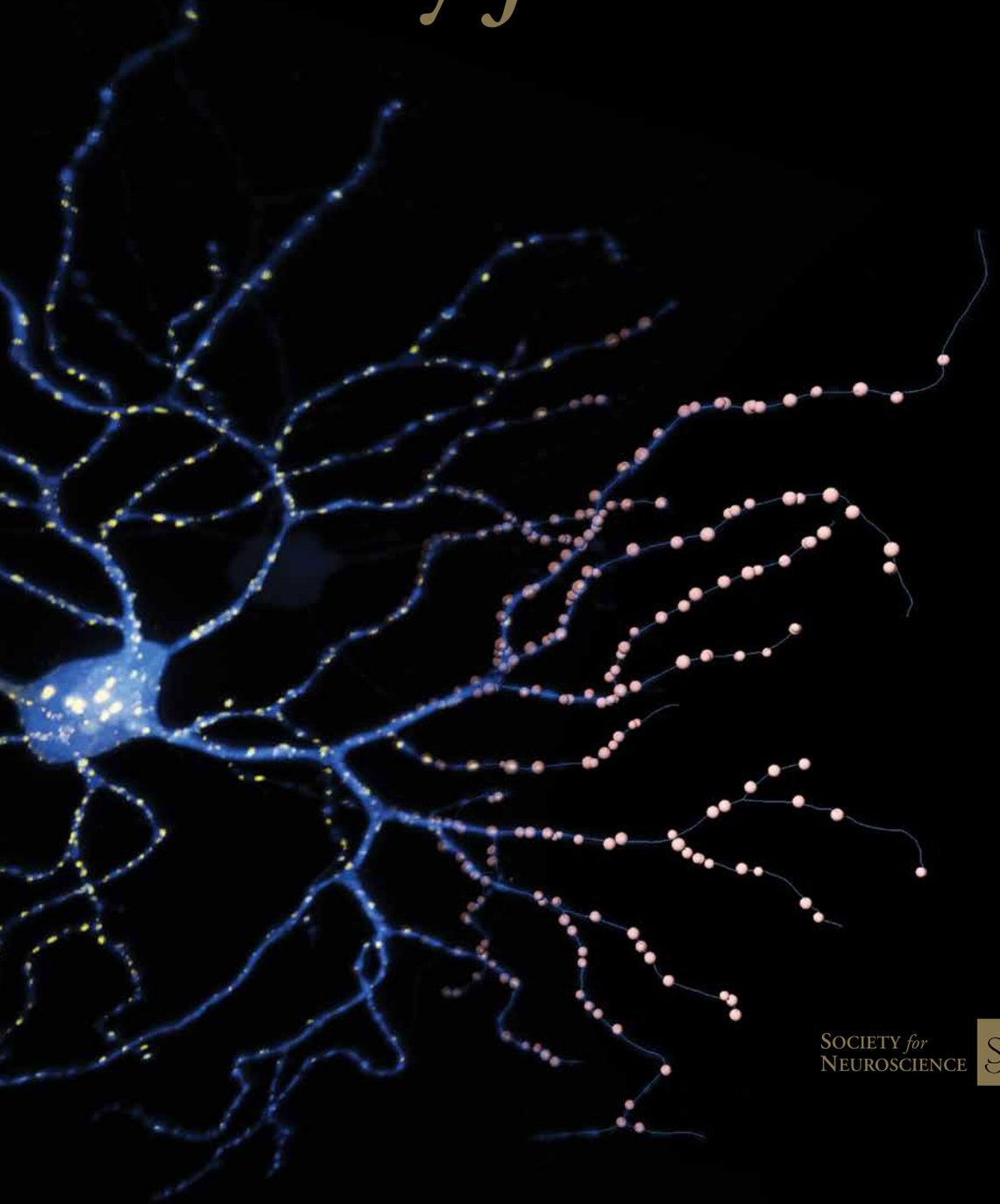
CELEBRATING 50 YEARS OF NEUROSCIENCE PROGRESS

A HISTORY OF THE Society *for* Neuroscience



SOCIETY *for* NEUROSCIENCE | CELEBRATING 50 YEARS 1969–2019

1969–2019

SOCIETY *for* NEUROSCIENCE

CELEBRATING 50 YEARS

Advancing the Understanding of the Brain and Nervous System

SOCIETY FOR NEUROSCIENCE

The Society for Neuroscience publishes works that advance the understanding of the brain and nervous system.

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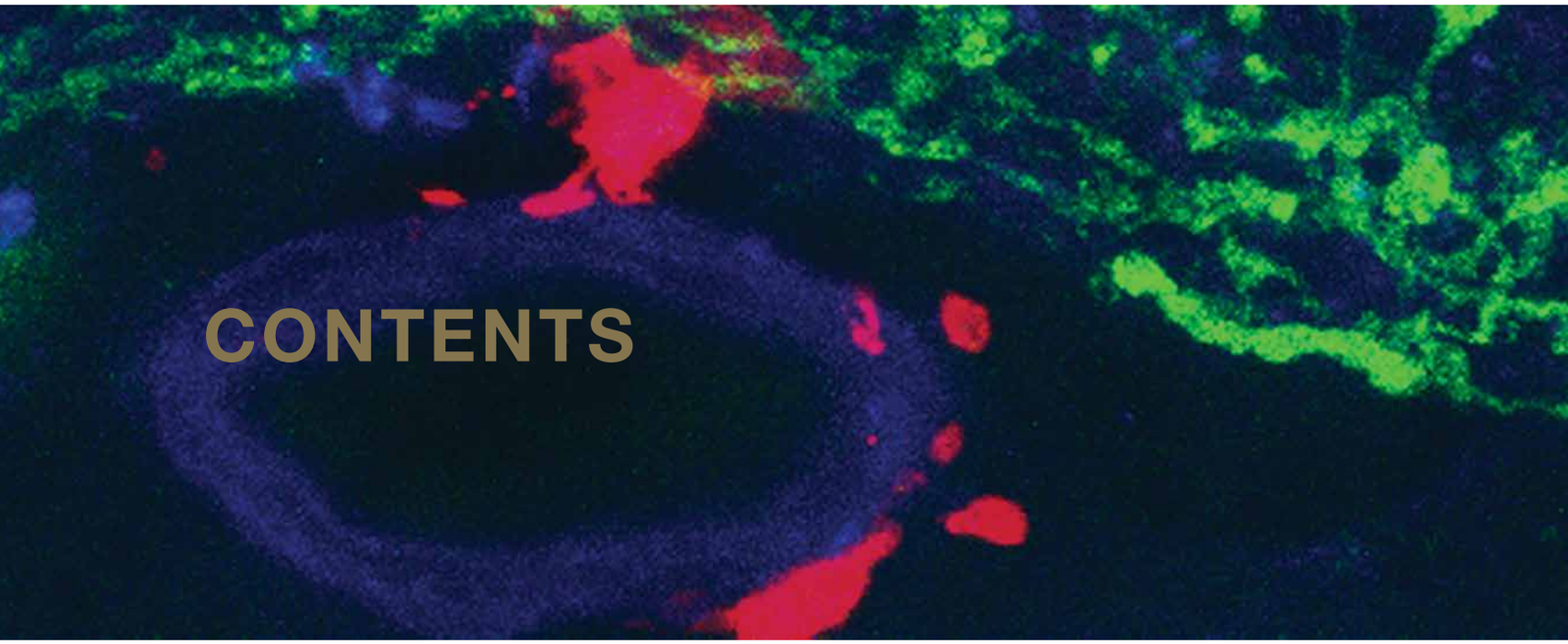
CELEBRATING 50 YEARS OF NEUROSCIENCE PROGRESS

A HISTORY OF THE Society *for* Neuroscience

Researched and written by **Marcia Meldrum**, **Joel Braslow**,
and **Rena Selya** of the University of California, Los Angeles

Society *for* Neuroscience SfN | 50 Celebrating 50 Years 1969–2019



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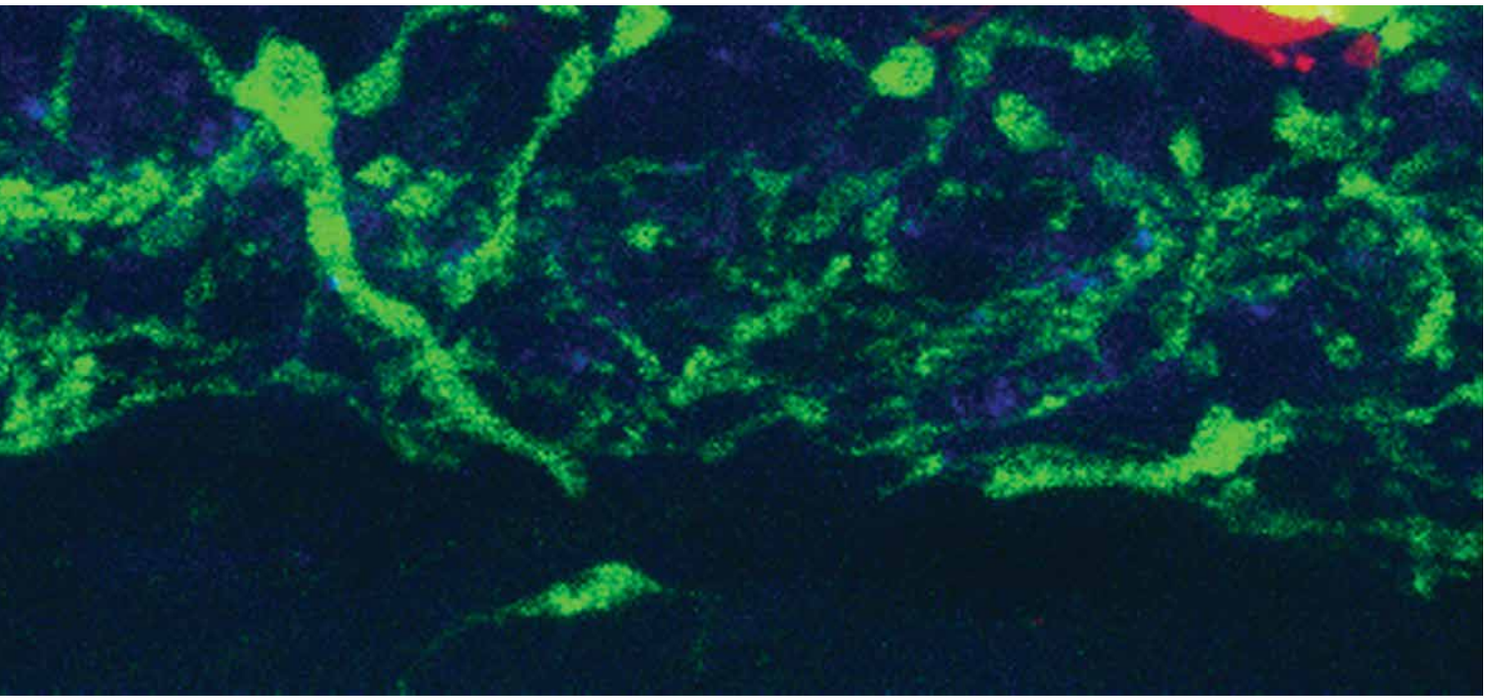


SOCIETY *for* NEUROSCIENCE

PREFACE

We hope you find this account of the founding and first 50 years of the Society for Neuroscience (SfN) informative and enjoyable. It is the story of a new academic discipline and a new Society that were born and grew up rapidly together, interdependent and synergistic. It is also the story of an era when unusually rapid progress was made in understanding the brain, mind, and behavior, and of the women and men who made it happen.

Ever since Classical Antiquity in Western civilization, life scientists and philosophers have been especially interested in how the brain works because it is the organ of consciousness, of thinking and feeling, of what makes each one of us human in the deepest sense. But after the Renaissance revival of concern with the natural (rather than with the mystical or supernatural) world, life sciences research expanded rapidly. By the end of the nineteenth century, the field became more and more specialized, so that eventually researchers studying the nervous system were relatively isolated in academic departments and societies devoted to anatomy (structure), physiology (function), biochemistry, psychology (the mind), neurology (disorders of the nervous system), and psychiatry (disorders of the mind).

The founding of the SfN in 1969 signaled a reversal of this trend and the beginning of a new era. Just seven years earlier, Francis O. Schmitt had used the term "neuroscience" for the first time when he and others began the famous Neurosciences Research Program that was housed for many years at MIT. Schmitt and his colleagues recognized the counterproductive effects of fragmentation on nervous system research and decided to bring together specialists from disciplines as seemingly disparate as mathematics, psychology, molecular biology, and computer science for discussions of mutual interest that resulted in widely distributed publications.

SfN's first annual meeting in 1971 greatly multiplied the scope of Schmitt's vision. The meeting was held at the Shoreham Hotel in Washington, D.C., where a little more than 1,200 people attended. I was one of them, a graduate student looking for a postdoctoral position, attending lectures by thought leaders in the field, browsing research posters, looking at product exhibitions, and beginning to get to know neuroscientists of all ages from institutions other than my own. I did find a postdoc and a lifelong passion for neuroscience – and I also found in SfN an outlet to give back by serving on committees, holding office, and volunteering for outside activities.

For all these reasons and many more, the Annual Meeting has become the most-impactful of SfN activities and has been such a valuable personal growth experience that since 1971 I haven't missed a single meeting, even though it has grown to around 30,000 attendees at massive convention centers in Washington, D.C., Chicago, and San Diego.

