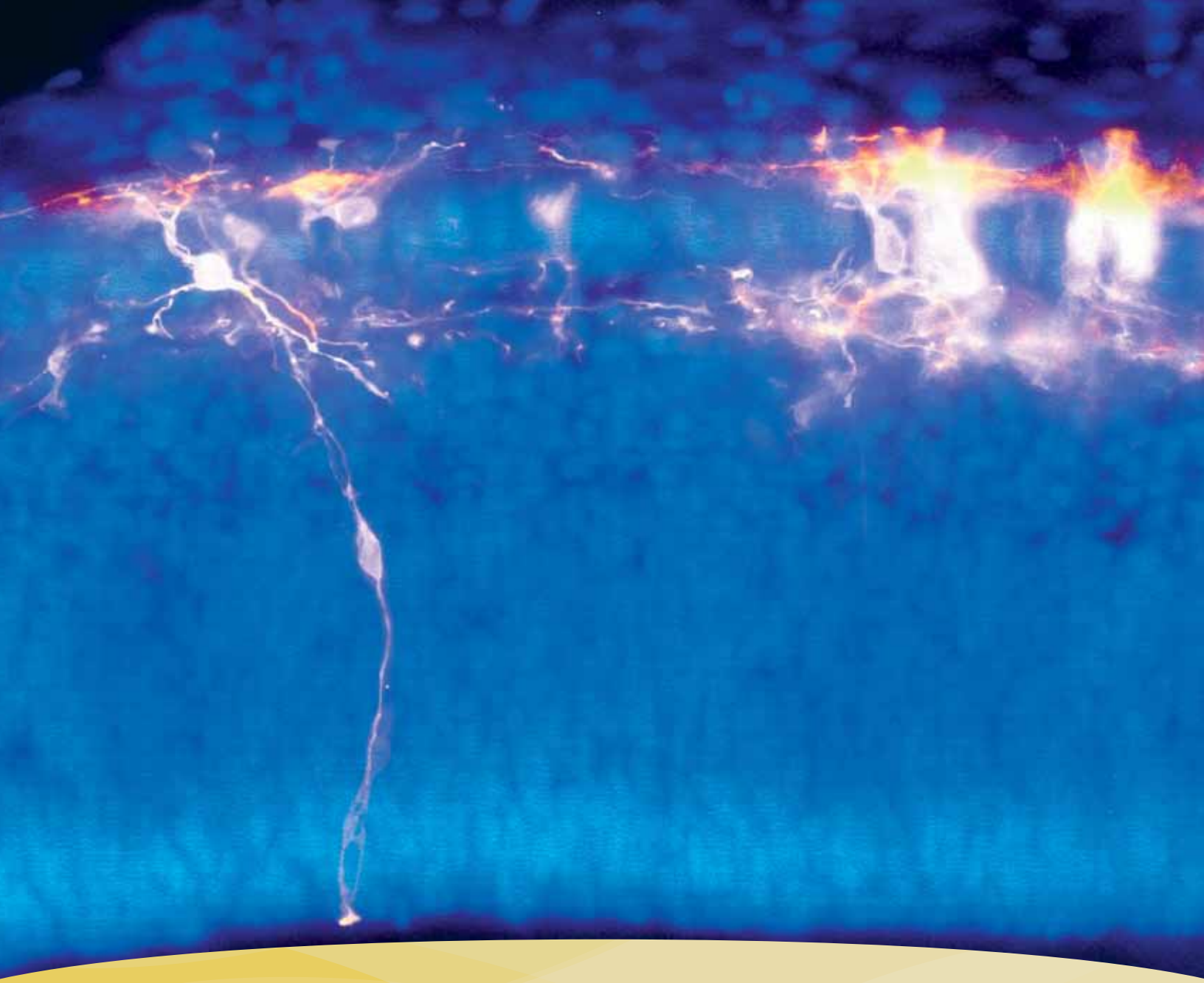
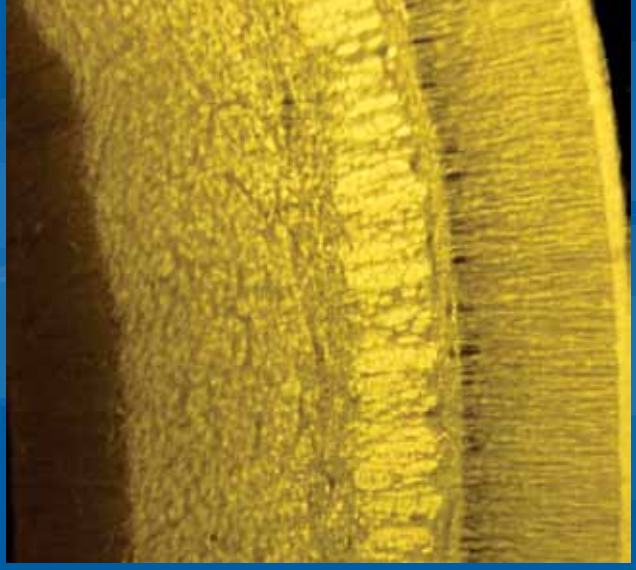


# Looking Beyond the HORIZON

**FY2010** *Annual Report*

SOCIETY FOR NEUROSCIENCE



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# Looking Beyond the HORIZON

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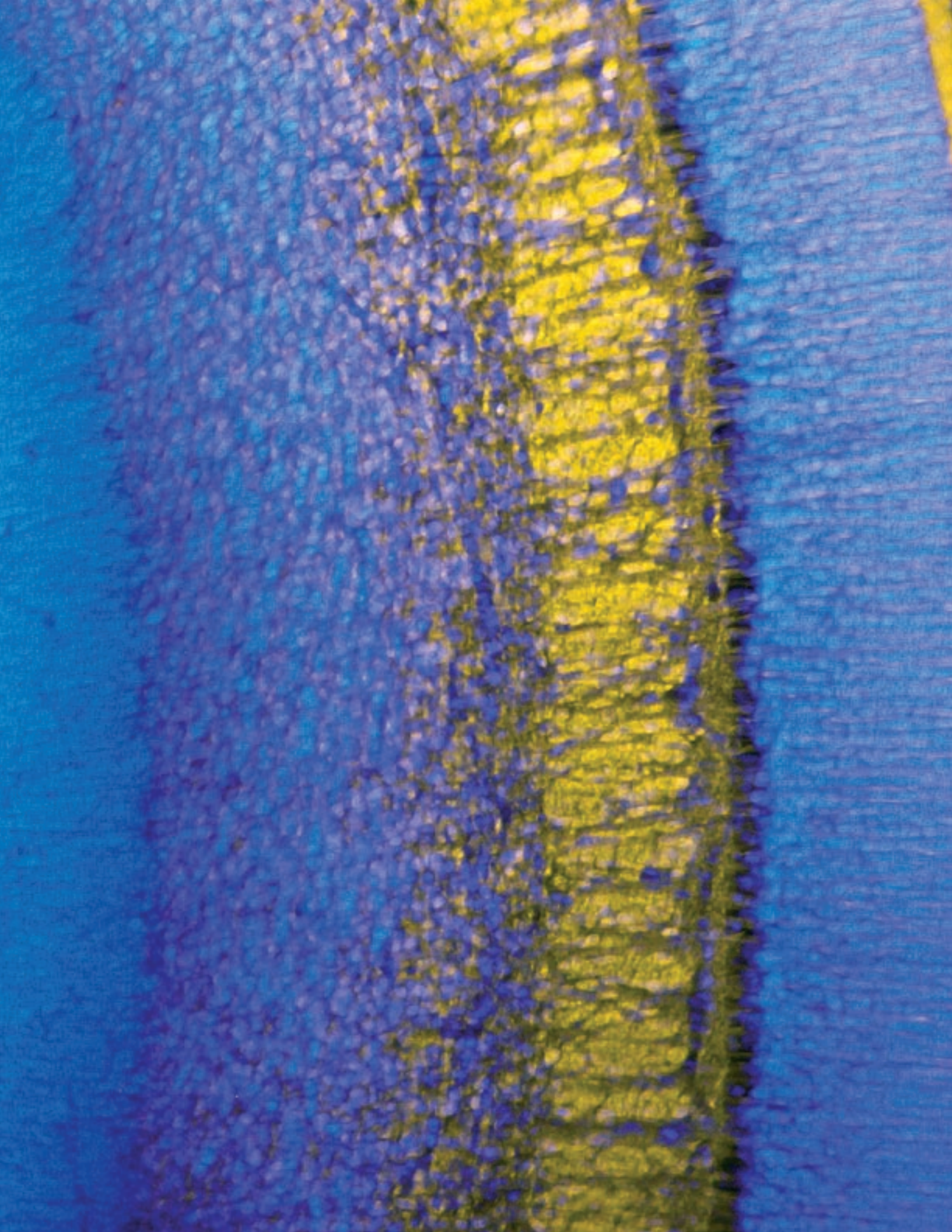

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# MISSION

**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 diverse cultural, ethnic, and geographic 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, recent developments, and emerging opportunities in neuroscience research and their implications for public policy, societal benefit, and continued scientific progress.

# VALUES

- Identifying and serving the evolving needs of SfN members as well as the field of neuroscience.

- Continuing to promote greater diversity of representation of women, minorities, and young investigators, along with geographic and specialty balance, in SfN's meetings, conferences, committees, and governance processes.

- Seeking new and innovative ways to utilize technology in ongoing activities to better serve members and to help manage the problems of scale as a successful association in the 21st century.

- Fulfilling its mission in a socially, economically, and environmentally responsible fashion, including minimizing SfN's environmental footprint through energy efficiency, recycling, and other initiatives, and being mindful of the broader impact of its day-to-day practices, decisions, and actions.

- Developing effective strategic relationships and collaborative initiatives with appropriate external partners, including other scientific societies and associations, health advocacy groups, foundations, public agencies, government entities, educational institutions, corporate entities, information technology service providers, etc.

- Building a model of iterative planning into the fabric of SfN governance and management processes, incorporating regular evaluation of the impact and success of initiatives and activities, and periodic revisiting of major programs and activity clusters.

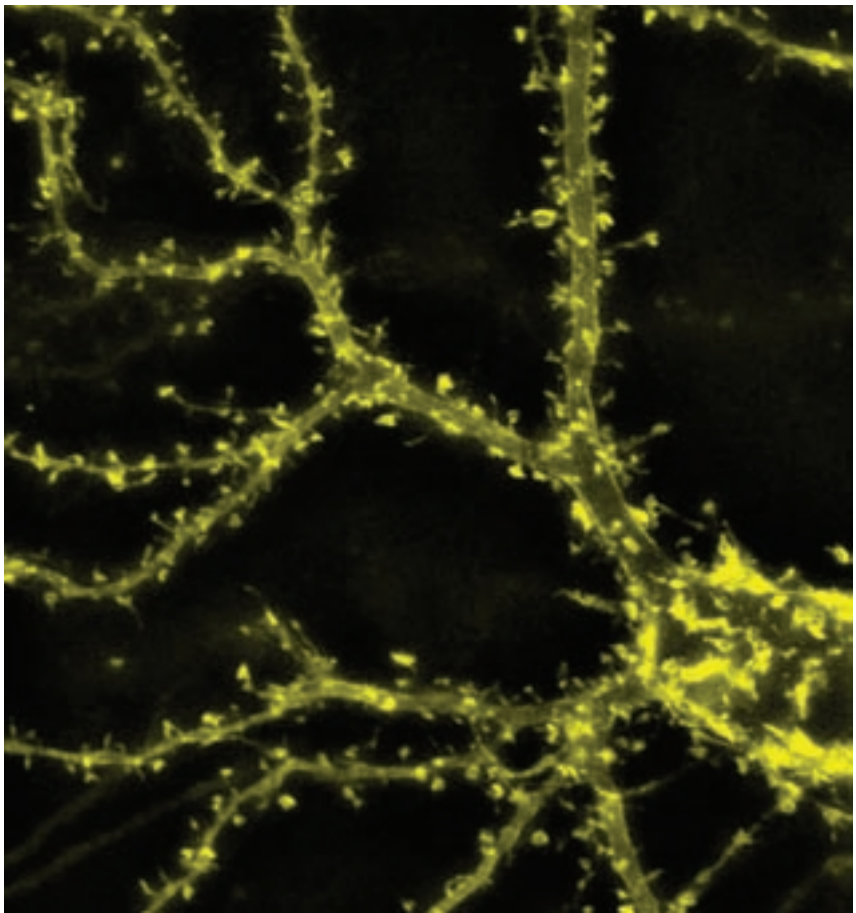
# VISION

## Society for Neuroscience Scientific Vision

Guided by its mission and its values, the Society for Neuroscience (SfN)'s vision is that the next decade should be one of breakthrough discovery that will lead to the translation of scientific advances to improve the health of people everywhere.

SfN represents the entire range of scientific research endeavors aimed at understanding, treating, and preventing nervous system disorders. It fosters the broad interdisciplinarity of the field that uses multiple approaches to study the nervous systems of organisms ranging from invertebrates to humans across various stages of development, maturation, and aging. SfN also facilitates the translation of research findings into treatment strategies, encourages information transfer from the clinic back to the basic research arena, and contributes to the breadth of the field of neuroscience, and its creative use of all the tools of modern biology to understand neural function in health and disease.

Neuroscience is a rapidly evolving field that benefits greatly from, and helps to drive, the ongoing development of powerful new tools used to acquire and analyze experimental data. The effort to make efficient use of the staggering amounts of diverse information known about the nervous system raises challenges that have social, ethical, and technical dimensions. Some of these challenges are common to biomedical research and its subdisciplines of bioinformatics and scientific ethics. Others are unique to neuroscience by virtue of the tremendous complexity of neural circuits and their role in controlling behavior. These challenges prompt opportunities, as well as responsibilities, to develop new tools and approaches for integrating and advancing the understanding of the nervous system.



SfN will play a key role in confronting new issues by challenging and energizing the field through active dialogue with federal funding agencies, such as the National Institutes of Health, National Science Foundation, and others, to define current needs and to develop strategies for meeting them. SfN's perspective on the field's current nature and its future trajectory permeates all the elements of the strategic plan and will guide the initiatives aimed at enhancing key scientific functions, including the annual meeting and *The Journal of Neuroscience*. This perspective will guide the ways in which SfN will strive to serve its membership and frame the public outreach and governmental interactions.

# A MESSAGE *from the* PRESID

In FY2010, with an external environment that remained challenging and unpredictable, the Society for Neuroscience steered through the uncertainty to protect and advance its mission, celebrate and support scientific progress, and help build a growing community of neuroscientists. While producing successful programs and services for a record number of members, SfN also began an intentional effort to "look beyond the horizon" — anticipating emerging opportunities; exploring, revising, or reconfirming its strategic priorities; and implementing early phases of new directions — in order to strengthen SfN's service to a dynamic and changing field.

If ever a number spoke to the progress and potential of a scientific field, SfN's 2009 membership offered it. The 40th anniversary year of SfN welcomed an historic 40,000 members, and the Society used the occasion to offer glimpses back on the field since 1969, and to look ahead at a bright future. Today, SfN's membership reflects the size and reach of the global neuroscience enterprise: tens of thousands of regular members serve in academia, publishing, government, clinical research and practice, as well as in biotech and pharmaceutical leadership positions all across the globe.

In May 2010, SfN President Michael Goldberg testified before Congress in support of funding for NIH.

Student membership is growing rapidly as young scientists, eager to make their mark, explore an open field. And international members are growing; today an estimated 37 percent of our members are from outside the United States, hailing from more than 80 countries.

The SfN Council knows these numbers reflect both the opportunity and excitement inherent in the field, and the value scientists and students find in membership and in sharing neuroscience discoveries. It also reflects SfN's careful stewardship of resources. In FY2010, SfN remained financially stable and retained and expanded programs and activities that our members value.

For instance, Neuroscience 2009 was a great success as the neuroscience community embraced Chicago as a new city in SfN's rotation. As always, the program offered an unmatched line up: spectacular science mixed with important discussions of science policy and funding, and engaging public interest events like "Magic, the Brain, and the Mind." *The Journal of Neuroscience* also remained among the leading peer reviewed journals in the field, and continued to adapt to its changing needs.

In support of our members' professional development and networking, SfN has undertaken significant changes and expansions. We joined forces to enhance connections to teaching programs through a consolidation with the

# E N T

former Association of Neuroscience Departments and Programs. A new broader Professional Development Committee is sustaining successful programming to meet the needs of a diverse community while it also explores new offerings for a wide range of professional development needs. And for the growing number of local neuroscience communities that choose to form chapters, not only in North America but also around the world, SfN has met demand by increasing funding for chapter grants and expanding communications and training programs.

When it came to engaging the public, SfN was active in promoting the investment made through the extraordinary American Recovery and Reinvestment Act (ARRA). New publications highlighted the basic investments made through ARRA and ongoing government R&D funding, and its potential scientific, health, and economic benefits. Whether that research was investigating potential environmental triggers for Parkinson's disease or the neural circuitry of autism, SfN worked to tell the public and policymakers why these government investments pay off for the public in the long-run, as well as creating and preserving jobs all across America in the short run.

I have had a particular focus during my tenure in promoting the importance of animal research and protecting the researchers who conduct this lifesaving research. More than a year ago, I heard more and more researchers talk about receiving requests for information under the U.S. federal Freedom of Information Act (FOIA). While SfN appreciates the value and importance of sunshine laws, we also recognize these requests are often used by those who do not respect research and the law to secure and misrepresent information about researchers. Moreover, members may not know their rights and responsibilities under this law. I am pleased that SfN was catalytic in producing a new publication to help educate researchers about FOIA, in partnership with the National Association for Biomedical Research and the Federation of Societies for Experimental Biology. I feel passionately that scientists, as a community, must be educated and engaged in promoting understanding of animal research among the public and protecting our colleagues and their families, as well as advancing the research enterprise.

