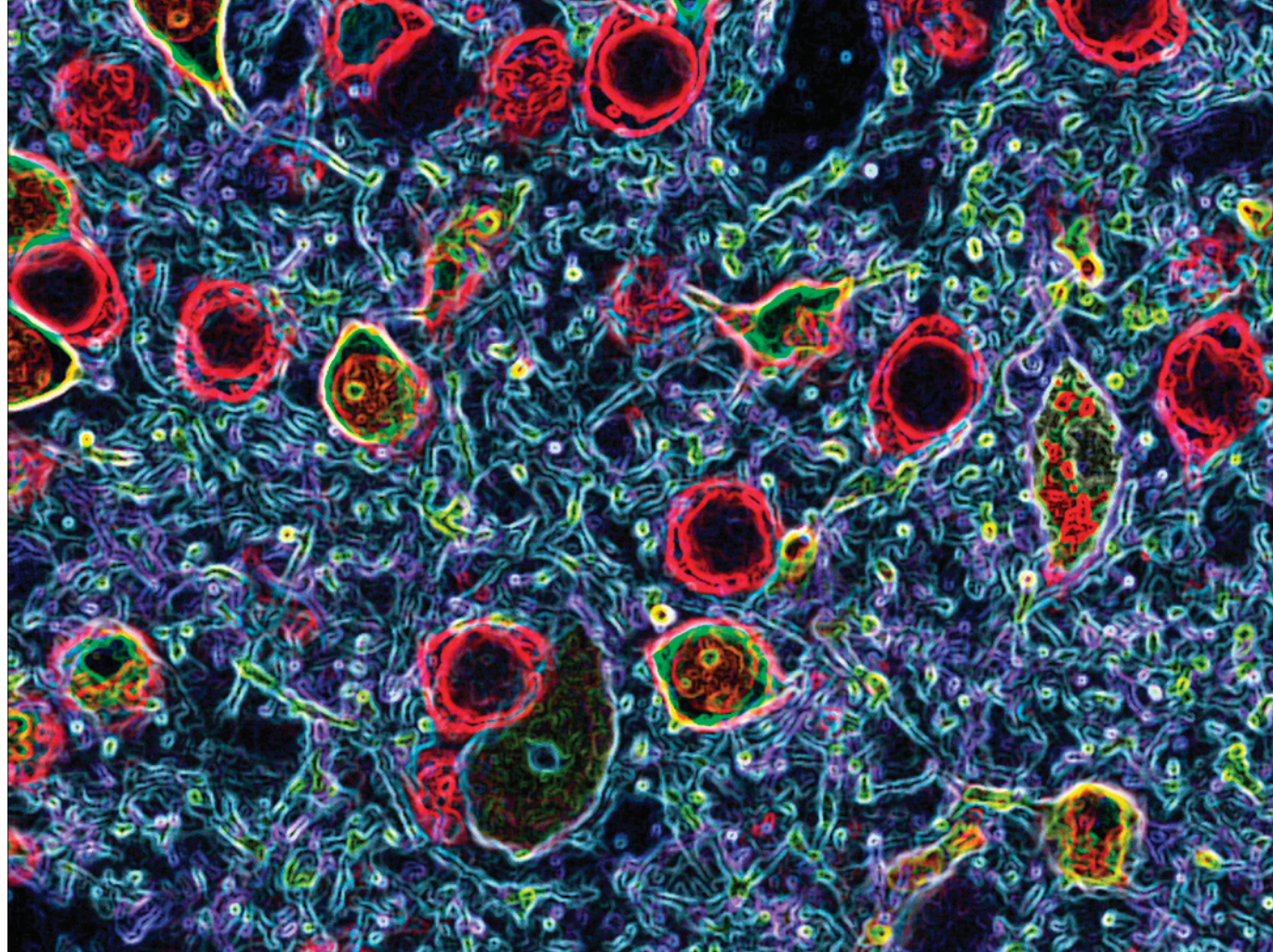
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