Over the years, the SfN's activities have expanded dramatically to include two high-quality research journals, a very successful public information website called *BrainFacts.org*, a plethora of career development tools, concerted advocacy efforts for the humane use of animals in medical research, and for increased federal funding to support neuroscience research. From the very beginning, the SfN has actively forged international partnerships to build scientific bridges around the globe. This effort has been so successful that now around 40% of our membership comes from outside the United States, and these members are playing increasingly important roles at the Annual Meeting, on committees, and especially as part of the elected leadership.

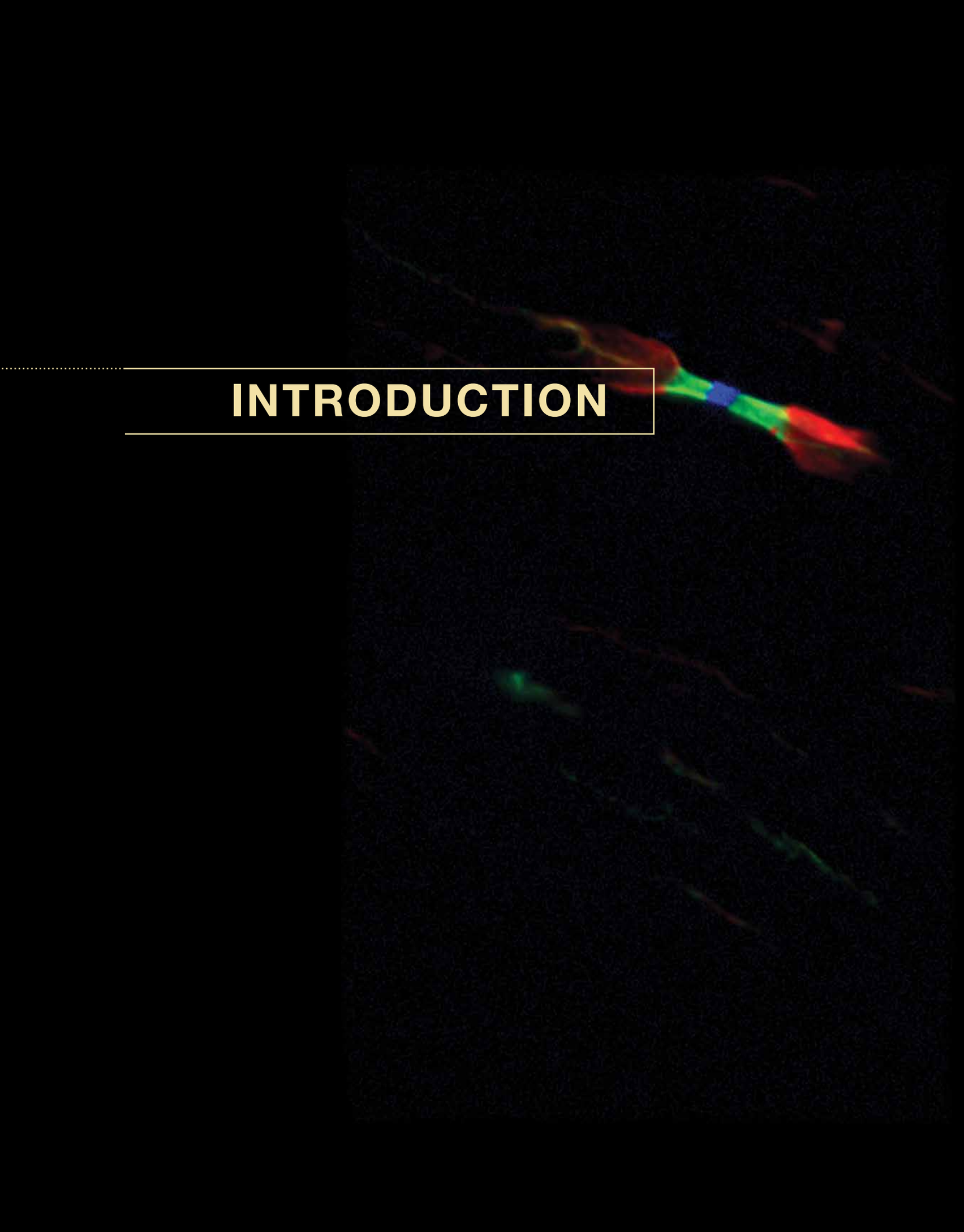
It is gratifying to acknowledge the generous support of the National Institutes of Health, and other national funding agencies across the globe in the growth of neuroscience research, which this Society showcases so effectively. Over the years, the number of attendees and the number of posters presented at the Annual Meeting is roughly proportional to the number of grants from the NIH to neuroscientists. This targeted funding has grown tremendously over the last 50 years and it represents a long-term investment by national governments in the future neurological and mental health of people around the world. Fortunately, support for basic and translational neuroscience research by public funding agencies (and increasingly by private agencies) around the world has increased in parallel, contributing to the dramatic internationalization of the SfN.

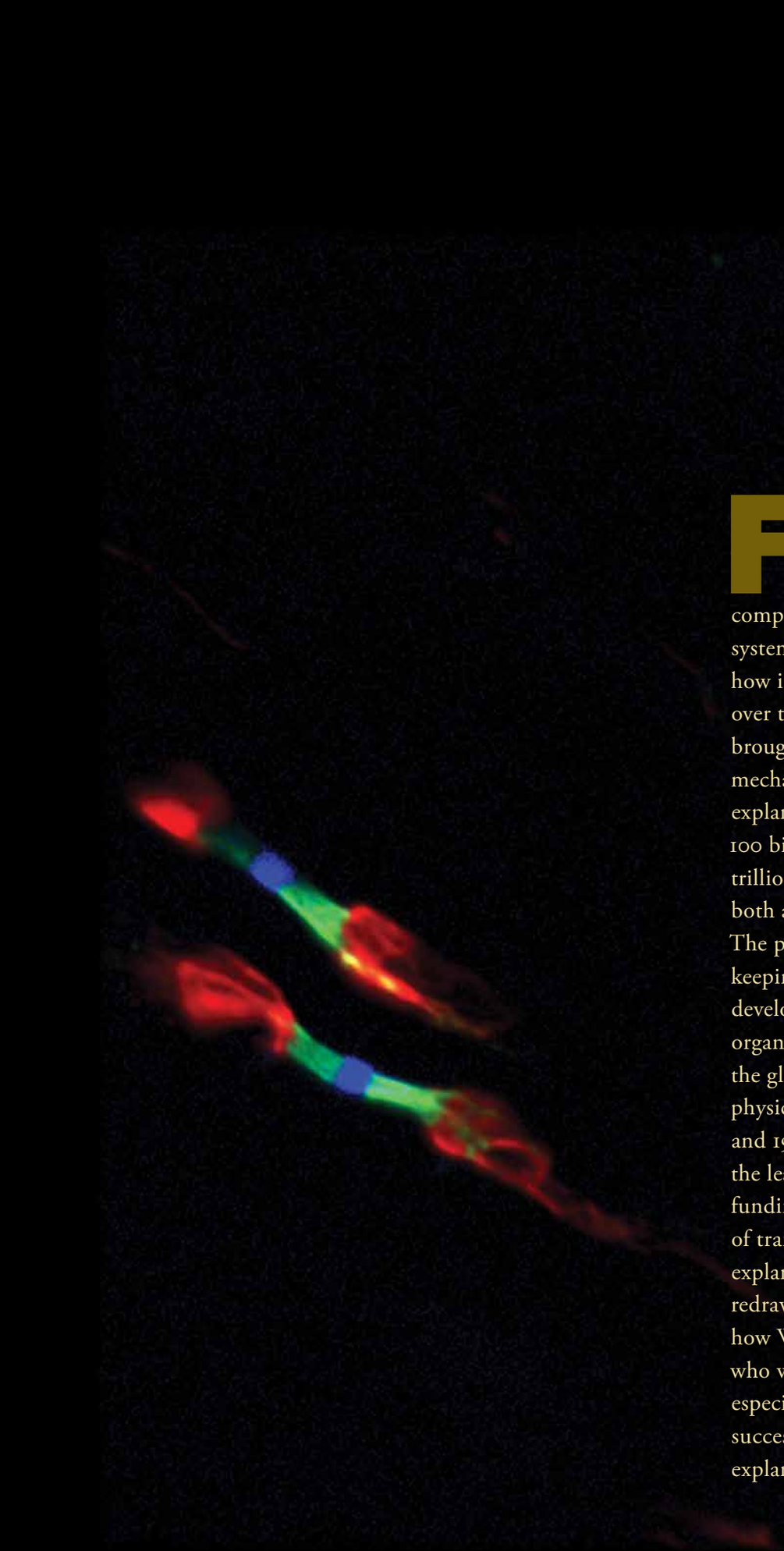
All great scientific societies, beginning with the Royal Society of London in the 1660s, are proud of their history and accomplishments, and our elected leadership and staff hope the foundation presented here fosters the same sentiment for the SfN. Efforts to document our history started long ago, but the thorny question always arose: which member could write a truly objective account? The stalemate was resolved during my SfN presidency (2012–2013) when the professional medical history team at UCLA, led by Drs. Joel Braslow and Marcia Meldrum, was engaged to sort out the SfN archives and write the first half of the history, followed later by the second half. The results exceeded our expectations and lead us to wonder what the next 50 years will bring for the SfN and the field of neuroscience. Trying to predict the future is always risky, but it seems safe to assume that it will be innovative, expansive, diverse, and exciting.

LARRY SWANSON
Milo Don and Lucille Appleman
Professor of Biological Sciences,
University of Southern California

Co-chair
(*with Magda Giordano*),
50th Anniversary Planning
Working Group

INTRODUCTION





FROM THE MOLECULAR BIOLOGY OF A SINGLE neuron to the breathtakingly complex circuitry of the entire human nervous system, our understanding of the brain and how it works has undergone radical changes over the past century. These advances have brought us tantalizingly closer to genuinely mechanistic and scientifically rigorous explanations of how the brain's roughly 100 billion neurons, interacting through trillions of synaptic connections, function both as single units and as larger ensembles. The professional field of neuroscience, in keeping pace with these important scientific developments, has dramatically reshaped the organization of biological sciences across the globe over the last 50 years. Much like physics during its dominant era in the 1950s and 1960s, neuroscience in 2020 has become the leading scientific discipline with regard to funding, numbers of scientists, and numbers of trainees. Furthermore, neuroscience as fact, explanation, and myth has just as dramatically redrawn our cultural landscape and redefined how Western popular culture understands who we are as individuals. In the 1950s, especially in the United States, Freud and his successors stood at the center of all cultural explanations for psychological suffering.

In the new millennium, we perceive such suffering as erupting no longer from a repressed unconscious but instead from a pathophysiology rooted in and caused by brain abnormalities and dysfunctions. The normal as well as the pathological have become thoroughly neurobiological in the last several decades. During this process, entirely new vistas have opened up in fields ranging from neuroeconomics and neurophilosophy to consumer products, as exemplified by a line of soft drinks advertised as offering "neuro" benefits.

It is easy to forget how much the neuroscience world changed during the first 50 years of the Society for Neuroscience (SfN), from 1969 to 2019, and to lose sight of the role that SfN played in helping to forge this new world. Even the fact that we now speak of "neuroscience" as a unified field having a history owes much to the efforts of the Society, its leadership, and its rapidly expanding membership during these formative years. By any measure, these 50 years witnessed a major epochal shift in the nature of brain science. The radical changes included an unprecedented growth in the science itself, coupled with the meteoric growth of a new scientific discipline with newly created neuroscience institutes, graduate programs, and departments, and, arguably most important, with the creation of a new cultural sensibility of what it means to be human, one that dissolved the Freudian-hued understanding of the mind and replaced it with a sharper neurobiological lens. These changes came about through the work of a community of brain scientists in the late 1960s and early 1970s who were committed to understanding how the mind emerges from the brain and convinced that such an effort required a fundamental reordering of scientific practices, institutions, and affiliations.

Of course, scientists have observed, dissected, and performed innumerable experiments on various parts of the nervous system for centuries. However, the idea that the study of the nervous system constituted a discipline separate from traditional fields of study such as anatomy, pathology, and physiology did not emerge until the 1960s and 1970s. Francis O. Schmitt coined the word "neuroscience" when he established the Neurosciences Research Program at MIT in 1962. His vision of this neologism was a discipline that could answer the fundamental question of how the brain gave rise to the mind.

Some 19th-century German psychiatrists had argued for the unity of mind and brain in the understanding of psychiatric disease. In his 1847 psychiatric textbook, *Principles of Medical Psychology*, Ernst von Feuchtersleben wrote: "Mental disease must therefore be deduced, neither from the mind nor the body, but from the relation of the each to the other."[1] Wilhelm Griesinger, the most famous of the 19th-century German materialist psychiatrists, wrote in 1868: "It is only from a neuropathological standpoint that one can try again to make sense of the symptomatology of the insane."[2] From the 1840s through the 1940s, researchers made repeated efforts to understand the biological basis of insanity and normal mental states though with little or no success.

That said, prior to the 1950s scientists lacked the intellectual and material tools to link the brain and mind compellingly and rigorously. During the early post-WWII era, major scientific breakthroughs dramatically altered what was possible. James Watson and Francis Crick's 1953 discovery of the double helical structure of DNA, combined with an unprecedented number of major neurobiological discoveries (ranging from Hodgkin and Huxley's discovery of the action potential to enhanced understanding of the chemical nature of synaptic transmission) and new technologies (e.g., the electron

SEE VIDEO "What is Neuorscience" on sfn.org/about/history-of-sfn/1969-2019/videos

microscope), transformed questions about the ways in which mind and brain interconnect into scientifically tractable problems. In 1963, Schmitt wrote: "It now seems possible to achieve…revolutionary advances in understanding the human mind…By making full use of [the approaches of physiology and behavioral sciences] and by coupling them with the conceptual and technical strengths of physics, chemistry, and molecular biology, great advances are foreseeable."[3] Presciently, Schmitt and the founders of the Society for Neuroscience realized the critical importance of creating fundamentally new infrastructures for training, professionalization, and funding if this new interdisciplinary effort were to succeed on a grand scale.