While applauding progress, we also must look beyond the horizon at emerging opportunities, needs, and expectations. Today, many SfN committees and working groups, along with our dedicated and talented staff, are asking critical strategic questions: how can we build on our platforms to serve our diverse global community even better in coming years? What new strategies and tools can connect and engage scientific and public conversation to advance knowledge, learning, and engagement about the brain? How can we best prioritize these activities to preserve and enhance our organization's strong financial foundation while supporting the field? It has been my honor to contribute my knowledge and my passion to these conversations and the enduring mission of our collective organization. I look with wonder at what our field has already achieved, and with excitement about what has yet to be discovered.

When it comes to science, it is true that the best is yet to come, and it will be produced through individual and collective efforts all across the scientific community.

Michael E. Goldberg

# CREATING VENUES *for* GREAT

Collaboration, learning, debate, and networking form the foundation for a rich scientific community. The world's two largest global venues for emerging neuroscience — the SfN annual meeting and *The Journal of Neuroscience* — offer scientists the opportunity to collaborate across specialties and around the world, learn from leaders in the field, and explore emerging technologies.

## Neuroscience 2009:
### Emerging Science in a New City

First-time host city Chicago welcomed 30,547 attendees to Neuroscience 2009, the premier venue for neuroscientists to collaborate and share the field's emerging science. With nearly 16,000 abstracts presented in poster sessions and nanosymposia, the 39th annual meeting fostered the exchange of cutting-edge research, while also offering participants the opportunity to choose from 11 featured lectures, 14 special lectures, 25 symposia, and 24 minisymposia. In addition, more than 500 commercial, nonprofit, and government/institute organizations were on-site to provide information on neuroscience products and services.

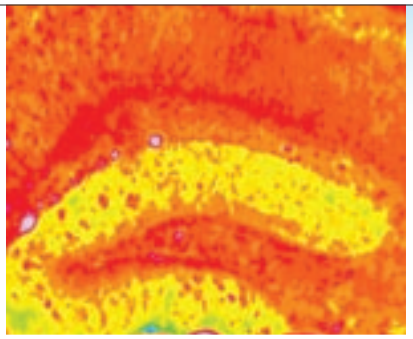
### Rich Science and a Touch of Magic

Four Presidential Special Lectures highlighted the changing brain in a changing world. Elizabeth Spelke discussed how humans apprehend concepts such as math while mapping the cognitive world of a changing brain through growth and development. Richard G. Morris explored learning and memory at a systems level while focusing on understanding neural mechanisms with the capacity to encode, store, consolidate, and retrieve information. Nora D. Volkow evaluated how advanced neuroimaging technologies and behavioral research have improved knowledge of brain changes caused by addiction. Eric Kandel discussed his work on long-term memory storage and current research findings on the protein CRB-3 in mice.

In addition to the Featured and Special Lectures, emerging areas of the field were highlighted through dozens of symposia and minisymposia, including new developments in the genetics and pathogens in amyotrophic lateral sclerosis, new technologies for probing brain disease with light, the role of oligodendrocyte precursor cells in neurological diseases,

# SCIENCE

SfN's annual meeting is the premier venue for neuroscientists around the world to collaborate, share science, and learn about emerging technologies.



## Beyond the Horizon

*Enhancing the world's largest venue for emerging brain science by fostering face-to-face dialogue and leveraging technologies that help the growing, evolving field self-organize and connect across specialties.*

NIH Director Francis Collins urged recipients of ARRA funding to communicate through crisp examples how research supports the community and why it is a positive national investment.

and new concepts of potassium channel function.

Of special interest to the media and attendees were 2009 "Dialogues Between Neuroscience and Society" presenters Apollo Robbins and Eric Mead, who amazed the audience with memory manipulation and sleight of hand tricks that use the neurobiology of attention and vision. The magic performances sparked audience interest in the types of experiments that could be used to explore attention manipulation. Discussions also included the mind's limitations and the strong and storied academic component that lies within the art of magic and illusion.

## Supporting Collaboration and Dialogue

Neuroscience 2009 also saw the debut of nanosymposia, an effort to foster collaboration by allowing attendees to form and suggest their own sessions. Nanosymposia consisted of short presentations of abstracts from multiple labs with a common topical interest. The collaborative nature of nanosymposia engaged younger scientists in the neuroscience community while unifying themes. Neuroscience 2009 offered 82 nanosymposia.

The annual meeting introduced a new online interactive dynamic with 11 neurobloggers sharing their Neuroscience 2009 experience as the meeting was happening. The blogs served as an informative resource for meeting attendees, while providing followers with research highlights found on the poster floor. In an effort to enhance the meeting experience, attendees were encouraged to blog and use Twitter.

## Strengthening Awareness and Support for Research

In a special presentation, National Institutes of Health (NIH) Director Francis Collins discussed his vision for NIH, and the key challenges and opportunities facing NIH and the broader scientific community. During the presentation, Collins focused on the research community's responsibility to communicate the scientific and health impact of grants funded through ARRA with the public. Collins urged recipients of ARRA funding to communicate through crisp examples how research supports the community and why it is a positive national investment. Collins also highlighted the SfN Recovery Act Impact Form as an important tool for educating policymakers on the economic impact of funding for NIH research. Collins emphasized the importance of responsible animal research and expressed NIH's concern and his personal commitment to support researchers.

In support of continued science funding, the 2009 Public Advocacy Forum brought together a diverse panel of academic, economic, and business leaders for a discussion regarding the importance of engaging in science advocacy. Moderator and Research!America President Mary Wooley discussed the national and local economic benefits of strong sustained biomedical research funding, while the panelists detailed the economic impact of NIH-funded research. Participants were provided with information and tools to enhance local and national advocacy efforts.

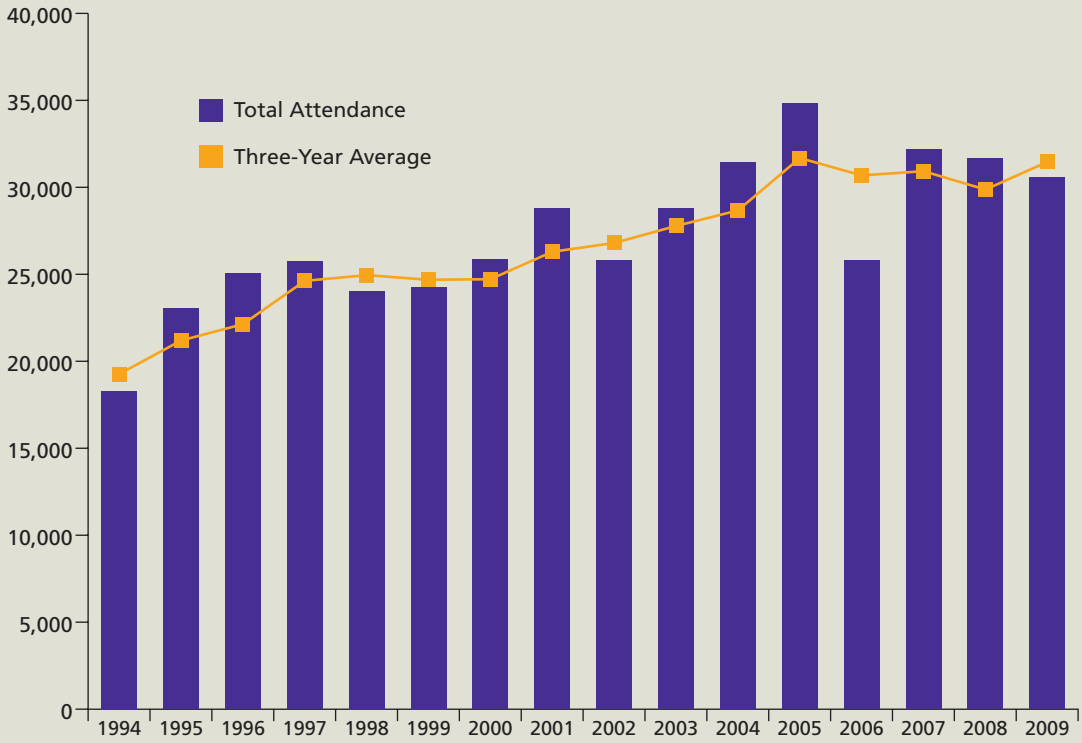
## Fostering Skills and Career Development

SfN's commitment to enhancing the professional development of neuroscientists throughout their careers was evident in the training and networking opportunities at the annual meeting.

The 2009 Neurobiology of Disease Workshop focused on the biology of depression and suicide,

## STRONG ATTENDANCE MEASURES MEETING SUCCESS

Neuroscience 2009 continued the trend of annual meeting growth — despite a new venue and struggling economy — demonstrating the importance and value of the meeting for SfN members.




including recent research and emerging advances in treatment. Three Short Courses offered attendees an in-depth look at research topics and techniques related to epigenetic control and neuronal function, rhythms of the neocortex, and live-cell imaging.

In the popular Meet-the-Expert series, eight established neuroscientists offered research technique tips and career advice to young investigators. Nine workshops were offered on a wide range of professional development topics that included managing a research laboratory, surviving as junior faculty, and research funding opportunities in Europe and the United States.

Other offerings included mentoring and networking events, and orientation and poster sessions for international and diversity trainees. The Celebration of Women in Neuroscience annual luncheon featured a talk by Huda Y. Zoghbi; roundtable discussions explored issues related to managing personal and professional commitments as female neuroscientists. The on-site NeuroJobs Career Center saw high traffic from job seekers and employers, who took advantage of free private booths for interviews.

The annual meeting was again the venue for the presentation of SfN awards recognizing professional achievement. Among the 150 fellowships, awards, and prizes presented was the inaugural Bernice Grafstein Award for Outstanding Accomplishments in Mentoring.

**LEARN MORE:**
*www.sfn.org/am2009*

# *The Journal of Neuroscience:* Standing Strong

In FY2010, *The Journal of Neuroscience* demonstrated its continuing value to the academic community. Although faced with an external environment that included an economic recession, the continuing transition to a digital world, and other challenges within the publishing community, *The Journal* has carefully preserved its role as a premier publishing venue, while sustaining the viability of its business model and maintaining its revenue. It also has continued to develop and implement new initiatives to further its reach, and to integrate new technologies that will keep pace with the latest methods of information dissemination.

Editor-in-chief John Maunsell, professor of neurobiology at Harvard Medical School and a Howard Hughes Medical Institute Investigator, introduced a new feature in *The Journal*, "Disease Focus." The section gives brief overviews of neural diseases or syndromes and a description of how they may be linked to basic neural mechanisms. Given that much neuroscience research in *The Journal* focuses on basic brain mechanisms, "Disease Focus" aims to provide a missing link, helping researchers connect their basic research findings to specific diseases and potential treatments. By highlighting areas in which progress might be achieved, "Disease Focus" also may influence young investigators in identifying research topics that could be profitable to pursue.

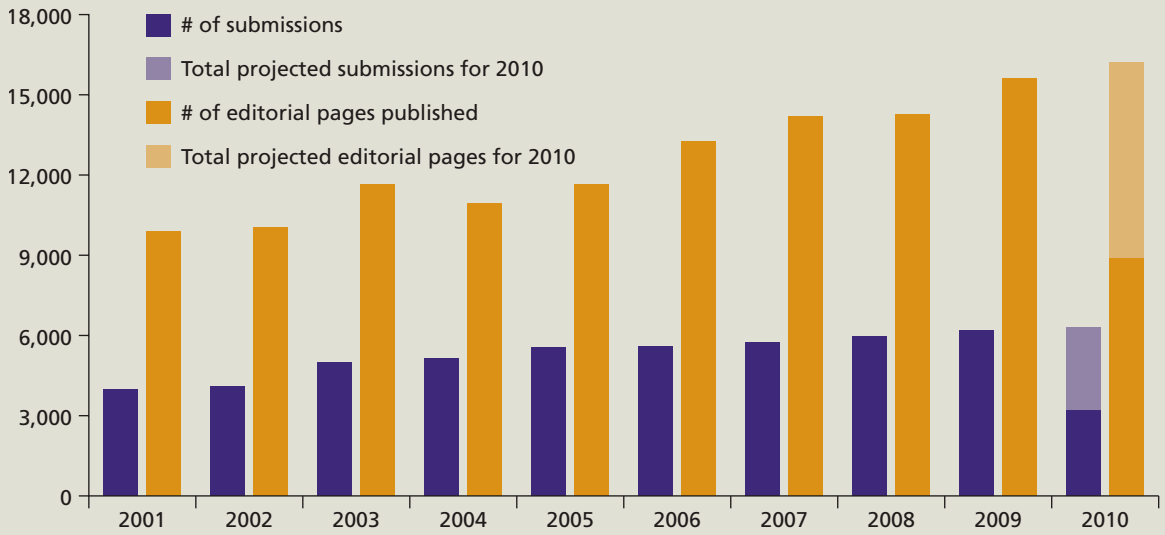
*The Journal* has altered its copyright policy, giving authors more control of their published research findings and increasing the public's access to *The Journal*'s highly regarded scientific content. Instead of granting full copyright to SfN, authors now retain copyright to their articles and grant SfN a license to publish. For the six months following publication, *The Journal* holds the exclusive rights to the article; after this period, the article becomes freely available for non-commercial use under the terms of a non-commercial creative commons license. The new license also will help streamline the permissions process.

## Numbers Reveal Staying Power

In a year of instability, *The Journal* maintained its staying power. Institutional subscriptions totaled 1,012 in CY2010. To help sustain and build this subscriber base, *The Journal* will implement a new tiered pricing system with subscriptions priced according to institution size in 2011. Tiered pricing means *The*

***THE JOURNAL* WITNESSES STEADY, CONTINUED GROWTH**

Increased article submissions make evident *The Journal*'s strong presence and reputation as a premier venue for publishing scientific research findings. This chart depicts manuscript submissions and editorial pages published by calendar year.



*Journal* will be more accessible to — and less expensive for — smaller institutions.

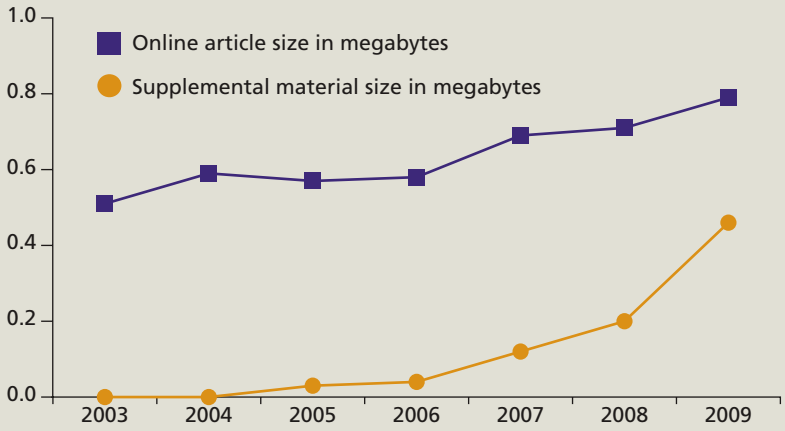
The article acceptance rate so far in 2010 has remained at 28 percent, the same percentage as 2009. The number of submissions has increased, with 3,555 total submissions as of July 15, 2010 — a 9 percent increase from the same time period in 2009.

## New Supplemental Material Policy

After comprehensive review, *The Journal* adopted two new policies that take effect in fall 2010. First, *The Journal* will no longer accept supplemental material. This decision was made due to the large volume of supplemental material linked with *The Journal* articles, and will ensure moving forward that each published article is a self-contained research report; reviewers and readers will not need to read and digest supplemental material for a full understanding of the research. Authors will be free to host supplemental materials on their Web sites, and include a URL and a brief description of the material via a footnote in their articles.

*The Journal* will also soon allow authors to include multimedia resources, such as videos and graphics, in their published articles, allowing for more in-depth visual representation of their research.

### GROWTH IN SUPPLEMENTAL MATERIAL SHAPES NEW POLICY




Supplemental material is growing rapidly and may soon exceed the size of a typical article. Represented is growth in size of an average article in *The Journal of Neuroscience* (purple curve) and growth in size of the average amount of supplemental material associated with an article (orange curve).

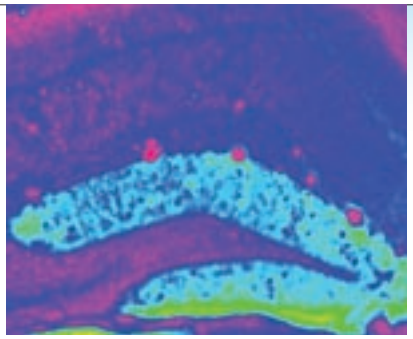
## Revised Guidelines on Responsible Conduct in Scientific Communications

Revisions to the SfN *Guidelines for Responsible Conduct Regarding Scientific Communications* have recently been released and are available online at www.sfn.org/guidelines.

These revisions come from a two-year working group effort led by SfN Past President David Van Essen to overhaul the SfN *Policy on Ethics* (as well as the *Guidelines*), and to create documented procedures for dealing with misconduct allegations.

The *Guidelines* focus on communications such as research manuscripts, supplemental data, abstracts, posters, oral presentations, and public electronic communications. The revisions address portions of the guidelines that had become outdated due to changes in internal procedures, and changes needed because of the advent of new technologies that affect scientific research scholarly publishing.

