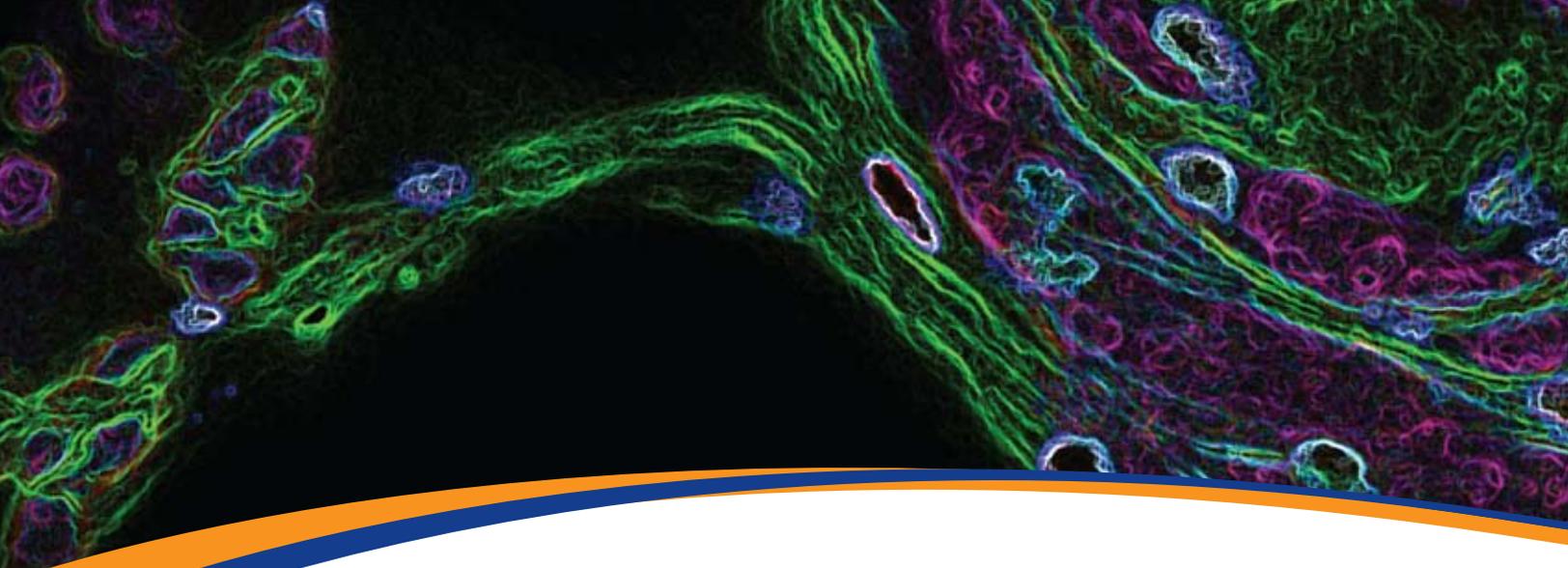




Evolving  
*for the* FUTURE  
FY 2009 ANNUAL REPORT



SfN  
SOCIETY FOR NEUROSCIENCE  
CELEBRATING 40 YEARS



**On the cover:** These zebrafish neurons growing in culture have unusually looped and swirling filaments due to a mutation in the *phr1* gene. As a result of this defect, neurons are unable to navigate correctly in the developing brain. **On the cover and opposite page:** Charles Darwin's "tree of life" explains the evolutionary relationship between different species. SfN celebrates the 150<sup>th</sup> anniversary of the publication *On the Origin of Species* by Darwin. This work, which established the theory of evolution, forms a foundation for advances in neuroscience and many other fields.

## 2008–2009 Society for Neuroscience Council

### OFFICERS

**Thomas J. Carew, PhD**  
President

**Michael E. Goldberg, MD**  
President-Elect

**Eve Marder, PhD**  
Past President

**Joanne E. Berger-Sweeney, PhD**  
Treasurer

**Marie-Francoise Chesselet, PhD, MD**  
Treasurer-Elect

**S. Murray Sherman, PhD**  
Past Treasurer

**Moses V. Chao, PhD**  
Secretary

**Freda D. Miller, PhD**  
Secretary-Elect

### COUNCILORS

**Roberta Diaz Brinton, PhD**

**Howard B. Eichenbaum, PhD**

**Marie T. Filbin, PhD**

**Frances E. Jensen, MD**

**Robert C. Malenka, MD, PhD**

**Anthony G. Phillips, PhD**

**Leslie P. Tolbert, PhD**

**Gina G. Turrigiano, PhD**

## 2008–2009 Society for Neuroscience Committee Chairs

**Robert C. Malenka, MD, PhD**  
Audit Committee

**Jeffrey H. Kordower, PhD**  
Committee on Animals in Research

**Moses V. Chao, PhD**  
Committee on Committees

**David R. Riddle, PhD**  
Committee on Neuroscience Departments and Programs

**Thomas J. Carew, PhD**  
Executive Committee

**Joanne E. Berger-Sweeney, PhD**  
Finance Committee

**John H. Morrison, PhD**  
Government and Public Affairs Committee

**Carol A. Barnes, PhD**  
International Affairs Committee

**David H. Cohen, PhD**  
Investment Committee

**Elisabeth J. Van Bockstaele, PhD**  
Membership and Chapters Committee

**Maryann E. Martone, PhD**  
Neuroinformatics Committee

**Thomas J. Carew, PhD**  
Nominating Committee

**Jill B. Becker, PhD**  
**Anne M. Etgen, PhD (Co-Chairs)**  
Professional Development Committee

**Marina R. Picciotto, PhD**  
Program Committee

**Nicholas C. Spitzer, PhD**  
Public Education and Communication Committee

**Daniel Johnston, PhD**  
Scientific Publications Committee

## Past Presidents

**Eve Marder, PhD, 2007-08**

**David C. Van Essen, PhD, 2006-07**

**Stephen F. Heinemann, PhD, 2005-06**

**Carol A. Barnes, PhD, 2004-05**

**Anne B. Young, MD, PhD, 2003-04**

**Huda Akil, PhD, 2002-03**

**Fred H. Gage, PhD, 2001-02**

**Donald L. Price, MD, 2000-01**

**Dennis W. Choi, MD, PhD, 1999-00**

**Edward G. Jones, MD, DPhil, 1998-99**

**Lorne M. Mendell, PhD, 1997-98**

**Bruce S. McEwen, PhD, 1996-97**

**Pasko Rakic, MD, PhD, 1995-96**

**Carla J. Shatz, PhD, 1994-95**

**Larry R. Squire, PhD, 1993-94**

**Ira B. Black, MD, 1992-93**

**Joseph T. Coyle, MD, 1991-92**

**Robert H. Wurtz, PhD, 1990-91**

**Patricia S. Goldman-Rakic, PhD, 1989-90**

**David H. Hubel, MD, 1988-89**

**Albert J. Aguayo, MD, 1987-88**

**Mortimer Mishkin, PhD, 1986-87**

**Bernice Grafstein, PhD, 1985-86**

**William D. Willis, Jr., MD, PhD, 1984-85**

**Gerald D. Fischbach, MD, 1983-84**

**Dominick P. Purpura, MD, 1982-83**

**David H. Cohen, PhD, 1981-82**

**Eric R. Kandel, MD, 1980-81**

**Solomon H. Snyder, MD, 1979-80**

**Torsten N. Wiesel, MD, 1978-79**

**W. Maxwell Cowan, MD, PhD, 1977-78**

**Floyd E. Bloom, MD, 1976-77**

**Robert W. Doty, PhD, 1975-76**

**Edward V. Evarts, MD, 1974-75**

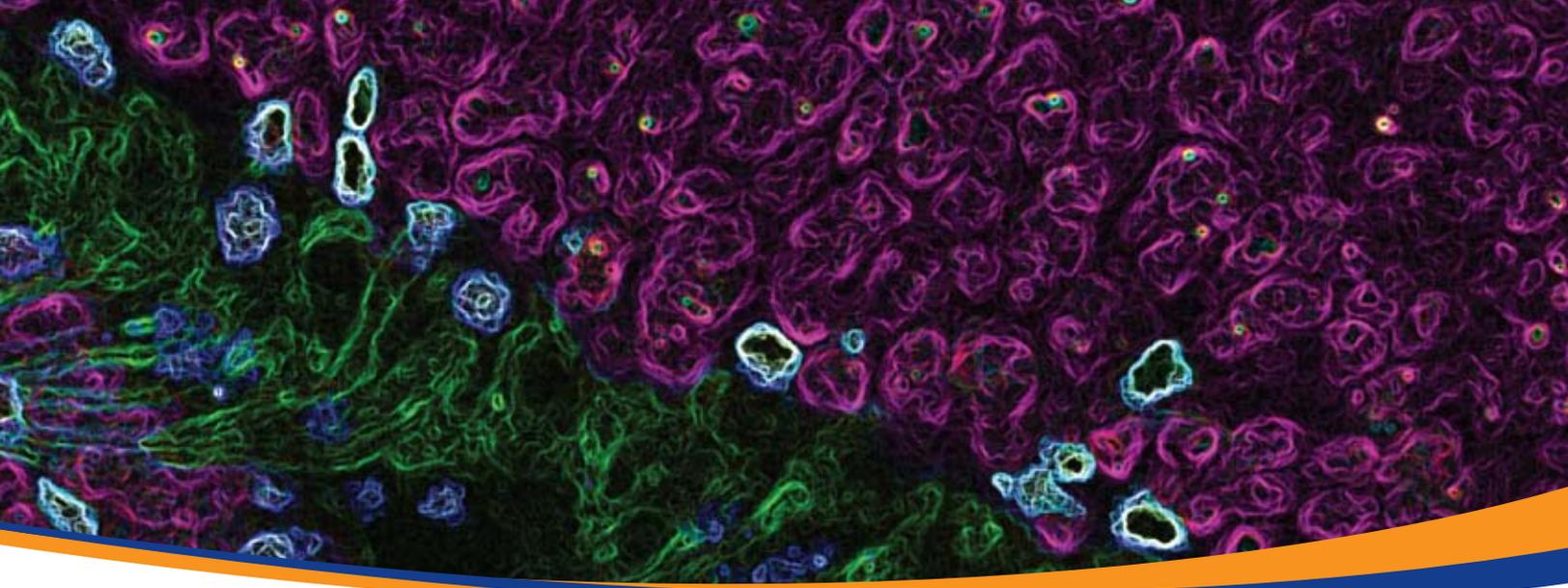
**Theodore H. Bullock, PhD, 1973-74**

**Walle J.H. Nauta, MD, PhD, 1972-73**

**Neal E. Miller, PhD, 1971-72**

**Vernon B. Mountcastle, MD, 1970-71**

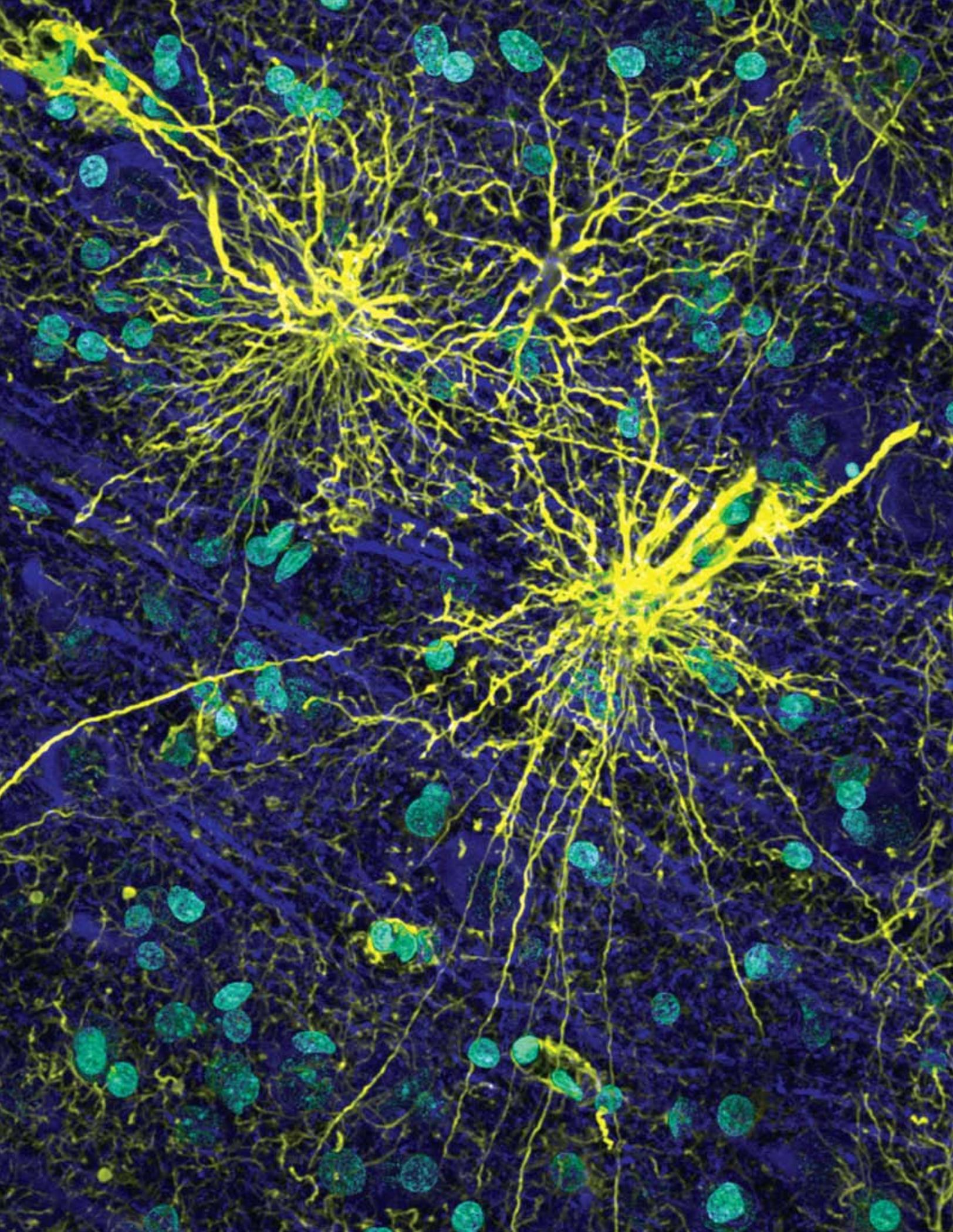
**Edward R. Perl, MD, 1969-70**



# Evolving *for the* FUTURE

FY2009 ANNUAL REPORT





# C O N T E N T S

- 4 SfN Mission, Values, and Vision
- 6 A Message from the President
- 8 SfN Milestones: 40 Years of Evolution



## 10 SECTION I: CREATING VENUES FOR GREAT SCIENCE

- 11 Annual Meeting
- 13 *The Journal of Neuroscience*

16 **MOVEMENT AND NEUROSCIENCE:** Science in Society, Science in Progress



## 20 SECTION II: SUPPORTING THE NEUROSCIENCE COMMUNITY

- 21 Membership
- 24 Chapters
- 26 Professional Development

30 **GLOBAL HEALTH AND NEUROSCIENCE:** Science in Society, Science in Progress



## 34 SECTION III: EDUCATING AND ENGAGING THE PUBLIC

- 35 Public Outreach
- 38 Science Advocacy

40 **THE ECONOMY AND NEUROSCIENCE:** Science in Society, Science in Progress



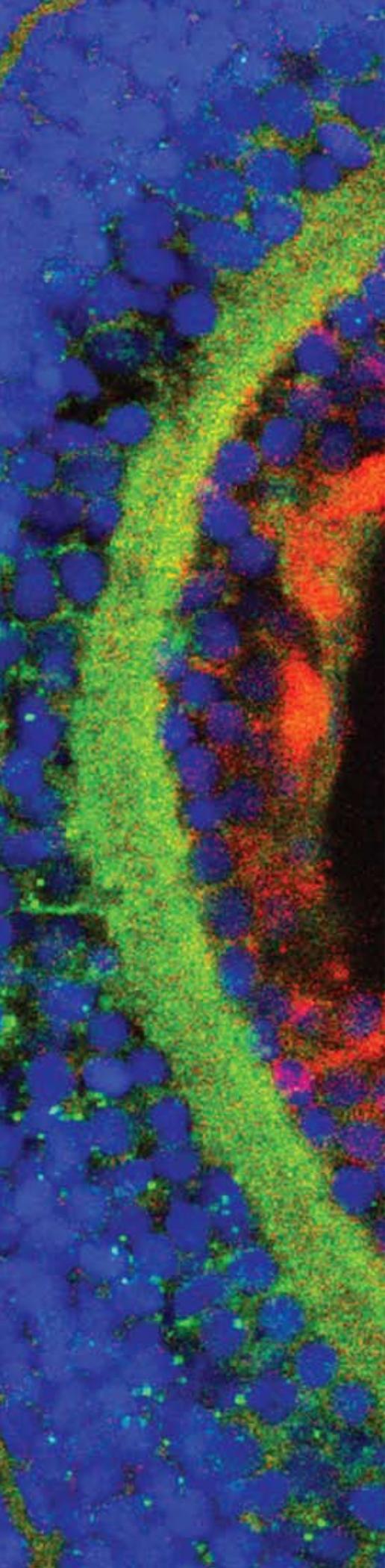
## 44 SECTION IV: FINANCIAL AND ORGANIZATIONAL HIGHLIGHTS

# 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 21<sup>st</sup> 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.

As 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 President

As we celebrate the 40<sup>th</sup> anniversary of its founding, the Society for Neuroscience (SfN) has completed a successful 2009 fiscal year. Despite a challenging external environment, SfN foresees a strong future based on an enduring vision, effective execution of that vision, and the ability to anticipate and adapt to a changing environment. The growing, global field that SfN supports stands on a cusp of transformational progress thanks to new discoveries, tools, and techniques. As one of the largest scientific societies in the world, SfN is also successfully evolving and adapting to lay the groundwork for the next 40 years with new programs and expanding outreach.

SfN, along with the broader scientific community, celebrates the discipline of evolution this year. In part, this recognizes the 150<sup>th</sup> anniversary of Charles Darwin's *On the Origin of Species*, a publication that shaped the exponential 20<sup>th</sup> century explosion of bioscience discovery. Today, as the 21<sup>st</sup> century approaches a second decade, that scientific foundation is sparking new advances across the sciences and especially in neuroscience.