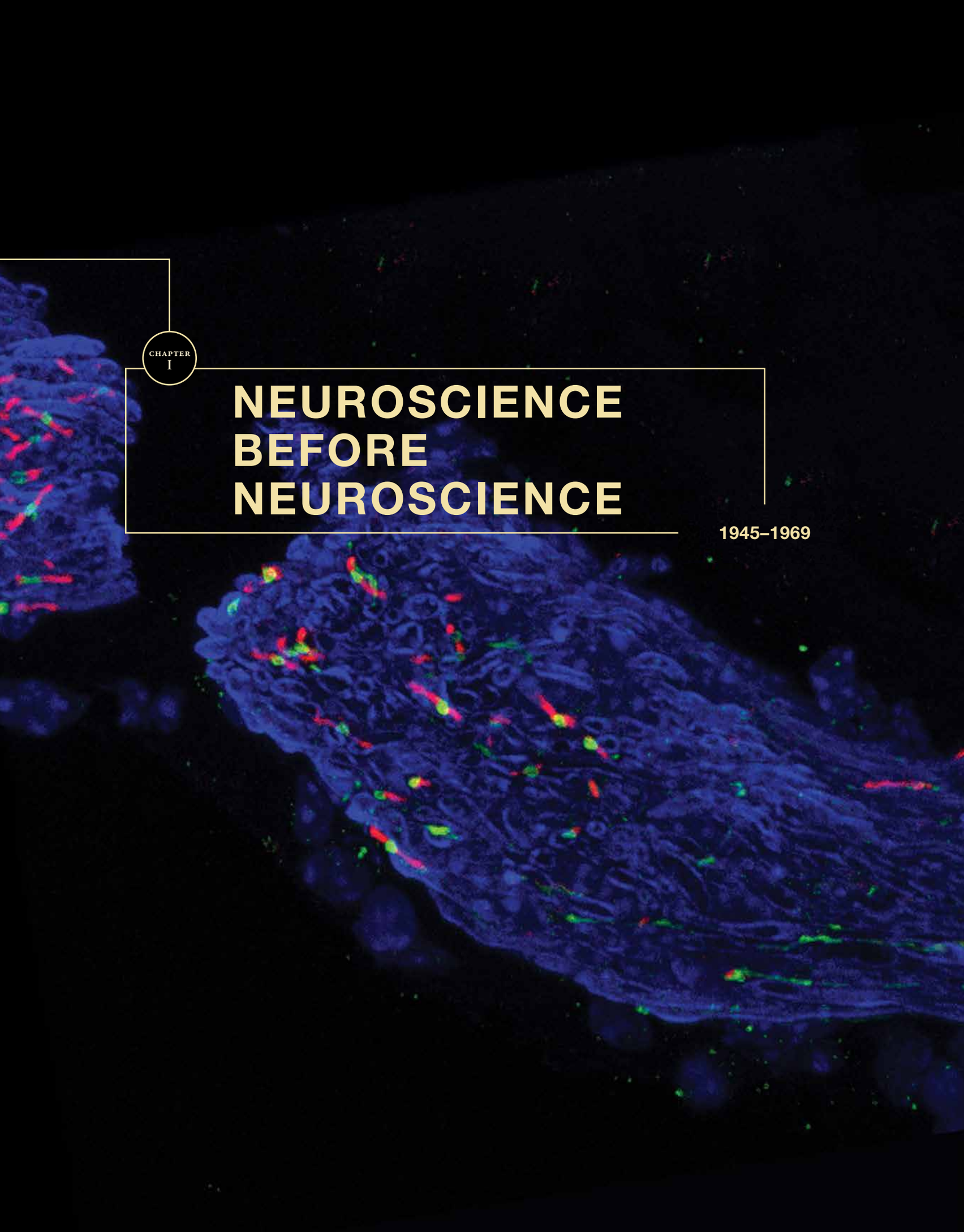
> Mental disease must therefore be deduced, neither from the mind nor the body, but from the *relation of the each to the other*.
>
> ERNST VON FEUCHTERSLEBEN, 1847

These early pioneers succeeded beyond their wildest expectations in fashioning a new discipline, held together not by a set of common methods or theories, but by the common drive toward understanding how the brain and nervous system worked. SfN founders and early leaders made this possible by emphasizing a kind of intellectual democracy and egalitarianism that self-consciously enforced inclusiveness regardless of a researcher's disciplinary background, favored organism, or methodological approach. All were welcome in the melting pot of neuroscience, a metaphor that aptly underscores the particularly postwar American stamp that shaped the Society for Neuroscience.

Indisputably, the conditions for such a perfect storm were already swirling about the biological sciences at the end of the 1960s. But, as we will outline in this essay, it took the active energy and foresight of brain scientists such as Schmitt, Ralph Gerard, and Vernon Mountcastle to shape these forces into what would become the single largest biomedical research discipline on the globe.

From its founding in 1969 to the present, the Society for Neuroscience has played a critical role in creating this brave new neuroscientific world. In this essay, we will explore the Society's work and influence through its 50th anniversary in 2019. In contrast to most modern professional societies, SfN played a unique role not only in the actual creation of the field, but also in developing the science and scientific community represented by that field by bringing together scientists trained in a variety of other disciplines and methodologies under the common banner of neuroscience. SfN founders and early leaders consciously sought to make a new community of scientists that eschewed traditional parochialism and disciplinary isolation and instead embraced the idea of an intellectually and methodologically open field in which no one approach was privileged over the other. The founding ideals of SfN bear the stamp of the time and place of its birth, of confidence in egalitarian and democratic institutions.

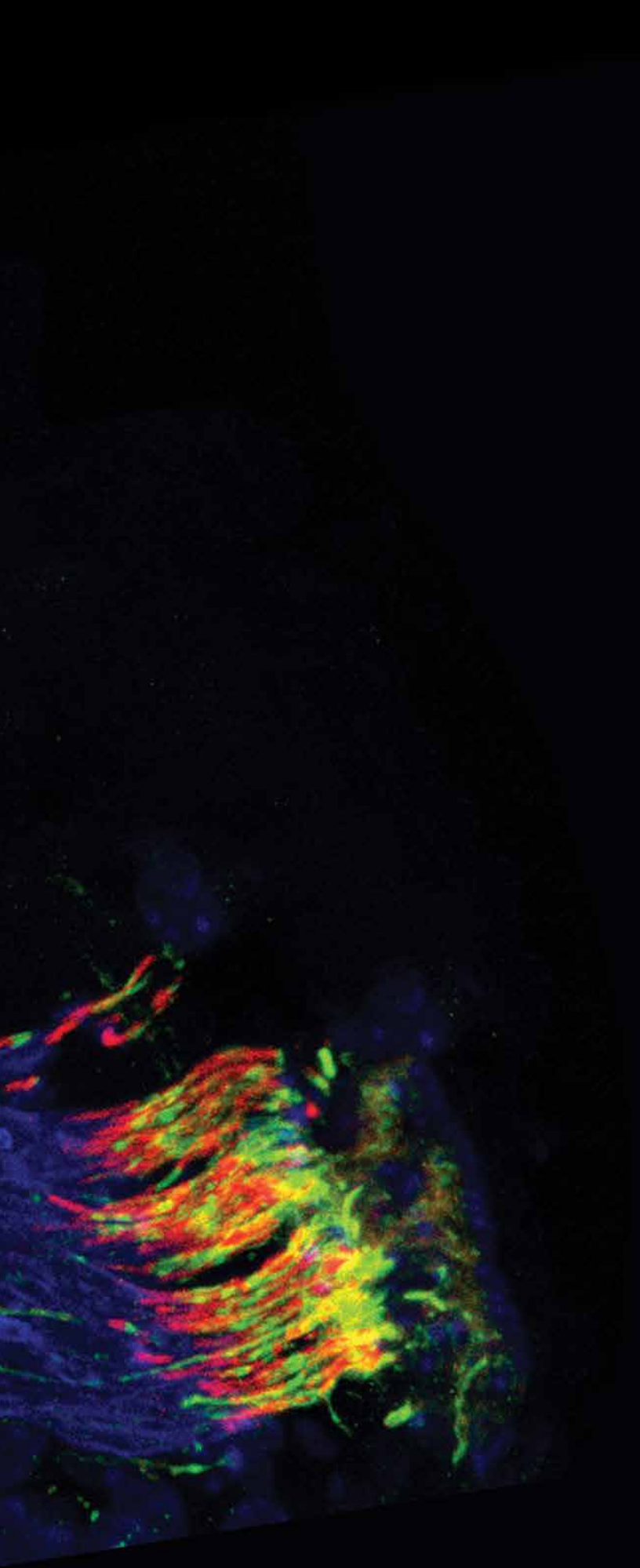
First and foremost, this is a story of how SfN created unity out of an enormous diversity of approaches and disciplinary traditions and then expanded its organizational mission to provide a home community for scientists at every career stage, in every nation, and in multiple career paths. This story is a complicated narrative that involves many individuals, institutions, new technologies, new biological discoveries, and changing social, economic, and political contexts. While we do not try to tell the full history of the Society in this essay, we have tried to relate the stories and events of SfN's first 50 years that we think have the most relevance for the present. Neuroscience in its short life has become one of the largest and most exciting fields within biomedicine. While this is an achievement worth celebrating, there are also major challenges ahead. We hope this history can help provide some context and even some guidance for those challenges.



CHAPTER
I

NEUROSCIENCE BEFORE NEUROSCIENCE

1945–1969



THE FOUNDING OF THE SOCIETY *for* NEUROSCIENCE, at a crucial time in the development of the brain sciences, can be seen as the consequence of three intersecting factors that continue to shape the current contours of the field. First, the 1950s and 1960s witnessed a dramatic explosion of new technologies and neuroscientific findings that redefined and enlarged the possible range of questions that neuroscientists could and did ask. Second, largely because of the rapidly changing landscape of neuroscientific facts, researchers increasingly sought to create forums for communication and collaboration. Lastly, a number of institutions sought to transform these newly emerging relationships into concrete, tangible institutions that allowed laboratory researchers and medical professionals to communicate not only with each other but also with the public about their field.

The study of the nervous system has always posed special problems when compared to other organ systems. Indeed, even the centrality of the brain in cognition, emotions, sensation, and movement is not necessarily self-evident. For example, Aristotle did not believe that the brain was critically involved in emotion, sensation, and movement; he instead attributed these functions to the heart, a view that ancient Egyptians also held. In contrast, Hippocratic physicians, despite their complex theory of humors as determinate of temperament, did attribute intellectual functions to the brain.

The physical nature of the brain made it especially difficult to study. On gross visual inspection, the brain looks like a gelatinous mass. The invention of the microscope at the end of the 17th century did little to help scientists visualize the inner substrates of neurons and glia. After the development of achromatic microscopes and better staining methods in the 19th century, botanist Matthias Jakob Schleiden in 1838 proposed that cells were the fundamental building blocks of plant life. Zoologist Theodor Schwann made the same claim for animals the following year. But neurons were less visible than other cells even to the improved microscopes of the early 19th century. The application of the cell theory to nervous tissue proved to be among the most vexing problems for early histologists. In 1871, Josef von Gerlach proposed that cells were not the fundamental unit of the brain. Instead, he claimed that individual nerve cells anastomosed with each other, creating a diffuse interconnected protoplasmic network. Two years later, Camillo Golgi perfected his silver staining method that allowed for the visualization of neurons with light microscopy (FIGURE 1).

As Santiago Ramón y Cajal wrote in 1917: "I expressed the surprise which I experienced upon seeing with my own eyes the wonderful revelatory powers of the chrome-silver reaction and the absence of any excitement in the scientific world aroused by its discovery."[4] Despite the clarity with which Golgi could now visualize neurons, he did not believe that they were distinct, individual cells and held throughout his career to a modified version of von Gerlach's reticular theory. Even in his Nobel lecture of 1906, as he accepted the Prize shared with Cajal, Golgi clung to his belief in the "anatomical and functional continuity between nerve cells."[5]

Cajal (FIGURE 2), having improved upon Golgi's staining methods, famously demonstrated (within the limits of light microscopy) the anatomical unity of the neuron in a series of pioneering publications

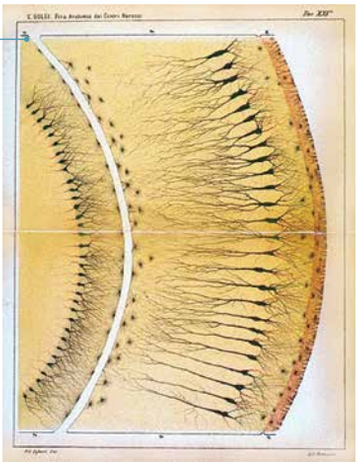


FIGURE 1. Hippocampus Golgi, C. Sulla fina anatomia degli organi centrali del sistema nervoso. Reggio-Emilia: S. Calderini e Figlio; 1885.

Reprinted in: On the fine structure of the pes Hippocampi major (with plates XIII–XXIII). *Brain Research Bulletin, Vol. 54*, No. 5, p. 481 (2001).