**LEARN MORE:**
*www.jneurosci.org*



# Beyond the Horizon

*Encouraging the dynamism of neuroscience by fostering excellence in online science publishing and facilitating vibrant scientific dialogue.*

# Neuroeducation

Understanding how students learn and using scientific research to improve teaching — these complementary pursuits provide the impetus for new efforts to bring neuroscience and education together.

Educators and scientists have long known that teaching, learning, and brain function are intricately connected. But until recently, the fields of education and neuroscience have remained isolated in the classroom and lab, respectively, with only sporadic attempts to find opportunities for strategic cooperation. Public interest in how these areas can benefit each other has grown in recent years, and the conversation between educators and researchers is starting to gain momentum. Participants are excited about applications for both the education and scientific communities and are encouraging open communication to explore new possibilities.

In 2009, this groundswell of interest in neuroeducation led Thomas J. Carew, then president of SfN, to convene the Neuroscience Research in Education Summit at the University of California, Irvine. Researchers, teachers, and policymakers participated in the event and helped to further develop recommendations for encouraging educator/scientist collaboration.

## Neuroeducation: What Is It?

The collaboration between educators and neuroscientists has taken the form of an emerging discipline known as neuroeducation. This developing field blends the collective specialties of neuroscience, psychology, cognitive science, and education to improve teaching methods and curricula. Understanding how neuroscience can inform education strategies and finding out what teachers want and need to know about the ways students learn are two key drivers behind the neuroeducation initiative.

Many areas of neuroscience are already producing research findings that could provide ideas to improve teaching methods and curricula. Studies of memory formation and retrieval suggest testing is important for learning. The inclusion of the arts, particularly music, can enhance memory and attention levels, according to recent research. Also, multiple studies investigating the impact of sleep and exercise on young brains indicate the importance of these activities in brain development, function, and health. Integrating this research into classroom practice, however, will require meaningful dialogue between educators, scientists, and policymakers to adequately inform both research agendas and teaching practices.

## A Developing Partnership

Several universities have taken the lead to effectively bridge the gap between neuroscience and education. The Neuro-Education Initiative at Johns Hopkins University aims to bring educators and scientists together through the development of joint research projects to improve the understanding of how students learn and develop. Harvard University's

## Neuromyth Busters

**MYTH:** *Listening to classical music makes you smarter.*
**MYTH:** *You only use 10 percent of your brain.*
**MYTH:** *Your brain can't make new cells.*
**MYTH:** *Vaccines cause autism.*

SfN is working to correct popular myths about the brain, like those listed above, with a new teaching tool called Neuromyth Busters. The full list of Neuromyths and explanations of why they are wrong can be found at www.sfn.org/neuromythbusters.

Scientists and educators are exploring how to apply research on learning and development to improve teaching methods and curricula.

degree program in Mind, Brain, and Education allows participants to explore the intersection of biological neuroscience and education.

These programs and efforts like the SfN summit have collectively identified several goals that could encourage progress within the neuroeducation movement. For example, moving beyond each field's institutionalized jargon to create a shared vocabulary is an important first step in bridging the communication gap between education and neuroscience. Identifying core research priorities also has become increasingly critical for shaping the field's future agenda, as has securing tangible financial resources to successfully ensure continued progress.

### Looking to the Future

Educators and scientists must continue to improve collaboration and keep communication open, topical, and research-driven to ensure effective progress. The continued popularity and proliferation of "neuromyths" show that misguided notions about the brain have far-reaching influence on curriculum development, and the neuroscience community is working diligently to correct those inaccuracies. Reaching teachers in preparation programs and those already in practice to effectively improve their awareness of current findings in brain research remains a paramount concern. Strategies for developing opportunities to promote the interaction of teachers and scientists in labs and as mentors to each other also offer exciting possibilities for bringing neuroscience and education together.

Continued efforts will be necessary to ensure scientific research on learning and childhood health and development is made relevant and understandable to educators and parents.

This is an important first step in a strategic agenda for the fields of both neuroscience and education to make neuroeducation a paradigm for informing broader social and educational policies. Improving academic achievement and scientific literacy through the education-neuroscience partnership promises better opportunities for young people and society-at-large. ■

**FOR MORE INFORMATION** *about the Neuroscience Research in Education Summit, visit www.sfn.org/neuroedsummit*

# The Machinery of Memory

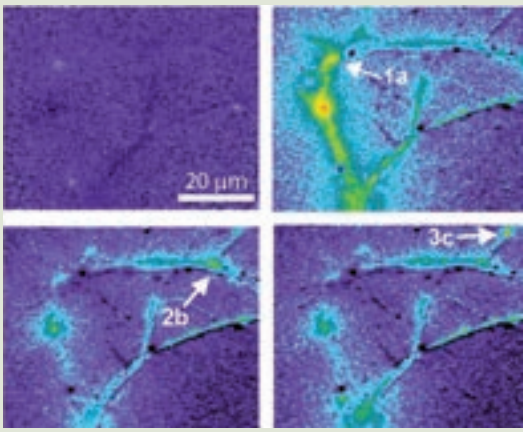
Brain researchers used a simple animal model, the sea slug, to unlock the secrets of learning and memory. Today their findings continue to inform the field and may suggest new approaches to disease therapies.

How do we learn? How do we recall something that happened many years ago? Over the years, neuroscience researchers have risen to the fundamental challenge posed by these questions. Today, the questions remain just as important to the field as scientists discover that common disorders such as drug addiction and post-traumatic stress disorder may represent the learning and memory process gone awry. Signature discoveries in learning and memory research are leading to surprising new treatments and therapies for these conditions.

To study how learning and memory happen in people, brain researchers, including SfN Past President Thomas J. Carew, turned to "simpler" organisms, particularly the marine snail *Aplysia californica*. Carew's mentor Eric Kandel pioneered the study of memory in *Aplysia* and produced an extensive body of research on the machinery of memory that earned him a Nobel Prize in 2000.

## Snail School

Because of its complexity, making sense of even simple functions in the human brain is extremely difficult. Humans have 100 billion nerve cells, and each one connects with 1,000 to 10,000 others. With just 20,000 nerve cells — a relatively simple nervous system — the *Aplysia* has become an animal model of choice for many researchers studying learning and memory.




Using sensitive dyes, researchers track how learning strengthens cellular communication in *Aplysia* nerve cells. Reds and yellows indicate sites of increased cellular activity, showing one way in which learning physically changes the brain.

Although they may never learn to spell or multiply fractions, *Aplysia* do learn from experiences in their environment. In the same way that humans quickly withdraw their hands if they touch a hot stove, *Aplysia* withdraw two of their sensitive appendages — the siphon and the gill, which are both involved in respiration — when touched. Many researchers have shown that *Aplysia* can learn to modify this defensive reflex in response to outside information.

For example, like people who stop believing "The Boy Who Cried Wolf," *Aplysia* show reduced

Because their nervous systems are much simpler than mammals, *Aplysia* have become an animal model of choice for many researchers studying some aspects of learning and memory.

responses to touch after they are repeatedly touched, a form of learning called habituation. In contrast, an unpleasant mild shock increases their response to a gentle touch — known as sensitization.

With their simplified model of learning in place, scientists have meticulously mapped the connections of nerve cells that control gill and siphon withdrawal. They found this network of neurons to be similar in every *Aplysia*, which allowed them to return to the study of the exact same set of neurons time after time, and examine how those neurons changed as a function of the animal's experience.

## Memory Molecules

How does a form of learning like sensitization affect the network of cells? Researchers have found it increased the chemical communication between nerve cells, strengthening their connections. Later, research in mammals showed that over time, learning also builds and strengthens the connections between the cells. Forming new memories therefore literally changes the brain, altering the traffic-flow of information.

Carew and his colleagues drilled down even further to find the chemicals in brain cells that make this synaptic strengthening possible. They found learning activated proteins called kinases. Kinases turn other proteins on or off by adding a phosphate chemical group to them — a process called phosphorylation. Turning one kinase on can activate many proteins at once, setting into motion a cascade of events in the cell. Some kinases phosphorylate the proteins that allow chemical signals to influence brain cells — thus learning can alter the very channels of brain communication. By modifying many cellular targets, including these important channels, kinases help form the cellular basis of memory.

There are hundreds of types of kinases that do lots of work for the cell. Carew's laboratory has identified some of the key players in memory — the kinases that modify the flow of information between brain cells.

Based on these findings, other researchers recently found that turning certain kinases on or off can modify memories in rats. If the same holds true in humans, it may suggest a new type of treatment for post-traumatic stress disorder, in which traumatic experiences can be vividly and repeatedly replayed. In addition, the ability to modify memory might reduce relapse in drug addicts who are vulnerable to exposure to anything they previously associated with drug use.

The basic science discoveries that began with the sea slug have revolutionized what we know about how people learn. These same findings have had extraordinary reach within the neuroscience field, affecting how we think about a wide range of topics, from drug abuse to education. ■

# SUPPORTING *the* NEUROSCIENC

The neuroscience community continues to expand and grow increasingly diverse. Given this dynamism, SfN is seeking new strategies and structures that position the organization to meet changing member needs and respond effectively to emerging trends. The Society reached record membership levels in 2009 and elected its first non-North American councilor — milestones reflective of the organization's ability to adapt and support the neuroscience community across all specialties, at all career levels, and around the globe.

## Membership and Chapters:
### Record Growth, Changing Demographics

As SfN celebrated its 40th anniversary, the Society reached another milestone in 2009, surpassing 40,000 members in 83 countries. Composition of the membership continued the trend of fastest growth among student and international members, with students comprising 27 percent and non-U.S. members comprising 37 percent of the 40,290 members.

### Responding to Member Needs

With this dynamic and growing membership in mind, SfN focused on adapting strategies and programs to meet evolving member needs. Younger members continued to drive the Society's efforts to integrate Web-based tools and technologies into communications and programming, while international members witnessed greater representation within the Society's governance structure.

Responding to needs of international members, the SfN Council approved an additional reduced dues and fees category for members in World Bank-defined lower-middle-income countries; new rates go into effect in 2011. SfN is also laying the groundwork for a 2011 follow-up to the 2007 member survey, both to gauge progress in meeting member needs and to identify additional areas where SfN can provide value.

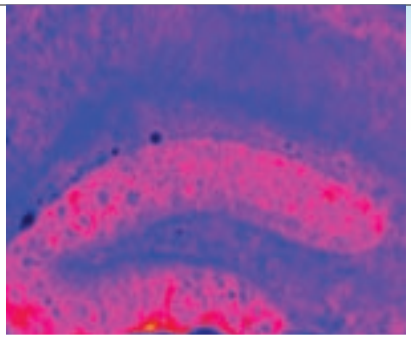
To meet the growing communication needs across all member segments, SfN is preparing to launch an enhanced online member directory in 2011. This members-only resource will enable individuals to enter career-related profile information for networking purposes and to form online communities around shared interests.

### Serving New Members

With the incorporation of the former Association of Neuroscience Departments and Programs, SfN expanded its mission to serve the neuroscience

# E COMMUNITY

With a dynamic and growing membership — the Society reached record membership levels in 2009 — SfN continues to adapt strategies and programs to meet member needs.



## Beyond the Horizon

*Introducing new online tools and regional chapter programming to enhance member learning, value, and engagement.*

SfN expanded its mission to serve the neuroscience community in new ways by adding an Institutional Program (IP) member category.

community in new ways by adding an Institutional Program (IP) member category. IP members are neuroscience departments and programs and represent those engaged in educating and training new generations of neuroscientists. More than 170 IP members have joined and are taking advantage of an expanded set of benefits. In the coming year, SfN will focus on increasing value to meet the needs of both its individual and institutional members.

## Expanding Engagement and Reach

Local and regional SfN chapters continued to grow, helping members to network, share information, educate communities about neuroscience, and engage in local advocacy. Today, the Society has 147 chapters in 21 countries worldwide and in 47 U.S. states. Eight chapters were established last year, including the first chapters in Israel, Malaysia, and South Korea. To help chapters get off to a strong start, SfN continues to provide start-up grants to new chapters.

## Supporting Success at the Local Level

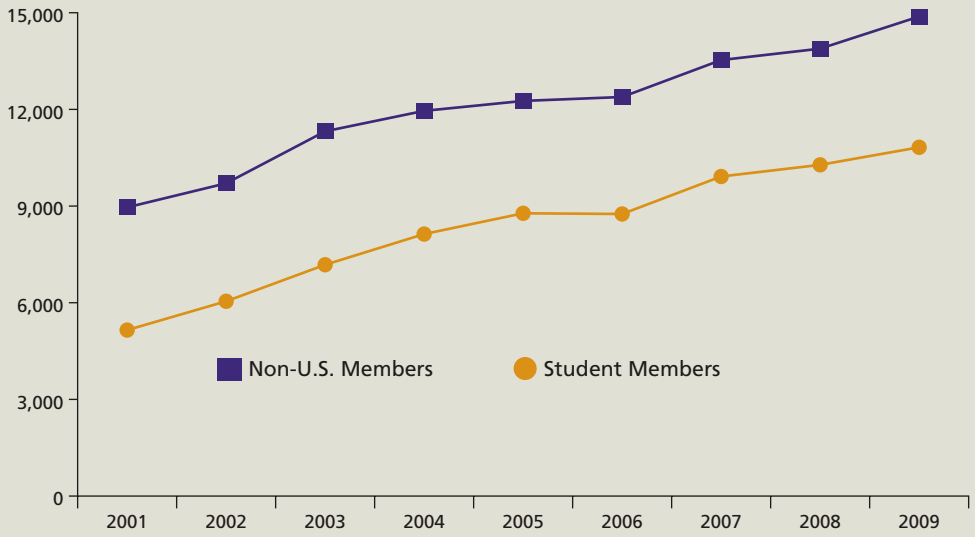
To support existing chapters, last year the Society disbursed more than $80,000 through 45 direct grants, enabling chapters to engage in such activities as student-oriented regional

### SfN's Growing Membership Reflects Vibrancy of the Field

Membership experienced explosive growth in the past decade, with a record 40,290 active members in 2009. This represents a 42 percent increase since 2001 and reflects SfN's continued success in serving evolving member needs.

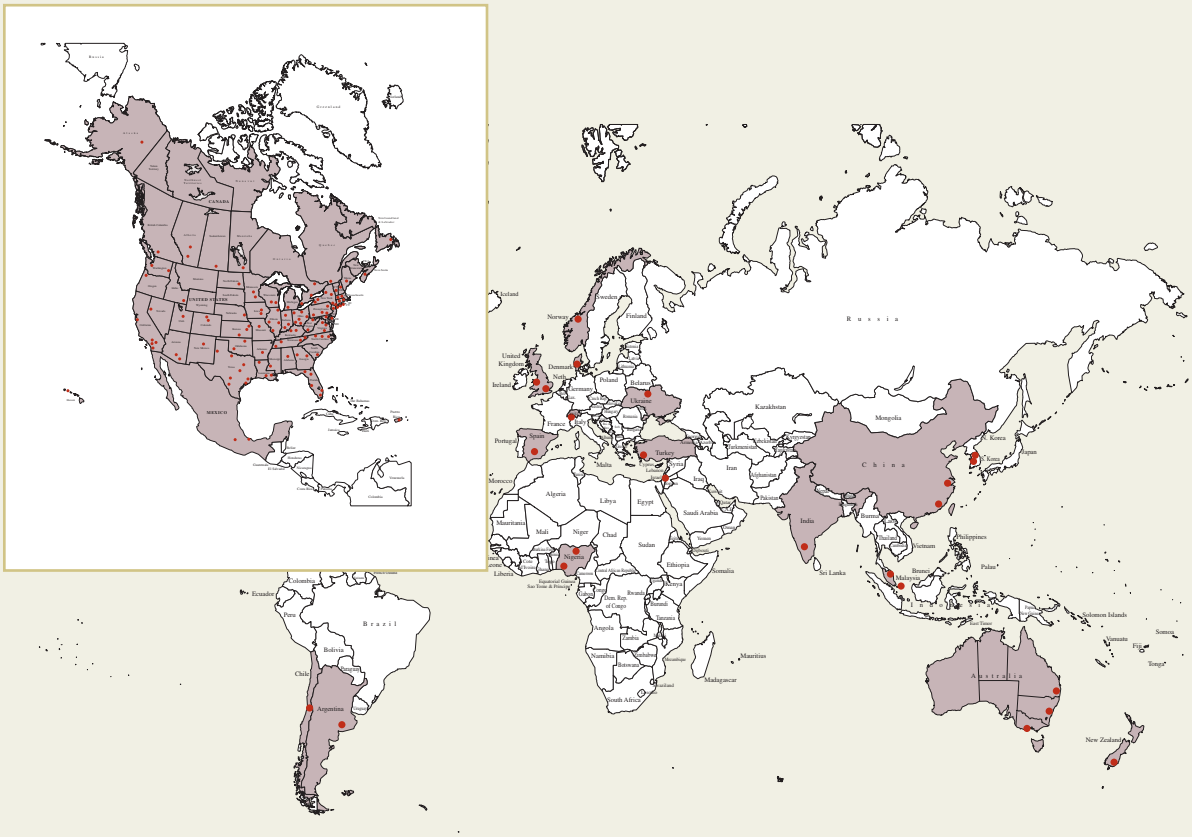
## INTERNATIONAL AND STUDENT MEMBERS REPRESENT SfN'S FASTEST-GROWING CONSTITUENCIES

The dynamism of the neuroscience field — attracting ever more young scientists — and SfN's leadership role as an international organization are reflected in the steady and significant rise in student and non-U.S. members. Students comprise 27 percent and members outside the United States total 37 percent of SfN membership. The Society is adapting strategies to support the targeted needs of these constituencies.