Evolution also speaks to SfN's 40<sup>th</sup> anniversary. On July 11, 1969 — just a few days before men first walked on the moon — 13 leading neuroscientists created SfN. Then, the goal was to “encourage ... the increase and diffusion of knowledge of nervous systems ... bring together neuroscientists from all relevant disciplines ... facilitate integration of research at all levels ... promote education ... inform the public ... and promote other activities.” Now, I hope those founders look with pride as the organization they and countless others fostered has evolved to support such a growing and dynamic field. SfN is a thriving society of nearly 39,000 scientists around the globe who are making extraordinary progress in solving basic scientific puzzles and elucidating the underlying

mechanisms of a wide range of debilitating diseases.

SfN is still focused on achieving that enduring vision articulated 40 years ago, and the contributions during this past year have been significant. Last fall, the Society held the third largest annual meeting in SfN history, as more than 31,000 scientists, clinicians, and advocates met in Washington, DC, where news coverage of the scientific discoveries tripled compared to previous years. Meanwhile, *The Journal of Neuroscience* continued its record of success as one of the leading journals in the field, publishing more articles than any other neuroscience-related journal and cited twice as often.

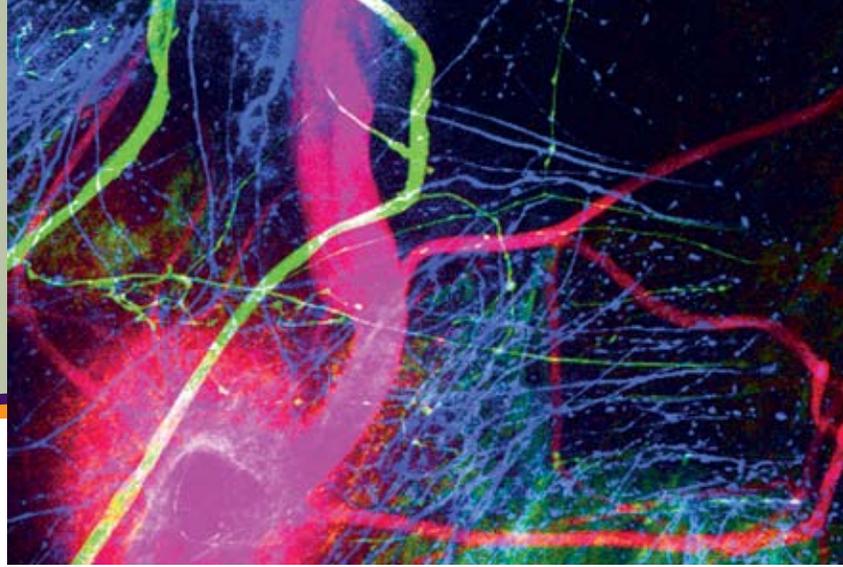
To better support the neuroscience community and respond to expressed member needs, the Society's professional development programming is evolving as well. In late June, new strategies and structures were put in place to strengthen and coordinate professional development and higher education activities. These efforts will enable SfN to better serve our growing and increasingly diverse field. Some recent data offer a snapshot of SfN's changing composition: International members — and especially international student members — are the fastest growing segment of membership. Thirty-six percent of members are non-U.S. residents and of those, 91 percent live in developed countries, largely Europe, Canada, and Japan. More expanded programming will seek to serve neuroscientists worldwide throughout their careers, and will take advantage of the growing number and activity of SfN chapters, which now total 138 in 18 countries.

SfN public education and information activity was extraordinarily productive in FY2009, with the launch of three major education tools that will continue to be key elements of SfN's work in

*SfN, along with  
the broader scientific  
community, celebrates the  
discipline of evolution  
this year.*

years to come: First, *Neuroscience Core Concepts*, a scholarly treatment of neuroscience fundamentals, was developed; second, an online education resource portal called NERVE was created and implemented; and finally, a new edition of *Brain Facts* was developed. All of these tools ensure that accurate and accessible information is widely available to teachers at all levels, as well as to the broader public. SfN also expanded its public education focus to explore the intersection of learning and the brain, an area called “neuroeducation.” The project seeks to catalyze efforts of scientists and educators effectively working together to explore how the science of brain function can inform how teachers teach.

SfN’s approach to advocacy for research funding also leaped forward in 2009 and we continued to aggressively support responsible animal research. Extraordinary economic times created funding opportunities in the United States not seen for science in a decade, and SfN members were active in making the case for such a strong science investment. After years of stagnant funding, the new resources hopefully also communicate to the next generation of scientists, first, they should stay the course in the field, and second, their contributions are integral to society’s health, scientific, and economic futures. The economic climate created challenges, as well as new opportunities, for research funding all around the globe, as policy-makers in many countries began to tune in to the myriad ways



Identified neurons in the central nervous system of the marine mollusk *Aplysia californica* exemplify simple forms of learning and memory.

in which a strong scientific research base can contribute to economic revitalization and job creation.

At the same time, the renewed investment in science is creating new responsibilities to effectively communicate the scientific, health, social, and economic value of research. SfN takes this challenge seriously for every audience — whether it is the educators of our children, public policy leaders, scientific peers, or the general public — and continues to work vigorously to promote the benefit of basic, translational, and clinical research.

Let me conclude by saying it has been an honor to serve as President of the Society, which has allowed me to add a 40<sup>th</sup> building block to the foundation of progress created over the last four decades. As the Society is ever forward looking, the next 40 years for our field, and for the Society, are certain to unravel more mysteries, provide more extraordinary challenges, and advance our collective mission in ways that we can now only imagine.

Sincerely,

Handwritten signature of Thomas J. Carew in blue ink. The signature is fluid and cursive, with a long horizontal stroke at the end.

THOMAS J. CAREW

# SfN Milestones: 40 YEARS of Evolution

## 1960s

### 1969

- SfN founded. Letters of incorporation signed July 11, 1969

## 1970s

### 1970

- Membership reaches 1,100

### 1971

- First annual meeting held (Washington, DC) with 1,396 attendees

### 1973

- Grass Traveling Scientist Program launches

### 1976

- First Sustaining Associate Member joins SfN

## 1980s

### 1981

- The Journal of Neuroscience founded
- SfN receives its first grant from NIH's National Institute for Neurological Disorders and Stroke to support diversity in science.

### 1985

- Annual meeting abstract submissions pass 5,000
- Membership reaches 10,000
- SfN elects first female president

## 1990s

### 1990

- Brain Facts is introduced as a primer on the brain and nervous system

### 1991

- Annual meeting attendance reaches 15,000
- The Journal of Neuroscience goes online

### 1993

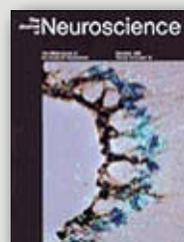
- 100<sup>th</sup> SfN chapter is established

### 1994

- First video filmed for The History of Neuroscience in Autobiography series

### 1996

- SfN joins Brain Awareness Week campaign, launched by the Dana Alliance



## 2000s

### 2002

- Membership reaches 30,000

- First Strategic Plan developed by Council

- Annual meeting Program divided into daily books to accommodate growing size of meeting

### 2003

- The Journal of Neuroscience begins publishing weekly



- Translational Neuroscience Accomplishments highlights impact of animal research

- Neuroscience Database Gateway launched

- First SfN chapter outside North America is established

### 2005

- Women in Neuroscience (WIN) becomes part of SfN

- 35<sup>th</sup> annual meeting draws a record 34,815 attendees

- Dialogues Between Neuroscience and Society Lecture is initiated at the annual meeting, featuring the Dalai Lama

### 2006

- SfN purchases and moves into new Washington, DC, headquarters building

### 2007

- International members (non-U.S.) comprise 36 percent of total membership

### 2008

- Neuroscience Core Concepts created

- Membership reaches 38,761

### 2009

- Members generate 19,000 advocacy letters in six weeks to support historic science funding

- SfN welcomes its 138th chapter

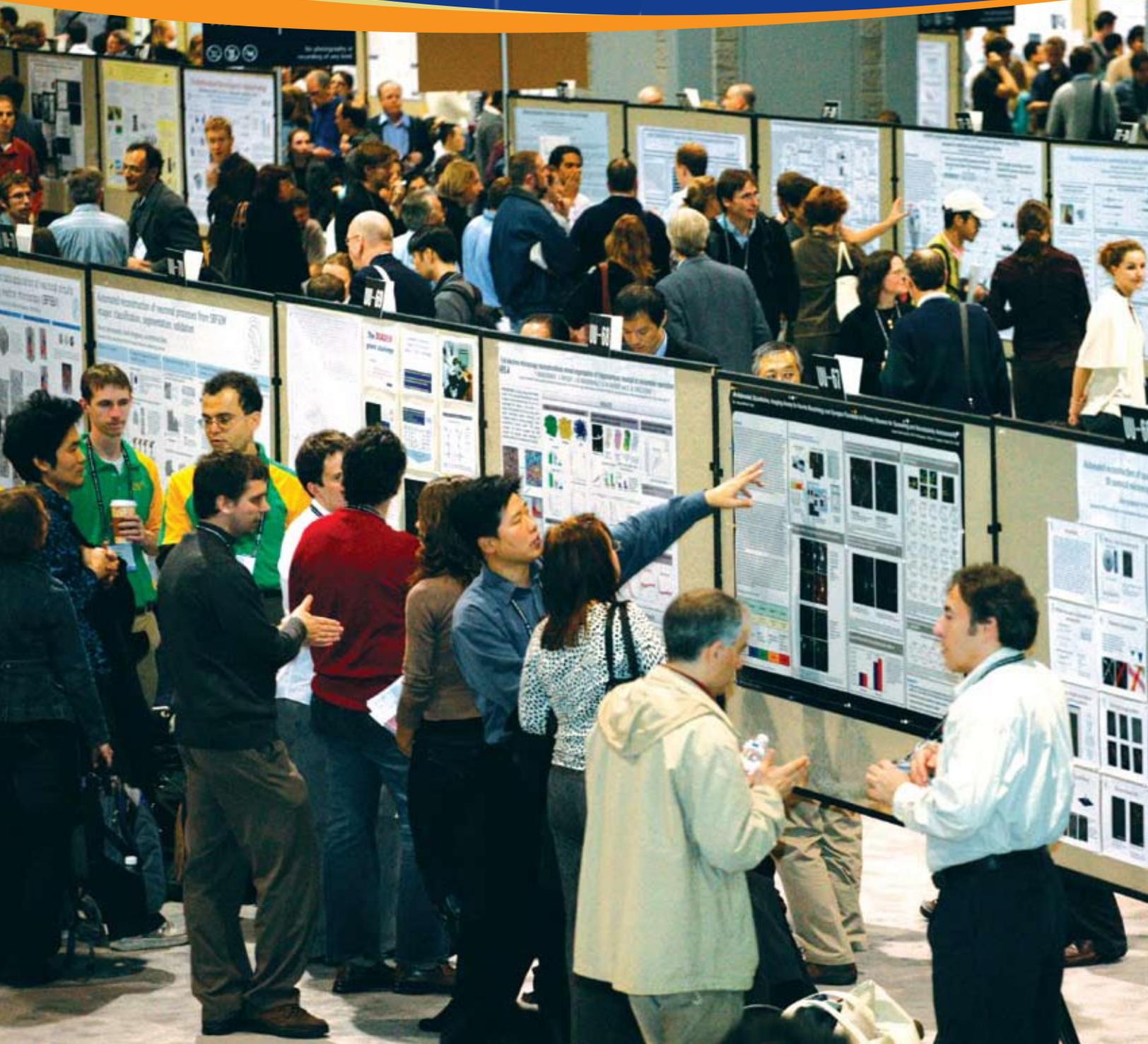
- Association of Neuroscience Departments & Programs (ANDP) becomes part of SfN

- Neuroscience Wikipedia Initiative launched

- SfN Facebook page created



# CREATING VENUES *for Great*



# Science

Neuroscience thrives on opportunities for scientists to collaborate across specialties and around the world; meet and learn from leaders in the field; and explore emerging tools and techniques. In FY2009, the world's two largest global venues for emerging neuroscience — the SfN annual meeting and *The Journal of Neuroscience* — provided both annual and year-round opportunities to encourage innovation, while they also worked to anticipate and adapt to new directions in the field.

## Neuroscience 2008: Continued Excellence

The SfN annual meeting has evolved over the past 40 years to become the premier neuroscience venue for scientists from around the world. Neuroscience 2008, held November 15–19 in Washington, DC, was no exception, drawing more than 31,600 attendees to the nation's capital. One-quarter of the attendees came from outside the United States, and more than 15,500 abstracts were presented during the five-day meeting. Combined with 10 featured lectures, 13 special lectures, 21 symposia, and 25 minisymposia, the meeting featured a robust scientific program.

The Presidential Special Lectures highlighted the importance of neural circuits research in a range of disciplines. Allison J. Doupe of the University of California presented her work on the neural mechanisms of birdsong, one of the few existing animal models for speech learning. Carol A. Barnes of the

University of Arizona discussed the impact of aging on memory and hippocampal networks in primates, leading to a better understanding of the neural basis of cognition. Insights into the sleep circuits of *Drosophila* and their impact on human sleep was the topic of Leslie C. Griffith of Brandeis University's lecture, and Catherine G. Dulac of Harvard University presented her work on the neuronal circuits involved in sex and smell.

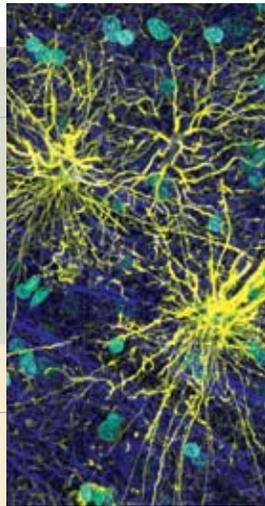
Of particular interest to the media was choreographer Mark Morris, Neuroscience 2008's "Dialogues Between Neuroscience and Society" speaker. Dancers and choreographers like Morris demonstrate the brain's control and understanding of movement and rhythm. In addition to his lecture, Mark Morris Dance Group members held a dance class for Washington area residents with Parkinson's disease during the meeting. Modeled after classes

## Then

**1ST MEETING:** 1971  
**LOCATION:** Washington, DC  
**ATTENDEES:** 1,396  
**EXHIBITORS:** 0

## Now

**38TH MEETING:** 2008  
**LOCATION:** Washington, DC  
**ATTENDEES:** 31,652  
**EXHIBITORS:** 575



held weekly at the company's studio in Brooklyn, NY, the on-site class allowed participants with a range of physical challenges to experience the joy of movement and dance.

In the History of Neuroscience Lecture, Brenda Milner from McGill University presented her seminal work studying patients with amnesia that began in the 1950s — including work on the research participant known as “H.M.”, which provided early evidence of the brain's multiple memory systems.

### Enhancing Professional Skills

The annual meeting offered rich prospects for professional development and networking. Three Short Courses exposed attendees to important scientific tools: technologies for using light to remotely control the activity of neurons; advances in antibody-based staining techniques; and the development of signal processing tools to quantify neuronal dynamics. The 2008 Neurobiology of Disease Workshop focused on the long-lasting effects of traumatic brain injury, in both its severe and mild forms. The two-day Professional Skills Workshop focused on career development and

grant writing — including in-person meetings with National Institutes of Health and National Science Foundation program officers.

### Raising Public Awareness

In the wake of the November U.S. presidential election, speakers at the Public Advocacy Forum titled “The Elections: And the Winner Is ... Science?” were cautiously optimistic about the prospects for science funding, especially important in light of the recent extended period of flat funding in the United States. Speakers included former National Institutes of Health Director and Memorial Sloan-Kettering Cancer Center President Harold Varmus, former U.S. Representative and Research!America Chair John Porter, and Wendell Primus, senior policy advisor to Speaker of the House Nancy Pelosi.

Nearly 300 participants attended “Brain Awareness: The Next Generation,” the annual reception and poster session to celebrate Brain Awareness Campaign efforts and accomplishments around the globe. The event, a collaboration between SfN and the Dana Alliance for Brain Initiatives, included remarks by then SfN President-Elect Tom Carew who challenged the assembled group to expand and enhance education outreach and partnerships.

When the annual meeting is held in Washington, a series of embassy events honor the important contributions of neuroscientists across the world. At embassies and other venues around the city, 12 countries sponsored social events during the meeting, hosting hundreds of visiting neuroscientists.

### Sharing the Science Story

Media interest in the science content was strong, with coverage on a range of topics, from infant brain development, to the benefits of napping, to traumatic brain injury, to the neurobiology of itch. Newspapers, wire services, scientific publications, and broadcast outlets were all well represented on site, with a noticeable increase in reporters blogging about the science content in “real time.” Press conference video was available to reporters on the SfN Web site for the first time this year, providing access to scientific content for reporters not able to attend, thus helping to widen coverage of the meeting.

## Showcasing the Field

SfN maintains a reputation for hosting one of the best exhibit floors, not only among scientific meetings, but also in the tradeshow industry at-large. The annual meeting again drew a diverse group of exhibitors that included education, technology, manufacturing, and publishing interests, as well as government research institutes and agencies,

nonprofit organizations, and academic institutions.

The SfN annual meeting continues to be a vibrant forum for the exchange of ideas, the sharing of scientific content, and the professional development of neuroscientists from around the globe.