FIGURE 2. Self-portrait of Ramón y Cajal in his laboratory, 1887.

public domain

in the late 1880s and early 1890s (FIGURE 3). The day after Golgi spoke, Cajal defended the neuron theory in his own Nobel lecture: "The nerve cells are morphological entities, neurons….The nerve elements possess reciprocal relationships in contiguity but not in continuity."[6]

> I expressed the surprise which I experienced upon seeing with my own eyes the wonderful revelatory powers of the chrome-silver reaction and the *absence of any excitement in the scientific world aroused by its discovery.*
>
> SANTIAGO RAMÓN Y CAJAL, 1917

A series of international achievements in brain science followed in the first half of the 20th century, drawing on the seminal observations of Golgi and Cajal, particularly the latter's recognition of the neuron as a single independent cell. The research and ideas of Charles Sherrington and Edgar Adrian characterized the nature of the synapse and the action potential, while the acetylcholine work of Otto Loewi and Henry Hallett Dale established the importance of neurotransmitters. These early observations revealed the centrality of the synapse and its role in the neural control of voluntary and involuntary activity, but also highlighted the promise of interdisciplinary collaboration and of new applications of technology. After John Carew Eccles acknowledged in 1951 that most communications between neurons were chemical in nature, a series of reports revealed the complicated and diverse roles of neurochemicals, including Arvid Carlsson's discovery that dihydroxyphenylalanine (DOPA) reversed Parkinson-like symptoms, James Austin's finding that chronic inflammatory neuropathy responded to prednisone, and Julius Axelrod's demonstration that monoamine oxidase inhibitors increased catecholamine levels at the nerve terminal. Each of these developments highlighted the ways in which biochemists could elucidate the physiological mechanisms of the nervous system and how both neurophysiologists and neurochemists, working with clinicians, could contribute to neurology and psychiatry. Meanwhile, Alan Hodgkin and Andrew Huxley had used classical neurophysiological methods, as well as mathematical modeling, to explain the ionic mechanism of action potential signaling in the giant squid axon. But, by the time Hodgkin and Huxley accepted their Nobel Prize in 1963, Bengt Falck and Nils-Åke Hillarp were using fluorescence histochemistry to trace neuronal projections while Michael Kidd and Robert Terry were identifying the plaques and tangles of Alzheimer's disease with the electron microscope. Novel technologies proved to be potential keys to mapping the complexity of the brain and the central nervous system.

Throughout the 1960s, in departments of anatomy, biochemistry, neurology, physiology, and pharmacology, researchers around the world followed up on these clues, using new ideas and methods to ask more ambitious sets of questions about the brain and behavior. They mapped neural pathways and systems, identified and characterized neurotransmitters

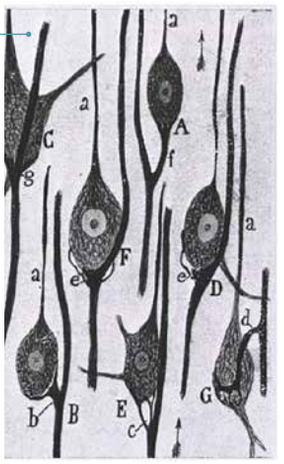


FIGURE 3. Illustration from *Cajal's Recuerdos de mi vida* (1917), showing that neurons are independent cells.

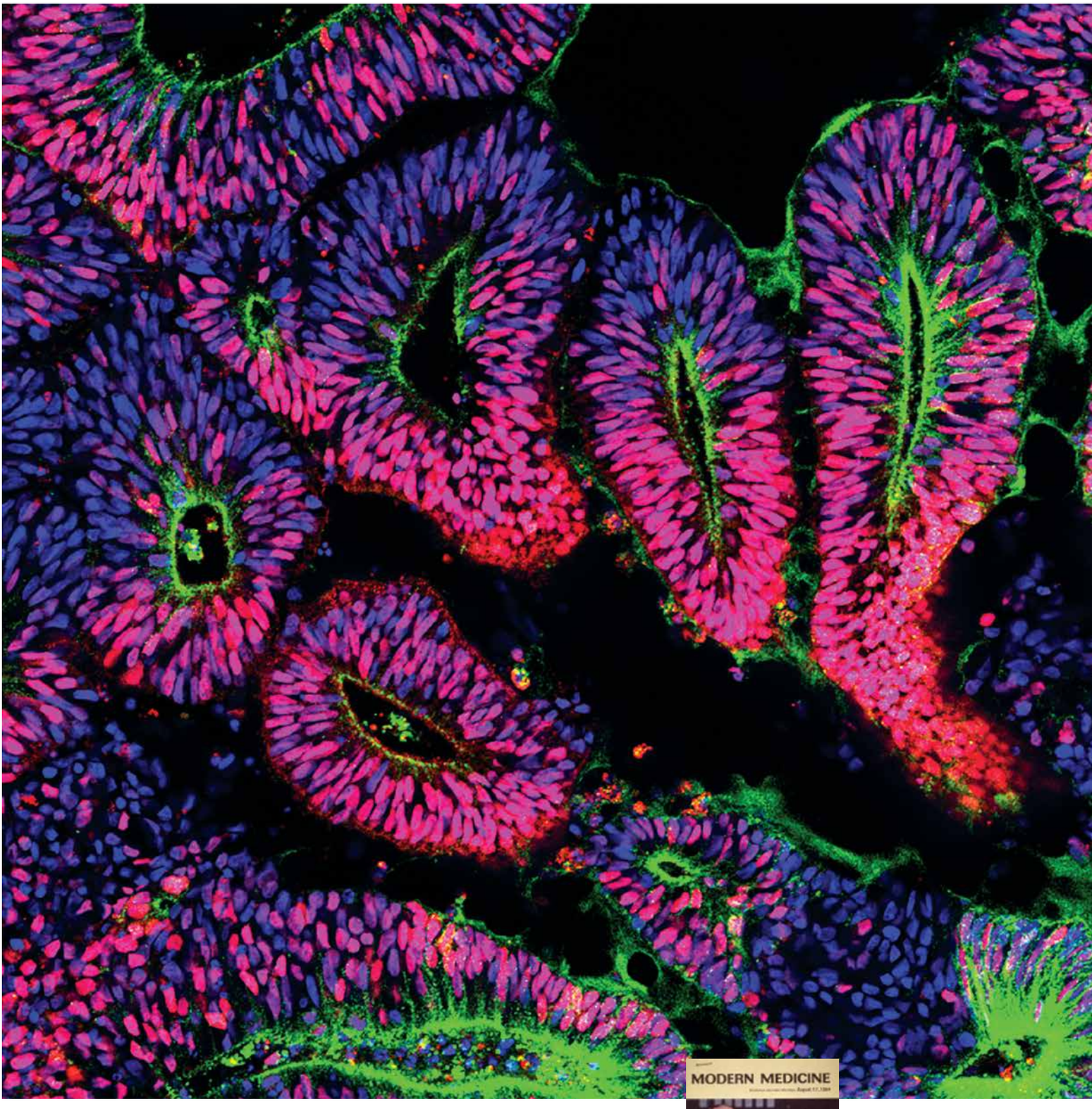
Santiago Ramón y Cajal – Photo gallery. NobelPrize.org. Nobel Media AB 2019. Thu. 12 Dec 2019. https://www.nobelprize.org/prizes/medicine/1906/cajal/photo-gallery. Original Source: The National Library of Medicine, History of Medicine Division).

and studied phenomena such as memory, movement, pain, and vision in a range of organisms. As scientists deepened their understanding of the mechanisms and physicochemical interactions that linked biology to behavior, they transgressed established disciplinary boundaries again and again, until these lines began to dissolve and were replaced by a coherent spectrum of research that could be called "brain science."

These new methods and cooperative projects opened up the possibilities of addressing fundamental questions about the mind-brain relationship through new interdisciplinary collaborations. As groups of scientists began to think about how they could collaborate most effectively to further their understanding of the brain and the nervous system, they had to consider what structure such collaborations would have and how they would work: How should we define brain science? Who belongs in this field? What common ideas and goals characterize our work and how can we borrow and share methods and techniques? How can we improve public understanding and attract or maintain public interest and support? What roles would a professional organization serve for its members and for society? In the late 1950s and 1960s, both sets of questions – scientific and organizational – were vigorously debated in a number of local and ad hoc groups.

Some brain scientists experimented with novel cross-disciplinary approaches to research and collaboration at their home institutions. In 1953, for example, University of Pennsylvania anatomy professor Louis Flexner founded the Institute of Neurological Sciences (now known as the Mahoney Institute for Neurosciences). Other major academic institutions, such as Cambridge University in the U.K., McGill University in Canada, and Columbia University and UCLA in the U.S., created similar institutions in the 1950s and 1960s to foster collaboration between researchers studying various aspects of the brain and nervous system.

In 1962, Francis O. Schmitt set up the Neurosciences Research Program (NRP) at the Massachusetts Institute of Technology, with support from the National Institutes of Health (FIGURE 4).[7] Schmitt did not intend the NRP to be a laboratory but explicitly described his creation as an interdisciplinary research program, bringing together the various "physical, biological, and neural sciences…to attack a single goal," to understand the connections between mind, brain, and behavior.[8] He visualized NRP scientists from a range of areas of expertise gathering together at collaborative "Work Sessions" that would produce "workable hypotheses [and] new theories" to stimulate researchers around the world.[9] Under Schmitt's direction, the NRP held a series of meetings of national and international researchers that generated books and journal articles about neuroscience problems and findings linking biology and behavior; it became a source of educational innovation and provided crucial interdisciplinary contact for brain researchers at its work sessions and through its *Bulletin*. However, the NRP was too limited in scope to provide extensive coordination across multiple campuses and departments – one of the key functions that SfN would later fulfill. Neal Miller, one of SfN's founders, later credited Schmitt with "laying the foundation and in bringing the field to the point at which such a Society would be possible." Understanding that the NRP and SfN filled two different and non-competing roles for neuroscientists,



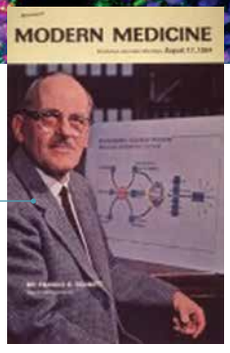


FIGURE 4. Francis O. Schmitt in 1964.

From http://ihm.nlm.nih.gov/luna/servlet/view/search?q=B029913. (Courtesy of Advanstar Publications).

Schmitt would lend "his characteristically warm and generous support to the Society."[10] Many NRP members would move into the SfN leadership and 10 out of the first 12 SfN presidents had been NRP Associates.[11]

Outside their academic grounds, individual brain researchers had long coordinated their own informal associations to present their work to interested colleagues from other disciplines.[12]

> A single society along the multidisciplinary lines of IBRO itself *might substantially strengthen* the many disparate studies of the nervous system.
>
> ROBERT DOTY, THE UNIVERSITY OF ROCHESTER

Starting in 1954, Karl Frank[13] of NIMH invited several hundred researchers to gather on the first Sunday afternoon of the meeting of the Federation of American Societies for Experimental Biology (FASEB). As Novera Herbert Spector recalled, these colloquia featured three invited speakers and "then dissolved into a free-for-all social and scientific gossip session…of the highest level."[14]

In the 1960s, similar groups proliferated. In the U.S., scientists studying neurons or the brain would convene at the Western Nerve Net, the Know Nothing Club at Johns Hopkins, the Bay Area Neuroscience Group (BANG) in California, the Neurophysiology Club in Washington D.C., or with the Axonologists in Chicago, who usually met in tandem with the American Physiological Society.[15] Although many continued to participate in the scientific umbrella societies of their home disciplines, they found that these smaller, more focused meetings gave them additional opportunities to learn from one another.

The penultimate step in the establishment of an independent organization for brain science, however, was the National Academy of Sciences' decision in 1965 to create a committee to respond to an international call for a global survey of brain research. The origins of this international effort began in 1958 with the Moscow meeting of the International Federation of Electroencephalography and Clinical Neurophysiology. Members in attendance unanimously endorsed the formation of an International Brain Research Organization (IBRO) to improve communication and promote international cooperation among scientists interested in the brain, which became a reality in 1960 under the auspices of UNESCO. An international coterie of basic researchers, including the French neurophysiologist Henri Gestaut, Russian physiologist Ivan Beritashvili, and Herbert Jasper, an American working in Canada, believed that advances in brain sciences merited an independent organization. In a rare instance of Cold War scientific cooperation, the founders created IBRO in the hope that it would foster collaboration in these developing fields that did not fit into existing clinical disciplines.

One of IBRO's first major projects was to request that each of its member countries conduct a survey of the existing laboratories, research groups and institutional support, as well as the resource needs, of eight subfields of brain science research

TABLE 1. NAS-NRC Committee on Brain Sciences, 1965–1969

R. W. Gerard	S. S. Kety	N. E. Miller	Frank Morrell	Eugene Roberts
Carl Pfaffmann	E. V. Evarts	D. B. Lindsley	H. W. Magoun	W. A. Rosenblith
F. O. Schmitt	K. R. Unna	R. D. Adams	David Bodian	V. H. Denenberg

defined as "Neuroanatomy, Neurochemistry, Neuroendocrinology, Neuropharmacology, Neurophysiology, Behavioral Sciences, Neurocommunications and Biophysics, and Neuropathology." In 1965, the National Academy of Sciences-National Research Council (NAS-NRC) formed the Committee on Brain Sciences (CBS) to direct the U.S. survey; in retrospect, the CBS was the first operational step toward the founding of the Society for Neuroscience.[16]

Ralph Gerard, a physiologist from the University of California, Irvine, led the committee, which consisted of a relatively small group of scientific leaders (TABLE 1).