**Left:** SfN offers programming, professional development, networking opportunities, and services to support the membership across all specialties, all career levels, and around the world. **Right:** SfN presented the first Chapter-of-the-Year Award to the Western North Carolina chapter for outstanding achievements in public communication, outreach, and education. Johannes Menzel (left), Membership and Chapters Committee member, presented the award to Dwayne Godwin, a past chapter representative.

## SfN'S EXPANDING NETWORK OF CHAPTERS AROUND THE WORLD




SfN chapters have grown from 25 in 1971 to 147 today, in 21 countries worldwide and in 47 U.S. states. Chapters help members network, share information, and educate the public about neuroscience at the local level.

conferences, cross-chapter events, and new Brain Awareness Week programs. SfN also funded 15 grants that allowed chapters to organize visiting lectures by eminent neuroscientists through the Grass Traveling Scientist Program. Although The Grass Foundation funding for this program ended, close-out activities continued through fall 2010.

The third annual Chapters Workshop in Chicago drew more than 100 participants. Organized by the Membership and Chapters Committee, the workshop "Using Social Networking and Technology to Enhance Chapter Communications and Outreach" featured chapter representatives who shared success stories. The Chapter Resource Kit, distributed at the workshop, continues to be updated and made available online.

### Recognizing Chapter Achievements

During Neuroscience 2009, SfN presented the first Chapter-of-the-Year Award to the Western North Carolina Chapter for outstanding achievements in public communication, outreach, and education. The vital role chapters play in public outreach and education was also recognized through the Next Generation Awards. The 2009 awards were given to chapters in Colorado and Georgia for promoting engagement in educational outreach by young neuroscientists.

**LEARN MORE:**
*www.sfn.org/membership*

# Global Affairs:
## Serving the International Neuroscience Community

An increasingly global organization — non-U.S. membership reached 37 percent of total membership in 2009 — SfN is exploring new ways to support the global neuroscience community. Using multiple venues, SfN is providing international neuroscientists with more opportunities to exchange knowledge and information and to be fully engaged in the life and activities of the Society.

Reflecting the new international strategy adopted by Council in 2009, SfN's International Affairs Committee is developing a more comprehensive approach to supporting international members in the areas of research, professional development, public education, and advocacy. This strategy includes collaboration with national, regional, and international societies; support to international chapters; training and professional development programs; and greater international representation on SfN committees and Council.

### Creating Strategic Partnerships

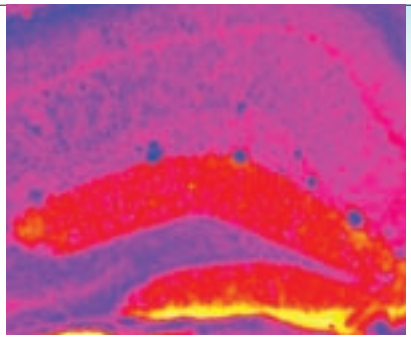
SfN is strengthening relationships with other neuroscience societies to achieve common goals while leveraging resources and maximizing impact. With the International Brain Research Organization (IBRO), SfN supported the professional development of African university-based educators through the second joint "Teaching Tools in Neuroscience" workshop, held in Egypt in early 2010. SfN also is working closely with the Federation of European Neuroscience Societies (FENS) on several initiatives, including joint working groups on professional development, global advocacy, and the use of animals in research. One result was the launch of the first joint FENS-IBRO-SfN Neuroscience School, held March 2010 in Naples, Italy, on brain evolution and pathologies. In coming years, these schools will continue to link U.S. and European institutions to provide neuroscience training for some 30 international students annually.

Through improved bilateral relationships with national and regional societies, SfN is seeking to better serve and support international members in ways that complement the important services and benefits national societies provide. The Society continued its support for the Canadian and Mexican national societies to strengthen their capacity for advocacy and public education. SfN, along with the Japan Neuroscience Society (JNS), FENS, and the Australian Neuroscience Society, co-organized a symposium on global perspectives for neuroscience public education and outreach at the 2009 JNS annual meeting. Collaboration will continue at the JNS meeting this year. As a show of support for members in Chile affected by the devastating 2010 earthquakes, SfN provided a donation to the Chilean national society to help young investigators in affected areas recover and continue their research. During the past year, SfN has engaged with these and other national neuroscience societies — most recently the British and Chinese societies — which have expressed interest in collaboration in pursuit of common goals.

### Supporting Career Development

With support from The Grass Foundation, SfN conducted the fifth Ricardo Miledi Neuroscience Training Program course for 15 young investigators from Latin America and the Caribbean in fall 2009. Each trainee receives a fellowship to attend the SfN annual meeting. SfN further supported international members through the IBRO-SfN travel awards, which enabled 30 early-career neuroscientists from developing countries to attend Neuroscience 2009.

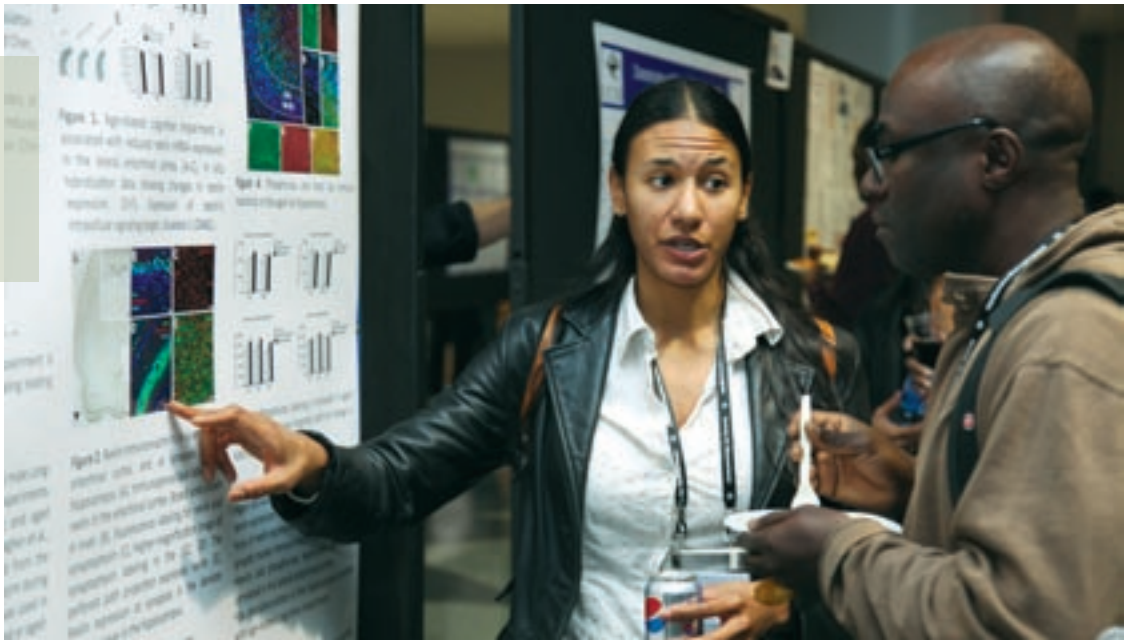
**LEARN MORE:**
*www.sfn.org/international*



# Beyond the Horizon

*Connecting and engaging neuroscientists around the globe to support research, advocacy, and career development.*

SfN is committed to increasing diversity in neuroscience through education, training, and professional development.



# Professional Development:
## Supporting Future Growth

SfN's professional development programming continued to evolve during FY2010. It was a year of consolidating new focus areas and governance structures, enhancing existing offerings, and strategic planning to position SfN for future growth in support of the profession.

### Serving a Broader Constituency

SfN's new Professional Development Committee focused on enhancing existing programs and activities, and prioritizing new ways to meet the career development needs of SfN's constituencies. Responding to the high-priority need for networking and mentoring across all career stages, SfN is launching an online mentorship program, where automated mentor-matching will be just one element. In this expanded tool, mentors and mentees can establish virtual relationships, access resources, and participate in discussion forums.

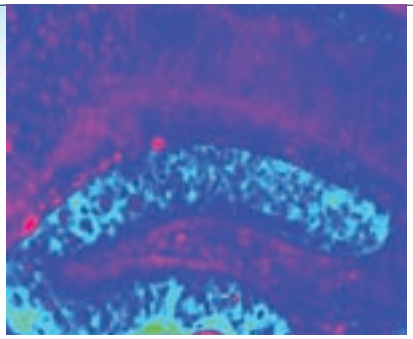
Following the 2009 consolidation of ANDP with SfN, the Society seamlessly transitioned to serving the needs of former ANDP members through its new Committee on Neuroscience Departments and Programs (CNDP). SfN enhanced programs and services for this constituency, including events at Neuroscience 2009, and a successful annual spring conference on the challenges and opportunities facing higher education and training in neuroscience. SfN also added new benefits to facilitate networking, communications, and information-sharing within this community. CNDP seeks to build upon these successes as it engages in strategic planning early in FY2011.

### Increasing the Commitment to Diversity

Through a new project, *Department Chair Training to Increase Women in Neuroscience* (IWiN), SfN is taking a leadership role in addressing the development of a more diverse neuroscience workforce. With a three-year grant from the National Science Foundation, SfN aims to assist neuroscience and related departments in improving the recruitment, promotion, and work

## Beyond the Horizon

*Supporting scientists at all career stages through new, year-round programming.*



**Left:** The "Surviving as Junior Faculty Workshop," held at the SfN annual meeting, provides participants with strategies for managing the bumpy road to success. This workshop and many others are part of SfN's commitment to supporting neuroscientists at all career levels. **Below:** The IWiN workshops provide strategies focusing on recruitment, advancement, and creating a favorable work climate for female faculty and faculty from diverse backgrounds in neuroscience and related departments and programs.

climate for women and underrepresented minorities at their campuses. The first of five regional workshops was held at SfN headquarters in April, and follow-up activities include online resources and a discussion forum to support idea-sharing among participants.

In the 29th year of the Neuroscience Scholars Program, the Society supported 55 diversity trainees, with funding from the National Institute of Neurological Disorders and Strokes (NINDS). SfN introduced new program features this year — peer mentoring clusters with former Scholars at the annual meeting, and an online newsletter and enrichment fund tracking system for participants. Reflecting the program's success, SfN received a record 102 applications for the 2010 class of scholars. With NINDS funding, SfN will launch a pilot project providing intensive coaching and mock reviews to increase the number of successful research and training NIH grant proposals from underrepresented minority postdoctoral fellows and junior faculty.

## Honoring Scientists Across the Field

FY2010 marked another successful year for members in the area of scientific achievement. The Society honored nearly 150 outstanding individuals with scientific awards and prizes, fellowships, and travel awards. The Mika Salpeter Lifetime Achievement Award and the Science Educator Award received new funding support from sanofi-aventis. In addition, the Award for Education in Neuroscience, previously presented by ANDP, and the Bernice Grafstein Award for Outstanding Accomplishments in Mentoring, debuted at the SfN 2009 annual meeting.

## Navigating New Strategies

Recognizing the growing dynamism of the profession and evolving member needs at pivotal career transition points, SfN is creating new opportunities for learning and career development at the annual meeting and beyond. A Council-appointed working group has developed recommendations for a multi-year professional development strategy, embracing a broad array of objectives to support neuroscientists' career-related interests and needs. The plan, once approved, will be launched in the coming year.

**LEARN MORE:**
*www.sfn.org/pd*

# Magic *and the* Brain

What do neuroscience and magic have in common? These fields share a common goal of understanding human perception and cognition.

Rabbits popping out of hats, smoke and mirrors — these are some of the images that come to mind when people think about magic.

But what about magic and the brain? Delving beneath the surface, magicians and neuroscientists share a deep desire to understand the inner workings of the human brain.

A significant amount of brain research focuses on gaining insight into perception, memory, and attention. While neuroscientists are occupied with discovering the biology behind these processes, magicians are interested in controlling and exploiting them to create illusions. During the "Dialogues Between Neuroscience and Society" presentation at Neuroscience 2009, renowned magicians Apollo Robbins and Eric Mead discussed the links between magic and neuroscience, and provided insight into how these seemingly disparate fields influence each other.

## The Art of Illusion

Magic is an ancient art, and professional magicians take their craft seriously, studying its vast literature and discovering new methods and principles through field work and research. The key foundation of magic is understanding people — their experiences, awareness, and expectations — so that magicians can manipulate the audience's assumptions with precision and skill. This ability to understand perception is critical for executing and maintaining an illusion.

Magicians use their talents to both distract and focus the audience's attention. Small, subtle hand movements embedded into larger, more obtrusive actions play upon a person's awareness during an illusion, Mead explained. Eye movements and pattern recognition

Magicians Eric Mead (far left) and Apollo Robbins (far right) discussed the connection between magic and brain research at the "Dialogues Between Neuroscience and Society" lecture at Neuroscience 2009.

can be used to the magician's benefit, effectively allowing the performer to deceive and manipulate the audience by exploiting the brain's natural processes.

For example, the cliché postulates that "the hand is quicker than the eye." In actuality it's not about speed, but rather a magician's ability to control or misdirect the audience's vision away from his hand movements. "Forcing" is used in some card tricks — the performer repeatedly shows a particular card to subliminally influence the audience's selection. Magicians also can manipulate audiences to accept false information by providing assumptions, such as implying the card deck was shuffled by another person.

The scientific literature explaining the neural processes exploited by these tricks has benefited magicians like Mead, who are not only interested in how to mislead the audience, but also want to understand how their actions affect the mind. Scientists, on the other hand, could use similar illusions to gain insight into the underlying brain processes and mechanisms involved in human cognition and perception.

## Therapeutic Deception

The principles of magic — that is, the exploitation and manipulation of attention and memory — could potentially offer brain researchers new avenues for clinical research or therapy. Adding the principles of magic to the study of disorders involving attention, social deficits, or memory may help provide better insight into healthy brains and the underlying causes of some neurological diseases.

Individuals with autism, for instance, have an impaired ability to relate to the outside world, often accompanied by an abnormal gaze. The way magic draws visual attention may provide new methods for studying or potentially treating the disorder. In addition, researchers could use illusions to study specific memory loss in patients with dementia or other forms of cognitive decline.

Other neurological disorders, like those involving motor impairment, could also potentially benefit from magic's inclusion in rehabilitation therapy. "The mastery of movements required for performing becomes unconscious," Robbins said while discussing his own childhood problems with motor control. For patients suffering from similar ailments, the repetitive nature of these gestures could provide possible alternatives for relearning muscle movement and management, Robbins suggested.

The tricks employed by magicians are informed by brain research and have the potential to further illuminate the biology of human cognition and perception. By understanding how magicians "hack" the brain, scientists have an exciting new opportunity to study brain function. ■

# Sensory Illusions

Brain researchers have learned much about sensory perception by using tricks and illusions.

What you see isn't always what you get. In fact, the brain makes best guesses about the outside world from surprisingly limited information. Research shows the brain reconstructs the rich tapestry that we sense and experience from bits of scattered data.

On rare occasions, the brain gets it wrong, resulting in an inaccurate perception — an illusion. But recent research suggests these illusions mean the brain is doing a good job of making sense of confusing situations.

Far from deceiving the brain, illusions represent important tools in perceptual research. Continued research in this field is vital, not only for our understanding of how the human brain works, but also for the design of computer systems that can perform valued human tasks, like facial recognition or security screening.

## Out of the Shadows: An Illusion

The visual system is quite good at interpreting shadows and contrast. In general, the brain interprets objects in shadow as brighter than they appear, and items placed next to darker ones are seen as lighter by contrast. By exploiting these two properties of visual perception, a brain researcher designed a clever optical illusion in which two squares on a checkerboard appear to be completely different hues, but are in fact the exact same shade.

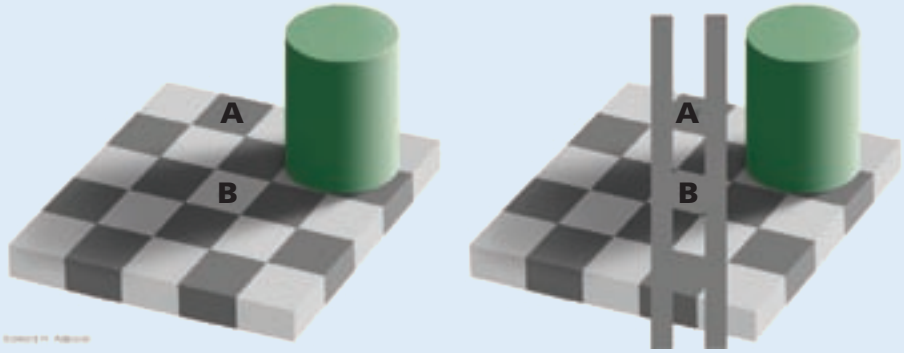
Does this mean the brain failed? If the brain's job is to be a light meter, then the answer may be yes. However, the brain's real job is not to measure light, but to interpret visual signals to make sense of the world, and from this point of view the "illusion" is a sign of success. In a study of motion illusions, scientists found the perceptual errors could be explained by assuming the brain is following an ideal set of computational rules. In other words, the "errors" were the natural outcome of the calculations the brain makes to interpret each and every visual experience.

## Probing Consciousness

Visual illusions have been useful in studying conscious awareness. Brain researchers used an illusion called "motion-induced blindness" to pinpoint the brain processes that are active when perception and reality part.

In the illusion, three immobile yellow dots are superimposed on a rotating grid of blue daggers.