**LEARN MORE:**  
[www.sfn.org/am2009](http://www.sfn.org/am2009)

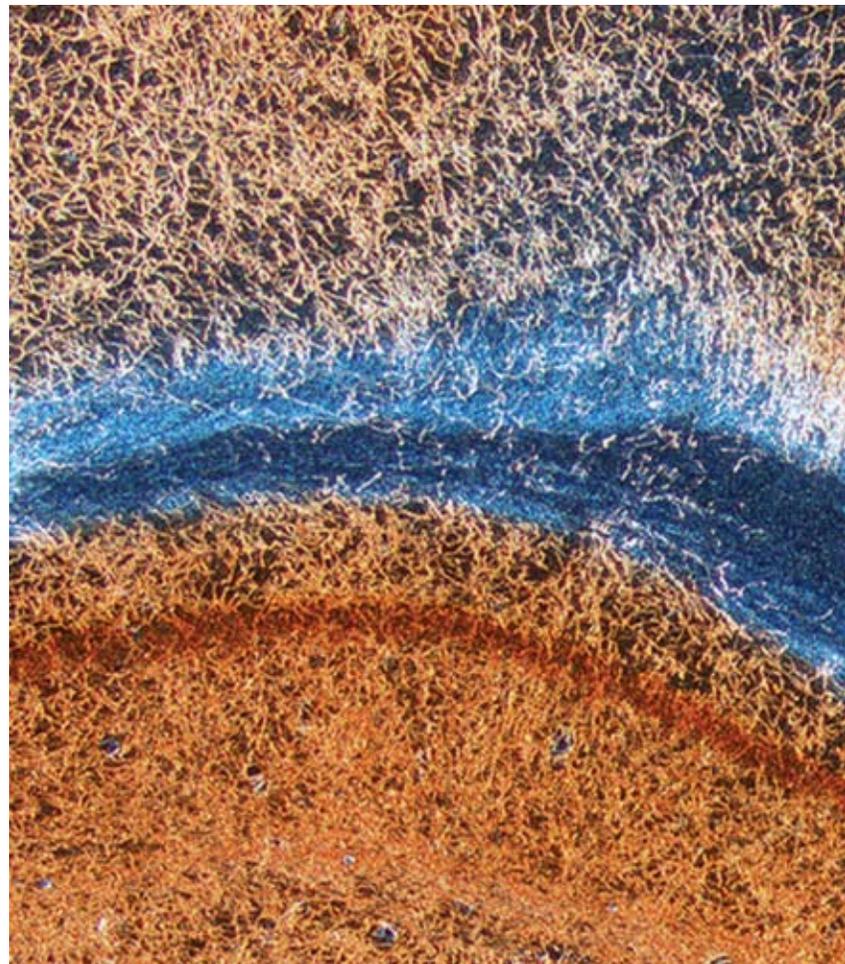
## **The Journal of Neuroscience:** Reporting on Emerging Science

In FY2009, *The Journal of Neuroscience* business model remained sound, including revenues from subscriptions; multi-site and global licenses; and author submission, publication, and reprint fees. *The Journal* continued a series of initiatives to prepare for future scientific and publishing opportunities.

Editor-in-chief John Maunsell, professor of neurobiology at Harvard Medical School and a Howard Hughes Medical Institute (HHMI) Investigator, spearheaded a number of enhanced features. Recognizing that the open exchange of ideas is important for the advancement of the field, Maunsell implemented a new policy on Internet prepublication. *The Journal* will now consider manuscripts that have been prepublished on the Internet, whether in repositories or elsewhere. Prepublishing manuscripts can provide investigators with input from colleagues around the world and facilitate the spread of ideas. Although this policy is not a common practice among neuroscience journals, it is common in other fields such as physics, chemistry, and quantitative biology. SfN leads the way in adopting a prepublishing policy for scholarly society journals.

## Technology Enhances Offerings

The Neuroscience Peer Review Consortium, which began its one-year trial period on January 1, 2008, continues to grow. Its “cascading review” system expedites manuscript evaluation that can be initiated at the author’s request. The process has proven to save reviewer time and effort for a small but



growing number of manuscripts. SfN will continue participation in the project for another two years. Thirty-four journals have joined the Consortium, with five more in the process.

The online manuscript submission and tracking system, eJournal Press, has been modified over the past year, and significant improvements have been made to better align the system with *The Journal's* work flow. It is now up to speed and serves staff, editors, reviewers, and authors well. *The Journal* continues to offer its readers a range of online features such as CITE-TRACK, eLetters, and collected papers, as well as links to cited articles through CrossRef.

### Numbers Demonstrate Growth

Manuscript submissions remained stable in FY2009. *The Journal* projects nearly 6,000 submissions for calendar year 2009, about the same as in 2008.

Acceptance rates have risen slightly. The acceptance rate thus far for 2009 is 21 percent for Brief Communications and 28 percent for Regular Manuscripts. Time to first decision is approximately 33 days for both Brief Communications and Regular Manuscripts. *The Journal* maintains a rapid acceptance-to-publication time frame of under

28 calendar days, one of the fastest rates among peer-reviewed journals.

Institutional subscription units in 2009 remained stable compared to calendar year 2008's total of 1,074. Units are expected to remain at that level for 2009. Multi-site units, such as a university subscribing at three different campuses, increased by 20 percent in 2009, offsetting a small decrease in single-site subscribers.

### Building on a Strong Foundation

*Open Choice* continues to offer authors a valuable option. By paying a fee, authors can have their articles freely available on *The Journal's* site upon publication. Since inception in January 2008, 46 articles have been published under *Open Choice*. SfN joins a growing number of publishers offering an open choice option for authors.

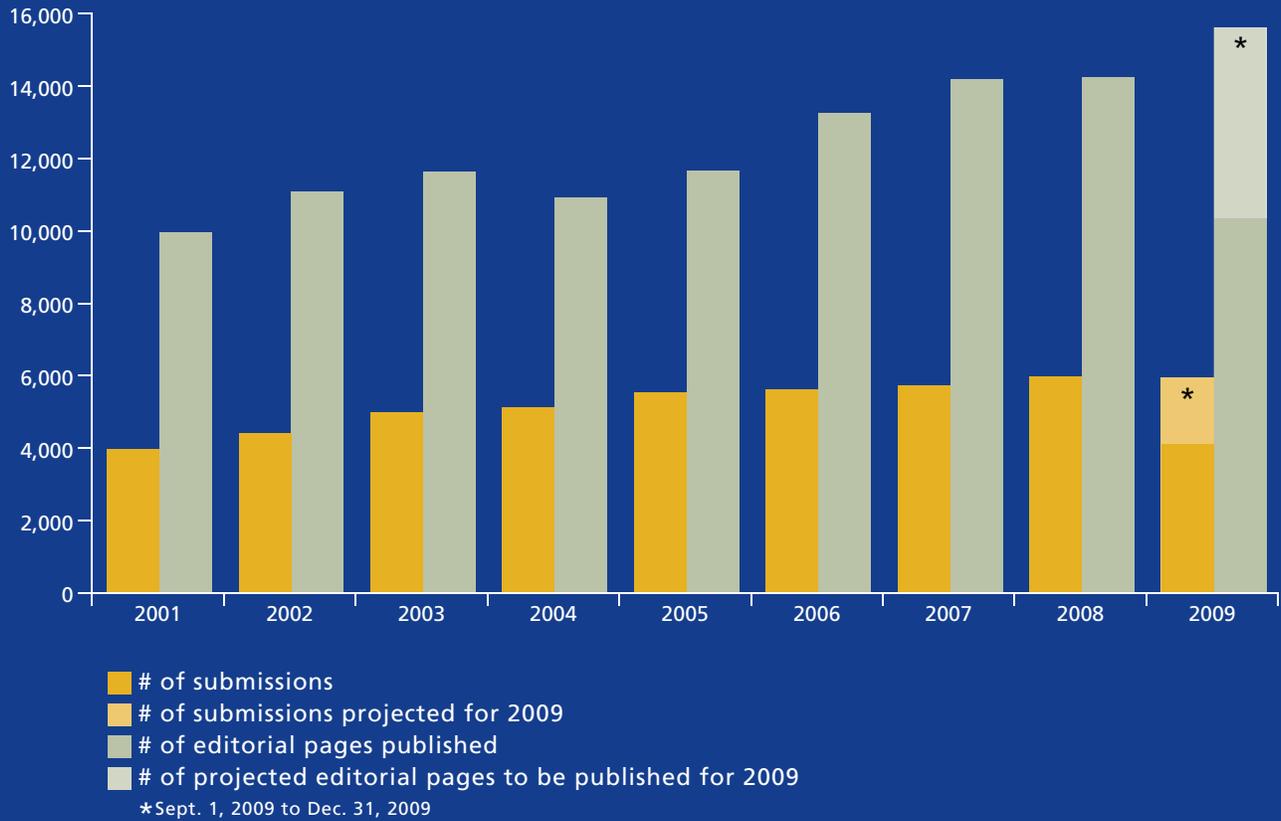
In FY2009, all 30 videos from *The History of Neuroscience in Autobiography* series were made available online. The series captures the lives and discoveries of eminent senior neuroscientists.

#### LEARN MORE:

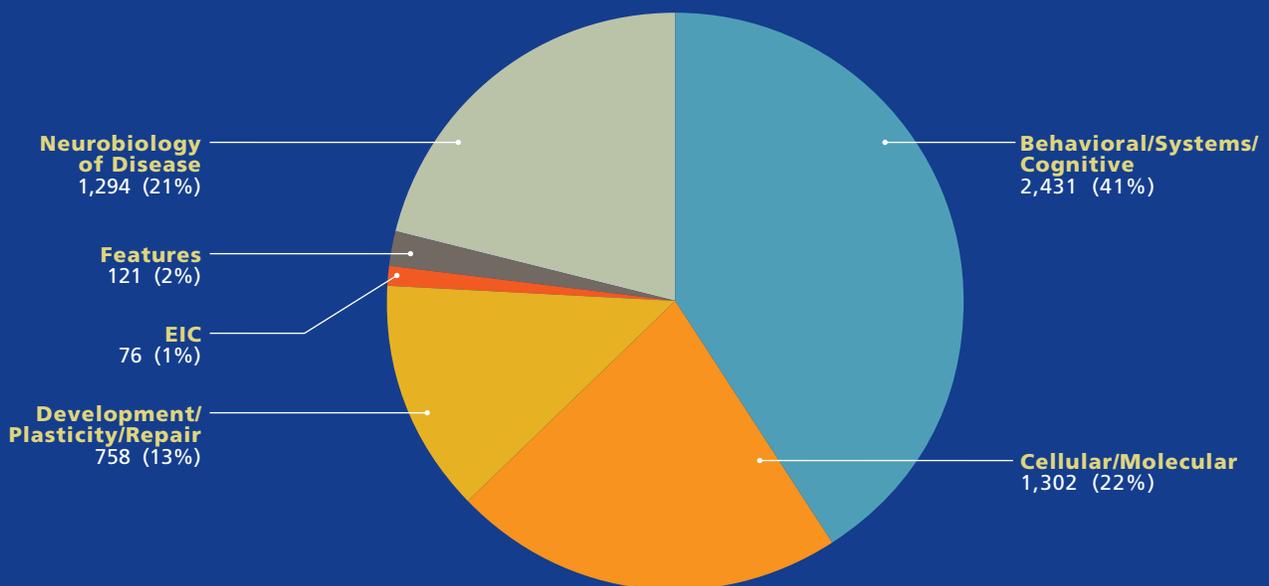
[www.sfn.org/journal](http://www.sfn.org/journal)  
[www.sfn.org/history](http://www.sfn.org/history)

*The Journal will now consider manuscripts that have been prepublished on the Internet, whether in repositories or elsewhere. Prepublishing manuscripts can provide investigators with input from colleagues around the world and facilitate the spread of ideas.*

**FIGURE 1** Manuscript Submissions and Editorial Pages Published by Calendar Year



**FIGURE 2** Manuscript Submissions by Section Type (CY2008)





## MOVEMENT AND NEUROSCIENCE

# Dance and the Brain

Toes tap, wrists flick, arms extend, but it is the brain that dances. Many parts of the brain act together to turn a body's motion from discrete movements into a fluid, physical art form. Creative dance works are experienced by both the dancer and an audience member. Watching or executing a moment of dance, several regions of the brain may become active: they may speedily calculate spatial orientation, readjust motor signals, or attach emotional responses to the choreography.

Our brains are the directors of our bodies' orchestra of movement, allowing dancers — be they professionals on stages or amateurs in living rooms — to move precisely in time and space. Exactly how the brain manages dance was the topic of discussion at the annual "Dialogues Between Neuroscience and Society" presentation at Neuroscience 2008. Renowned dancer, choreographer, and conductor Mark Morris of New York talked with neuroscientists about the intersection of dance and brain science.

### Practice Makes Perfect

Researchers have long sought to discover exactly how exquisite body movement is controlled, learned, and appreciated by others. Morris, who began his dance training at the age of 8, explained that practicing the same steps repeatedly helps decrease the body's response time to create seamless motion in time with music.

"By the time you've done a particular sequence thousands of times it feels like nothing. It's like driving or something where you're just there. You just got there and you don't have to consciously look at your feet," Morris said. "Ideally, dancers aren't thinking 'five six seven eight, now's my entrance,' they just do it. It's the thing where a fish doesn't know it's in water. That's how it is in dancing."

Orchestrated or planned movements start in the motor cortex. This region is divided into sections, with each governing a different part of the body. Signals from the motor cortex travel down 20 million nerve fibers in the spinal cord to an arm or finger, telling it to respond in a particular way. The more minute the movement,

the greater the area in the motor cortex devoted to the movement.

To achieve a rhythmic, well-coordinated style of dance, the brain must coordinate all this effort for joints to act in proper order and muscles to contract to perfect degree. A cluster of brain cells called the basal ganglia plan movement, while the cerebellum takes sensory input from the limbs and refines signals in the cortex to smooth out motion.

### A Sixth Sense

Each limb of the body is defined in part by its distance to everything else. The ability to understand our position in space is called proprioception — the sense of how far your arms reach when you stick them out — while kinesthesia is the sense of arms and legs in motion in that space.

This sense of physical self-awareness can extend beyond the body to clothes and props, or even other people. For a trained dancer, Morris said in his Dialogues appearance, such body awareness is like a sixth sense.

"To dance in front of thousands of people you have to have a lot of confidence, and that means a great deal of physical awareness," explained Morris. "You somehow do this calculation of where the



*Above:* Mark Morris, a celebrated dancer and choreographer, spoke at the Dialogues Between Neuroscience and Society lecture at Neuroscience 2008.

*Above:* Mark Morris' company partners professional dancers with students who have limited mobility due to Parkinson's disease. The classes enable students to experience new forms of movement and self-expression.

person is behind you. Our broad conception of proprioception is, 'This is me here.'"

## **The Joy of Dance**

Even for individuals who struggle to coordinate the most basic movement, dance is still a superb release and learning experience. The degenerative disorder Parkinson's disease (PD) destroys basal ganglia

neurons, causing tremors, stiffness, and halting movements, hardly the hallmarks of a dancer.

Yet, Dance for PD, a joint project between the Mark Morris Dance Group and the Brooklyn Parkinson Group, offers people with Parkinson's the chance to engage in ballet, tap, jazz, and modern dance exercises. In sessions, patients learn from movement experts how they can use their senses and brains to control movement.

While there is growing interest in understanding how and whether dance could benefit PD patients physiologically, the classes appear to improve mood and concentration. Further insight and advances, however, may yet reveal new treatments for human disorders in different ways, including through dance and rhythm.



## MOVEMENT AND NEUROSCIENCE

# Captivating Rhythm

Rhythm is universal — all over the world, people respond to a steady tempo. Strong beats drive people to dance. Even young children seem to instinctively know how to move to music.

Perhaps we are all so sensitive to rhythm because it drives so much of our biology. Our hearts beat rhythmically, and we wake and sleep to circadian rhythms. These intrinsic rhythms are associated with rhythmic activity in the brain. Perhaps it is fitting that rhythmic brain activity is vital to produce the movements that comprise dance.

Even small changes to these natural rhythms can have dire effects on the whole animal. Diseases like depression and injuries like repeated concussions can throw rhythms off balance, ultimately resulting in changes in cognition, mood, and behavior.

In living creatures, specialized neuronal circuits called central pattern generators (CPGs) produce rhythmic behaviors, like walking, swimming, breathing, and chewing. The cells found in these circuits produce electrical discharges in an “oscillatory” pattern that repeats.

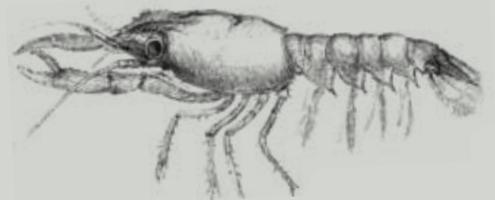
### Model Nervous System

Researchers have learned much about CPGs and the rhythmic activity of the nervous system by studying crustaceans, like crabs and lobsters. Compared with most mammals, these animals have simpler nervous systems, so they are attractive models for understanding how neural circuits produce rhythmic behaviors.

Researchers, including SfN Past President Eve Marder, have been particularly interested in the stomatogastric nervous system (STG) in these animals. The STG is the part of the crustacean central nervous system that controls the movement of the stomach. The STG contains about 30 nerve cells that are organized into two different rhythmic CPGs. Researchers have mapped the connections between these cells, and the resulting web-like network can be studied to obtain insights into how larger neural networks function.

### Constantly Active

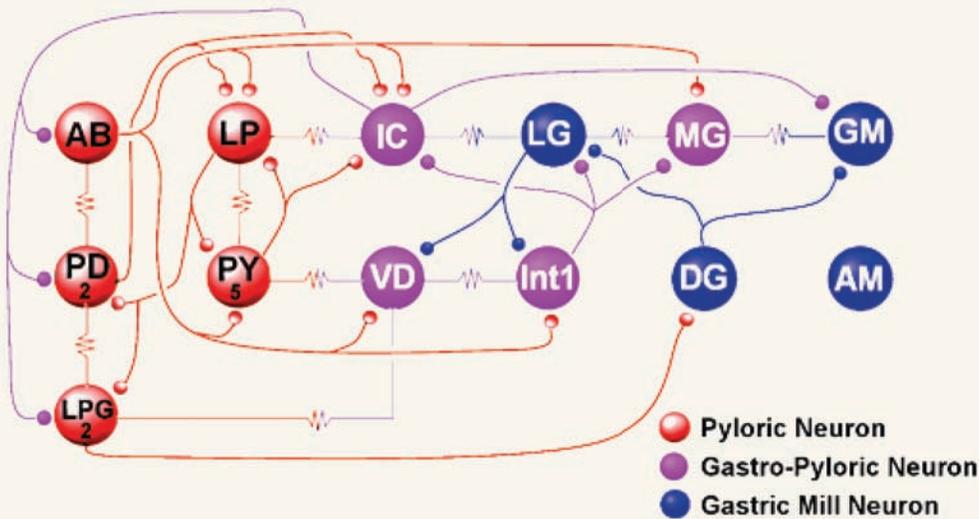
Where does the rhythmic activity of CPGs come from? Even when they are removed from the body, groups of STG nerve cells maintain



**Top:** Lobsters have simplified neural pathways, which makes them good models to study the circuitry of the nervous system. **Right:** Even in relatively simple nervous systems, brain cells form complex connections. These connections, often illustrated in circuit diagrams, like the one shown here from the crab stomatogastric nervous system, form the foundations for behavior and much of physiology.

their rhythmic firing patterns. These findings demonstrate that the rhythmic activity is intrinsic to the CPG. Rather than wait for something to trigger their activity, these circuits are constantly active.