Though no women were members of the committee, the NAS staff person assigned to the Committee on Brain Sciences, Louise Marshall, was an energetic scientist and administrator who played an important organizational role in both the IBRO survey and the founding of SfN.[17]

From 1965 to 1969, the committee met every few months, rotating the leadership and responsibilities, and developed an understanding of the challenges posed by integrating the multiple strands of brain research. The members quickly discovered that, while the American brain research community was vibrant and active, it was

FIGURE 5. Ralph W. Gerard.

With the permission of the University of Chicago Libraries.

NEUROSCIENCE AS A VOCATION

The IBRO survey underlined what many already knew; namely, neuroscience was already an important and rapidly growing area of scientific interest. The training of new scientists provides an illustrative window into this growth. Assessing dissertation titles and abstracts completed between 1960 and 1976, Louise Marshall and Horace Magoun tabulated the number of neuroscience dissertations. They found that between 1960 and 1969, the number of doctoral dissertations on neuroscience topics increased by a factor of six from 50 to 301, compared to a 2.4-fold increase for all dissertations in the biological sciences. From 1970 to 1976, the number of neuroscience dissertations continued to increase, rising from 334 to 521.[20]

widely scattered and lacked focus or impact. The CBS report on "Research Facilities and Manpower in Brain Sciences in the United States" appeared in two volumes during 1968 and 1969 (FIGURE 6); its findings awakened the committee to the need to develop a more formal national institution to link scientists, share knowledge of practices and findings, recruit government and foundation support, and disseminate the potential meaning and importance of the emerging brain-behavior connections.[18] As Robert Doty of the University of Rochester recalled, the committee "came to recognize the diffuseness of neuroscience, a part of many disciplines but lacking a focus of its own….The idea began to crystallize that a single society along the multidisciplinary lines of IBRO itself might substantially strengthen the many disparate studies of the nervous system."[19]

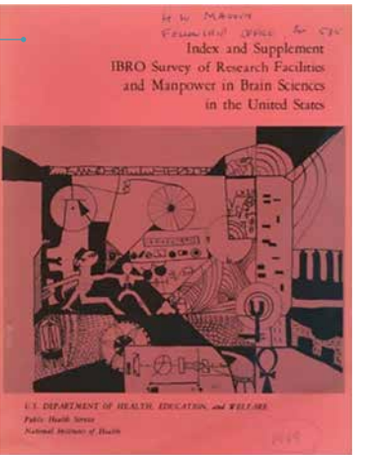


FIGURE 6. IBRO Survey of Research Facilities and Manpower in Brain Sciences in the U.S.

Supervised by the Committee on Brain Sciences, Division of Medical Sciences, National Research Council. 1969.

FIGURE 7. Dissertation topics in neuroscience vs general bioscience, 1960–1969.

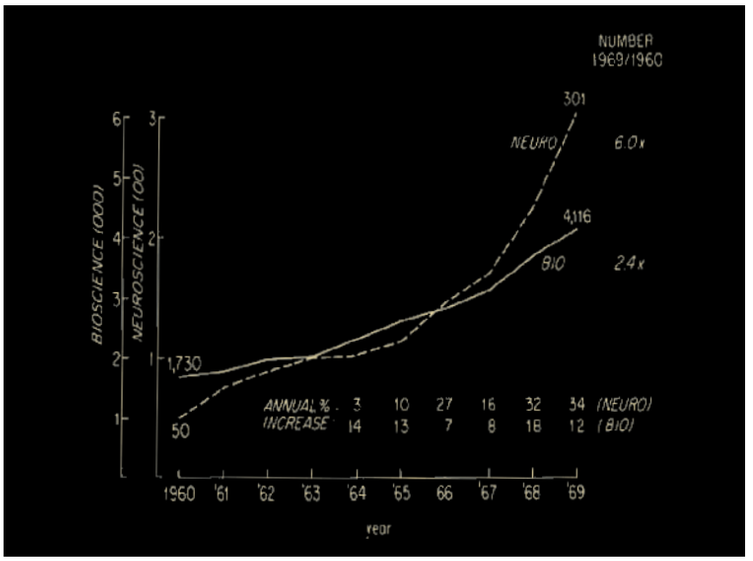


FIGURE 8. Neuroscience-focused Dissertations by Field, U.S., 1959–69.

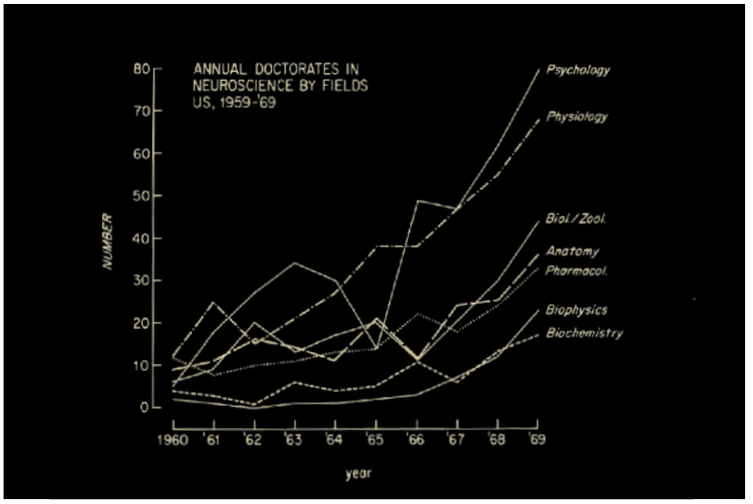
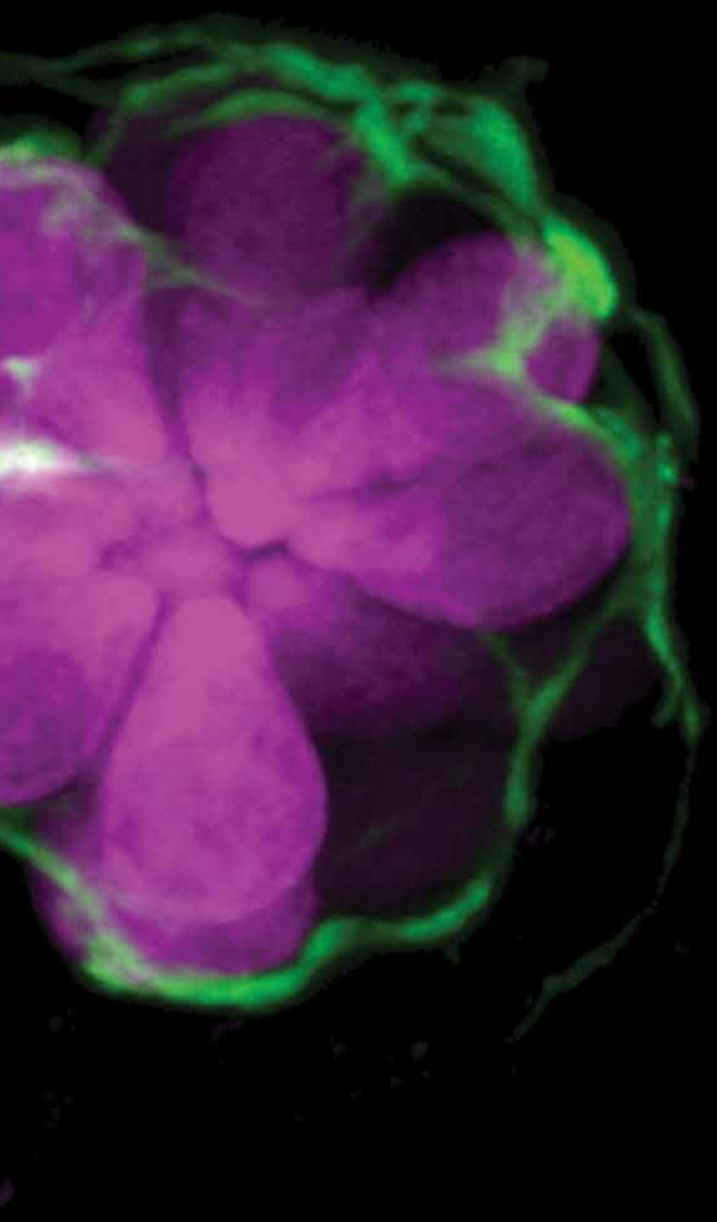


FIGURE 9. United States neuroscience institutions in 30 states, 1970.[21]

CHAPTER
II

ESTABLISHING THE SOCIETY FOR NEUROSCIENCE

1968–1970



THE COMMITTEE ON BRAIN SCIENCES' REALIZATION that collaborative work in brain science in the U.S. was alive and well, but without strong recognition, support, or communications, made a strong case for an organization that could articulate the interests of this new generation of scientists who, armed with increasingly sophisticated methods, were often blurring the traditional disciplinary boundaries in understanding brain and nervous system function. As early as June 1967, the committee agreed that a "formal organization of brain scientists in this country was desirable and feasible at this time, and that the emphasis should be on innovative means of communicating with students and integrating the brain research specialties."[22] CBS members had ambitious goals for the new entity: to "help direct attention to the importance of neurosciences for the future intellectual and emotional well-being of this country."[23] They believed that recent findings and research providing insights into vision and memory and suggesting therapies for Parkinson's, stroke, and mental illness would attract public interest and build support for increased institutional and academic funding, as well as facilitate educational recruitment and scientific collaboration.

The question of how to design and establish such an organization preoccupied the CBS in 1968 and 1969. On the one hand, a network of existing local and regional groups, under a name such as the "Federation of American Brain Research Organizations," could be most easily and quickly established and would attract ready support from those who were already involved in scientific collaborations. But some, such as Robert Doty, doubted whether a network would recruit new scientists who had been working in isolation, deliver the public impact of a new organization, or adequately "unite the many disparate strands." Ultimately, the plan to create a single, independent society won out, after Doty conducted a survey of representative scientists that expressed "a groundswell…in favor of better vehicles for scientific exchange than existing organizations offered."[24]

In August 1968, Ralph Gerard appointed Ed Perl of the University of Utah as chair of the 20 member Executive Group for the Organization of Brain Sciences. Although their initial charge was described as organizing and coordinating the "extensive network of local organizations,"[25] the Executive Group agreed that their goal was to create an interdisciplinary society and to ensure its survival through its formative years. The mandate for the new group was clear: as Perl recalled in 1986, "there were pleas for an organization to promote the public image of work on the nervous system and to enhance financial support for it."[26] Over the winter months of 1969, Perl drafted a constitution and bylaws for this new organization and enlisted Louise Marshall to request institutional assistance and initial operating funds from NAS.[27] The Executive Group shared drafts of the constitution and bylaws – which put no limits on members from any subdiscipline – with 200 colleagues they had identified as potential members. Interest in the new society began to build.[28]

On June 16, 1969, at the NAS building in Washington, D.C., the Committee on Brain Sciences held the crucial meeting that would bring the new Society into being. Psychologist Neal Miller of Rockefeller University, as the chair, reviewed the survey findings and the proposed constitution and bylaws submitted by Perl and his Executive Group. "Miller waved his long yellow pencil" and "all 20 of those at the conference table… being qualified neuroscientists, became founding members." The eight members of the Steering Committee, with Gerard, Miller, and Marshall, declared themselves the first acting Council of the Society, authorized to serve until there were enough members to hold a formal election. Perl was named acting president and Marshall was designated acting secretary-treasurer, until elections could be held.[29]

A ROSE BY ANY OTHER NAME: NAMING THE SOCIETY

Conjuring up an appropriate name raised fundamental questions about the nature of neuroscience – issues that, to this day, have

TABLE 2. **Members of the Executive Group for the Organization of Brain Sciences, 1968**

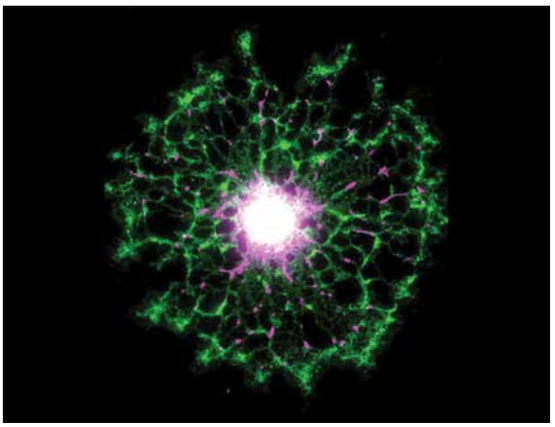
Edgar A. Bering, NINDS	**John M. Brookhart,** NSF	**Robert W. Doty,** University of Rochester
Daniel X. Freedman, Pritzker School	**Lore Heinlein,** Elsevier	**Charles U. Lowe,** NICHD
Neal Miller, Rockefeller University	**Alfred Pope,** McLean Hospital	**James M. Sprague,** University of Pennsylvania
Robert L. Thompson, Hunter College	**A.T. Bever,** NSF	**James H. Brown,** NSF
Fred Elmadjian, NIMH	**Ralph Gerard,** UC Irvine	**Richard T. Louttit,** NIMH
Louise H. Marshall, NAS-NRC	**Edward R. Perl,** University of Utah	**Vernon Rowland,** Case Western
Eliot Stellar, University of Pennsylvania	**John E. Wilson,** University of North Carolina	

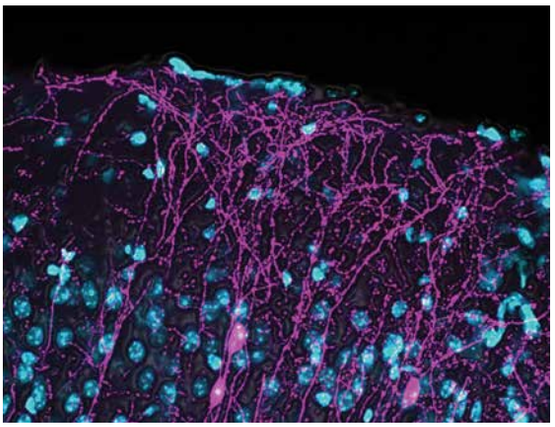
remained relevant. First and foremost, the founders wanted a name that underscored the expansive scope that they envisioned for the field. But then should the name emphasize the disparities or the perceived unities within the American brain science community? And what of the word "brain"? Was it essential, or would it deter some potential members whose work did not fall so readily under the umbrella of "brain" sciences? Further, was there a group of words that could encompass all the methods and problems on which U.S. researchers were working? Was it possible to bring together, within a single society, researchers who focused on the molecular biology of single cells and those who worked on diseases, like schizophrenia, that involved not only the brain but just as intimately an afflicted individual's social and psychological world?