# MAGIC AND NEUROSCIENCE




Which square is darker, A or B? It turns out they are exactly the same hue, but the brain interprets them differently because of the suggestion of shadow and the contrast between neighboring squares.

Participants are asked to observe a blinking green dot at the center of the whole image. As they do, the yellow dots appear to vanish for short periods of time as the blue grid rotates around.

In both monkeys and humans, researchers found that similar brain regions are responsible for the illusion. One group recorded the electrical signals in monkeys and found that three areas of the visual cortex were active during the illusion, but only one — known as V4 — predicted whether the observer "saw" the yellow dots. Brain imaging research in humans also showed that V4 tracked awareness of the yellow dots, becoming more active when the dots appeared and less active when they disappeared.

Visual information is thought to pass from more general areas of the visual cortex, such as V1 and V2, on to so-called "association" areas that do more complex work, such as V4. These findings point to V4 as an important region in perception and awareness.

## A Touching Response

Recent research suggests illusions that fool different senses may use the same brain circuits. If you watch objects moving in one direction for long enough, immobile objects appear to move in the opposite direction. This phenomenon is known as an after effect. Researchers found after study participants were shown visual scenes moving in a single direction, the participants perceived stationary tactile stimuli — a row of vibrating pins placed on a finger — as moving in the opposite direction. In turn, tactile stimuli moving in one direction caused participants to perceive visual scenes as moving the opposite way.

These findings suggest the brain uses the same system to process visual and tactile motion. Future studies may indicate to what extent the brain circuits that process visual and tactile illusions overlap.

Has our increased understanding of sensory perception led to advances in artificial intelligence? Interestingly, brain researchers and computer scientists have not yet been able to design a machine that sees or senses as well as humans. So far, nothing has proved to be as complex and agile as the human systems of sensation and perception. ■

# EDUCATING *and* ENGAG*the* PU

Raising awareness about the importance of brain research and its impact on health and society, plus sharing the wonders of brain function and discovery, continue to be driving forces for SfN. In FY2010, SfN made significant strides in widening and modernizing the reach of its publications designed for the public and educators. The Society also launched new tools for public advocacy and continued to advance the importance of animal research.

## Public Information and Outreach: Partnerships and Growth

The dissemination of clear, accurate facts about brain research is essential for encouraging people of all ages to become critical and informed "brain aware" consumers. During FY2010, public outreach programming focused on reaching new audiences through expanded education initiatives and public information resources, as well as strengthening relationships with SfN partners. Under the leadership of the Public Education and Communication Committee, many activities are underway and are forming the foundation for committee strategic planning to identify priorities for coming years.

### Partnering with K–12 Educators

In the past year, the Society successfully increased the reach of its public information and outreach efforts, spearheading new avenues for promoting neuroscience literacy for teachers, policymakers, and the public.

Public education efforts remained strong, with participation at the annual conference of the National Science Teachers Association (NSTA), the creation of new teaching resources, and an upgraded Brain Awareness Web site. SfN participated in the NSTA meeting in Philadelphia in March, meeting hundreds of science teachers on the exhibit floor and promoting SfN's educational tools in workshops led by neuroscientists. Volunteer scientists and staff connected with nearly a thousand educators during the meeting, and teachers continued to embrace SfN publications and products to supplement their classroom curricula.

The Society also is producing tools that address popular misconceptions about the brain. *Neuromyth Busters* is a new resource that addresses

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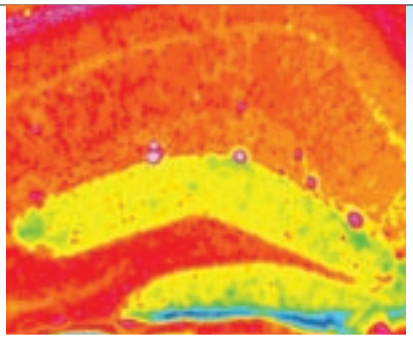
SfN focuses on sharing clear, accurate facts about brain research to encourage people of all ages to become informed "brain aware" citizens.



## Beyond the Horizon

*Leveraging the Web and social media to share emerging brain discovery with the public, and spark excitement among the next generation of scientists.*

common misconceptions about the brain, clearly outlining fact vs. fiction. *Neuromyth Busters* debuted in one of the NSTA conference workshops, giving science teachers a useful resource to take back to their classrooms.

## Teaching Brain Awareness

SfN's educational resources, including *Neuromyth Busters*, *Neuroscience Core Concepts*, *Brain Briefings*, *Brain Facts* and many more, can be easily accessed through the newly redesigned Brain Awareness Web site. The remodeled site launched in early 2010 and is a go-to source for educators interested in Brain Awareness Week (BAW) activities in early spring, and in fostering brain awareness among students year-round. Navigation is simpler and more intuitive, resources are clearly labeled for their intended audiences, and images enhance the user experience.

The 15th annual BAW campaign occurred March 15-21. In collaboration with BAW founding organization The Dana Foundation, SfN and its members sponsored events to increase knowledge and interest in brain research at public schools, museums, community venues, and colleges throughout the United States. In addition to the series of regional Brain Bees around the country, SfN again cosponsored Brain Bees in both New York and Washington, DC, and cosponsored the U.S. National Brain Bee competition in Baltimore. SfN staff also took part in BAW activities at the National Museum of Health and Medicine in Washington, DC, and presented event organizers with a proclamation from DC Mayor Adrian Fenty; more than 800 local students participated in the museum's BAW activities.

SfN has been delivering content in new formats as the media landscape transitions from traditional print to dynamic online presentation.

## Extending Our Reach

The ongoing modernization of SfN's media outreach activities continued this year. Media coverage of Neuroscience 2009 was robust, with exposure in consumer outlets like *The New York Times*, National Public Radio, *USA Today*, *Los Angeles Times*, *Wall Street Journal*, and *Chicago Sun-Times*. Scientific content from the meeting was also extensively covered in scientific trade publications. Coverage of *The Journal of Neuroscience* remained strong throughout the year, with a wide range of outlets, both trade and consumer, reporting on compelling studies.

As part of public information dissemination strategies, SfN's Facebook page quickly developed a following of more than 8,000 SfN members and neuroscience enthusiasts. While fan activity has been consistently high, posts about new studies in *The Journal of Neuroscience* and notices about new SfN publications have been especially popular. This continued interest has reinforced the importance and value of public outreach resources, which are at the core of SfN's mission.

## Have You Heard the Latest *Brain Facts*?

Consistent with this effort, SfN has been delivering content in new formats as the media landscape transitions from traditional print to dynamic online presentation. Increasing the online "reach" of Society publications was a major thrust this year, as *Brain Facts*, *Brain Briefings*, and *Research & Discoveries* continue to be important tools for educators, policymakers, and members of the public.

Traffic on SfN's Web site increased substantially as educational resources and publications were posted in easy-to-access,

During FY2010, SfN spearheaded new avenues for promoting neuroscience literacy for teachers and the public. For instance, the Society launched a new Brain Awareness Week Web site to support the international campaign.

freely downloadable formats. For example, from spring 2009 to spring 2010, the *Brain Facts* landing page received more than 53,000 visits. Nearly all of those visitors downloaded the publication — contributing to a "brain aware" citizenry. In partnership with colleagues at Denison University, SfN now hosts an audio edition of *Brain Facts*, providing free and downloadable audio content on the brain to millions of users. The audio files can be found on both the SfN Web site and iTunesU. In the coming year, the Society will continue to explore creative approaches for reaching new audiences.

**LEARN MORE:**
*www.sfn.org/baw*

# Science Advocacy:
## Influencing Public Policy, Protecting Researchers

SfN leadership has recognized advocacy as a continuing high priority. In FY2010, the Society worked to promote federal support for biomedical research at the National Institutes of Health (NIH) and National Science Foundation (NSF), and to aggressively support the responsible use of animals in research.

### Reporting on ARRA-Funded Research

Upon Congressional passage of the American Recovery and Reinvestment Act (ARRA), SfN launched efforts to highlight the ARRA neuroscience investment, asking members to submit stories about how their research is advancing science, improving health, and strengthening the economy.

In 2010, 15 editions of "In the Lab: Recovery Act Stories" were produced, offering snapshots of basic research investments made through ARRA. A dedicated Web page also provides an overview of the ARRA neuroscience investment in NIH and NSF, and offers information available from other key community advocates. In May, SfN President Michael Goldberg testified before a House Appropriations Subcommittee about the importance of sustaining the momentum generated by ARRA by supporting $35 billion for NIH in FY2011.

### Lab Tours Launch, Advocacy Network Grows

SfN members conducted lab tours and meetings in the home districts of key congressional members as a new component of SfN's advocacy outreach. Events were held by the University of New Mexico, University of Pittsburgh, Yale University, University of California, San Diego, and Kent State. The events educated members of Congress about NIH investment in their districts, explaining potential health applications of emerging discoveries and local economic impact.

Members of Congress returned to Washington talking about NIH funding and energized to "champion" biomedical research. The tours also sparked the first SfN-initiated local Science Advisory Committee for a member of Congress. A new guide — *How to Conduct a Congressional Lab Tour* — was launched in June and is available online. Moreover, SfN Advocacy Network membership increased to more than 2,000 activists in 48 states, nearly doubling over 2009. Launched in 2008, the Advocacy Network helps engaged SfN members become active easily and quickly.

### Congressional Staff Tour at SfN Annual Meeting

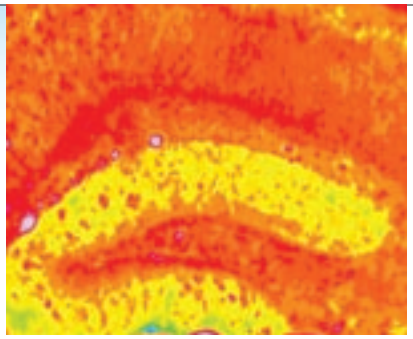
A new component of the annual meeting was the Congressional Staff Tour. Led by scientists from the host city of Chicago, the tour helped congressional members and staff learn about NIH and NSF funded neuroscience — both emerging discoveries and the role neuroscience plays in expanding a high-wage, high-technology economy. Staffers visited the poster floor and talked with scientists, and also toured the exhibit hall, seeing the bustling businesses and vocal advocates. Congressional staff met with the leadership of NIH neuroscience institutes exhibiting at the meeting.

### Capitol Hill Day and Continuing Leadership in Washington

On March 25, nearly 50 attendees participated in 73 congressional meetings during SfN's annual Capitol Hill Day, tripling in participation since its inaugural year. Participants were urged to

## Beyond the Horizon

*Building and supporting champions for research funding and animal research through grassroots activism, national advocacy, and global coordination.*



"take the Hill home" by sustaining relationships with members of Congress throughout the year. Attendees also included a growing number of young members who realize that advocacy will remain an important part of their scientific careers.

SfN worked to play a leadership role in the Washington research advocacy community year-round, partnering with Research!America, serving on the Steering Committee for the AdHoc Group for Medical Research and as an engaged member of the Coalition for Life Sciences and the American Brain Coalition.

## Supporting Animal Research

Amid threats, violence, and harassment targeting researchers over the last decade, SfN continues to advocate for responsible animal research and support for researchers through its Committee on Animals in Research. As a growing number of U.S. Freedom of Information Act (FOIA) requests were received by SfN members over the past few years, the Society spearheaded a working group to develop a new resource informing members of their rights and responsibilities under the law. Released in January, *Responding to FOIA Requests: Facts and Resources* was a collaborative effort by SfN, the National Association for Biomedical Research, and the Federation of American Societies for Experimental Biology.

Nearly 50 SfN members participated in the 2010 Capitol Hill Day event, meeting with 73 different congressional offices and representing 23 states, 3 countries, and the District of Columbia, to discuss the importance of federal funding to advancing biomedical and neuroscience research.

## Building Community Support

SfN continues to work with coalition members to support animal research and oppose legislation that would hamper medical progress. This included voicing opposition to Congress on the Great Ape Protection Act and expressing the scientific community's concerns that the legislation would impede medical research benefiting both humans and primates. SfN also rallied its grassroots to take action on the issue: members responded by generating nearly 1,000 messages to their legislators. Additionally, one lab tour on NIH funding resulted in a dialogue with the representative about his position on animal research issues.

## Supporting Member Engagement

Two expert commentaries released in the September 16, 2009, issue of *The Journal of Neuroscience*, also highlighted the increasingly violent animal rights movement, and emphasized the need for an educated public and engaged research community to ensure the safety of animals and researchers. The commentaries, written by SfN members, outlined the critical importance of humane and responsible animal research, and stressed the need for continued activism and public engagement. SfN helped secure significant press attention to these important publications and remains vigilant in highlighting and promoting the importance of animal research. SfN also ensured the material was shared and discussed with Francis Collins, U.S. NIH director. Together, these actions played a role in encouraging NIH to create an inter-agency group working across the federal government to ensure sharing of information about animal extremism and violence against researchers.

**LEARN MORE:**
*www.sfn.org/gpa*

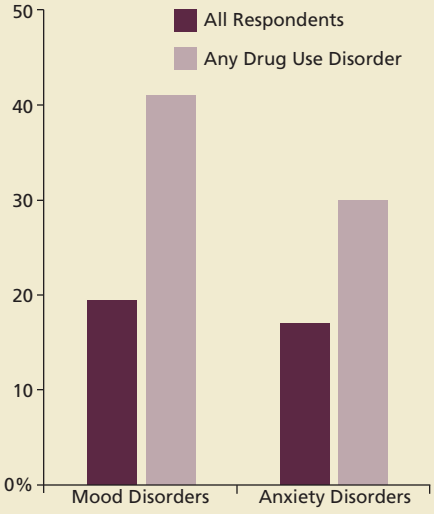
# Burden of Addiction

Addiction, and other mental disorders linked to it, have widespread consequences for society.

When one person is overcome by drug abuse and addiction, the burden is shared by millions. Chronic drug use not only harms people's livelihoods and loved ones, it also adversely affects the economic, social, and professional well-being of the world's citizens.

## Tangible and Intangible Costs

Each year, more than half a trillion dollars is lost to substance abuse in the United States alone, according to the U.S. Office of National Drug Control. Those losses are realized across the board — in health, criminal, and productivity-related areas. That impact totals about $181 billion for illicit drugs, $168 billion for tobacco, and $185 billion for alcohol.

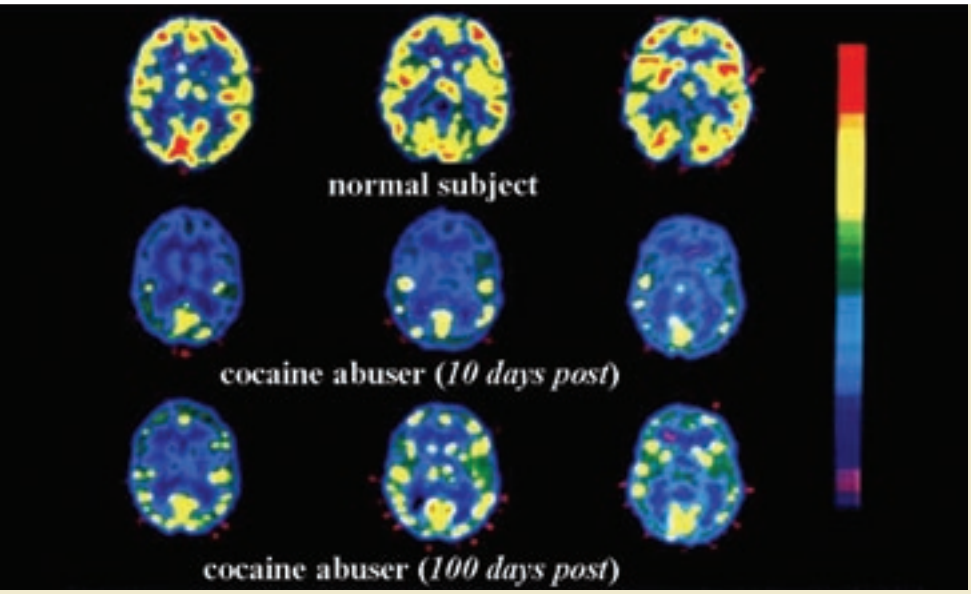



Research data shows the high coincidence of mental illness and drug use disorders.

Even more worrisome are the statistics on drug-induced mortality. The Centers for Disease Control and Prevention reported that more than 38,000 people in the United States died of legal or illegal substances in 2006. That figure doesn't even include the 300,000 to 450,000 deaths each year attributed to nicotine addiction. As disturbing as these numbers are, they don't reflect the unquantifiable impact of drug abuse. Drug abuse dissolves families, shreds the social fabric in neighborhoods, leads to loss of jobs and income, contributes to poor school and job performance, and is often a causal factor in domestic violence and auto accidents.

The consequences of substance abuse for children in society are especially tragic. Drug-addicted parents often don't properly care for their children, neglecting medical and educational needs, and failing to provide basic food and shelter. When parents fail, the government must step in. These deficits are ultimately made up for by the taxpayer.

Although more than 75 percent of illicit drug users are employed, these adults are more likely to frequently change jobs, be involved in accidents, be absent, and be less productive even when at work. Notably, heavy drinkers are absent from work four to eight times more often than non-addicts.




Imaging scans show cocaine interferes with brain cells' ability to use energy. Red and yellow colors indicate areas where there is greater energy use. Cocaine abusers slowly recover from deficits in brain energy metabolism the longer they have abstained from drugs.

## Addiction as a Brain Disorder

Drug abuse and addiction has been classified as a drug use disorder — a mental disorder — by the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, the standard used by medical professionals.