These crustacean studies reveal an important principle about all neural networks: the nervous system is constantly active. It does not wait passively for a stimulus



to turn it on. The nervous system is active day and night, whether an organism is asleep or awake, although the patterns of activity are different during sleep than when the animal is awake. Research indicates that sensory stimuli modify internally generated activity. For example, the animal's ingestion of food alters the firing rhythm of STG cells and ultimately increases movement in the stomach. Similarly, the presence of a predator changes CPG firing rhythm, resulting in swimming behavior aimed at escape.

## Changing Tempo

Sensory stimuli are not alone in modifying rhythms. Natural and not-so-natural chemicals modify CPG rhythms as well. Dr. Marder's lab has shown that chemicals called neuromodulators fundamentally alter the activity produced by neuronal circuits so that the circuits can produce different behaviors. For example, one substance might increase a rhythm's rate and amplitude, while another substance might silence the rhythm.

Because of the network structure of brain circuits, changing the rhythm of one brain cell can influence many others. In fact, throughout the nervous system, individual neural networks interact,

forming one master network web. So, seemingly remote modifications can affect the whole animal.

By showing how small changes in the chemical environment can affect many nerve cells and the behaviors they produce, these studies offer insight into the dramatic effects of disorders like depression. Upsetting the balance of brain chemicals changes the state of brain circuits, profoundly altering mood and behavior.

In studying cellular rhythms in crabs and lobsters, researchers are discovering the mechanisms driving our rhythms — those in dance, thought, and sleep.

SUPPORTING  
*the* Neuroscience



# Community

Since its founding, SfN has recognized the power and promise of neuroscience to spark passion among scientists of all ages and across the globe. As the neuroscience community continues to expand and diversify, SfN works to harness the commitment and passion of scientists through membership, chapters, and professional development programming that support the teaching, training, and life-long pursuit of neuroscience. In FY2009, SfN member services and programs have been adapting and evolving to reflect these trends and serve changing needs.

## **Membership:** Growing and Changing

Members, nearly 39,000, are the source of SfN's strength as the neuroscience profession's largest professional society. In just 40 years, the Society has grown from 500 members to a record high of 38,761 in 82 countries at the end of 2008. SfN's continued membership growth in a challenging economic period is a sign of the compelling value members find through their engagement in the Society and its activities and programs.

Composition of the Society's membership in 2008 continued the trend of fastest growth among student and international members, with students now comprising 26 percent and non-U.S. members comprising 36 percent of total members. In response, SfN has adapted its strategies and programs to address the needs of these growing member segments. Younger members are a key impetus behind SfN's efforts to integrate Web-based tools

and technologies into communications and programming to enhance outreach, while international members are benefiting from more professional development opportunities and seeing greater representation within the Society's governance structure. Any regular member, regardless of the country where they live and work, is now eligible to serve as a Councilor, and Council has appointed more international members than ever to serve on SfN committees.

### **Responding to Member Needs**

Another adaptation to better serve member needs is SfN's introduction of new membership and annual meeting registration rates for postdoctoral fellows in 2009. Just as in 2005 when SfN created the undergraduate student member category, the reduced dues and fees for postdoctoral fellows are



**Above:** Ramesh Vemuri from the National Institute on Aging introduced graduate students, postdoctoral fellows, and junior neuroscientists to training opportunities through the National Institutes of Health at the “How to Fund Your NIH Training Proposal” workshop during Neuroscience 2008.

aimed at facilitating greater participation by younger generations of neuroscientists.

Responding to member needs also came in unexpected ways this year as members in the United States and Italy faced crises following natural disasters. When Hurricane Ike destroyed much of eastern Texas in October 2008, SfN established a special fund for travel awards to the annual meeting and supported recovery efforts at the University of Texas Medical Branch in Galveston that benefited neuroscience graduate students and research fellows. In response to the earthquake that devastated the Abruzzo region of Italy in April 2009, SfN made a donation to assist affected students and young investigators in need.

The Society also is laying groundwork for continued innovation by implementing strategies that emerged from the 2007 member survey and resulting membership enhancement plan. Efforts include better communication with members to raise awareness of SfN benefits and to facilitate interactions with the Society. At Neuroscience 2008, “Did You Know” signs conveyed essential information about SfN to members and potential members alike, and member communications tools are evolving to encompass social networking sites, such as Facebook, as other ways of engaging the community.

In February, SfN launched a new data management system that forms the foundation for future member service enhancements and more efficient information processing. Members can easily renew their membership, update profiles, and express interest in special content areas. Soon, more personalized communication preferences will be available through the system.

### Serving New Members

While continuing to better serve its individual members, SfN is expanding its operation to serve the neuroscience community in new ways in the years to come. Arising from a consolidation with the Association of Neuroscience Departments and Programs, SfN has created a new category of institutional program members to represent and address the needs of members engaged in educating and training new generations of neuroscientists.

Over the coming fiscal year, SfN will focus on increasing value for its members and strive to meet evolving needs of both its individual and new institutional members, as well as the field of neuroscience.

**LEARN MORE:**  
[www.sfn.org/membership](http://www.sfn.org/membership)

## Then: 1970

**TOTAL MEMBERSHIP:** 1,029

**STUDENT MEMBERSHIP:** 39

**INTERNATIONAL MEMBERSHIP:** 24

**CHAPTERS:** 10

## Now: 2009

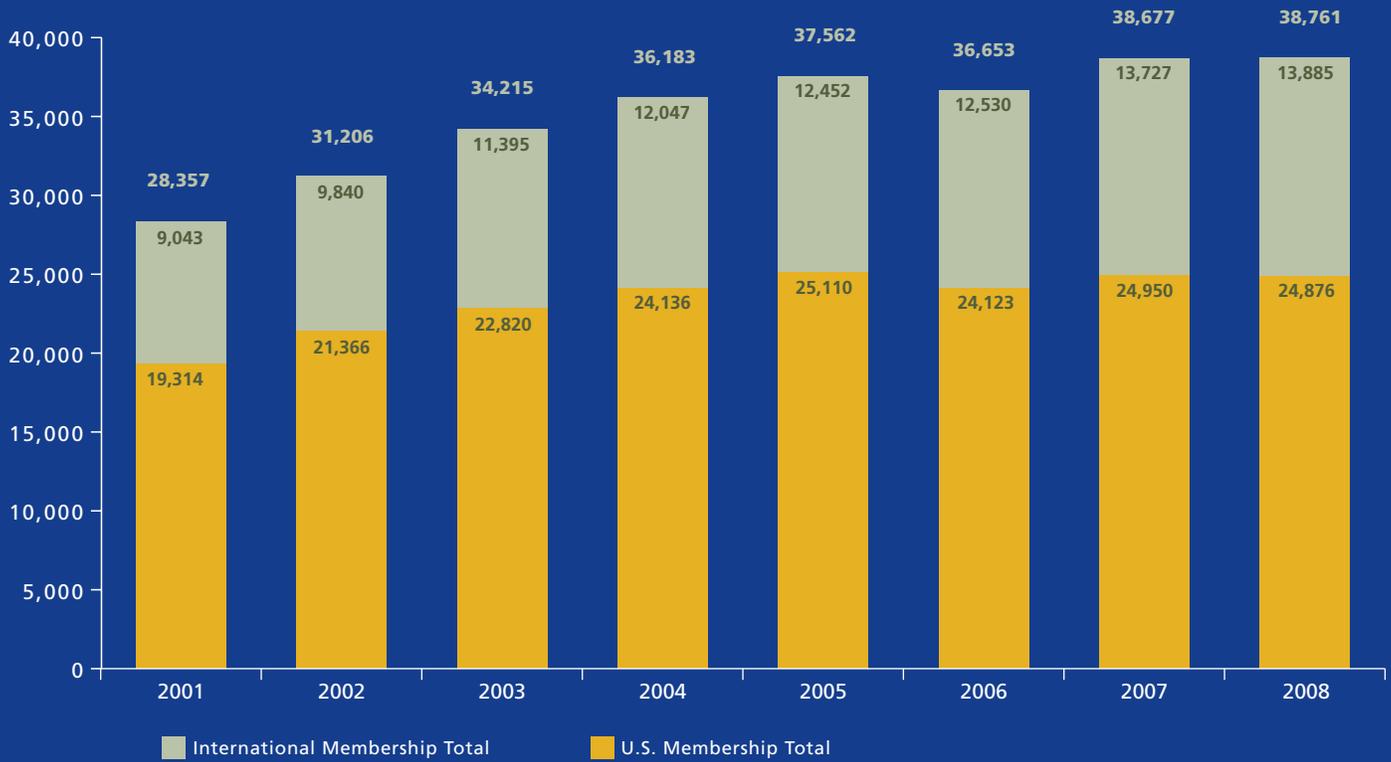
**TOTAL MEMBERSHIP:** 38,761

**STUDENT MEMBERSHIP:** 10,279

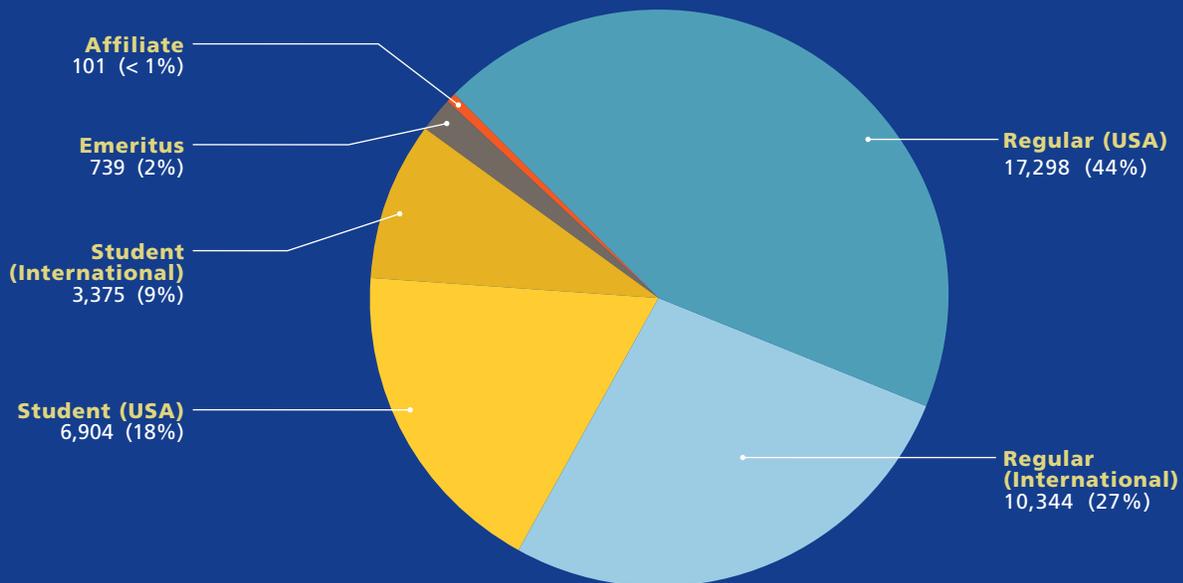
**INTERNATIONAL MEMBERSHIP:** 13,885

**CHAPTERS:** 138

**FIGURE 3** Membership Growth



**FIGURE 4** 2008 SfN Membership by Category



## Chapters: Expanding Engagement and Reach

As the organization grows, so does chapter expansion and engagement at the local level. This trend evolves from a prescient understanding of the SfN founders that local chapters have tremendous potential — helping members to network, share information, and educate the public about neuroscience in their communities.

### Increasing International Presence

Chapters continue to grow at a fast pace, and today, SfN has 138 chapters in 45 of the United States and 18 countries worldwide. The first SfN chapters were established in 1970 and by the following year there were 25 chapters. The number doubled five years later and doubled again to 100 in 1993. Consistent with trends in international membership, chapters outside the United States saw the largest growth during FY2009, with 10 of 12 new chapters established in nine countries on five continents. Among them are the first chapters in Africa (Nigeria), Argentina, New Zealand, Norway, Singapore, Spain, and Wales.



A local primary school student participates in the Ile-Ife, Nigeria chapter “Biology of the Brain” quiz and debate.

### Supporting Success at the Local Level

To facilitate and support chapter efforts, SfN increased its chapter grant funding by 60 percent starting in FY2009. SfN made 39 direct grants to chapters, enabling them to engage in such activities as student-oriented regional conferences and launching new Brain Awareness Week programs. To help new chapters get off to a strong start, SfN began to provide start-up grants to all new chapters this year. SfN also funded a total of 27 grants that allowed chapters to organize visiting lectures by eminent neuroscientists at their campuses through the Grass Traveling Scientist Program, which continued in 2009 with funding from The Grass Foundation. The Society is also encouraging chapters to consider advocacy opportunities — whether in support of research investments or to support responsible animal research — for chapter grant proposals as well.

The second annual chapter workshop, held during Neuroscience 2008, drew nearly 100 participants. Organized and led by the Membership and Chapters Committee, the “Global SfN Chapter Invigoration” workshop featured chapter representatives who shared success stories, ideas for chapter activities such as science advocacy and education, and experiences starting international chapters. A Chapter Resource Kit continues to be updated and made available online.

### Growing Engagement and Roles

Local and regional chapters are increasingly engaged in a wide range of activities as SfN’s grassroots arm. The 2009 Capitol Hill Day, for example, involved 19 chapters, a 46 percent increase over 2008. The vital role of chapters in fostering public outreach and education about neuroscience was again recognized through the Next Generation Awards. The 2008 awards were given to two chapters for

promoting engagement in educational outreach by young neuroscientists and to individual members for their exceptional public outreach efforts.

The continued vitality and growth of chapters worldwide and their potential to contribute to new programs and initiatives are crucial to the future of SfN. For example, roles for local chapters were

built into several grant proposals this year. SfN will continue to develop strategies that tap the energy and engagement of members at the local level to help achieve its mission.

**LEARN MORE:**  
[www.sfn.org/chapters](http://www.sfn.org/chapters)

## Chapters

<b>NORTH AMERICA</b>		<b>118</b>
Canada		11
Mexico		2
United States and territories		105
<b>EUROPE</b>		<b>8</b>
Denmark	Aarhus	1
Norway	Trondheim	1
Spain	Madrid	1
Switzerland	Swiss Alpine	1
Turkey	Izmir	1
Ukraine	Kiev	1
United Kingdom	London and Wales	2
<b>ASIA &amp; THE PACIFIC</b>		<b>8</b>
Australia	Brisbane, Melbourne, and Sydney	3
China	Shanghai and Hong Kong	2
India	Bangalore	1
New Zealand	Otago	1
Singapore		1
<b>LATIN AMERICA &amp; THE CARIBBEAN</b>		<b>2</b>
Argentina	Buenos Aires	1
Chile	Santiago	1
<b>AFRICA</b>		<b>2</b>
Nigeria	Ile-Ife and Kaduna	2
<b>TOTAL</b>		<b>138</b>

## Professional Development: Fostering the Community

SfN professional development programming continued to evolve to meet member needs during FY2009. An increasingly younger and more international membership, along with a growing range of career options and varying needs at different career stages for all members, encouraged SfN to explore new strategies and structures that position the organization for the future.

### New Strategies, New Focus

The renewed focus began to crystallize at Council's summer 2008 strategic planning discussions

where leadership discussions focused on the need to broaden and enhance the Society's professional development offerings, including outside the annual meeting. The fiscal year ended with the adoption of several significant changes in strategies and governance structures that reinforce existing strengths while taking advantage of new opportunities.

Looking ahead, members will benefit from a revised professional development strategy that is more comprehensive and embraces a broader array of objectives to support professional development interests and needs. The newly created Professional Development Committee (PDC) allows SfN to more effectively develop and pursue programs and services for all its members. The PDC builds on a combination of the Committee on Diversity in Neuroscience (C-DIN) and Committee on Women



Neuroscience 2008 offered three Short Courses to more than 850 registrants.

*An increasingly younger and more international membership, along with a growing range of career options and varying needs at different career stages for all members, encouraged SfN to explore new strategies and structures that position the organization for the future.*

in Neuroscience (C-WIN), incorporating and broadening their missions, activities, and members.

In a major development in the Society's evolution as a steward for the neuroscience profession, SfN will directly serve the neuroscience teaching needs of its members through a consolidation with the Association of Neuroscience Departments and Programs (ANDP). ANDP members overwhelmingly voted in supported of a decision to become a formal part of SfN. As part of the consolidation agreement, the SfN Council formally adopted into its strategic plan a new higher education and training strategy that includes the creation of a new Committee on Neuroscience Departments and Programs (CNDP), a new class of institutional program members, and incorporation of ANDP's mission, programs, and services.

### **Recognizing Achievement**

Meanwhile, throughout the year, SfN continued to promote and recognize professional achievement of its members. Professional development offerings at Neuroscience 2008 were expanded and continued to grow. SfN recognized nearly 200 individuals in the form of fellowships, travel awards, and scientific achievement awards and prizes. The Swartz Prize for

Theoretical and Computational Neuroscience was presented for the first time at Neuroscience 2008. The newest addition to the Society's awards recognizing the work of neuroscientists is the Bernice Grafstein Award for Outstanding Accomplishments in Mentoring. Supported by and named after SfN's first female president, the award will be presented for the first time at Neuroscience 2009.

### **Commitment to Diversity**

Underscoring its commitment to enhancing diversity in neuroscience — gender, racial and ethnic, and geographic — SfN expanded its support and advocacy for the role of women and minorities in neuroscience, and service to its international members. Working closely with leaders of SfN's diversity and women's committees, the Society submitted two federal grant proposals: one aimed at advancing women neuroscientists within the ranks of academia and the other at increasing diversity within the mental health workforce through a national mentoring network. SfN succeeded in receiving NSF funding for the three-year *Department*



*Top:* Young neuroscientists present snapshots of current research at the Diversity Fellows Poster Session.  
*Right:* Women of all ages and professional roles talk about their personal journey in the pursuit of a scientific research career during the Mentoring Reception.



Chair Training to Increase Women in Neuroscience (“IWIn”) project, which is expected to benefit more than 30 academic institutions.

In its third year, the “Celebration of Women in Neuroscience” annual luncheon featured SfN past president Huda Akil as guest speaker. The event’s popularity continued with more than 200 attendees at the Neuroscience 2008 event, which featured a slideshow showcasing accomplishments of women neuroscience leaders.