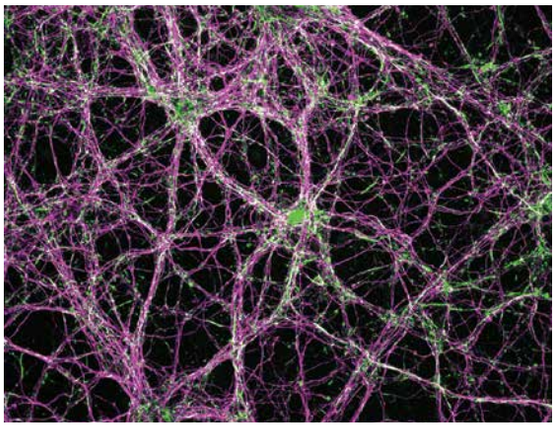
The "Neurobiological Society" was deemed by some "just a little narrow to psychiatrically and behaviorally oriented members;" others felt that the word "American" should be in the name to clarify its affiliative role in IBRO.[30] As Perl recalled the discussion:

> *Some … favored putting "Brain" into the title, and there also were arguments in favor of including "Behavior" in the title. The majority of the Executive Group believed that the term "Brain" would tend to inhibit interest in membership by investigators interested in axons, ganglia, the spinal cord, or molecular processes. This, so it seemed to us, would defeat the notion of interdisciplinary contacts. Certain early proposals for names were awkward – for example, "Society for Research on the Nervous System."… "American Neurosciences Society" disturbed several of the Executive Group. "American" implied more than the United States and its immediate neighbors to the north and south, and the use of "Neuroscience" as an adjective for "Society" appeared ungrammatical, although efficient.*[31]

Other discussions revolved around whether "Neuroscience" should be singular or plural. Gerard and Marshall both adamantly preferred "Neuroscience" because it denoted a single, unified field.[32] Eliot Stellar recalled that the singular "could more readily include all 'neuro' fields equally" while the plural "would imply an amalgamation of old fields."[33]







THE COUNCIL'S THREE MAJOR GOALS

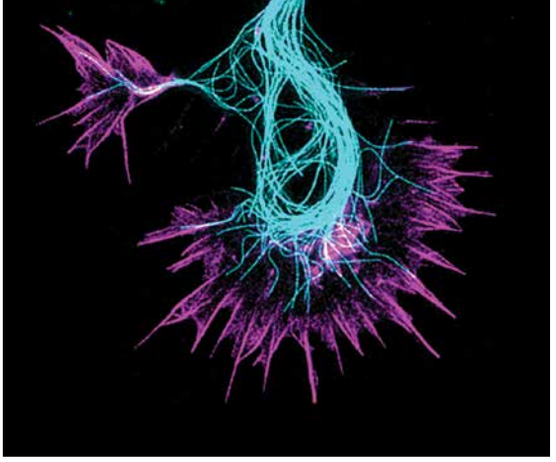
1. To advance understanding of nervous systems and their role in behavior
2. To promote education in the neurosciences
3. To inform the general public on results and implications of current research

In the end, as David Bodian explained, "the word 'science' was indispensable, and 'Neuroscience' told it all. I believe it was Frank Schmitt who first visualized an organization in which scientists of every description, from mathematics to psychiatry, could contribute to each other's understanding of the workings of the nervous system."[34] Finally, the broad and simple name, "Society for Neuroscience," was approved.

Thus the Society chose to define neuroscience in the broadest terms as unbounded. The Council further articulated three major goals, which remain the core of the Society's mission and again reflect the founders' intentions to develop an interdisciplinary field, promote scientific work, and establish public support through emphasis on the importance and benefits of self-governing scientific research: "1) To advance understanding of nervous systems and their role in behavior; 2) To promote education in the neurosciences; 3) To inform the general public on results and implications of current research."[35]

Based on these goals, the Council also began to define its priorities for the immediate future. These priorities reflected the Council's definition of neuroscience as a field that spanned multiple traditional disciplines and, as such, would require an unusually diverse membership, new forums for communicating, and funding organizations (especially NIH) sympathetic to the expanded definition of neuroscience and the interdisciplinary methods necessary to address questions posed by this new cadre of neuroscientists. The Council also realized that federal funds would have to be justified through presentation of the future tangible social benefits of neuroscientific knowledge (e.g., the cure of diseases) made possible by improved understanding of the relationships between biology and behavior. Thus, the initial priorities for SfN were to secure the Society's viability by building membership and attracting external funding; to build interdisciplinary ties through a dynamic annual meeting and a regular newsletter; to introduce neuroscience and its potential benefits to the government and the public through the media; and to build collaborative links with other organizations and institutions.

The Council had a strong belief that science flourished best within democratic organizations and it fashioned the Society's governance after Western principles of democracy. This conviction was especially evident in the Council's decisions regarding membership criteria and officer selection. The Council recognized that it needed not only to recruit a diverse cadre of scientists as members but also to assure them that all groups would have representation in Society governance and programs, and, through the Society, a voice in public policy. Moreover, while established leaders in the various fields would be important in attracting funding and public interest younger scientists, trained to think across disciplines, would over time contribute most to the scientific work and

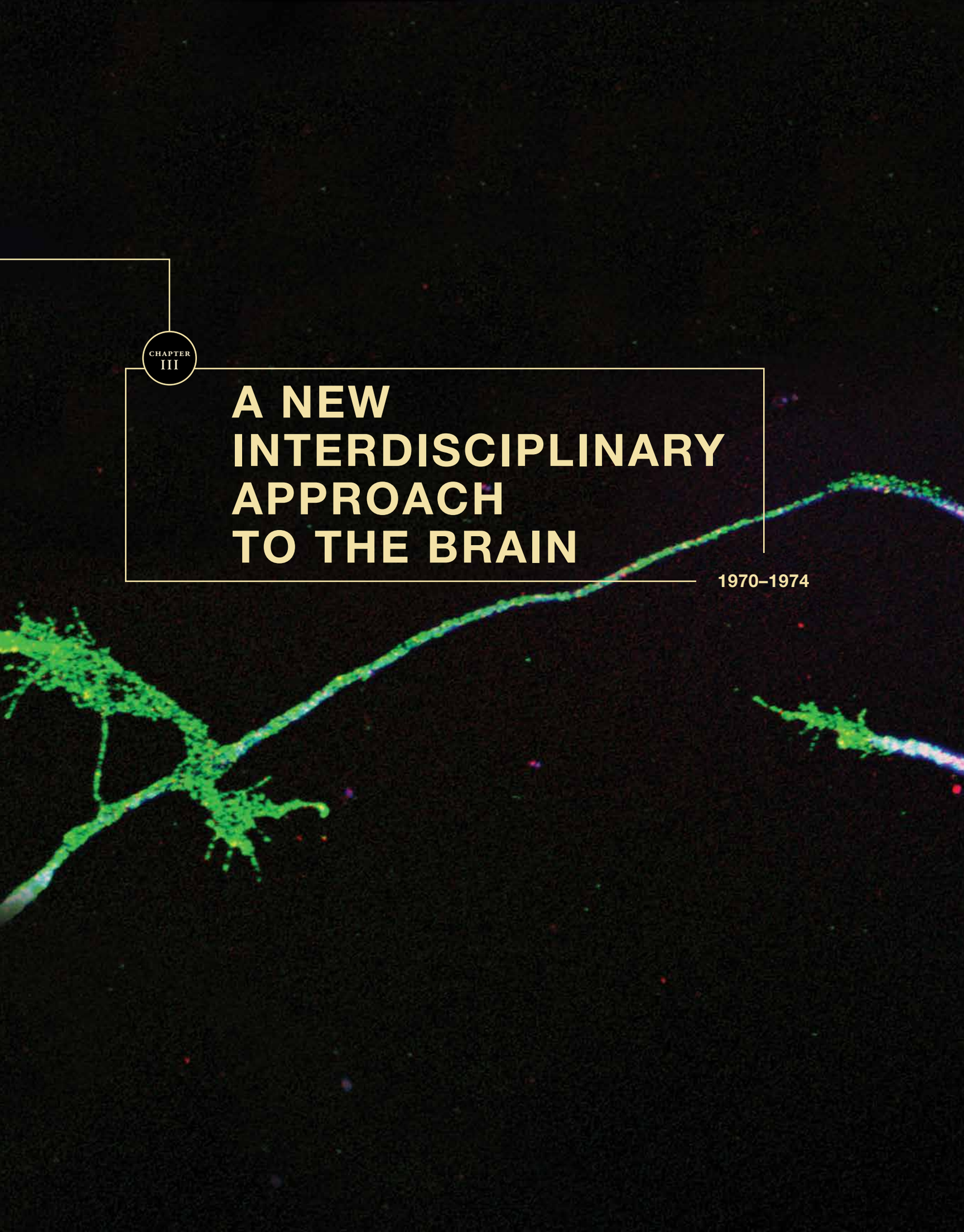


maintain the Society's multidisciplinary character. As Perl later commented, he and others were "dismayed by the tendency of scientific societies to be governed by…a dynasty of older individuals who were no longer active in the laboratory and promoted one another for leadership positions."[36] The Society founders anticipated that more democratic policies would promote the fertile scientific collaborations and major public impact envisioned for the new organization.

Reflecting the above concerns, the questions that Council debated at its first formal meeting at the NAS building on October 26, 1969 included: What disciplines and age groups should SfN recruit? What criteria should be established for nomination to the Council and admission to the Society? And how could the Society ensure a wide geographic representation? The minutes noted that "the younger potential members of the Society have expressed concern that membership should be determined democratically and in a manner to counteract any tendency toward stagnation of the Society. 'Operators' in peripheral professions or disciplines would perhaps be most likely to promote their self interest rather than the best interests of the neurosciences. Because the Society is promoting interdisciplinary interests among its members it was felt that even those known to have a narrow outlook should be included."[37]

SfN was not unique in trying to fashion a democratic identity; the idea that scientific societies should reflect democratic values of openness and majority rule was a feature of many scientific institutions in the Cold War era, particularly in the U.S.[38] But because the SfN founders were redrawing scientific boundaries to form a new discipline at the same time that they were establishing a new organization, a democratic approach was also the best way to ensure that neuroscience would remain an independent and open field. The early Council members deliberately established nominating procedures for Society offices that helped to ensure a democratic organization, specified that future leaders would be drawn from both biological and behavioral disciplines, and invited younger members, those under 45, to run for Council positions. The Council divided the United States into four geographic regions: Baltimore South, Philadelphia North, Pittsburgh Rocky Mountain, and West Coast. It also divided disciplines into two categories: neurobiological and behavioral, and left it to the next Council to "rectify any unbalance between biological and behavioral disciplines" in future elections.[39] As Perl recalled in 1986, "Our wish was to attract to the new society investigators interested in the neural basis of behavior, but we wanted to insure that the new organization would be dominated by neither the behaviorally nor the biologically inclined."[40]

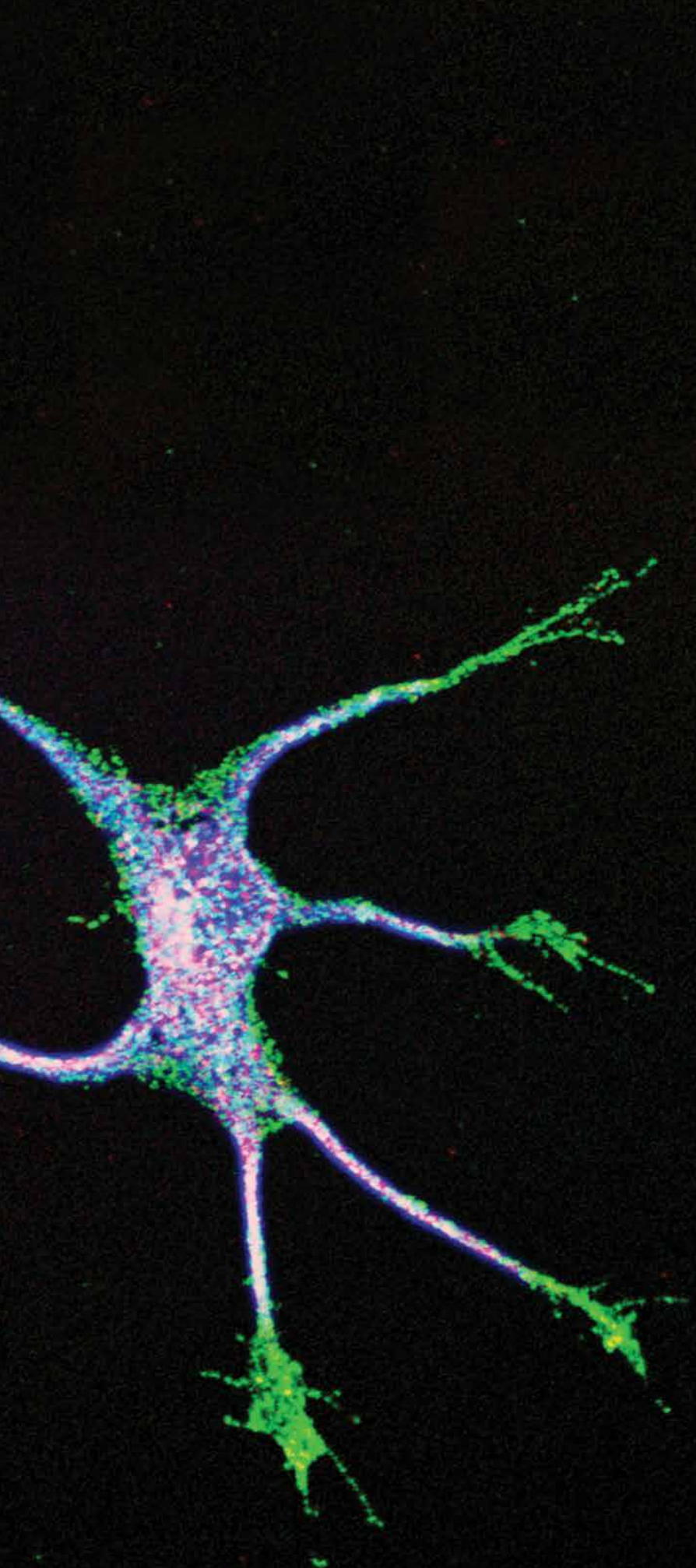
These established needs and priorities – membership growth, financial support, promotion of interdisciplinarity, public information, and institutional collaboration – would shape activities for the next 50 years.