That drug abuse is a brain disorder may come as a surprise to some. Addiction is at times mistakenly viewed as a character flaw or a lack of resolve; but studies of the brain show drug addiction is a disease. The hallmarks of drug abuse — compulsion, tolerance, and withdrawal — are caused by chemical changes in key brain areas.

Drug use disorders often coexist with other mental disorders. When two or more disorders or illnesses are present in the same body, the condition is called "comorbidity." Often, these conditions exacerbate one another.

Data collected by the National Institute on Drug Abuse show people diagnosed with mood disorders are twice as likely to abuse or be dependent upon drugs. In fact, the brain areas changed by drug abuse are the same ones disrupted by depression, anxiety, or schizophrenia. Symptoms also overlap. For medical professionals, deciding whether a behavior is due to drug dependence or another mental disorder is tricky, and diagnosis and treatment are challenging.

## Gray Areas

One example is the correlation between tobacco use and schizophrenia. In clinical studies, as much as 90 percent of schizophrenia patients smoke. Overall, individuals with psychiatric disorders buy about 44 percent of cigarettes sold in the United States. These commonalities may occur because mental patients are self-medicating with tobacco or other drugs. Some theories even suggest nicotine may ease some symptoms of schizophrenia. Conversely, drug abuse may elicit latent symptoms of mental illness.

Genetics studies suggest if a person shows signs of one disorder, he or she is more likely to have a second one. This may be due to overlapping genetic risks. Similar environmental triggers, such as stress or trauma, may also contribute to both conditions. Researchers have determined early exposure to drugs alters the developing brain in ways that may make it more susceptible to mental disorders later on.

The scientific community continues to work on understanding diseases of the brain to ultimately contribute to global solutions. The stakes involved in the drug epidemic make action on behalf of our fellow human beings a social and moral imperative. ■

# Addiction: Reward *and* Punishment

Drug abuse and addiction disturb the brain's natural pleasure-producing reward system, altering self-control and decision-making abilities on a cellular level.

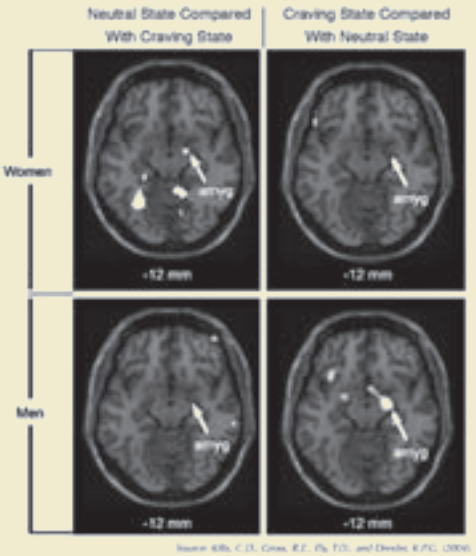
Of all Americans age 12 or older, more than 9 percent have struggled with drug dependence and 20 percent with nicotine addiction. For these people, a once-voluntary source of pleasure segues into a destructive habit.

## Addictive Circuit Breakers

When a person takes an addictive substance — whether it be in pill, syringe, or cigarette form — chemicals travel through the blood stream into the brain, where they act on key regions. Each of these drugs provides an artificial chemical boost to the body's reward system.

The brain circuit underlying reward makes biologically necessary actions, such as eating and reproducing, feel good. The circuit consists of nerve cells that cluster in a region near the base of the brain called the ventral tegmental area. These cells extend fibers toward the front of the brain, specifically to a collection of neurons called the nucleus accumbens.

Substances of abuse seize this reward system, throwing it out of balance. The drugs create an artificially blissful high, one that is often more intense than naturally euphoric actions. But the brain adapts — the abused system becomes desensitized.

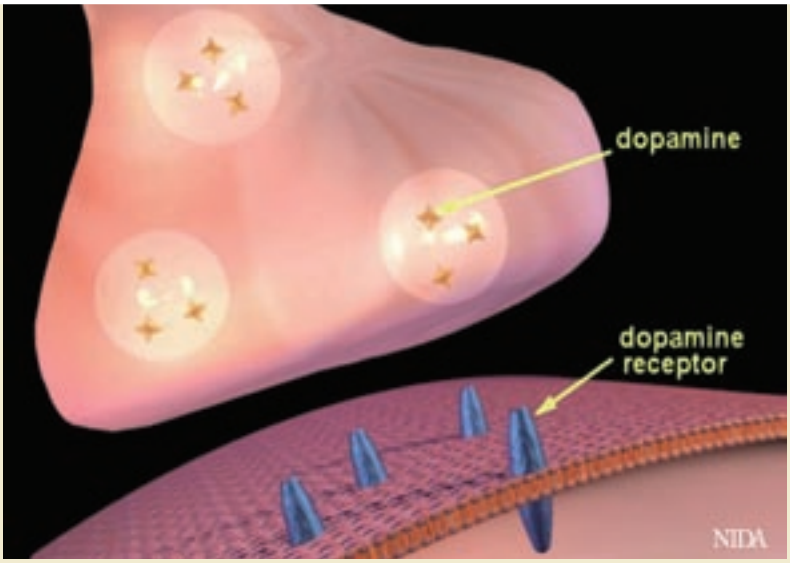



Lab studies have shown, like humans, rats will repeatedly self-administer drugs, prioritizing that immediate high over even eating. Even if the animals are removed from the drugs for months, they will quickly return to drug-taking behaviors if stress or certain environmental cues are introduced.

## A Dangerous Cycle

Different drugs work in the same basic way — they all increase the action of the chemical dopamine. Like other chemical messengers that transmit information in the brain, dopamine attaches to special sites on cells called receptors that send and receive signals.

When drugs spur the release of abnormally large amounts of dopa-




**Above:** The neurotransmitter dopamine acts on specific receptors in the brain to increase pleasure and reward. The image shows that dopamine produced in one nerve cell activates receptors in neighboring brain cells.
**Left:** Drug cravings affect men and women differently, activating different brain regions. In the above image, the sex difference is particularly notable in the amygdala, which is important in fear and emotion.

mine, the body adjusts by decreasing the number of its receptors. Drug users must then consume more drugs to achieve the same high, while drug tolerance similarly increases. Thus, the addiction cycle is set.

Recent studies with rhesus monkeys show cocaine use reduces the production of dopamine receptors of a particular subtype, called the D2 receptor. The D2 receptor is in the outer membranes of brain cells found to shape motivation, emotion, thought, and movement. This protein allows dopamine to influence the function of these cells. Studies show fewer D2 receptors in people who abuse nicotine, heroin, and alcohol, and even in the severely obese.

Compounding the effect of dopamine receptor loss, research also indicates chronic drug abusers have less dopamine in their brains, perhaps to compensate for repeated surges in the reward system. This explains why addicts often feel depressed and anxious when sober.

## Importance of Genetics and the Environment

Researchers are now learning more about the role that genetics plays in addiction. Research indicates that many genes influence how likely a person is to become addicted. Although there is no "addiction gene," studies show a single gene variation may have considerable effects.

For example, recent research funded by the National Institute on Drug Abuse shows an animal's response to nicotine may depend on the particular composition of its nicotine receptors. One type of gene variation may alter the receptor composition in a way that increases the risk for addiction, while another variation may decrease risk. Scientists are still unraveling how the complex cocktail of genes mixes to better understand addiction and its affect on health.

Environmental factors also play a key role in addiction. Scientists estimate 40 to 60 percent of a person's susceptibility to addiction may be determined by the effects of environment on genes. The risk is greater for adolescents and people with mental disorders than for the general population.

Addicts can recover. The brain has a remarkable ability to mend from drug use. Imaging studies show that dopamine levels eventually increase to near-normal after months of abstinence. In addition to traditional behavioral therapy, new pharmacological treatments may prove a valuable aid to addicts. Better knowledge of genetic and environmental factors will help medical professionals develop more effective methods of getting addicts off of drugs — permanently. ■

# FINANCIAL and ORGANIZATIONAL HIGHLIGHTS

Despite the economic downturn experienced over the past few years, the Society for Neuroscience has remained financially sound through record membership, continued success of *The Journal of Neuroscience,* and the popular annual meeting.

## Finance and Development:
### Positioning for the Future

The Society kept expenditures to a modest increase during the fiscal year in light of economic pressures affecting both the Society and its members, assisting the Society in its rigorous financial stewardship. At the same time, the continued vibrancy of the organization has enabled Society leadership to evaluate future opportunities to strengthen the compelling value it delivers to members. The Society also received recognition for being one of the 50 Best Nonprofits to Work For in 2010, an accomplishment that reflects the Society's commitment to sound management and to the staff who help realize its mission.

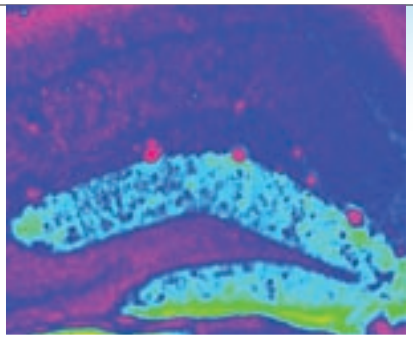
### Sound Finances and Growing Membership

The Society delivered an operating net revenue of $827,000 in FY2010, exclusive of the Society's long-term investment activity. The Society's 1121 Properties, LLC, which manages the Society's headquarters building, posted an operating net expense of $363,000. The modest consolidated surplus of $464,000 represents strong financial planning and thoughtful financial management. Total revenue (net of investment income and one-time gift) increased by 0.9 percent to $25.3 million in FY2010 from $25 million the prior year. Total expenses increased 1.2 percent in FY2010 compared to the prior fiscal year, from $24.8 million in FY2009 to $25.1 million in FY2010.

Record membership continued to add to the financial success of the Society. With 40,290 members across 83 countries, the Society continues to broaden its ability to serve the field of neuroscience, and provide world-class member benefits, including unmatched venues for sharing great science, compelling professional development and networking opportunities, and effective public outreach.

# IZATIONAL GHLIGHTS

The Society's headquarters building employs green efficiencies, which realize economic savings and societal benefit while supporting SfN's commitment to environmental responsibility.



## Beyond the Horizon

*Conserving SfN's financial strength and investing in priority projects that strengthen the value of membership.*

## Strong Revenue Sources Support the Field

The annual meeting continued its scientific and financial momentum with more than 30,500 attendees in Chicago. Given a new host city and a difficult economic year, attendance reflected the strong value found in the meeting. Attendees presented nearly 16,000 abstracts and participated in a wide range of professional development and networking opportunities. More than $500,000 in merit awards and travel grants were presented to neuroscientists during FY2010, continuing to recognize the achievements of investigators and supporting student scientists in their development.

*The Journal of Neuroscience* — among the most-cited neuroscience publications in the world — continued its commitment to expanding the vibrancy of peer-reviewed global neuroscience findings. It also provided stable sources of revenue from its strong institutional subscription base and author publication income, which increased in FY2010 due to the publishing of more articles in *The Journal* than in years prior.

The Society's 1121 Properties, LLC, which manages the Society's headquarters building, posted an operating net expense of $363,000, inclusive of depreciation. It also housed the Society staff in an effective work space, with green efficiencies that accrue both economic savings and aesthetic and social benefits.

## Long-Term Investments Ensure Long-Term Vision

The Society's long-term investments rebounded strongly in FY2010, and ended the fiscal year with a fair market value of more than $28.2 million, reflecting a $3.4 million increase over the FY2009 balance. The Society's investment strategy continues to be guided by its Investment Committee, with crucial input from three outside financial experts who serve on the committee *pro bono* to offer advice on appropriate diversification and discipline to achieve the goals set forth by Society leadership.

## Investing in the Future: Programs and Infrastructure

Resourceful budgeting has allowed the Council and volunteer leadership to continue to implement programmatic priorities, even during tough economic times, while operating under a balanced budget. Reflecting expressed member needs, SfN implemented several new initiatives, made possible through the thorough planning of its leadership. These include a new Professional Development Committee focusing on the development of neuroscientists at all levels of their career; a consolidation with the former Association of Neuroscience Departments and Programs; and the application of social technologies to serve SfN's mission, from blogging at the annual meeting to rapid SfN Facebook "fan" page growth, which topped 8,000 people.

Grant funding during FY2010 increased with the program initiation of the Department Chair Training to Increase Women in Neuroscience. Funded through the National Science Foundation, SfN is working to increase the participation and advancement of women in academic science and engineering careers. Similarly, the Neuroscience Scholars Program, funded through the National Institute of Neurological Disorders and Stroke, continues to foster the professional development of underrepresented minority scientists. Sponsorships continue to support several educational initiatives, including many lectures and awards. More than $1.1 million in grant and sponsorship funding in FY2010 helped support SfN's programs and membership development, and the Society continues to pursue other partnerships, collaborations, and funding to continue these valuable programs.

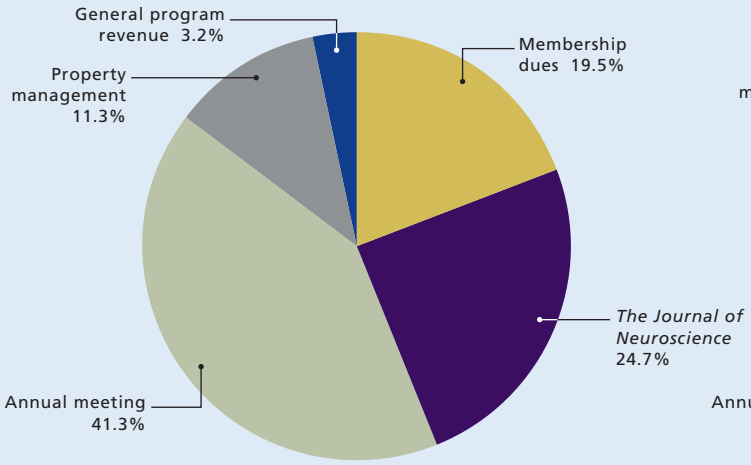
Additionally, SfN has made significant strides in its goal to define and execute a smart and forward-thinking information strategy — a critical part of SfN's ability to serve the growing community and increase the ease of taking part in many diverse activities it offers. Built on the association management system implemented in 2009, the goal is to create a universal "key" that enables the organization to link all its data systems.

Today, integrated content includes membership, abstract submission and sessioning, annual meeting registration and housing, e-mail distribution, and many more functions. As additional systems are added, this work will allow SfN to enhance services offered to members and as well as expand functionality to provide content and benefits to members using social media, multimedia, and mobile platforms.

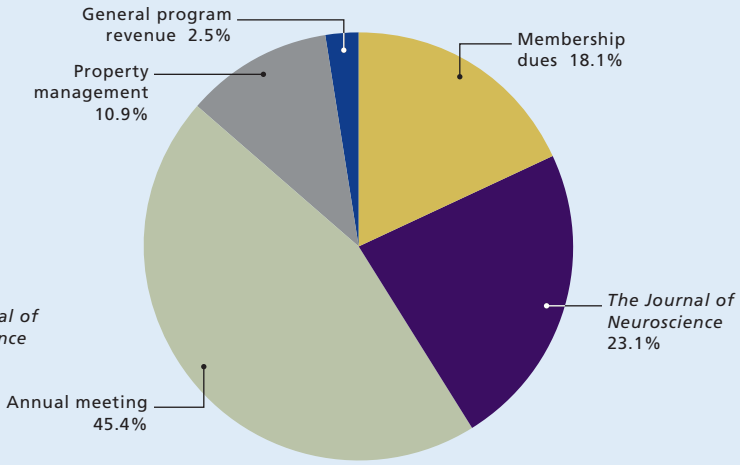
Overall, strong infrastructure, budgeting, staff management, and planning is helping to ensure the organization's programs and services keep pace with the speed of discovery and growing diversity of the vibrant neuroscience field.

## CURRENT AND PAST FISCAL YEAR REVENUE AND EXPENDITURES BY ACTIVITY

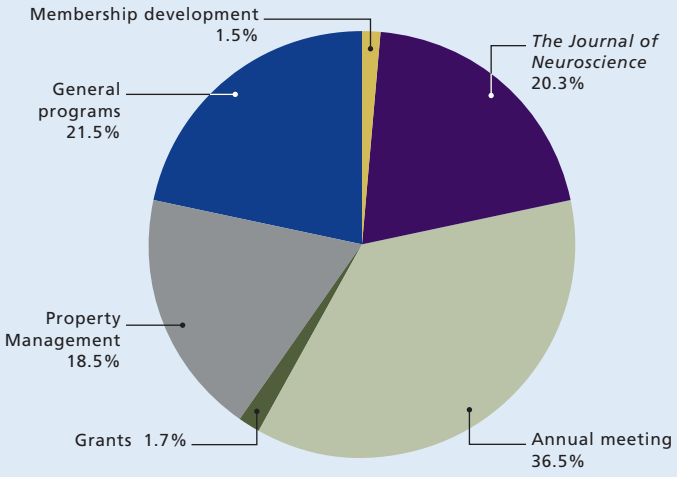
### FY2010 REVENUE — $25,298,183
(net of investment income)



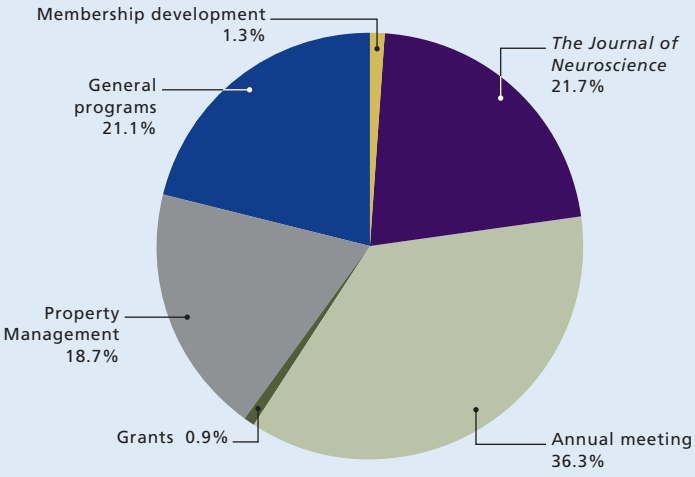

### FY2009 REVENUE — $25,722,980*
(net of investment income)




### FY2010 EXPENSES — $25,095,117




### FY2009 EXPENSES — $24,781,044




**FY2009 Revenue includes a one-time long-term gift of $650,000.*

GELMAN, ROSENBERG & FREEDMAN
CERTIFIED PUBLIC ACCOUNTANTS

## INDEPENDENT AUDITORS' REPORT

To the Council
Society for Neuroscience and 1121 Properties, LLC
Washington, D.C.