The Society supported 49 diversity trainees during FY2009 under the Neuroscience Scholars Program (NSP), a three-year fellowship for minority neuroscience trainees. Funded by the National Institute of Neurological Disorders and Stroke (NINDS), the program has benefited several hundred trainees since its inception in 1981. SfN was recently awarded a grant renewal designed to expand and enhance the program over the next five years. Meanwhile, at Neuroscience 2008, events such as the Diversity Fellows Poster Session and NSP Mentor-Fellow Breakfast drew record participation, and the newly introduced NSP orientation session received positive reviews.

### Embracing an International Perspective

SfN continues to expand its activities and collaborations to benefit its growing international membership, both in developing and developed countries. Efforts to adapt to changing needs are now reflected in a new international strategy and realigned International Affairs Committee (IAC) adopted by Council.

In FY2009, the Society supported several initiatives aimed at advancing neuroscience in developing countries. An innovative “Teaching Tools in Neuroscience Workshop,” organized by the IAC-US National Committee to IBRO, benefited 65 junior faculty members in Africa. SfN contributed for the second year to IBRO’s Return Home Program in which promising junior neuroscientists are given small grants to support their successful reintegration into their home institutions. In a new and highly successful initiative, SfN organized a poster session for international fellows at Neuroscience 2008; the session will be expanded in 2009.

Recognizing that European members constitute the largest group of members outside North America, SfN continued to strengthen its relation-

## Then: 1981

**PROGRAM NAME:** *Traveling Fellows Program for Underrepresented Minorities*

**OVERSIGHT COMMITTEE:** *Minority Education Training and Professional Advancement Committee*

**PARTICIPANTS:** *5 Travel Fellows*

## Now: 2009

**PROGRAM NAME:** *Neuroscience Scholars Program*

**OVERSIGHT COMMITTEE:** *Diversity in Neuroscience Subcommittee/Professional Development Committee*

**PARTICIPANTS:** *55 Scholars*

ship with the Federation of European Neuroscience Societies (FENS). SfN exhibited at the 2008 FENS Forum in Geneva and hosted a social for students and postdoctoral fellows from North America, including the nine winners of SfN’s travel awards to the FENS meeting. To guide future collaboration in the areas of professional development and advocacy, the SfN and FENS presidents established joint working groups. One result thus far is agreement on a multi-year collaboration that brings SfN together with the FENS/IBRO Programme of European Neuroscience Schools (PENS); the first joint course will be held in Naples, Italy, in March 2010. The Society also initiated outreach to the Japanese neuroscience community, which represents the single largest country of SfN members outside the United States. SfN met at Neuroscience 2008 with leaders of the Japan Neuroscience Society (JNS), resulting in plans for a joint symposium at the JNS 2009 annual meeting.

### LEARN MORE:

[www.sfn.org/professional\\_development](http://www.sfn.org/professional_development)



GLOBAL HEALTH AND NEUROSCIENCE

# Global Burden of Brain Disorders

Brain disorders have far-reaching impact, affecting people of all age groups from all geographic locations. According to the World Health Organization (WHO), an estimated 1 billion people worldwide suffer from neurological and psychiatric disorders. These disorders account for 6.3 percent of the total burden of disease. As many as 6.8 million people die annually from brain disorders, accounting for 12 percent of global deaths. Brain disorders are considered one of the greatest threats to public health, and yet there are many gaps in the understanding of these conditions.

Moreover, mental disorders such as depression and schizophrenia are among the leading causes of disability in the United States, Canada, and Western Europe for ages 15 to 44 — prime working years. A recent report conducted by the WHO, World Bank, and Harvard University indicates mental disorders may account for more than 15 percent of the burden of disease in established market economies.

## Economic Hardship

In addition to human suffering, these disorders cause tremendous economic hardship for individuals and society: the loss of gainful employment, the caretaker's loss of family income, the cost of medications, and the need for other medical services. Some estimates place the economic burden of brain-related illness for 2008 at over \$2 trillion worldwide. Another recent study indicated that the economic burden of serious mental health conditions in the United States may top \$317 billion, including health-care costs, loss of earnings, and disability payments, but not including associated costs such as incarceration or homelessness.

Given the lack of health resources in developing nations and the expense of modern medicine, costs in those parts of the world are especially debilitating. Moreover, the absence of brain-related disorders from official cause of death tallies means they are often neglected in developing nations. And the stigma and discrimination that accompany neurological disorders often cause patients to go untreated.

For instance, according to WHO, while some 50 million people worldwide suffer from epilepsy, 90



As the world population grows and ages rapidly, the global scientific community is working to develop new advances in medical research to offset the burden of disease.

percent of affected individuals in developing nations fail to receive appropriate treatment. Nearly 70 percent of those affected could become seizure-free with appropriate antiepileptic drug treatment, thereby decreasing stigma and increasing their ability to lead normal lives.

As the global population continues to age due to increased life expectancy, worldwide neurological disease prevalence is expected to increase dramatically. Brain disorders are especially common among the elderly, and age-related brain disorders, like dementia and Alzheimer's disease, pose a particular problem. In the United States, these disorders were the subject of a major policy evaluation and report led by co-chairs Newt Gingrich, former Republican speaker of the U.S. House of Representatives, and Bob Kerrey, a former Democratic senator and governor from the state of Nebraska.

## Approaching a Tipping Point

The number of people suffering from dementia is already estimated to be in the tens of millions. WHO estimates the incidence of Alzheimer's disease and other dementias will increase 66 percent by 2030,

and another study suggested about 43 percent of all cases worldwide need a high level of care, like a nursing home.

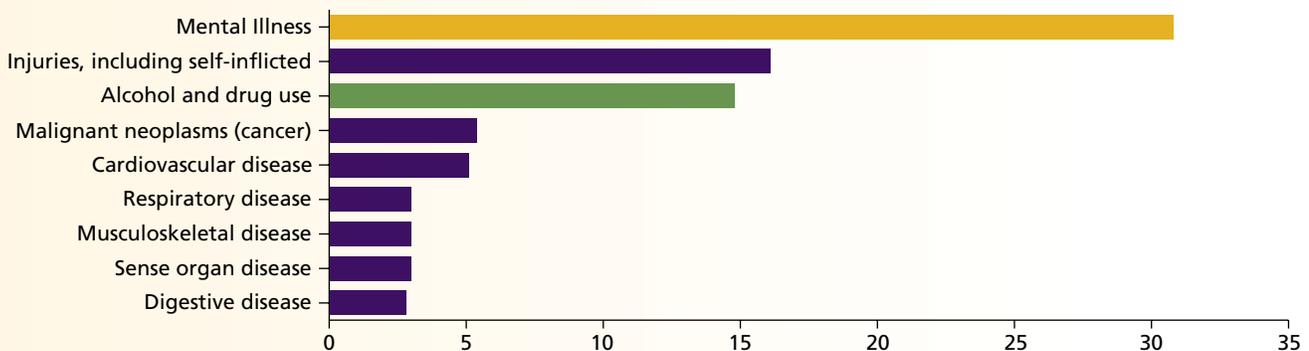
Finding effective ways to target and treat these debilitating conditions is a priority for the global health community. In the United States alone, delaying the onset of Alzheimer's disease by five years could save \$50 billion in annual health-care costs, and researchers believe interventions that delay disease onset and progression by just one year would result in 9.2 million fewer cases of disease in 2050. They note that nearly all of the decline would be "attributable to decreases in persons needing high level of care."

Age-related brain disorders affect entire families and society-at-large. The National Institute on Aging reports that in 2006, nearly 500 million people worldwide were 65 and older; by 2030, that figure is expected to climb to 1 billion. The

number of elderly people in the developing world is expected to jump 140 percent by 2030.

The proportion of elderly people in industrialized nations also will swell. In the European Union (EU), where state-provided health-care programs are the norm, those over 65 outnumber those under 14 — the latter figure has dropped 21 percent in 25 years. While there are now four working persons for every pensioner in the EU, by 2050 there will be only two. Governments are grappling with how to provide adequate long-term care for the elderly — and how to pay for it.

Researchers continue to decipher the mysteries of these brain diseases and disorders. Now more than ever, neuroscience research and a broader commitment to biomedical research is nothing less than a global imperative with monumental personal, economic, and social implications.



The burden of disease is measured in disability-adjusted life years, a public health metric for assessing how a disease adversely affects society through mortality and loss of health.



## GLOBAL HEALTH AND NEUROSCIENCE

# Unraveling Alzheimer's Disease

Alzheimer's disease is an emerging problem in the developing world, according to researchers. As populations grow and life expectancies rise, the number of people suffering from age-related neurological diseases like Alzheimer's may skyrocket. However, research is pointing the way to promising new treatments.

### Alzheimer's Disease in India

India offers one example of the global impact of Alzheimer's disease. According to the World Health Organization, average life expectancy in India is now 63 years of age — quickly approaching 65, when vulnerability to Alzheimer's disease increases. The United Nations projects that by the year 2050, life expectancy in India will rise to 73, and there will be 221 million Indian citizens who are 65 or older.

According to the Alzheimer's Association, one in eight people over the age of 65 develops Alzheimer's disease. So, by 2050, more than 27 million Indians may be living with the disease. The challenge of caring for so many Alzheimer's patients

is daunting — there are currently fewer than 1,000 neurologists in the entire country.

### Alzheimer's Disease Research

These predictions make unraveling the biology of Alzheimer's disease all the more important. Ongoing research is helping to identify the biological bases of memory loss, cognitive decline, and brain cell death in Alzheimer's disease.

Many researchers are examining the protein deposits that litter Alzheimer's disease brains for clues to the cause of disease. Alzheimer's disease brains contain plaques composed of large deposits of a protein called amyloid-beta. The plaques themselves were once believed to be responsible for disrupting brain cell communication; however, recent research implicates earlier forms and smaller amounts of amyloid-beta. According to new research in animal models of Alzheimer's disease, treatments targeting amyloid-beta may prevent or delay disease progression.

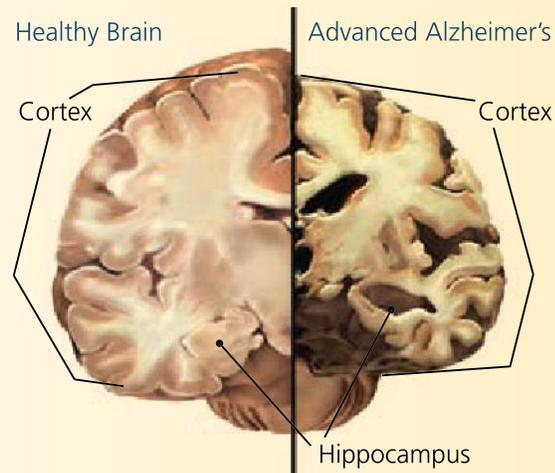
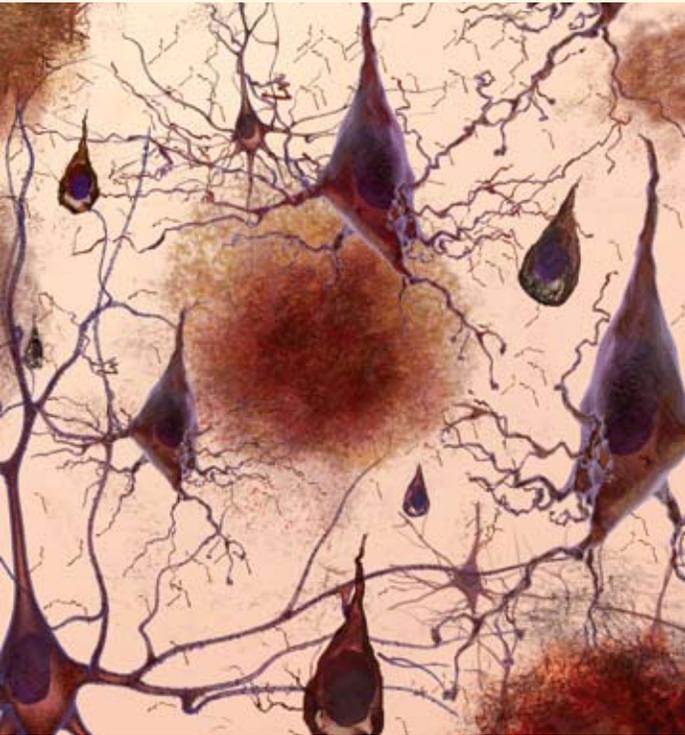
Alzheimer's disease brains also include aggregates of the tau protein called neurofibrillary tangles. Like amyloid plaques, these protein clumps may be at the heart of

the Alzheimer's disease process. Researchers are now looking for ways to limit protein aggregation and tangle formation.

Advances in genetics are helping to identify people most at risk for developing Alzheimer's disease and the molecules and cellular processes involved in disease onset. Researchers have identified three genes (*APP*, *PSEN1*, and *PSEN2*) that cause early-onset Alzheimer's disease, which strikes before the age of 65. Although scientists agree that an array of genes likely contribute to and confer increased risk for the more common, later-onset form of the disease, only one gene (*APOE*) is currently known to do so. Researchers are now investigating how *APOE* is involved in the Alzheimer's disease process.

Scientists also are identifying medical conditions and lifestyle factors that increase the risk of Alzheimer's disease. For example, people with Type 2 diabetes may be at increased risk of developing Alzheimer's disease. Damage to the blood vessels that supply the brain also may increase Alzheimer's disease risk. Together, these findings suggest that maintaining

# SCIENCE *in* PROGRESS



**Left:** Healthy nerve cells communicate across a space called the synapse. In Alzheimer's disease, however, the presence of plaques (in brown) and tangles make for a toxic environment in which cells wither and normal communication ceases. **Above:** As Alzheimer's disease progresses, it kills brain cells mainly in the hippocampus and cortex, which leads to impairments in learning, memory, and thinking.

healthy weight, blood pressure, and cholesterol may reduce the risk for Alzheimer's disease and other forms of dementia.

Additional research suggests that Alzheimer's disease may kill brain cells by hijacking a process involved in normal brain development. During development, the brain makes too many brain cell connections. Like overgrown trees, the ones that are not needed are "pruned" back. Researchers recently found the precursor protein that produces amyloid-beta also produces a protein fragment that activates the pruning process.

Deprived of their cellular connections, many mature brain cells die. So, the new finding suggests that Alzheimer's disease kills brain cells by activating the pruning process at the wrong time. Blocking this pruning process might therefore be beneficial to at-risk adults.

## Global Opportunity

Although researchers hope to stop the expansion of Alzheimer's disease in the developing world, they recognize that the global community offers unique opportunities for Alzheimer's research. By studying populations with rich cultural and genetic diversity, researchers may gain new insights into the causes of

disease, specifically the genetic and lifestyle factors that protect against or enhance disease risk.

Is Alzheimer's disease preventable? Researchers are not sure. But because it strikes late in life, they recognize that even delaying disease onset by several years would greatly limit its reach. Achieving this goal will require the efforts of a global community of scientists and clinicians, sensitive to both the similarities and unique needs of patients around the world.

# EDUCATING *and*



# ENGAGING the Public

Brain research is a proven path to better health, a stronger economy, and future scientific advances. It is also a fascinating topic that excites the public of all ages. SfN is committed to helping the public learn about brain function and how it influences our lives, health, and social interactions. In FY2009, public outreach programming evolved with the addition of new online resources for teachers and the public. Advocacy efforts increased substantially to help policy makers understand the health and economic impact of research on society, as well as to support bold and visionary funding created through the U.S. Recovery and Reinvestment Act.

## Public Outreach: Opportunities and Resources

The Society continues to develop new initiatives and alliances that support its public education and information work, which is led by the Public Education and Communication Committee.

To further its mission of promoting public education, SfN launched the Neuroscience Wikipedia Initiative to urge members to improve and expand the neuroscience-related content on Wikipedia, one of the most widely used online resources. The initiative reflects a broader public outreach strategy that seeks to create a better understanding of and support for scientific research. Over the coming months, SfN will assess the impact its members are having on the overall neuroscience-related content on Wikipedia, and explore a second phase to engage a wider group of undergraduate and graduate

neuroscience programs to formally involve students in developing content.

### Reaching K-12 Teachers

Neuroscience Education Resources Virtual Encyclopedia (NERVE), SfN's online resource of teaching materials for K–12 educators and members engaged in outreach, was launched in fall 2008. NERVE offers easy access to hundreds of online neuroscience education resources, and SfN continues to expand the contents and functionality. SfN's newest education resource, *Neuroscience Core Concepts*, debuted at Neuroscience 2008, and features fundamental principles about the brain and nervous system. *Neuroscience Core Concepts* offers insights gained through decades of brain research — a concise



Volunteers enjoy visiting classrooms and teaching students about neurobiology and brain functions.

summary of what every person should know about the brain and nervous system. Dissemination to the K-12 community has included print and Web material, along with an introduction to the educator community at the annual National Science Teachers Association (NSTA) conference held in New Orleans in March.

Reflecting the successful collaboration between SfN members and educators, the Society's Neuroscientist-Teacher Partner Program experienced notable growth in FY2009 with more than 520 members participating. The program partners members with K-12 educators and others involved in teacher preparation at the college or university level.

SfN is also building a foundation for continued growth of understanding and interest in neuroscience among young people. In a featured presentation at the NSTA conference that coincided with international Brain Awareness Week, SfN President Tom Carew highlighted the Society's efforts to integrate the science of learning with classroom teaching strategies.

### **Are You Brain Aware?**

Neuroscientists from around the world joined together to promote the 14<sup>th</sup> annual Brain Awareness Week (BAW), March 16–22, with events that raised public knowledge, engagement, and excitement about the brain. Washington, DC, kicked off BAW 2009 with official greetings from DC Mayor Adrian Fenty. The Mayor's letter was delivered to the National Museum of Health and Medicine during their 10<sup>th</sup> annual BAW event, which drew over 750 local students throughout the week. Elsewhere around the world, members in dozens of SfN chapters — such as in Philadelphia; St. Louis; Ile-Ife, Nigeria; and British Columbia — participated in BAW 2009.

The Society continued its partnership with the Science Olympiad, one of the premier national science competitions. Middle and high school students participate in local and state competitions at more than 14,000 schools in efforts to reach the national tournament. SfN sponsored two team-based events, Health Science and Anatomy, which included neuroscience components. SfN presented the Health Science winning team from Michigan with a special award — a trip to Neuroscience 2009.

### Focused on Neuroeducation

As part of its commitment to public education, SfN hosted a June “Neuroscience Research in Education Summit” to spark discussion about how neuroscientists and educators could work together to enhance K-12 classroom education practices. Launched by SfN President Tom Carew, the special presidential initiative convened at the University of California, Irvine, a group of leaders from the education and science communities. Participants addressed issues such as “what do teachers want and need to know about how students think and learn,” and “how can a teacher’s questions drive neuroscience research?” The summit catalyzed a productive dialogue focused on answering these questions. Participants agreed on the imperative for educators to become critical consumers of brain science and the need for interdisciplinary partnerships that can shape a future agenda for the emerging field of neuroeducation.