CHAPTER
III

A NEW INTERDISCIPLINARY APPROACH TO THE BRAIN

1970–1974



IN THE EARLY 1970s, THE NASCENT SOCIETY SET UP an office with NAS support and concentrated on fostering a new interdisciplinary approach to brain and behavior research. This was an exciting period for the field, with such developments as the isolation of the opioid receptors in the brain, which heightened public interest in "natural highs" and solutions to the problems of pain and addiction; the fields of learning and memory enhanced by Tim Bliss and Terje Lomo's description of long-term potentiation and Eric Kandel's findings that habituation and sensitization altered the strength of synaptic connections, which enhanced the fields of learning and memory; and the introduction of CT, MRI, and PET scanners which made the interior of the brain visible *during behavior*.

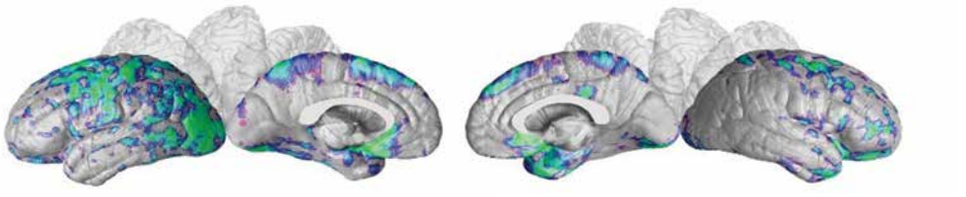


FIGURE 10. MRI map of the language network in patient with Alzheimer's disease.

Image courtesy of Dr. Liana Apostolova, Department of Neurology, David Geffen School of Medicine, UCLA.

The newly christened field had the opportunity to capitalize on these findings to build support and funding for such interdisciplinary work and for the ideal of a diverse but collaborative and self-governing, enterprise.

The major issues confronting the Society at this time were: 1) to promote scientific communication and collaboration; 2) to ensure and perpetuate interdisciplinary representation in membership and governance; 3) to promote public interest and understanding through informational programs and the creation of a logo. The Society organized around its Annual Meetings in the fall, where members presented and discussed their work and extended their professional and scientific networks. The Annual Meeting was also the Society's major expenditure and source of income. The Council met two or three times each year to plan the Annual Meetings and to consider questions of membership and finance; the quarterly *Neuroscience Newsletter* acted as the adhesive cementing long-distance and transdisciplinary ties in between the yearly gatherings.

In setting membership rules and leadership criteria, the early leaders of SfN shaped the Society in ways that reaffirmed their definition of an expansive neuroscience that explicitly addressed questions across multiple domains. They declared membership open to any scientist in North America who demonstrated "serious interest in research evidenced by publication" and "a sincere interest in an interdisciplinary approach to problems of brain and behavior." To facilitate the approval process, members could sponsor their colleagues and students[41] and dues were set low at $15 per year, and $3 for students.[42] This strategy proved immediately successful. By December 1969, 6 months after the founding, 500 individuals, representing disciplines ranging from biochemistry to clinical psychology, had joined the Society and formed 6 local chapters. Each subsequent Council meeting brought the approval of new chapters, which continued to form all over the country. By the time the Society met for its first Annual Meeting in October 1971, there were 25 approved chapters in 18 states, as well as 2 in Canada.[43] The chapters often met monthly to share results and techniques and to engage in interdisciplinary seminars.

Although SfN began under the aegis of U.S. scientific leadership at the NAS, the founders recognized the importance of building a scientific community that extended beyond the borders of the United States. They were particularly keen on embracing Canadian and Mexican neuroscientists. Neuroscience was well established in Canada, where the Montreal Neurological Institute was a pioneering leader in the nascent field, and emerging as a field in Mexico, which was developing its own school of integrative neurobiology.[44]

Even more than geographic diversity, the Council valued intellectual diversity, especially if neuroscientists were to grapple successfully with the most compelling questions of the relationships between brain, behavior, and mind. To this end, the Council worked from the beginning to ensure that the leadership reflected a field that spanned the biological and behavioral disciplines.

Developing this breadth of leadership was not necessarily an easy task. At one point in March 1972 Louise Marshall noted a "danger … that the more self-aware, self-assured disciplines may run away with the Society. For example, with the […1971]

TABLE 3. The First SfN Council Members

NAME	DISCIPLINE	INSTITUTION
Theodore Bullock	Neurophysiology; Electroreception	UC San Diego
Robert Doty	Neurophysiology	University of Rochester
Edward Evarts	Neurophysiology	National Institute of Mental Health
Lawrence Kruger	Neuroanatomy	UC Los Angeles
William Neff	Experimental Psychology	Indiana University
Sidney Ochs	Neurophysiology	Indiana University
Dominick Purpura	Medicine	Albert Einstein Medical College, Yeshiva University
Wilfrid Rall	Biophysics	National Institutes of Health

election, the Council has a preponderance of neurophysiologists." Therefore, the Council amended the bylaws that year so that officers would only serve one-year terms instead of two. Marshall and others expressed concerns about changing the bylaws so soon, fearing that the Council and Society would be in constant flux due to idealistic whims, but these fears proved unfounded.[45]

The SfN leadership maintained its commitment to supporting an interdisciplinary milieu. The Membership Committee again expressed diversity concerns in 1975, when it noted the minority of clinical researchers among members and requested advice from the Research Society of Neurosurgeons and the International Neuropsychologists Society on how to attract more members whose "primary identification may not be as neuroscientists," but who nevertheless would find interdisciplinary collaborations useful and productive.[46]

The first elected Council was chosen from a slate "with careful consideration given to geographic and disciplinary distribution of candidates."[47] With 57% of the new Society voting, members chose neurophysiologist Vernon Mountcastle of Johns Hopkins as the first elected president, Neal Miller of Rockefeller University as the president-elect, and Mountcastle's biophysicist colleague Martin Larrabee as secretary-treasurer.

The eight Council members included biophysicists, neurophysiologists, neuroanatomists, and an experimental psychologist, representing a diverse array of institutions, including NIH, Albert Einstein Medical School of Yeshiva University, Indiana University, the University of Rochester, and the University of California, San Diego.[48] The first Council gathered in Atlantic City, New Jersey, on April 15, 1970, and began organizing its workload by creating committees on membership and chapters, the Annual Meeting, affiliations, and budget and finance (SEE TABLES 4 AND 5).

The Council, in appreciation for their contributions to the establishment of SfN, named Ralph Gerard honorary president for two years and Louise Marshall special consultant to the Council, "until such time that it is determined by her or a future Council that the need for consultation no longer exists."[49]

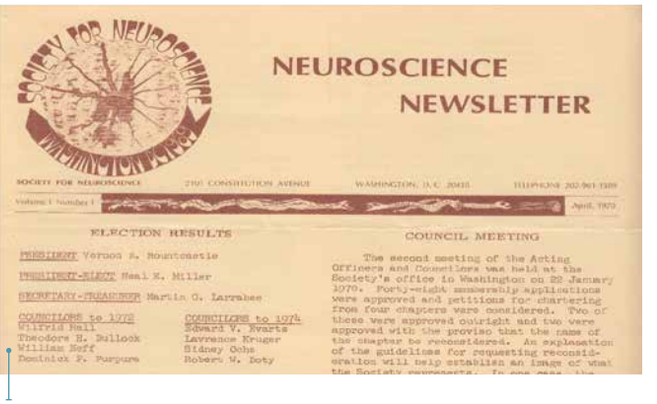
Marshall was instrumental in maintaining the connection between the new Society and the NAS-NRC's Committee on Brain Sciences through this transition period. She described "the current relationship" at this juncture in these terms: "the umbilical cord

TABLE 4. SfN Standing Committees, 1970–1995

COMMITTEE	DATE ESTABLISHED
Membership	1970
Chapters	1970 (Changed to Chapters and Communication 1991)
Annual Meeting/Program	1970
Nominations	1970
Budget and Finance	1970
Affiliations	1970
Education	1971
Communications	1970–1980
Publications	1972
Social Issues	1973
Public Information	1974
Resolutions	1978
Minority Education, Training and Professional Advancement	1985 (Subcommittee of Social Issues 1979–1984)
Governmental and Public Affairs	1980 (Ad hoc Committee on Research Resources 1977–1979)
Animal Research	1985 (Ad hoc 1981)
Neuroscience Literacy	1991 (Ad hoc Committee on Secondary School Education 1990)
Development of Women's Careers in Neuroscience	1998 (Ad hoc 1991)
History of Neuroscience	1994 (Ad hoc 1992)

TABLE 5. SfN Ad Hoc Committees

AD HOC COMMITTEE	DATE ESTABLISHED
Availability of Primates	1975–1978
Advisory Committee on the Boston Museum of Science Brain Exhibit	1975–1982
Quality of the Annual Meeting	1981–1985
Monoclonal Antibodies	1981
Student Services	1987
Public Education	1988
Decade of the Brain	1990–1999
Neuroscience and Public Policy	1991–1992


NEUROSCIENCE NEWSLETTER

SOCIETY FOR NEUROSCIENCE 2100 CONSTITUTION AVENUE WASHINGTON, D.C. 20418 TELEPHONE 202/961-1989

Volume I Number 1 April, 1970

ELECTION RESULTS

PRESIDENT Vernon B. Mountcastle

PRESIDENT-ELECT Neal E. Miller

SECRETARY-TREASURER Martin G. Larrabee

COUNCILORS to 1972
Whitrid Hall
Theodore H. Bullock
William Neff
Dominick P. Purpura

COUNCILORS to 1974
Edward V. Evarts
Lawrence Kruger
Sidney Ochs
Robert W. Doty

COUNCIL MEETING

The second meeting of the Acting Officers and Councilors was held at the Society's office in Washington on 22 January 1970. Forty-eight membership applications were approved and petitions for chartering from four chapters were considered. Two of these were approved outright and two were approved with the proviso that the name of the chapter be reconsidered. An explanation of the guidelines for requesting reconsideration will help establish an image of what the Society represents. In one case, the

FIGURE 11. First Issue of the *Neuroscience Newsletter*, April 1970.

UCLA-NHA Archives.

has been cut but the infant not yet weaned."[50] With crisp prose peppered with her characteristic acerbic wit, she also edited and wrote most of the articles for the *Neuroscience Newsletter* from 1970 until 1977 (FIGURE 11), providing the single most extensive chronicle of SfN's early struggles and aspirations.

The first issues of the *Newsletter* underscore the Society's preoccupation with a democratic science, one that embraces multiple perspectives and that eschews elitism. Declaring the *Newsletter* the "conservator of the founding spirit of the Society," Marshall wrote that the Society would shape the field by "its pluralism of disciplines connecting to form new insights, and its freedom from elitism," and promised that "No one meeting, workshop, or publication (excepting the Society's own) would be featured without equal space to others"[51] in the publication's pages. Her editorial introducing the goals and scope of the *Newsletter* concluded, "As a healthy organism, the *Newsletter* aims to survive through its capacity to perceive and respond to the environment, which in turn depends on the quality of the feedback it receives. This first issue, for which the Editor takes full responsibility, should serve as a stimulant."[52]

IMAGINING NEUROSCIENCE

The effort to find a suitable logo illustrates the Society's determination to forge an identity that ignored traditional disciplinary boundaries and gave a clear visual meaning as to what "neuroscience" meant as a field and as an endeavor. Each early issue of the *Neuroscience Newsletter* featured a different logo for the Society, submitted by scientists or graphic artists in anticipation of the 1972 Annual Meeting when members would be asked to vote on their favorite submission. The first logo to appear in the Newsletter, submitted by graphic designer Percy Martin, featured an eye in the center with neurons radiating outward, circumscribed by what appears to be a petri dish. (Figure 12) The second design, created by Julian Maack, an artist at the University of Utah, with input from Ed Perl, was a silhouette of a human head, with nerve cells and EEG readouts flowing out of the brain (FIGURE 12). The third option, designed by artist Timothy Volk for a neurobiology conference at the University of Wisconsin, graphically depicts some of the laboratory tools neuroscientists could use in their experiments, including DNA, primates, chemicals, EEG recordings, and video tapes (FIGURE 13).