We have audited the accompanying consolidated statement of financial position of the Society for Neuroscience and 1121 Properties, LLC (collectively, the Society) as of June 30, 2010, and the related consolidated statements of activities and change in net assets and cash flows for the year then ended. These consolidated financial statements are the responsibility of the Society's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audit. The prior year summarized comparative information has been derived from the Society's 2009 consolidated financial statements and, in our report dated September 10, 2009, we expressed an unqualified opinion on those statements.

We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement. An audit includes consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Society's internal control over financial reporting. Accordingly, we express no such opinion. An audit also includes examining, on a test basis, evidence supporting the amounts and disclosures in the consolidated financial statements, assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall consolidated financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the consolidated financial position of the Society as of June 30, 2010, and its consolidated change in net assets and its consolidated cash flows for the year then ended in conformity with accounting principles generally accepted in the United States of America.

Gelman Rosenberg & Freedman

September 24, 2010

4550 MONTGOMERY AVENUE · SUITE 650 NORTH · BETHESDA, MARYLAND 20814
(301) 951-9090 · FAX (301) 951-3570 · WWW.GRFCPA.COM

## CONSOLIDATED STATEMENT OF FINANCIAL POSITION *(as of June 30, 2010)*

| ASSETS | 2010 | 2009 |
|---|---|---|
| **Current Assets** | | |
| Cash and cash equivalents | $ 736,515 | $ 736,764 |
| Accounts receivable, net of allowance for doubtful accounts | 370,366 | 424,722 |
| Prepaid expenses | 912,492 | 925,903 |
| Total current assets | 2,019,373 | 2,087,389 |
| **Non-current Assets** | | |
| Investments (Notes 2 ,11 and 14) | 28,209,700 | 24,732,520 |
| Property, furniture, equipment and improvements, net of accumulated depreciation and amortization of $6,796,379 for 2009 (Notes 3, 8 and 9) | 33,541,446 | 34,713,204 |
| Deferred rent receivable (Note 6) | 708,137 | 657,991 |
| Deposits | 3,892 | 3,892 |
| Total non-current assets | 62,463,175 | 60,107,607 |
| **Total Assets** | **$ 64,482,548** | **$ 62,194,996** |
| LIABILITIES AND NET ASSETS | | |
| **Current Liabilities** | | |
| Current portion of note payable (Note 8) | $ 550,000 | $ 512,500 |
| Line of credit (Note 11) | 494,497 | 1,601,561 |
| Accounts payable and accrued liabilities | 1,553,134 | 1,732,738 |
| Deferred revenue | 6,305,580 | 6,196,308 |
| Total current liabilities | 8,903,211 | 10,043,107 |
| **Non-current Liabilities** | | |
| Note payable, net of current portion (Note 8) | 18,041,667 | 18,579,167 |
| Bonds payable (Note 9) | 12,000,000 | 12,000,000 |
| Tenant deposits | 17,584 | 17,584 |
| Interest rate swap obligation (Notes 10 and 14) | 6,236,969 | 4,413,612 |
| Total non-current liabilities | 36,296,220 | 35,010,363 |
| Total liabilities | 45,199,431 | 45,053,470 |
| **Net Assets** | | |
| Unrestricted | 18,176,151 | 15,979,027 |
| Temporarily restricted (Note 4) | 1,106,966 | 1,162,499 |
| Total net assets | 19,283,117 | 17,141,526 |
| **Total Liabilities And Net Assets** | **$ 64,482,548** | **$ 62,194,996** |

*See accompanying notes to consolidated financial statements.*

## CONSOLIDATED STATEMENT OF ACTIVITIES *(as of June 30, 2010)*

| | Unrestricted | Temporarily Restricted | 2010 Total | 2009 Total |
|---|---|---|---|---|
| REVENUE | | | | |
| Membership dues | $ 4,920,257 | $ - | $ 4,920,257 | $ 4,643,634 |
| *The Journal of Neuroscience* | 6,254,572 | - | 6,254,572 | 5,952,069 |
| Annual meeting | 10,450,765 | - | 10,450,765 | 11,678,803 |
| Investment income (loss) (Note 2) | 3,520,629 | 133,149 | 3,653,778 | (4,894,285) |
| Property management revenue (Note 6) | 2,850,602 | - | 2,850,602 | 2,809,100 |
| General program revenue | 821,987 | - | 821,987 | 639,375 |
| Net assets released from donor restrictions (Note 5) | 188,682 | (188,682) | - | - |
| Total revenue | 29,007,494 | (55,533) | 28,951,961 | 20,828,696 |
| EXPENSES | | | | |
| **Program Services:** | | | | |
| *The Journal of Neuroscience* | 5,085,582 | - | 5,085,582 | 5,373,335 |
| Annual Meeting | 9,156,612 | - | 9,156,612 | 8,984,465 |
| Grants | 417,456 | - | 417,456 | 230,934 |
| General Programs | 5,408,473 | - | 5,408,473 | 5,235,839 |
| Total program services | 20,068,123 | - | 20,068,123 | 19,824,573 |
| **Supporting Services:** | | | | |
| Membership Development | 388,126 | - | 388,126 | 310,633 |
| Property Management Expenses | 4,638,868 | - | 4,638,868 | 4,645,838 |
| Total supporting services | 5,026,994 | - | 5,026,994 | 4,956,471 |
| Total expenses | 25,095,117 | - | 25,095,117 | 24,781,044 |
| Change in net assets before other items | 3,912,377 | (55,533) | 3,856,844 | (3,952,348) |
| OTHER ITEMS | | | | |
| Unrealized loss on interest rate swap (Note 10) | (1,823,357) | - | (1,823,357) | (2,718,063) |
| Transfer of ANDP (Note 15) | 108,104 | - | 108,104 | - |
| Total other items | (1,715,253) | - | (1,715,253) | (2,718,063) |
| Change in net assets | 2,197,124 | (55,533) | 2,141,591 | (6,670,411) |
| Net assets at beginning of year | 15,979,027 | 1,162,499 | 17,141,526 | 23,811,937 |
| **Net assets at end of year** | **$ 18,176,151** | **$ 1,106,966** | **$ 19,283,117** | **$ 17,141,526** |

*See accompanying notes to consolidated financial statements.*

## CONSOLIDATED STATEMENT OF CASH FLOWS *(as of June 30, 2010)*

| CASH FLOWS FROM OPERATING ACTIVITIES | 2010 | 2009 |
|---|---|---|
| Change in net assets | $ 2,141,591 | $ (6,670,411) |
| Adjustments to reconcile change in net assets to net cash provided by operating activities: | | |
| Loss on disposal of equipment | 2,403 | - |
| Depreciation and amortization | 1,771,535 | 1,676,692 |
| Net (appreciation) depreciation of investments | (2,904,140) | 6,008,110 |
| Unrealized loss on interest rate swap | 1,823,357 | 2,718,063 |
| (Increase) decrease in: | | |
| Accounts receivable | 54,356 | (49,175) |
| Prepaid expenses | 13,411 | (125,744) |
| Deferred rent receivable | (50,146) | (280,556) |
| Increase (decrease) in: | | |
| Accounts payable and accrued liabilities | (179,604) | 528,061 |
| Deferred revenue | 109,272 | 583,423 |
| Net cash provided by operating activities | 2,782,035 | 4,388,463 |
| **CASH FLOWS FROM INVESTING ACTIVITIES** | | |
| Sales and maturities purchases of investments, net | (573,040) | (1,604,867) |
| Purchase of property, furniture, equipment and improvements | (602,180) | (1,859,017) |
| Net cash used by investing activities | (1,175,220) | (3,463,884) |
| **CASH FLOWS FROM FINANCING ACTIVITIES** | | |
| Proceeds from line of credit | 1,117,936 | 2,645,783 |
| Payments on line of credit | (2,225,000) | (2,809,182) |
| Payments on note payable | (500,000) | (483,333) |
| Net cash used by financing activities | (1,607,064) | (646,732) |
| Net increase (decrease) in cash and cash equivalents | (249) | 277,847 |
| Cash and cash equivalents at beginning of year | 736,764 | 458,917 |
| **Cash and cash equivalents at end of year** | **$ 736,515** | **$ 736,764** |
| **SUPPLEMENTAL INFORMATION:** | | |
| **Interest Paid** | **$ 1,554,692** | **$ 1,609,212** |

*See accompanying notes to consolidated financial statements.*

## 1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES AND GENERAL INFORMATION

**Organization -**

The Society for Neuroscience (SfN) is a non-profit organization, incorporated in the District of Columbia. The primary purposes of SfN are to advance the understanding of the nervous system, including the part it plays in determining behavior, by bringing together scientists of various backgrounds and by facilitating the integration of research directed at all levels of biological organization; to promote education in the field of neuroscience; to inform the general public on the results and implications of current research in this area.

The 1121 Properties, LLC (the LLC) is a limited liability company, incorporated in the District of Columbia on July 7, 2005. The primary purpose of the LLC is to engage in the business of performing services as directed by SfN for leasing and maintaining the leases of offices and other retail space in the premises known as 1121 14th St., NW, Washington, D.C. 20005.

The accompanying consolidated financial statements reflect the activity of the Society for Neuroscience and 1121 Properties, LLC (collectively, the Society) as of June 30, 2010. The financial statements of the two organizations have been consolidated because they are under common control. All intercompany transactions have been eliminated during consolidation.

**Basis of presentation -**

The accompanying consolidated financial statements are presented on the accrual basis of accounting, and in accordance with FASB ASC 958-010, *Not-for-Profit Entities,* Consolidation.

The consolidated financial statements include certain prior year summarized comparative information in total but not by net asset class. Such information does not include sufficient detail to constitute a presentation in conformity with generally accepted accounting principles. Accordingly, such information should be read in conjunction with the Society's consolidated financial statements for the year ended June 30, 2009, from which the summarized information was derived.

**Recently issued accounting standards -**

In June 2009, the Financial Accounting Standards Board (FASB) issued FASB ASC 105, *Generally Accepted Accounting Principles,* which establishes the FASB Accounting Standards Codification as the sole source of authoritative generally accepted accounting principles. Pursuant to the provisions of FASB ASC 105, the Society has updated references to GAAP in its consolidated financial statements issued for the year ended June 30, 2010. The adoption of FASB ASC 105 did not impact the Society's consolidated financial position or results of operations.

**Cash and cash equivalents -**

The Society considers all cash and other highly liquid investments with initial maturities of three months or less to be cash equivalents.

At times during the year, the Society maintains cash balances at financial institutions in excess of the Federal Deposit Insurance Corporation (FDIC) limits. Management believes the risk in these situations to be minimal.

**Investments -**

The Society invests in shares held in individual securities or investment funds, which include bonds, stocks, money market funds held for investment purposes, and limited partnerships.

Investment fund managers trade in various domestic and foreign financial markets, which carry a certain amount of risk of loss. Investments are stated at fair value based on quoted market prices at the reporting date, or in absence of such quoted market price, a reasonable estimate of fair value as approved by management. Realized and unrealized gains and losses are included in investment income in the Consolidated Statement of Activities and Change in Net Assets.

The fair value of financial instruments is determined by reference to various market data and other valuation techniques as appropriate. Credit risk from financial instruments relate to the possibility that invested assets within a particular industry segment may experience loss due to market conditions. The Society has diversified its financial instruments to help ensure that no one industry segment represents a significant concentration of risk.

Although management uses its best judgment at estimating fair value of the underlying assets for its investments, there are inherent limitations in any valuation technique. Therefore, the value is not necessarily indicative of the amount that could be realized in a current transaction. Future events will also affect the estimates of fair value, and the effect of such events on the estimates of fair value could be material.

**Accounts receivable -**

Accounts receivable are stated at their fair value. The allowance for doubtful accounts is determined based upon an annual review of account balances, including the age of the balance and the historical experience with the customer.

**Property, furniture, equipment and improvements -**

Property, furniture, equipment and improvements are stated at cost. Property, furniture, and equipment are depreciated on a straight-line basis over the estimated useful lives of the related assets, generally three to ten years. Leasehold improvements are amortized over the remaining life of the lease. The building and building costs are recorded at cost and are depreciated over thirty-nine years.

Expenditures for major repairs and improvements with useful lives greater than one-year and in excess of $3,000 are capitalized, and expenditures of lesser amounts for minor and maintenance costs are expensed when incurred.

**Income taxes -**

The Society is exempt from Federal income taxes under Section 501(c)(3) of the Internal Revenue Code. In addition, the Society qualifies for the charitable contribution deduction under Section 170(b)(1)(A) and has been classified as an organization that is not a private foundation under Section 509(a)(2) of the Code. Accordingly, no provision for income taxes has been made in the accompanying consolidated financial statements. The Society is required to report unrelated business income to the Internal Revenue Service and the appropriate state taxing authorities.

The Society leases office space to several unaffiliated tenants. The activity is considered to be unrelated business activity under Internal Revenue Service regulations. Defined net income from the operations is taxable. To date, there has been a loss from unrelated business activities.

As of June 30, 2010, there were net operating loss carryforwards of approximately $467,015. No deferred tax asset has been recognized due to uncertainty realization. The net operating losses expire between 2028 and 2029.

In June 2006, the Financial Accounting Standards Board (FASB) released FASB ASC 740-10, *Income Taxes,* that provides guidance for reporting uncertainty in income taxes. For the year ended June 30, 2010, the Society has documented its consideration of FASB ASC 740-10 and determined that no material uncertain tax positions qualify for either recognition or disclosure in the consolidated financial statements.

For the purpose of corporate tax reporting for the LLC, all financial transactions are reported under SfN's filing status.

**Deferred revenue -**

Deferred revenue consists of member dues, journal subscriptions, and annual meeting-related fees. The Society recognizes member dues and journal subscriptions on a pro-rata basis over an annual period, while annual meeting fees are recorded at the time the annual meeting occurs.

**Net asset classification -**

The net assets of the Society are reported in two self-balancing groups as follows:

- **Unrestricted net assets** include unrestricted revenue and contributions received without donor-imposed restrictions. These net assets are available for the operation of the Society and include both internally designated and undesignated resources.
- **Temporarily restricted net assets** include revenue and contributions subject to donor-imposed stipulations that will be met by the actions of the Society and/or the passage of time. When a restriction expires, temporarily restricted net assets are reclassified to unrestricted net assets and reported in the Consolidated Statement of Activities and Change in Net Assets as net assets released from restrictions.

**Revenue recognition -**

Membership dues and journal subscription revenues are recorded as revenue in the year to which the revenue is related. Contributions and grants are recorded as revenue in the year notification is received from the donor. Contributions and grants are recognized as unrestricted support only to the extent of actual expenses incurred in compliance with the donor-imposed restrictions and satisfaction of time restrictions. The Society recognizes annual meeting fees when the related event has occurred.

Contracts and grants received from departments or agencies of the United States Government are considered to be exchange transactions (as opposed to contributions) and are not recorded as revenue until related costs are incurred.

Rental income is recognized on a straight-line basis. The leases call for rent abatement and/or annual rental payment escalations.

The difference between rental income received and rental income recognized on the straight-line basis is recorded as deferred rents receivable in the accompanying Consolidated Statement of Financial Position. Deferred revenue is recognized for rental payments received in advance of the period earned.

**Use of estimates -**

The preparation of consolidated financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenue and expenses during the reporting period. Accordingly, actual results could differ from those estimates.

**Functional allocation of expenses -**

The costs of providing the various programs and other activities have been summarized on a functional basis in the Consolidated Statement of Activities and Change in Net Assets. Accordingly, certain costs have been allocated among the programs and supporting services benefited.

**Risks and uncertainties -**

The Society invests in various investment securities. Investment securities are exposed to various risks such as interest rates, market and credit risks. Due to the level of risk associated with certain investment securities, it is at least reasonably possible that changes in the values of investment securities will occur in the near term and that such changes could materially affect the amounts reported in the accompanying consolidated financial statements.

**Fair value measurements -**

The Society adopted the provisions of FASB ASC 820, *Fair Value Measurements and Disclosures.* FASB ASC 820 defines fair value, establishes a framework for measuring fair value, establishes a fair value hierarchy based on the quality of inputs (assumptions that market participants would use in pricing assets and liabilities, including assumptions about risk) used to measure fair value, and enhances disclosure requirements for fair value measurements. The Society accounts for a significant portion of its financial instruments at fair value or considers fair value in their measurement.