### Reaching a Wider Audience

Working with the media and producing high quality public information has been a core SfN emphasis for many years. The 2008 annual meeting saw a tripling of news coverage, with exposure in the *New York Times*, *Los Angeles Times*, National Public Radio, NBC News, *USA Today*, *Science*, *Nature*, and more. Robust coverage of *The Journal of Neuroscience* continued year-round with regular reporting from a wide range of outlets, from wires to radio to many international and science publications. The Society also promotes neuroscience knowledge by providing the public with compelling, scientifically accurate



At Neuroscience 2008, National Institutes of Health directors and other NIH program leaders addressed the media on research priorities in mental health, substance abuse, eye health, stroke, and many other neurological diseases and disorders. From left: Paul Sieving, National Eye Institute; Tom Insel, National Institute on Mental Health; Story Landis, National Institute of Neurological Disorders and Stroke; and Nora Volkow, National Institute on Drug Abuse.

resources. Popular publications — *Research & Discoveries*, *Brain Facts*, *Brain Briefings*, and *Brain Research Success Stories* — are broadly available online in easy-to-download formats to broaden readership and reach. These publications illuminate the importance and excitement of basic science and draw crucial links between fundamental discovery and the clinical, medical, and social applications that contribute to better health, wellness, and quality of life.

#### LEARN MORE:

[www.sfn.org/public\\_education](http://www.sfn.org/public_education)  
[www.sfn.org/newsroom](http://www.sfn.org/newsroom)

## Science Advocacy: Influencing Public Policy, Protecting Researchers

The Society for Neuroscience works actively to increase federal support for biomedical research and, as President Obama has said, “restore science to its rightful place.” While science funding was receiving new Administration and congressional support, SfN researchers using animal models were again targeted for harassment and violence. SfN increased efforts to advocate in support of animal research, and to support and protect researchers.

### Advocacy at Work

In early 2009, the American Recovery and Reinvestment Act (ARRA) was a powerful statement of the U.S. commitment to basic science. Thanks in large part to Congressional science champions, the recovery bill included \$10 billion for the National Institutes of Health (NIH) and \$3 billion for the National Science Foundation (NSF). President Obama signed the legislation on February 18, 2009. SfN members exhibited unmatched advocacy leadership with ARRA by sending nearly 19,000 letters on behalf of research funding. Members of Congress from every state and the administration heard from local scientists as to why science funding must be a higher federal priority.

The SfN Advocacy Network, launched in June 2008, and now totaling more than 1,100 members, played a key part. The Advocacy Network consists of SfN members committed to developing substantive communications and relationships with their legislators.

### Mobilizing Chapters

SfN chapters also are engaged in SfN advocacy efforts. By working at the local level, chapters help build greater understanding about the regional impact of science in their communities. In 2009, SfN’s New Mexico chapter led Representative Martin Heinrich (D-NM) on a tour of the neuroscience lab

at the University of New Mexico. The tour created a forum to discuss the local and national importance of neuroscience research and how research funding is a proven pathway to better health and a stronger economy. Rep. Heinrich and the SfN chapter are now exploring how to form a science advisory committee with members of the life and physical science community in his district.

### Visiting the Hill

The 2009 Capitol Hill Day, held on April 22, brought nearly 40 SfN members to visit 68 congressional offices. SfN members thanked legislators for ARRA science funding and encouraged continued support for bold, sustained investments. Chapter leaders from 19 chapters attended the Hill Day.

ARRA funding was meant as a short-term stimulus to assist in creating and preserving jobs, while also supporting high quality research. The recent influx of funding should not be confused with the necessary long-term campaign to re-establish dynamic, predictable, and sustainable increases for NIH and NSF. SfN, along with Research!America and other partners, has actively supported strong NSF and NIH increases in FY2010 and beyond, and is working aggressively to convey the importance of sustained research funding growth to advance science, improve health, and strengthen the economy now and for the future.

### Animals in Research: Lessons Learned

SfN’s Committee on Animals in Research (CAR) continued strong programs designed to help researchers who experience animal rights extremism and to engage in proactive advocacy efforts.

Emphasizing the importance of preparation, CAR hosted a panel at Neuroscience 2008 focused on how research institutions can help ensure safe and secure environments for research. Panelists included individuals in key departments of research institutions — including administration, security, media, and animal care — and they shared their experience in preparing for and combating extremist activity. The panel built upon SfN’s *Best Practices for Protecting Researchers and Research* document



**Left:** Former U.S. Representative John Porter (R-IL), chair of Research!America Board of Directors, challenged SfN members to “walk the halls of Congress and advocate for biomedical research funding.”

**Right:** SfN Chapters from Pennsylvania, Texas, and Massachusetts were among the 19 chapters participating in 2009 Capitol Hill Day.

released in 2008, which also informs scientists how to help their institutions develop protection plans.

### Protecting Personal Information

Another increasingly employed strategy of animal rights extremists is Freedom of Information Act (FOIA) and open record requests. Unfortunately, these important sunshine laws are being used to acquire information that is sometimes used inappropriately by animal rights activists to secure personal or professional information that forms the foundation for researcher harassment, or selectively misrepresent research work. CAR is working to develop resource materials to educate scientists and institutions about how these requests are being used and offering guidance to help members respond to meet the law’s intent while being aware of how information is being used. SfN is partnering with the National Association for Biomedical Research, the Federation of American Societies for Experimental Biology, and the National Association of College and University Attorneys to form a working group to draft these guidelines, which will be released in the coming year.

### Building Support

CAR also continues to implement a proactive advocacy campaign by engaging SfN members and chapters. Building upon this strategy, SfN Council is encouraging chapters to get involved, and asking members to consider speaking up in support of animal research. In 2009, thousands of SfN members were among the more than 10,000 people who signed a petition opposing violence, intimidation, and harassment of scientists, and stating that animal research is vital to understanding basic biological processes and for the development of new treatments and therapies.

In addition, SfN and CAR continued to highlight the importance of responsible animal research to life-enhancing neuroscience research on the SfN Web site, during the annual meeting, while on Capitol Hill, and through educational materials for the public.

#### LEARN MORE:

[www.sfn.org/gpa](http://www.sfn.org/gpa)

[www.sfn.org/animals](http://www.sfn.org/animals)



## THE ECONOMY AND NEUROSCIENCE

# Investment *and* Impact of Research

While biomedical research advances science and improves health for millions around the globe, it also has a powerful economic impact. Although much research in this area predates the recent economic downturn, the data indicate the long-term value of science as an economic engine.

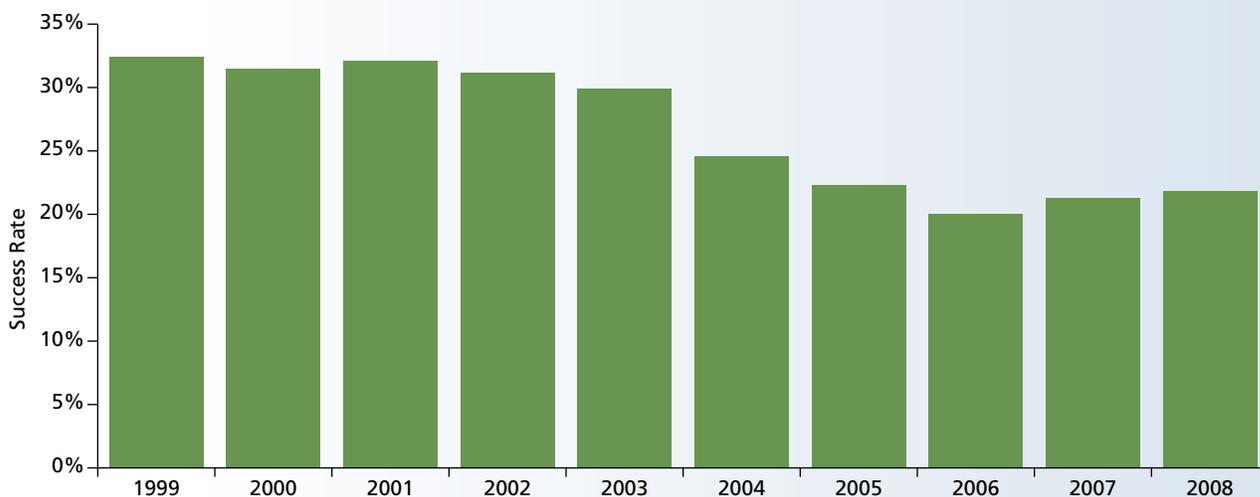
### The U.S. and Global Biomedical Investments

In the United States, biomedical research investment has been a story of upward growth, but subject to

wide swings. The years 1998 to 2003 were an economic boom, in large part because Congress doubled the budget of the National Institutes of Health (NIH), the hub of America's federal biomedical research enterprise. However, following that strong investment, the NIH budget crested in 2003 and began to fall in real dollars, creating an 11 percent drop in purchasing power. Many scientists were severely underfunded or not funded at all. In 2000, scientists who tried to renew a previously

funded grant succeeded 53 percent of the time on first submission. By 2008, that success rate dropped to less than 24 percent. Given estimates that each NIH grant funds approximately six to seven jobs, the implications extended beyond the laboratory into local communities.

The American Recovery and Reinvestment Act was an historic affirmation of the role science plays in the economy and provided a crucial boost at a crucial time. Passed by Congress in early 2009, it



**Above:** The application success rate for National Institutes of Health research project grants declined from about 32 to 21 percent over the past decade. **Opposite page:** Public and private sector neuroscience investments create discoveries and jobs that ultimately result in new therapies and diagnostic tools.

is specifically focused on investing in science to create or preserve jobs over a two-year timeframe, while also funding excellent, peer-reviewed science. NIH will receive close to \$10.4 billion and the National Science Foundation (NSF) will receive \$3 billion. This support will be crucial to universities, research institutes, their faculty, and staff — and to the communities in which they work.

Moreover, as part of his pledge to “restore science to its rightful place,” President Obama has indicated that he wants the United States to increase its research and development budget to 3 percent of gross domestic product (GDP), an increase of approximately \$46 billion annually from the current investment of 2.7 percent. A modest approved increase in the FY09 NIH and NSF federal budgets begins to make welcome progress toward that goal, but bold and visionary increases in FY10 and beyond will be necessary to meet it.

Worldwide, a commitment to basic and clinical science has enabled many countries from Japan and Singapore to Germany and the United Kingdom to become world leaders in medical and scientific discovery. For instance, Japan dedicates 3.61 percent of GDP for its science budget, putting it near the top worldwide with South Korea, while Germany invests 2.53 percent. As in the United States, many advocates in these regions, including in the European Union, are calling for additional increases as part of efforts to combat difficult economic times.

## **U.S. Job Creation and Biomedical Research**

The creation of new jobs is especially important during a recession, and biomedical research supports high-wage jobs. In 2007, NIH grants and contracts created and supported more than 350,000 jobs, generating wages in excess of \$18 billion. The average annual salary was \$52,000, nearly 25 percent higher than the national average. Every dollar of NIH funding generated more than twice as much in state economic output: an overall investment of \$22.84 billion from NIH generated a total of \$50.53 billion in new state business, taking the form of increased output of goods and services. Between 80 and 90 percent of NIH’s annual budget funds research in local communities, including universities, hospitals, and research institutes in every state.

## **Private Sector Investment, Public Benefit**

Federal investment also can help spark public-private partnerships, support small businesses, and yield state-wide benefits. One example is the Small Business Innovation Research program at NIH, which funds small companies interested in biomedical or behavioral research. In 2005, NIH expended approximately \$562 million. Beyond government funding, a neurotechnology industry group estimates that venture capital investments in the field for 2005 totaled about \$1.5 billion. Bioscience venture capital investments more broadly have been tallied at more than \$11.6 billion nationwide in 2007.

The public-private funding can pay off, which is why many states



compete aggressively to secure biotechnology investments and attract companies. A key example is New Jersey. A 2007 report found the state’s biotechnology industry impact to be in excess of \$1.7 billion with more than \$80 million in generated tax revenue. Other leading states include California, New York, Minnesota, Texas, Tennessee, North Carolina, and Pennsylvania. Other midwestern states, such as Nebraska, Utah, and Missouri, are also growing their biotech sectors and are overall among the most competitive in the United States. Smaller states, such as Maryland, Delaware, New Hampshire, and Connecticut, lead the way in medical devices and research.

Clearly, the interplay of public and private investment can keep nations at the forefront of scientific discovery and better physical and mental health. Policymakers increasingly recognize that encouraging job and industry growth also can contribute to greater economic health.



## THE ECONOMY AND NEUROSCIENCE

# Neuroeconomics: Money and the Brain

Whether to hold or sell a stock, or rent or buy a house, we all face important economic decisions. These decisions can be stressful, rewarding, or both. Researchers in a new field called neuroeconomics are studying how the brain evaluates economic information and weighs financial risks and social exchanges.

Much of neuroeconomics is based on decision theory and game theory, mathematical ways to study risks and rewards in the presence or absence of social pressures. In the 1950s, researchers developed a classic social predicament called the Prisoner's Dilemma. In this game, two people play criminals who are interrogated independently about a crime they committed together. If the partners remain silent (cooperate), they both benefit, but if one chooses to testify against the other (defect), harsh punishment may result. Each participant tries to minimize his own punishment without knowing his partner's intentions. Should he risk trusting his partner, or should he betray him?

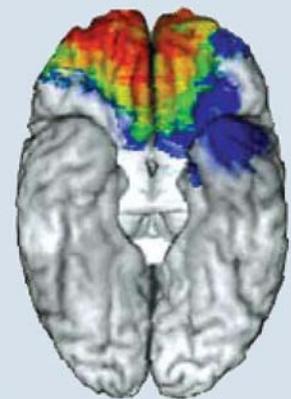
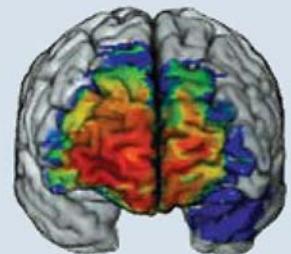
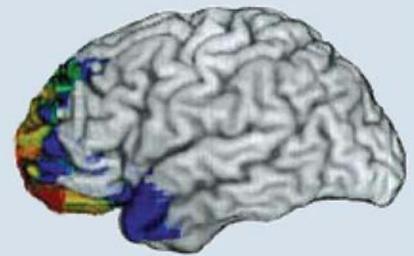
Many neuroeconomics researchers study games that create different kinds of personal and social rewards. In a variation on the classic Prisoner's Dilemma game, each player has an item of

worth, but each values the other's item more than his own. If a player chooses to cooperate, he gives his item to the other player; if he defects, he keeps it. Both players benefit from exchanging goods. However, if one player cooperates, and the other defects, the first ends up empty-handed and the second takes all.

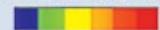
### Brain Imaging and Economic Games

Brain imaging studies show that people find cooperating socially rewarding. When both players cooperate, a brain region involved in anticipating reward called the striatum becomes active. However, if a player faces off against a computer instead of a human, mutual cooperation does not increase striatal activity, suggesting that the social interaction of the economic exchange is rewarding.

Punishing unfair opponents and donating money to charity also are rewarding, according to imaging research, suggesting that people may have an innate, biological sense of equity. In repeated rounds of the game, if players are given



N= 1 2 3 4 5 6



Number of subjects

*Above:* Damage to the frontal cortex affects the ability to make good financial decisions. Each color indicates the injured region in each of six study participants.

the option of penalizing their opponents for repeatedly defecting, an economic punishment activates the striatum, but a physical punishment does not. In addition, the more a participant chooses to donate to a charity, the greater the activation in his striatum.

Researchers determined other brain regions involved in gauging financial fairness by studying people with injuries or lesions. In

## **Hormones and Trust**

A hormone also may increase trust in financial exchanges. In a trust game, an investor decides how much money to give to an investment trustee. The trustee automatically triples the investment, but can decide how much money to return to the investor. Investors who took a sniff of oxytocin, a hormone involved in lactation and birth, invested more

## **Risks and Sure Bets**

What about financial decisions that do not involve social relationships? Like people who only play the lottery when the jackpot breaks records, researchers found that animals choose risky options over smaller sure bets when they cannot predict the likelihood of a reward. Furthermore, both human and primate research shows that the

*Researchers in a new field called neuroeconomics are studying how the brain evaluates economic information and weighs financial risks and social exchanges.*

the ultimatum game, one player makes an offer to another player who can accept or reject it. Most people accept fair offers and reject unfair ones. However, people who have lesions in the ventromedial prefrontal cortex, a brain region important in cognitive control, reject more offers than others. In contrast, when researchers temporarily inactivated the right dorsolateral prefrontal cortex in healthy people, they found that affected study participants accepted more unfair offers.

money than did other investors. However, oxytocin did not affect investor decisions when a random mechanism, rather than a person, determined their return.

Imaging research suggests that oxytocin reduces people's fear of betrayal. After learning that their trust had been violated in repeated games, investors decreased their investments, and their brains showed increased activity in regions involved in fear (amygdala and midbrain) and arousal (insula and postcentral gyrus). However, those who sniffed the oxytocin spray did not change their investments and did not show brain activity changes.

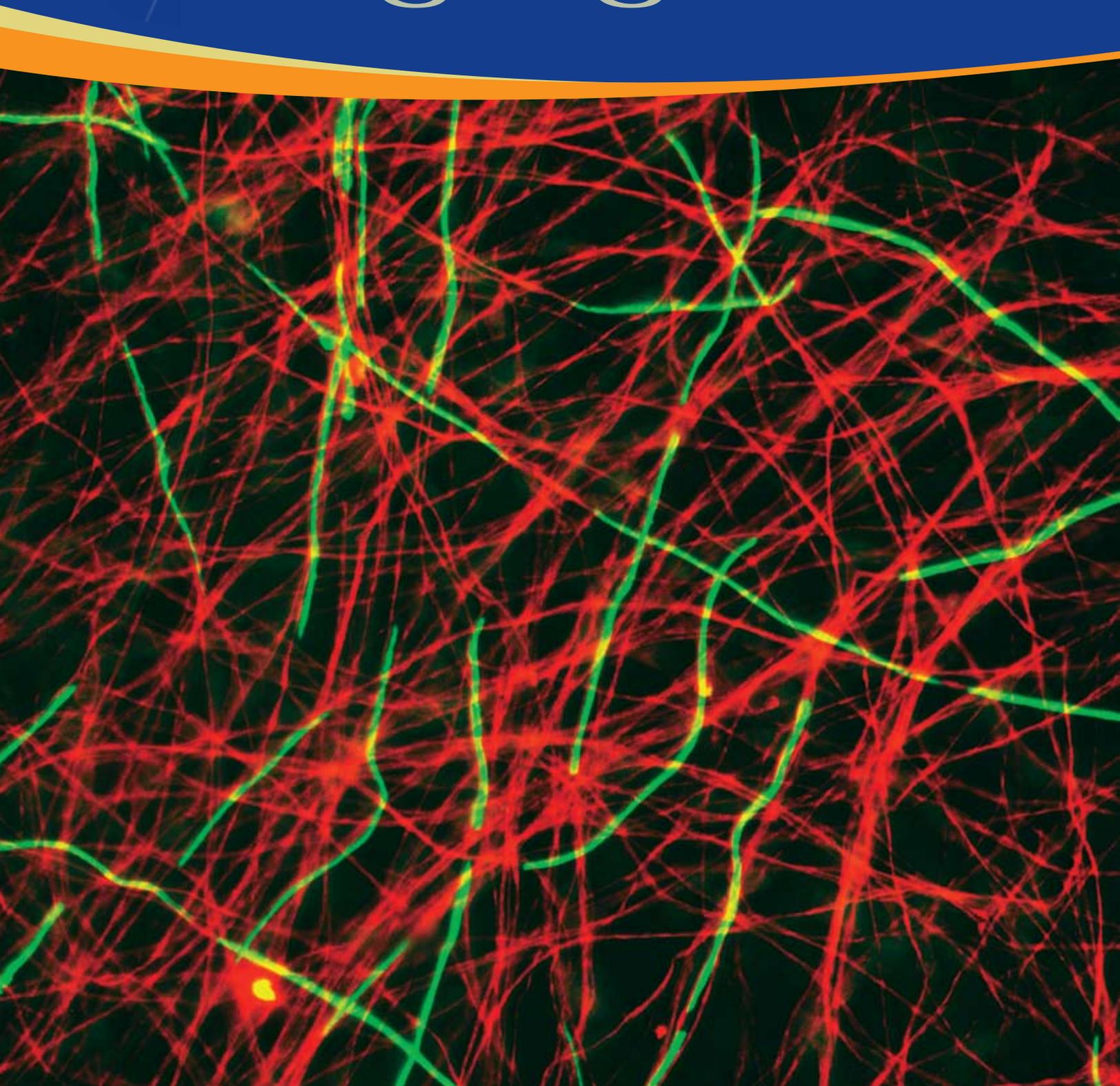
striatum becomes more active as the size of an expected reward increases. And in humans, insula activity increases with the perceived risk of a financial decision.

In today's financial climate, many are experiencing challenges to their comfort level with risk and reward and social and financial responsibilities to others. By helping researchers understand these complex human behaviors, neuroeconomics is helping to bridge biological and social sciences, offering a view into behaviors maintained across evolution as well as those that are uniquely human.



FINANCIAL *and*

# Highlights



# ORGANIZATIONAL

In the face of substantial economic volatility, SfN's leaders continued to position the Society in FY2009 to support a strong and stable future. SfN's volunteer leadership and staff remain steadfast in actively managing SfN operations and finances, while taking advantage of select opportunities to support long-term growth of the field.

Fiscal year 2009 was a time of tremendous uncertainty in the financial world, as a weakening economy and downward spiral in market valuation gripped the globe. For SfN, the impact of the economic downturn has been moderated thanks in large part to the thoughtful foresight and diligent planning of the Society's leadership and the continuing strong support of SfN's committed membership.

## Continued Financial Strength

A successful business model with diversified revenue streams — combined with efficient operations and careful budgeting — enabled SfN to realize a modest year-end surplus in FY2009. Based on preliminary (unaudited) figures, the total was approximately \$217k (\$712k net revenue from the Professional Society offset with a \$494k net expense from 1121 Properties, LLC), exclusive of long-term investment activity.

In calendar year 2008, membership grew to a record 38,761 members, enabling SfN to provide member services that strengthen neuroscience, while contributing to a strong financial base. Other revenue sources were stable as well: authors and subscribers showed their ongoing commitment to *The Journal of*

*Neuroscience*, with strong subscription trends generating financial value for *The Journal* and the Society. Author submissions in CY2008 continued to increase (more than 4 percent from CY2007), and increasing multi-site and global licensing facilitated worldwide information sharing for larger institutional subscribers. SfN's 38th Annual Meeting in Washington, DC, was a success scientifically and financially, with 15,558 scientific abstracts submitted and 31,652 attendees.

## Taking Strategic Action for Future Growth

The Society continued to take select actions to enhance long-term growth of membership, attendee, and subscription bases, while financially protecting the Society from potentially adverse macroeconomic trends.

First, the Society continued to aggressively tighten its operational performance by improving its efficiency. Second, as part of a continuing investment in infrastructure and continuity planning, the Society implemented a new association management system, combining numerous fragmented information sources into an integrated, powerful organization-wide database. This created a single point of entry for

members and customers, streamlined operations, and added reporting capabilities to enhance data-driven analysis and decision-making. Third, the Society's Business Continuity Plan was updated to ensure the Society's work to fulfill its mission is able to continue if a disaster or extended disruption to daily operations occurs. Finally, the Society also invested in its network infrastructure, making a decision to purchase a more flexible server system that will save tens of thousands of dollars over the next five years and reduce the Society's energy usage by an estimated 90 percent compared with the current system.

as increasing revenues. SfN staff continues to explore prospective funding sources with a goal of increasing external funding and allowing for enhanced investment in SfN's mission, consistent with Council's strategic priorities for the Society.

### **SfN Headquarters Building Success**

The Society continues to operate out of its downtown headquarters in Washington, DC, in a Class A office building that it purchased and moved into in 2006. The 84,000 square foot building provides needed space for the Society, as well as additional

*The Society continued to take select actions to enhance long-term growth of membership, attendee, and subscription bases, while financially protecting the Society from potentially adverse macroeconomic trends.*

### **Building Partnerships, Serving Neuroscience**

In recognition of the importance of a strong portfolio of partnerships and diversified revenue sources to meet the needs of a growing field and a changing membership, the Society created a Grants and Development department to actively pursue additional support for programs of shared value to donors and neuroscientists. These efforts have resulted in a large gift to the Society. The Waletzky Family made a generous donation to permanently support the Waletzky Prize, which recognizes excellence in research on substance abuse. Along with FY2008's grant to sustain the Julius Axelrod Prize, the Society now has two large, long-term funds established to provide recognition for research excellence.

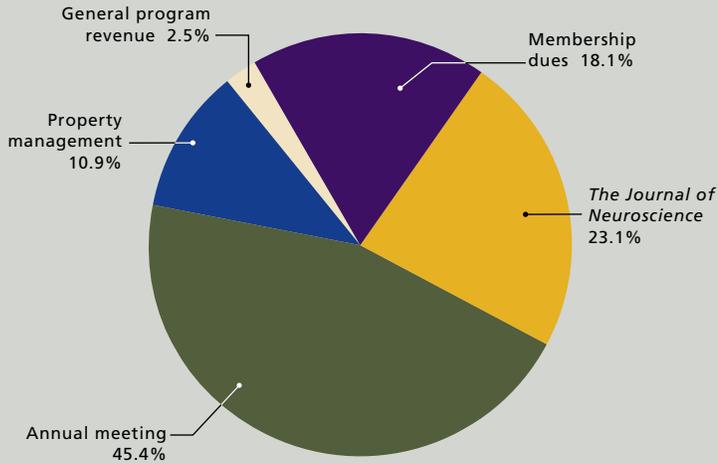
The Society also applied for several multi-year federal grants, one of which was a five-year renewal of the Neuroscience Scholars Program, funded through the National Institute of Neurological Disorders and Stroke. At the time of this printing, SfN had received a positive award notification of the renewal as well as a new grant from the National Science Foundation to support women scientists. Lastly, the Society has been more proactive in soliciting sponsors for annual meeting events, increasing the number of sponsors by more than 40 percent as well

rental income from tenants. Including the Society, the building is more than 97 percent leased, and the building operations are expected to provide positive cash flow to Society operations beginning in FY2010 and for many years to come.

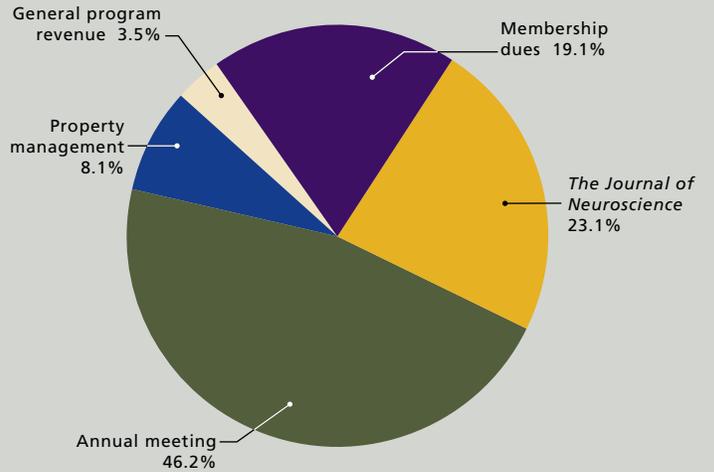
SfN's diversified investment portfolio experienced a significant decline in the FY2009 in line with reductions in the overall market. The consistent guidance of the Investment Committee, informed by outside investment experts who serve as pro bono committee members, has been to maintain investing discipline and diversification, in the belief that the portfolio will rebound in the coming years. Despite this temporary decline in the value of its long-term investments, the Society's overall FY2009 financial performance was very good: the Society continues to have a strong balance sheet, a diversified revenue base, and substantial long-term growth opportunities and cash flow potential. While not immune to the difficult U.S. and global economic environment, the Society is committed to managing through this turbulent period with financial and programmatic discipline. Our Strategic Plan, including a Reserve Strategy, continues to allow the Society to operate effectively and efficiently to serve our members' interests, despite the financial risks and concerns facing the world today.

**CURRENT AND PAST FISCAL YEAR REVENUE AND EXPENDITURES BY ACTIVITY\***

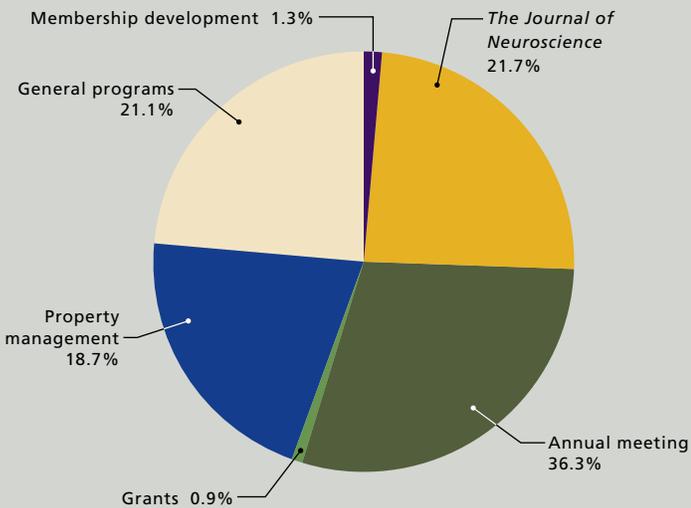
**FY2009 REVENUE — \$25,722,980**  
(excluding investment gain or loss)



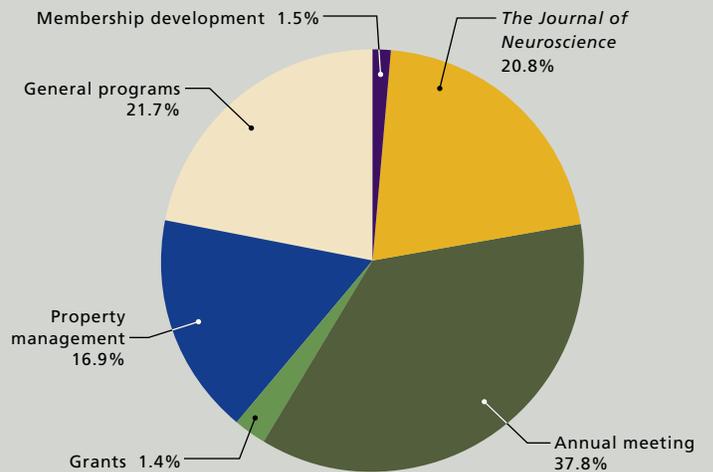
**FY2008 REVENUE — \$23,539,962**  
(excluding investment gain or loss)



**FY2009 EXPENSES — \$24,781,044**



**FY2008 EXPENSES — \$24,173,943**



\*These graphs represent the functional revenue and expense totals for the most recent two fiscal years ending June 30, 2009 and 2008, respectively. These totals were obtained from the audited financial statements of the Society for Neuroscience.





**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, 2009, 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 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 2008 consolidated financial statements and, in our report dated September 17, 2008, 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 examining, on a test basis, evidence supporting the amounts and disclosures in the consolidated financial statements. An audit also includes 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, 2009, 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 10, 2009

4550 MONTGOMERY AVENUE · SUITE 650 NORTH · BETHESDA, MARYLAND 20814  
(301) 951-9090 · Fax (301) 951-3570 · [www.grfcpa.com](http://www.grfcpa.com)

MEMBER OF CPAMERICA INTERNATIONAL, AN AFFILIATE OF HORWATH INTERNATIONAL  
MEMBER OF THE AMERICAN INSTITUTE OF CERTIFIED PUBLIC ACCOUNTANTS' PRIVATE COMPANIES PRACTICE SECTION

2

## CONSOLIDATED STATEMENT OF FINANCIAL POSITION *(as of June 30, 2009)*

ASSETS	2009	2008
<b>Current Assets</b>		
Cash and cash equivalents	\$736,764	\$458,917
Accounts receivable, net of allowance for doubtful accounts	424,722	375,547
Prepaid expenses	925,903	800,159
<b>Total current assets</b>	<b>2,087,389</b>	<b>1,634,623</b>
<b>Non-current Assets</b>		
Investments (Notes 2 and 13)	24,732,520	29,135,763
Property, furniture, equipment and improvements, net of accumulated depreciation and amortization of \$5,183,459 for 2009 (Notes 6, 8 and 9)	34,713,204	34,530,879
Deferred rent receivable (Note 5)	657,991	377,435
Deposits	3,892	3,892
<b>Total non-current assets</b>	<b>60,107,607</b>	<b>64,047,969</b>
<b>Total assets</b>	<b>\$62,194,996</b>	<b>\$65,682,592</b>
<b>LIABILITIES AND NET ASSETS</b>		
<b>Current Liabilities</b>		
Current portion of note payable (Note 8)	\$512,500	\$483,333
Line of credit (Note 11)	1,601,561	1,764,960
Accounts payable and accrued liabilities	1,732,738	1,204,677
Deferred revenue	6,196,308	5,612,885
<b>Total current liabilities</b>	<b>10,043,107</b>	<b>9,065,855</b>
<b>Non-current Liabilities</b>		
Note payable, net of current portion (Note 8)	18,579,167	19,091,667
Bonds payable (Note 9)	12,000,000	12,000,000
Tenant deposits	17,584	17,584
Interest rate swap obligation (Note 10)	4,413,612	1,695,549
<b>Total non-current liabilities</b>	<b>35,010,363</b>	<b>32,804,800</b>
<b>Total liabilities</b>	<b>45,053,470</b>	<b>41,870,655</b>
<b>Net Assets</b>		
Unrestricted	15,979,027	23,040,876
Temporarily restricted (Note 3)	1,162,499	771,061
<b>Total net assets</b>	<b>17,141,526</b>	<b>23,811,937</b>
<b>Total liabilities and net assets</b>	<b>\$62,194,996</b>	<b>\$65,682,592</b>

See accompanying notes to consolidated financial statements.

## CONSOLIDATED STATEMENT OF ACTIVITIES *(as of June 30, 2009)*

	2009			2008
	Unrestricted	Temporarily Restricted	Total	Total
<b>REVENUE</b>				
Membership dues	\$4,643,634	\$-	\$4,643,634	\$4,503,158
<i>The Journal of Neuroscience</i>	5,952,069	-	5,952,069	5,437,701
Annual meeting	11,021,603	657,200	11,678,803	10,864,475
Investment income (loss) (Note 2)	(4,682,752)	(211,533)	(4,894,285)	(2,188,968)
Property management revenue (Note 5)	2,809,100	-	2,809,100	1,908,649
General program revenue	516,247	123,128	639,375	825,979
Net assets released from donor restrictions (Note 4)	177,357	(177,357)	-	-
<b>Total revenue</b>	<b>20,437,258</b>	<b>391,438</b>	<b>20,828,696</b>	<b>21,350,994</b>
<b>EXPENSES</b>				
<b>Program Services:</b>				
<i>The Journal of Neuroscience</i>	5,373,335	-	5,373,335	5,016,387
Annual meeting	8,984,465	-	8,984,465	9,143,335
Grants	230,934	-	230,934	336,573
General programs	5,235,839	-	5,235,839	5,242,459
<b>Total program services</b>	<b>19,824,573</b>	<b>-</b>	<b>19,824,573</b>	<b>19,738,754</b>
<b>Supporting Services:</b>				
Membership development	310,633	-	310,633	368,997
Property management expenses	4,645,838	-	4,645,838	4,066,192
<b>Total supporting services</b>	<b>4,956,471</b>	<b>-</b>	<b>4,956,471</b>	<b>4,435,189</b>
<b>Total expenses</b>	<b>24,781,044</b>	<b>-</b>	<b>24,781,044</b>	<b>24,173,943</b>
Change in net assets before other item	(4,343,786)	391,438	(3,952,348)	(2,822,949)
<b>OTHER ITEM</b>				
Unrealized loss on interest rate swap (Note 10)	(2,718,063)	-	(2,718,063)	(1,695,549)
Change in net assets	(7,061,849)	391,438	(6,670,411)	(4,518,498)
<b>Net assets at beginning of year</b>	<b>23,040,876</b>	<b>771,061</b>	<b>23,811,937</b>	<b>28,330,435</b>
<b>Net assets at end of year</b>	<b>\$15,979,027</b>	<b>\$1,162,499</b>	<b>\$17,141,526</b>	<b>\$23,811,937</b>

See accompanying notes to consolidated financial statements.