2. INVESTMENTS

Investments consisted of the following at June 30, 2010:

| | Cost | Market Value |
|---|---|---|
| U.S. Government obligations | $ 1,938,043 | $ 1,991,532 |
| Fixed income | 6,382,854 | 8,160,856 |
| Equities | 19,262,368 | 17,470,829 |
| Cash | 586,483 | 586,483 |
| **Total long-term investments** | **$ 28,169,748** | **$ 28,209,700** |

Alternative investments are comprised of the following at June 30, 2010:

| Investment Type | Amount | Liquidity |
|---|---|---|
| Cayman Islands Exempted Company | $ 1,533,966 | Quarterly with 90 days prior notice |
| Vintage Fund V Offshore LP | 336,836 | None until dissolution or transfer to another party |
| | **$ 1,870,802** | |

As of June 30, 2010, the Society has no uncalled commitments.

Included in investment income are the following:

| | |
|---|---|
| Interest and dividends | $ 749,638 |
| Net appreciation of investments | 2,904,140 |
| **Total investment income** | **$ 3,653,778** |

The investment management fee expense was $222,608 for the year ended June 30, 2010, which is included in general programs expense.

Included in equities are alternative investments with an estimated market value of $1,870,802. The sale of these investments is subject to certain conditions.

The Society has resolved to use available funds and future earnings thereon to establish a strategic reserve pool that represents at least one year of expense budget. Based upon the intent of the Society, assets of the strategic reserve pool are classified as long-term.

## 3. PROPERTY, FURNITURE, EQUIPMENT AND IMPROVEMENTS

At June 30, 2010, property, furniture, equipment and improvements consisted of the following:

| | |
|---|---|
| Land | $ 7,150,400 |
| Building | 23,086,859 |
| Building improvements | 5,867,853 |
| Furniture | 1,154,224 |
| Computer equipment | 1,734,733 |
| Leasing commissions | 1,062,410 |
| Other | 281,346 |
| | 40,337,825 |
| Less: Accumulated depreciation and amortization | (6,796,379) |
| **Property, furniture, equipment and improvements, net** | **$ 33,541,446** |

Depreciation and amortization expense was $1,771,535 for the year ended June 30, 2010.

## 4. TEMPORARILY RESTRICTED NET ASSETS

Temporarily restricted net assets consisted of the following at June 30, 2010:

| | |
|---|---|
| Julius Axelrod Prize | $ 468,822 |
| Grass Traveling Scientist Program | 14,368 |
| Ricardo Miledi Neuroscience Training Program | 82,232 |
| The Jacob P. Waletzky Award | 536,744 |
| Bernice Grafstein Award | 4,800 |
| | **$ 1,106,966** |

## 5. NET ASSETS RELEASED FROM RESTRICTIONS

The following temporarily restricted net assets were released from donor restrictions by incurring expenses which satisfied the restricted purposes specified by the donors:

| | |
|---|---|
| Julius Axelrod Prize | $ 37,383 |
| Grass Traveling Scientist Program | 20,091 |
| Ricardo Miledi Neuroscience Training Program | 91,360 |
| The Jacob P. Waletzky Award | 37,448 |
| Bernice Grafstein Award | 2,400 |
| | **$ 188,682** |

## 6. LEASE COMMITMENTS

The LLC currently has a total of ten tenants leasing office space within its premises. The period of the leases range from August 14, 2006 to May 31, 2018. Rental income from these leases is included in the accompanying Consolidated Statement of Activities and Change in Net Assets in property management revenue. Rental income from these leases totaled $2,307,655 for the year ended June 30, 2010 and is included in the accompanying Consolidated Statement of Activities and Change in Net Assets in property management revenue. Property management revenue totaled $2,850,602, and includes income for garage and storage leasing fees and operating expense recoverables.

Rental income is recognized on a straight-line basis. The difference between rental income received and rental income recognized on the straight-line basis is recorded as deferred rent receivable in the accompanying Consolidated Statement of Financial Position. As of June 30, 2010, the deferred rent receivable totaled $708,137.

The following is a schedule of future minimum rental payments to be received by the LLC:

| **Year Ended June 30,** | **Tenants** |
|---|---|
| 2011 | $ 2,390,549 |
| 2012 | 2,108,901 |
| 2013 | 1,878,444 |
| 2014 | 1,937,019 |
| 2015 | 1,987,607 |
| Thereafter | 4,473,186 |
| | **$ 14,775,706** |

## 7. RETIREMENT PLANS

The Society maintains a defined contribution plan for employees meeting certain eligibility requirements. Eligible employees may contribute a percentage of their salary, subject to the maximum contribution as per the applicable IRS regulation.

The Society contributes 4% to 16% of a participating employee's salary, depending upon the percentage of contribution made by the employees. The Society's contributions to the plan for the year ended June 30, 2010 totaled $631,247. Additional pension expense not directly contributed to the plan totaled $71,735 for the year ended June 30, 2010.

SfN also has a deferred compensation plan under Section 457 of the Internal Revenue Code for certain executive level employees. Contributions to this plan totaled $33,000 for the year ended June 30, 2010.

## 8. NOTES PAYABLE

On February 1, 2006, the Society entered into an agreement to purchase the property at 1121 14th Street, N.W., Washington, D.C. The purchase was financed through a $20,000,000 note payable from Bank of America, N.A. The note called for interest-only payments until the building reaches stabilization of tenant income or once a period of eighteen months has elapsed since the closing. As of August 1, 2007, the latter criteria was met. The Society entered into a swap agreement to artificially fix the interest rate (see Note 10).

Future minimum principal payments are as follows:

| **Year Ended June 30,** | |
|---|---|
| 2011 | $ 550,000 |
| 2012 | 563,333 |
| 2013 | 592,500 |
| 2014 | 622,500 |
| 2015 | 656,667 |
| Thereafter | 15,606,667 |
| | 18,591,667 |
| Less: Current portion | (550,000) |
| **Non-current portion** | **$ 18,041,667** |

## 9. BONDS PAYABLE

On February 1, 2006, the District of Columbia agreed to issue its Variable Rate Revenue Bonds (Society for Neuroscience Issue) Series 2006 in the aggregate principal amount of $12,000,000, for the benefit of the Society through Bank of America, N.A., in order to finance a portion of the costs of acquiring, constructing, and furnishing the office building, including parking garage, located at 1121 14th Street, N.W., Washington, D.C. The Society agreed to pay the principal or purchase price and interest on the bonds. The bonds carry a fluctuating rate of interest per annum that approximates the BMA index (a national index of seven-day floating tax-exempt rates). As of June 30, 2010, the interest rate was 0.3%. Principal payments shall begin February 1, 2030.

## 10. INTEREST SWAP AGREEMENT

To minimize the effect of changes in the variable rate, the Society entered into an interest rate swap contract with a commercial bank for both the note and bonds payable, which it pays interest at a blended fixed rate of 5.2%. The interest rate swap contract is considered a derivative financial instrument, because it derives its value from the interest rate paid on the DC Bonds.

The fair value of the interest rate swap contract has been included as a liability in the amount of $6,236,969 in the Consolidated Statement of Financial Position as of June 30, 2010. The unrealized loss on the interest rate swap of $1,823,357 is shown as an other item in the Consolidated Statement of Activities and Change in Net Assets. The liability amounts represent an estimate of what the Society would have to pay if the agreement was cancelled as of June 30, 2010.

The recorded amount of the liability or asset representing the fair value of the swap contract will vary from year to year as (1) the variable rate received changes in relation to the fixed rate paid, (2) the principal amount is paid down, which reduces the corresponding amount of the swap contract and (3) the remaining time until maturity of the swap contract which terminates in 2030 for the note payable and 2037 for the bond payable.

## 11. LINE OF CREDIT

The Society has a line of credit with Citigroup Global Market, Inc. in the amount of $5,000,000, with a fixed interest rate based on the applicable floating rate, which was 4.5% at June 30, 2010. As of June 30, 2010, the line of credit had outstanding borrowings in the amount of $494,497. The line of credit is collateralized by investments held by Citigroup.

## 12. REVOLVING CREDIT NOTE

The Society has a revolving credit note with Bank of America, N.A. in the amount of $400,000, with an interest rate per annum equal to the applicable floating daily rate of the British Bankers Association (BBA), LIBOR plus 120 basis points. As of June 30, 2010, the revolving credit note had no outstanding borrowings.

## 13. COMMITMENTS

The Society is committed under an agreement for conference space in 2013. The total commitment under the agreement is not determinable, as it depends upon attendance and other unknown factors. There is a cancelation penalty that would be due if the agreement was canceled prior to the event date. The amount of the cancellation penalty increases through the date of the event.

## 14. FAIR VALUE MEASUREMENTS

In accordance with FASB ASC 820, *Fair Value Measurements and Disclosures,* the Society has categorized its financial instruments, based on the priority of the inputs to the valuation technique, into a three-level fair value hierarchy. The fair value hierarchy gives the highest priority to quoted prices in active markets for identical assets or liabilities (Level 1) and the lowest priority to unobservable inputs (Level 3).

If the inputs used to measure the financial instruments fall within different levels of hierarchy, the categorization is based on the lowest level input that is significant to the fair value measurement of the instrument. Investments recorded in the Consolidated Statement of Financial Position are categorized based on the inputs to valuation techniques as follows:

**Level 1.** These are financial instruments where values are based on unadjusted quoted prices for identical assets in an active market the Society has the ability to access.

**Level 2.** These are financial instruments where values are based on quoted prices in markets that are not active or model inputs that are observable either directly or indirectly for substantially the full-term of the investments.

**Level 3.** These are financial instruments where values are based on prices or valuation techniques that require inputs that are both unobservable and significant to the overall fair value measurement. These inputs reflect assumptions of management about assumptions market participants would use in pricing the investments. These investments include non-readily marketable securities that do not have an active market.

Financial instruments recorded in the Consolidated Statement of Financial Position are categorized based on the inputs to the valuation technique as follows for the year ended June 30, 2010:

| | Level 1 | Level 2 | Level 3 | Total |
|---|---|---|---|---|
| Assets: | | | | |
| **Investments** | **$ 26,338,898** | **$ -** | **$ 1,870,802** | **$ 28,209,700** |
| Liability: | | | | |
| **Interest Rate Swap Obligation** | **$ -** | **$ -** | **$ 6,236,969** | **$ 6,236,969** |

**Level 3**

The following table provides a summary of changes in fair value of the Society's financial assets for the year ended June 30, 2010:

| | Investments | Interest Rate Swap Obligation |
|---|---|---|
| Beginning balance as of July 1, 2009 | $ 1,146,132 | $ 4,413,612 |
| Unrealized and realized gains | 126,307 | 1,823,357 |
| Purchases | 598,363 | - |
| **Balance as of June 30, 2010** | **$ 1,870,802** | **$ 6,236,969** |

## 15. TRANSFER OF ANDP

Effective July 1, 2009, the Association of Neuroscience Departments and Programs (ANDP) became part of the Society's programs and activities. The net assets transferred to the Society totaled $108,104.

## 16. SUBSEQUENT EVENTS

In preparing these consolidated financial statements, the Society has evaluated events and transactions for potential recognition or disclosure through September 24, 2010, the date the consolidated financial statements were issued.

# Photography Credits

**Cover:** During the ninth week of gestation, neurons that will eventually form the human neocortex — home to many aspects of perception, cognition, language, movement and memory — start to gather in a dense band called the cortical plate. Reaching up into this layer is a bipolar cell, probably a precursor that divides to create cortical neurons and transforms into a radial glial cell, over which new neurons migrate into the cortical plate.

Courtesy, with permission: Irina Bystron, PhD, University of Oxford, UK. From: Bystron, I., Blakemore C., and Rakic P. (2008) *Nature Reviews Neuroscience* 9:110-122. Research supported by Hill Foundation, Zvi & Ofra Meitar Family Fund, US Public Health Service and Kavli Institute for Neuroscience at Yale.

**Inside Cover:** Human cerebral wall at GW12. The subplate (SP) in humans is a separate layer that forms shortly after the emergence of the cortical plate (CP) 30, 64, 66. Here we provide examples of the complexity of this zone in humans. TU20 staining, which reveals both neurons and their processes, suggests that the spaces between SP cells are filled with axons.

Figure reproduced, with permission: Bystron, I., Rakic, P., and Blakemore, C. Early development of the cortical subplate in human and non-human primates. Program No. 674.10. Neuroscience 2007. San Diego, CA: Society for Neuroscience, 2007.

**Page 2:** Human cerebral wall at GW12.

Figure reproduced, with permission: Bystron, I., Rakic, P., and Blakemore, C. Early development of the cortical subplate in human and non-human primates. Program No. 674.10. Neuroscience 2007. San Diego, CA: Society for Neuroscience, 2007.

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**Page 5:** AKAP79–YFP localizes in dendritic spines of a cultured hippocampal neurons. The postsynaptic scaffold protein AKAP79 regulates dendritic spine maturation through binding to PSD-95 family MAGUK scaffold proteins.

Courtesy, with Permission: Holly R. Robertson, Emily S. Gibson, Timothy A. Benke, and Mark L. Dell'Acqua, 2009, *The Journal of Neuroscience* 29: 7929-7943.

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**Page 36:** Data courtesy of National Institute on Drug Abuse *Research Reports Comorbidity: Addiction and Other Mental Illnesses* 2009.

**Page 37, 38, 39:** Courtesy, with permission: National Institute on Drug Abuse.

**Inside Back Cover:** In a 50-day-old human embryo, a bundle of neuronal processes (stained gold for β3-tubulin) extends through the mesenchyme from the developing olfactory placode (bottom left) towards the forebrain. The cell bodies of immature neurons are seen migrating over this bundle. The green stain (for anti-phosphohistone) marks dividing mesenchymal stem cells.

Courtesy, with permission: Irina Bystron, PhD, who works with Colin Blakemore, PhD, at the University of Oxford, UK, in collaboration with Pasko Rakic, PhD, MD, at Yale University. Research supported by Hill Foundation, Zvi & Ofra Meitar Family Fund, US Public Health Service and Kavli Institute for Neuroscience at Yale.

**Back Cover:** Transverse section through the neonatal spinal cord of a double-transgenic mouse engineered so that ubiquitous expression of a β-galactosidase/neo fusion protein is replaced by that of GFP specifically in cells that express glial fibrillary acidic protein. Section is labeled with antibodies against GFP (green), the neuronal marker NeuN (red), and β-galactosidase (blue).

Courtesy, with Permission: Andrew M. Garrett and Joshua A. Weiner, 2009, *The Journal of Neuroscience* 29: 11723-11731

**Beyond the Horizon Image Credit (Pages 9, 13, 19, 23, 24, 31, 34, 41):** $GABA_A$ receptor δ subunit expression in the hippocampus. Color-transformed images of $GABA_A$ receptor δ subunit expression in the hippocampus of a virgin wild-type mouse (left panels) and pregnant mice (right panels), show a high density of expression in the dentate gyrus molecular layer in wild-type mice. $GABA_A$ receptor δ subunit expression is reduced in hippocampus during pregnancy.

Courtesy, with Permission: Jamie Maguire, Isabella Ferando, Charlotte Simonsen, and Istvan Mody, 2009, *The Journal of Neuroscience* 29: 9592-9601

## Sustaining Associate Members

PLATINUM SUSTAINING ASSOCIATE MEMBER

**David Kopf Instruments**

GOLD SUSTAINING ASSOCIATE MEMBERS

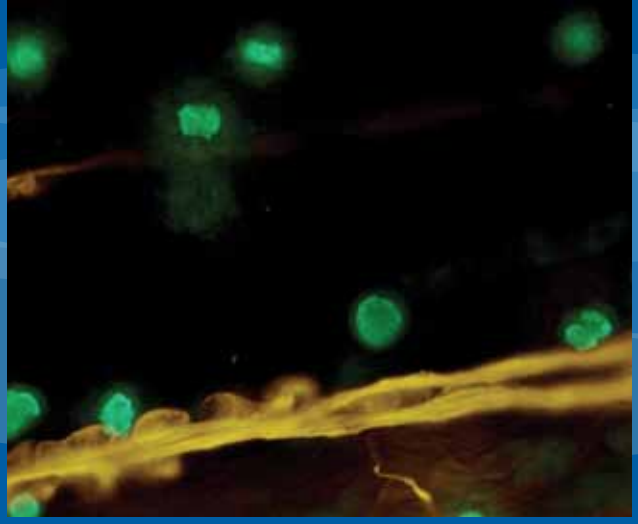
**Elsevier**
**Olympus America Inc.**
**sanofi-aventis**
**Sutter Instrument Company**

SILVER SUSTAINING ASSOCIATE MEMBERS

**Charles River**
**F. Hoffman-LaRoche Ltd.**
**Millipore Corporation**
**Nikon Instruments Inc.**

NONPROFIT SUSTAINING ASSOCIATE MEMBERS

**Cambridge University Press**
**Montreal Neurological Institute**
**National Institute on Drug Abuse**



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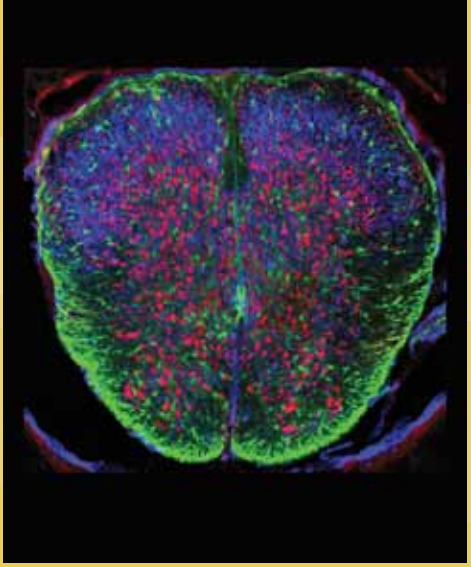

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