## CONSOLIDATED STATEMENT OF CASH FLOWS *(as of June 30, 2009)*

CASH FLOWS FROM OPERATING ACTIVITIES	2009	2008
Change in net assets	\$(6,670,411)	\$(4,518,498)
Adjustments to reconcile change in net assets to net cash provided by operating activities:		
Depreciation and amortization	1,676,692	1,435,844
Net depreciation of investments	6,008,110	3,151,817
Unrealized loss on interest rate swap	2,718,063	1,695,549
(Increase) decrease in:		
Accounts receivable	(49,175)	161,029
Prepaid expenses	(125,744)	688,872
Deferred rent receivable	(280,556)	(377,435)
Increase (decrease) in:		
Accounts payable and accrued liabilities	528,061	(1,222,728)
Deferred revenue	583,423	397,893
<b>Net cash provided by operating activities</b>	<b>4,388,463</b>	<b>1,412,343</b>
CASH FLOWS FROM INVESTING ACTIVITIES		
Sales and maturities (purchases) of investments, net	(1,604,867)	(238,764)
Purchase of property, furniture and equipment	(1,859,017)	(1,665,168)
<b>Net cash used by investing activities</b>	<b>(3,463,884)</b>	<b>(1,903,932)</b>
CASH FLOWS FROM FINANCING ACTIVITIES		
Proceeds from line of credit	2,645,783	2,051,477
Payments on the line of credit	(2,809,182)	(1,317,073)
Payments on notes payable	(483,333)	(425,000)
<b>Net cash provided (used) by financing activities</b>	<b>(646,732)</b>	<b>309,404</b>
Net increase (decrease) in cash and cash equivalents	277,847	(182,185)
Cash and cash equivalents at beginning of year	458,917	641,102
<b>Cash and cash equivalents at end of year</b>	<b>\$736,764</b>	<b>\$458,917</b>
SUPPLEMENTAL INFORMATION:		
<b>Interest paid</b>	<b>\$1,609,212</b>	<b>\$1,676,374</b>

See accompanying notes to consolidated financial statements.

## 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, 2009. 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 Statement of Financial Accounting Standards No. 117, "Financial Statements of Not-for-Profit Organizations".

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, 2008, from which the summarized information was derived.

#### 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.

#### Fair value measurements

The Society adopted the provisions of Statement of Financial Accounting Standards (SFAS) No. 157, entitled Fair Value Measurements. SFAS No. 157 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.

#### 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, equipment and improvements are depreciated on a straight-line basis over the estimated useful lives of the related assets, generally three to ten years. 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 Organization 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 the 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, 2009, there were net operating loss carryforwards of approximately \$270,350. 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 Interpretation No. (FIN) 48, Accounting for Uncertainty in Income Taxes. FIN 48 interprets the guidance in FASB Statement of Financial Accounting Standards (SFAS) No. 109, Accounting for Income Taxes. When FIN 48 is implemented, reporting entities utilize different recognition thresholds and measurement requirements when compared to prior technical literature. On December 30, 2008, the FASB Staff issued FASB Staff Position (FSP) FIN 48-3, Effective Date of FASB Interpretation No. 48 for Certain Non-public Enterprises. During 2008, management elected to implement FASB interpretation No. (FIN) 48, Accounting for Uncertainty in Income Taxes. As a result, SfN did not identify any uncertain tax positions that 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.

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

### 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.

### Reclassification

Certain amounts in the prior year's consolidated financial statements have been reclassified to conform to the current year's presentation.

## 2. INVESTMENTS

Investments consisted of the following at June 30, 2009:

	Cost	Market Value
U.S. government obligations	\$1,244,193	\$1,267,284
Fixed income	9,156,167	8,747,537
Equities	16,308,838	13,948,796
Cash	768,903	768,903
<b>Total long-term investments</b>	<b>\$27,478,101</b>	<b>\$24,732,520</b>

Alternative investments are comprised of the following at June 30, 2009:

Investment Type	Amount	Liquidity
Cayman Islands Exempted Company	\$926,114	Quarterly with 90 days prior notice
Vintage Fund V Offshore LP	220,018	None until dissolution or transfer to another party
	<b>\$1,146,132</b>	

As of June 30, 2009, the Society has no uncalled commitments.

Included in investment income (loss) are the following:

Interest and dividends	\$1,113,825
Net depreciation of investments	(6,008,110)
<b>Total investment income (loss)</b>	<b>\$(4,894,285)</b>

The investment management fee expense was \$169,076 for the year ended June 30, 2009.

Included in equities are alternative investments with an estimated market value of \$1,146,132. 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. TEMPORARILY RESTRICTED NET ASSETS

Temporarily restricted net assets consisted of the following at June 30, 2009:

Julius Axelrod Prize	\$443,820
Grass Traveling Scientist Program	34,459
Ricardo Miledi Neuroscience Training Program	173,592
The Jacob P. Waletzky Award	503,428
Bernice Grafstein Award	7,200
	<b>\$1,162,499</b>

## 4. 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	\$38,739
Grass Traveling Scientist Program	39,941
History of Neuroscience Video Series	60,000
The Jacob P. Waletzky Award	38,677
	<b>\$177,357</b>

## 5. LEASE COMMITMENTS

The LLC currently has a total of nine 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 \$1,932,396 for the year ended June 30, 2009 and is included in the accompanying Consolidated Statement of Activities and Change in Net Assets in property management revenue. Property management revenue totaled \$2,809,100, 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, 2009, the deferred rent receivable totaled \$657,991.

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

Year Ended June 30,	Tenants
2010	\$2,556,801
2011	2,281,046
2012	2,029,183
2013	1,785,276
2014	1,841,539
Thereafter	6,126,118
	<b>\$16,619,963</b>

## 6. PROPERTY, FURNITURE, EQUIPMENT AND IMPROVEMENTS

At June 30, 2009, property, furniture, equipment and improvements consisted of the following:

Land	\$7,150,400
Building	22,939,766
Building improvements	5,768,190
Furniture	1,137,488
Computer equipment	1,637,807
Other	1,263,012
	39,896,663
Accumulated depreciation and amortization	(5,183,459)
<b>Total</b>	<b>\$34,713,204</b>

Depreciation expense was \$1,676,692 for the year ended June 30, 2009.

## 7. DEFINED CONTRIBUTION PENSION PLAN

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, 2009 totaled \$695,580.

## 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 calls 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,	
2010	\$512,500
2011	537,500
2012	563,333
2013	592,500
2014	622,500
Thereafter	16,263,334
	19,091,667
Less: Current Portion	(512,500)
<b>Non-Current Portion</b>	<b>\$18,579,167</b>

## 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, 2009, the interest rate was 0.32%. 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 \$4,413,612 in the Consolidated Statement of Financial Position as of June 30, 2009. The unrealized loss on the interest rate swap of \$2,718,063 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, 2009.

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, LIBOR plus 50 basis points (1.139% at June 30, 2009). As of June 30, 2009, the line of credit had borrowings in the amount of \$1,601,561. 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, NA 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 75 basis points. As of June 30, 2009, the revolving credit note had no borrowings.

## 13. FAIR VALUE MEASUREMENTS

In accordance with Statement of Financial Accounting Standards (SFAS) No. 157, 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 investments 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 investments 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 investments 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 assets 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, 2009:

	Level 1	Level 2	Level 3	Total
Asset Category:				
<b>Investments</b>	<b>\$23,586,388</b>	<b>\$ -</b>	<b>\$1,146,132</b>	<b>\$24,732,520</b>

### Level 3 Financial Assets

The following table provides a summary of changes in fair value of the Society's financial assets for the year ended June 30, 2009:

	Investments
Beginning balance as of July 1, 2008	\$1,069,757
Unrealized and realized gains (losses)	(143,643)
Purchases	220,018
<b>Balance as of June 30, 2009</b>	<b>\$1,146,132</b>

## 14. SUBSEQUENT EVENT

On May 27, 2009, the Society entered into an agreement with the Association of Neuroscience Departments and Programs (ANDP) to bring its programs and activities into and become a part of the Society effective July 1, 2009.

A summary of the financial position of ANDP at July 1, 2009 is as follows:

Total assets	\$109,720
Total liabilities	\$1,617
Net assets - Unrestricted	\$108,103

The revenue and expenses for ANDP for the six-month period ended June 30, 2009 totaled \$56,143 and \$41,511, respectively.

# Photography

## CREDITS

**Cover:** Microtubules, as visualized with an  $\alpha$ -tubulin antibody, form excessive loops in the axons of neurons derived from a zebrafish *phr* mutant. These defects lead to guidance failures at intermediate targets *in vivo*.

Courtesy, with permission: Michael Hendricks et al.; *The Journal of Neuroscience* 2009, 29(20):6593-6598.

**Inside cover and Page 1:** An artistically stylized view of a mutant *Drosophila* visual system. When the transcription factor Runt is mis-expressed in the developing visual system, seen here at 40 percent pupal development, many photoreceptor axons (green) bypass the lamina and terminate in the medulla. The pupal brain was immunohistochemically labeled for the neuronal nuclei (anti-ELAV, magenta), photoreceptor axons (anti-Chaoptin, green) and glial nuclei (anti-Repo, blue).

Courtesy, with permission: Tara N. Edwards et al.; *The Journal of Neuroscience* 2009, 29(3):828-841.

**Page 2 and 12:** Human temporal lobe cortex immunolabeled for astrocytes (GFAP; yellow), neurons (MAP2; blue), and nuclei (DAPI; green) shows protoplasmic astrocytes and a varicose projection astrocyte, a novel glial type.

Courtesy, with permission: Oberheim et al.; *The Journal of Neuroscience* 2009, 29(10):3276-3287.

**Page 5:** Expression of marker proteins in the retina of zebrafish embryos (72 h postfertilization). Frozen eye sections were stained with PKC 1 (green), Zn-5 (red), and DAPI (blue).

Courtesy, with permission: Nakaya et al.; *The Journal of Neuroscience* 2008, 28(31):7900-7910.

**Page 7:** Identified neurons in the central nervous system of the marine mollusk *Aplysia californica* exemplify simple forms of learning and memory.

Courtesy, with permission: Thomas J. Carew.

**Page 13:** Serotonin (5-HT) axons in portions of somatosensory cortex and dorsal hippocampus from an 18-month-old mouse. The axons were visualized by silver gold enhanced 5-HT immunocytochemistry and darkfield microscopy.

Courtesy, with permission: Liu et al.; *The Journal of Neuroscience* 2008, 28(51):13805-13814.

**Page 17:** Photo by Katsuyoshi Tanaka

**Page 18:** Figure 1, Courtesy, with permission, Eve Marder, PhD, Brandeis University; Illustration: © 2003 Benjamin Marder  
Figure 2, Courtesy, with permission, Eve Marder, PhD, Brandeis University

**Page 24:** Courtesy, with permission: Nigeria chapter of the Society for Neuroscience.

**Page 30:** Photo Greg Baker/AP Images

**Page 31:** Data courtesy of WHO *World Health Report* 2002.

**Page 33:** Neuron image: Courtesy National Institute on Aging. Brain image: Adapted and reprinted with permission from the Alzheimer's Association. © 2008 Alzheimer's Association. [www.alz.org](http://www.alz.org). All rights reserved. Image Credit: Jannis Productions. Rebekah Fredenburg, computer animation; Stacy Jannis, illustration/art direction

**Page 40:** Data Courtesy: National Institutes of Health Research Portfolio Online Reporting Tool; [http://report.nih.gov/award/success/Success\\_ByIC.cfm](http://report.nih.gov/award/success/Success_ByIC.cfm). Image: Copyright 2009, Society for Neuroscience. All rights reserved. Photo by Joe Shymanski.

**Page 42:** Courtesy, with permission: Ian Krajbich et al.; *The Journal of Neuroscience* 2009, 29 (7): 2188-2192.

**Page 43:** Copyright 2009, Society for Neuroscience. All rights reserved. Photo by Joe Shymanski.

**Page 44:** Double immunolabeling of axons ( $\beta$  tubulin; red) and myelin (myelin basic protein; green) in dorsal root ganglion cultures shows *in vitro* myelination by endogenous Schwann cells.

Courtesy, with permission: Saher et al., *The Journal of Neuroscience* 2009, 29(19):6094-6104.

**General Photography:** Copyright 2009, Society for Neuroscience. All rights reserved.

## Sustaining Associate Members

### PLATINUM SUSTAINING ASSOCIATE MEMBER

David Kopf Instruments

### GOLD SUSTAINING ASSOCIATE MEMBERS

Crist Instrument Co. Inc.  
Elsevier  
Olympus America  
Sanofi-aventis  
Sutter Instruments

### SILVER SUSTAINING ASSOCIATE MEMBERS

Bristol-Myers Squibb  
F. Hoffman-LaRoche Ltd.  
GlaxoSmithKline  
Hamamatsu Corporation  
Millipore Corporation  
Nikon Instruments Inc.  
Visiopharm A/S

### NONPROFIT SUSTAINING ASSOCIATE MEMBERS

Dystonia Medical Research Foundation  
Montreal Neurological Institute  
National Institute on Drug Abuse  
The Mind Research Network

## Society for Neuroscience Staff

**Marty Saggese**  
Executive Director

**Robert M. Doucette**  
Deputy Executive Director

**Eun-Joo Chang**  
Senior Director,  
Education & Member Development

**Kate Hawker**  
Senior Director,  
Planning & Information

**Paula Kara**  
Senior Director,  
Meeting Services

**Mona Miller**  
Senior Director,  
Communications & Public Affairs

**Lara C. Moninghoff**  
Senior Director,  
Finance & Development/CFO

### FINANCE

**Matthew Barager**  
Director of Finance & Accounting

**Stephen Chokshi**  
Assistant Director of  
Finance & Accounting

**Janice Ford**  
Accounting Manager

**Craig Reed**  
Budget & Financial Systems Manager

**Robert Hayes**  
Staff Accountant - Accounts Receivable

**Rena James**  
Staff Accountant - Payroll & Benefits

**Arvind Lemuel**  
Financial Analyst

**Brian McMichael**  
Staff Accountant - Accounts Payable

### GOVERNMENT & PUBLIC AFFAIRS

**Erica Froyd**  
Director of Government  
& Public Affairs

**Mark Cason**  
Government & Public Affairs Manager

**C. Elizabeth Holcomb**  
Government & Public Affairs  
Coordinator

**Laura Martin**  
Government & Public Affairs Assistant

### GRANTS & DEVELOPMENT

**Christina Rush**  
Grants & Development Coordinator

### HUMAN RESOURCES & ADMINISTRATION

**Marlene Poole**  
Director of Human Resources &  
Administration

**Jennifer Grant**  
Office Manager

**Paul Troxell**  
Procurement Manager

**Tiffanye Phillips**  
Human Resources Coordinator

**Emily Richardson**  
Procurement Coordinator

**Juanita Young**  
Receptionist

### INFORMATION & DECISION SUPPORT

**Melissa A. Garcia**  
Director of Information & Decision  
Support

**Jessica M. Wesley**  
Information & Decision Support  
Coordinator

### THE JOURNAL OF NEUROSCIENCE

**Suzanne Rosenzweig**  
Director of Scientific Publications

**Alexander Coltery**  
Production Manager

**Maisha Fleming-Miles**  
Editorial Manager

**Keith Layson**  
Subscriptions Coordinator

**Sola Yu**  
Production Coordinator

**Jessica Bates**  
Editorial Assistant

**Sam Culver**  
Editorial Assistant

**Alina Foo**  
Editorial Assistant

**Sarah Lake**  
Editorial Assistant

### MEETING SERVICES

**Elvia Gonzalez**  
Assistant Director of  
Exhibits & Registration

**Dawn Keane**  
Assistant Director of  
Housing & Logistics

**Elizabeth Rumsey**  
Assistant Director of  
Annual Meeting Program

**Sharon Kerley-Bowles**  
Logistics Manager

**Allison Burns**  
Exhibits Manager

**Ramona Sawyer**  
Registration Manager

**Cynthia Cheatham**  
Annual Meeting Program Coordinator

**Stephanie Embrey**  
Meetings Coordinator

**Megan Cifrino**  
Annual Meeting Program Assistant

**Janel Johnson**  
Annual Meeting Program Assistant

### MEMBER COMMUNICATIONS & CREATIVE SERVICES

**Melissa Ferrari**  
Director of Member Communications  
& Creative Services

**Lisette Bassett**  
Assistant Director of Member  
Communications & Creative Services

**Nicole Abushaikha**  
Senior Graphic Designer

**Robert Laws**  
Web Editor

**Lori Bocek**  
Member Communications Coordinator

**Beryl Roda**  
Junior Graphic Designer

**Anita Howard**  
Production Coordinator

### MEMBERSHIP & MARKETING

**Wendy Sturley**  
Director of Membership & Marketing

**Francine Johnson**  
Membership Manager

**Marcia Leach**  
Sales & Marketing Manager

**Danielle Hanafin**  
Membership Assistant

### OPERATIONS & GOVERNANCE

**Julie Orlando-Castro**  
Director of Operations & Governance

**John Goodrum**  
Operations & Governance Manager

**Melanie McGraw**  
Operations & Governance Assistant

### PROFESSIONAL DEVELOPMENT PROGRAMS

**Anne Busse**  
Professional Development  
Programs Manager

**Claire MacDonald**  
Professional Development  
Programs Manager

**Andrew Wallace**  
Professional Development Programs  
Coordinator

**Liz Larabell**  
Professional Development  
Programs Assistant

### PUBLIC EDUCATION

**Colleen McNerney**  
Director of Public Education

**Corinne Dreskin**  
Public Education Manager

**Sarah Ames**  
Public Education Assistant

### PUBLIC INFORMATION

**Todd Bentsen**  
Director of Public Information

**Debra Speert**  
Public Information Manager

**Sarah Bates**  
Media Officer

**Kat Snodgrass**  
Media Officer

**Andrea Powers**  
Public Information Coordinator

### TECHNOLOGY SERVICES

**Matthew Dickens**  
Director of Technology Services

**Jack Koulinkovitch**  
Network Manager

**Scott Moore**  
Development Manager

**Yan Zhu**  
Senior Web Developer

**Rigo Espinosa**  
Web Developer

**Nelson Miranda**  
Network Administrator



1121 14th Street, NW  
Suite 1010  
Washington, DC 20005

**Telephone:** 202.962.4000

**Fax:** 202.962.4941

[www.sfn.org](http://www.sfn.org)