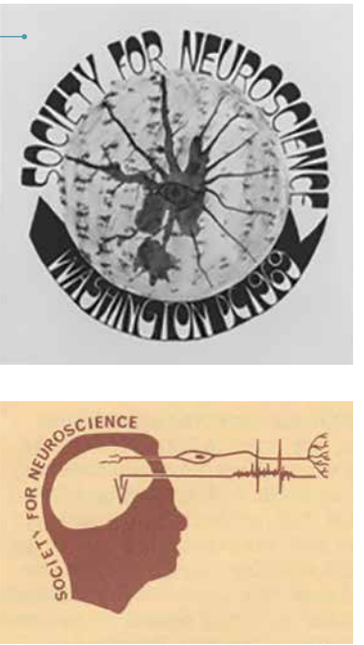


FIGURE 12. First proposed logo April 1970 (*top*) and second proposed logo Oct 1970 (*bottom*).

UCLA-NHA Archives.

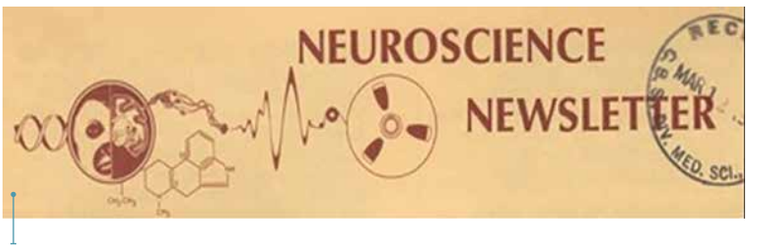


FIGURE 13. Third proposed logo, Dec 1970.

UCLA-NHA Archives.

A fourth logo, from June 1971, dispensed with scientific imagery, but proposed a graphic of "Neuroscience" and "Newsletter" (FIGURE 14) that "refers to the normal and the skewed distributions (natural, behavioral, statistical) basic to all work of neuroscience."[53] Other options featured representations of the brain, neurofiber bundles, and an EEG readout forming the N in Neuroscience (FIGURE 14).

The winning logo (FIGURE 15), submitted by Vernon Rowland of Case Western Reserve University School of Medicine reaffirmed the leadership's vision of neuroscience as a synthetic scientific field.

And, as the most abstract of the submissions, it was a safe choice, while still privileging the brain over other sites of neuroscientific investigation. However, this was far from Rowland's intention. He explained his logo (FIGURE 16) as follows: "The brain of a neuroscientist, in trying to encompass some other brain, must fragment it (analysis). The brains of neuroscientists form a Society for Neuroscience in order to put it back together (synthesis)."[54] This compelling image appeared on Society publications from 1972 until November 1983.[55] The logo's multiple perspectives cleverly reflected the duality of the researcher as both the observing and observed brain.

FIGURE 14. Proposed logos from March 1971 (*top*), June 1971 (*bottom left*) and Dec 1971 (*bottom right*).

UCLA-NHA Archives.

FIGURE 15. The winning SfN logo, Sept 1971.

UCLA-NHA Archives.

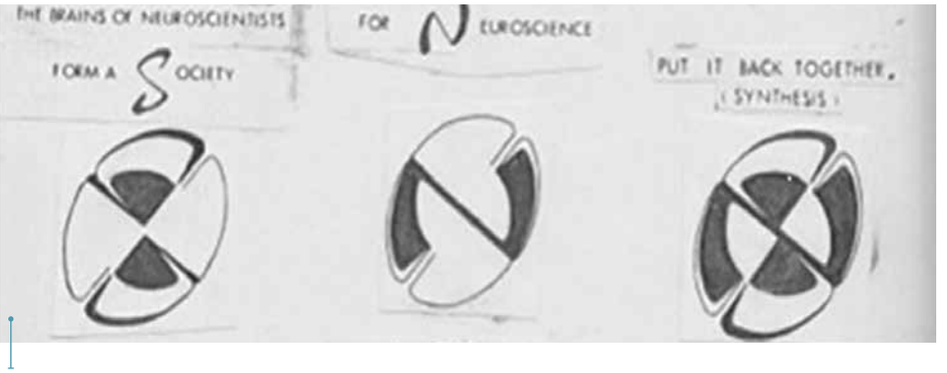


FIGURE 16. Rowland's explanation of his winning logo design.

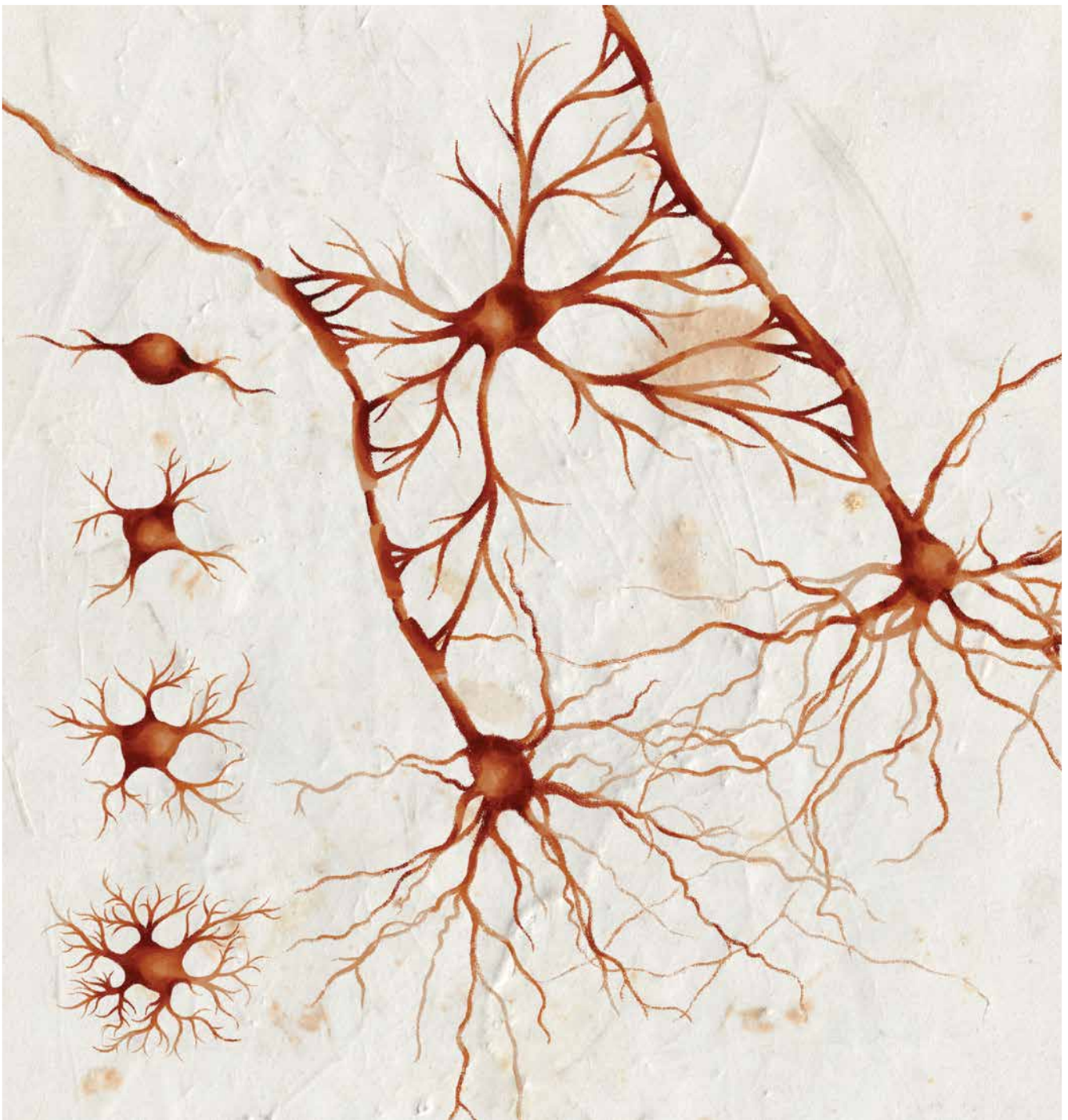
UCLA-NHA Archives.

A SOCIETY REALIZED

The Society held its first Annual Meeting in October 1971 in Washington, D.C., with a structure that changed little over the next two decades. Symposia, lectures, poster sessions, and public outreach gave reality to the Council's efforts to create a vibrant community, enhanced by an intimate setting; all activities took place at the Shoreham Hotel.

Innovations included three simultaneous morning paper presentation sessions; the social program featured a performance of "Candide" at the Kennedy Center.[56] The Planning Committee, chaired by Henry Wagner of the National Institute of Neurological Diseases and Stroke (NINDS),[57] included an educational program discussing the brain, consciousness, and the control of behavior. The program was directed at students, but open to the public, "to involve scientists, laymen, and students in a discussion of…brain in behavior that is open to the temper of the times."[58] The public session was the first in a series of Annual Meeting events designed to introduce the public and interested students to "information on and about the broad range of the neurosciences," what neuroscientists studied, what they learned, and how their findings could benefit society."[59]

The reactions of the 1,395 scientists (including 390 students) who attended this first meeting were overwhelmingly



positive. Louise Marshall noted that many were "pleasantly surprised neuroscientists – surprised to see so many others from contingent disciplines with mutual interests, and surprised at the high quality of the sessions."[60] Planning Committee member Maxwell Cowan, a neurobiologist at Washington University in St. Louis, expressed relief that "many of the problems which I and others had foreseen just did not materialize." He noted that the morning sessions were seen as "the most successful innovation in the program. …The only criticism of these sessions was that in some cases the material dealt with got lost in experimental detail."[61]

TABLE 6 lists the sites of the Annual Meetings through 1995. Although all but two Meetings were held in the U.S., the leadership encouraged attendance from throughout North America and tried to select the locations most accessible to international members. In 1976, the Annual Meeting was held in Toronto and featured a special symposium, "Prospects in Neuroscience: A View From Three Nations."[62] The first president from outside the U.S., Albert Aguayo, an Argentinian-Canadian working at McGill, took office in 1987.

TABLE 6. SfN Annual Meeting Locations 1971–95

1971	Washington, D.C.	1984	Anaheim, CA
1972	Houston, TX	1985	Dallas, TX
1973	San Diego, CA	1986	Washington, D.C.
1974	St. Louis, MO	1987	New Orleans, LA
1975	New York, NY	1988	Toronto, Canada
1976	Toronto, Canada	1989	Phoenix, AZ
1977	Anaheim, CA	1990	St. Louis, MO
1978	St. Louis, MO	1991	New Orleans, LA
1979	Atlanta, GA	1992	Anaheim, CA
1980	Cincinnati, OH	1993	Washington, D.C.
1981	Los Angeles, CA	1994	Miami Beach, FL
1982	Minneapolis, MN	1995	San Diego, CA
1983	Boston, MA		

ANNUAL MEETING HIGHLIGHTS

The 1972 Meeting was scheduled for Houston and again included a public session on "Neuroscience in the Public Interest." Although Floyd Bloom and other Society leaders saw the meeting as a valuable resource for neuroscientists across the country, they were concerned that members might be unwilling to make transcontinental journeys every year.[63] Under the direction of F. G. Worden, the Houston Program Committee experimented with different types of presentations such as demonstrations, panel discussions of pre-circulated materials, and poster sessions, since "the launching of a new society offers an opportunity to try to rescue the scientific community from the straitjacket of the traditional format."[64] The majority of the proposed abstracts, however, were for the traditional 10-minute presentation format, so the Program Committee adjusted the schedule so as to accommodate both traditional and more "experimental" formats.[65] The Committee planned nearly a full day of physiological and behavioral demonstrations and arranged for a "Women's Hospitality Room" at the Shamrock Hotel where "social registrants" could relax and socialize during the day while their spouses attended the scientific sessions.[66] [In that day and age, it was assumed that all "social registrants" would be female.] Despite these attractive features, attendance in Houston was slightly lower than at the Washington Meeting the year before.

The 1973 Program Committee, chaired by Floyd Bloom, nevertheless determinedly planned a full docket at the third meeting, scheduled for November in San Diego.[67] In addition to the usual presentations and public lectures, they also set aside time for special interest dinners, identifying a dozen different scientific subspecialties within neuroscience. There were clinically oriented groups, such as EEG, neuroendocrinology, sensorimotor integration, vision, and psychopharmacology; groups focused on experimental techniques, such as tissue culture and neuromodeling; and groups focused on brain function, chemistry, and structures: motivation, neurochemistry, neurotransmitters, memory, and morphology.[68] The Program Committee's efforts were an outstanding success; so many neuroscientists came to San Diego that a large number of sessions were standing room only and SfN President Walle Nauta asked Bloom to apologize to the attendees.[69]

SEE VIDEO "Early Annual Meetings" on sfn.org/about/history-of-sfn/1969-2019/videos

SEE VIDEO "Third Annual Meetings" on sfn.org/about/history-of-sfn/1969-2019/videos

SEE VIDEO "5th Annual Meeting" on sfn.org/about/history-of-sfn/1969-2019/videos

SEE VIDEO "6th Annual Meeting" on sfn.org/about/history-of-sfn/1969-2019/videos

The Program Committees of the 1970s continued to experiment with new forms of presentations, including poster sessions, workshops, and demonstrations.[70] By 1975, the Annual Meeting was large enough (3,775) that the Education Committee sponsored two neuroscience symposia, on neurotransmitters, hormones, and receptors: novel approaches. Seven papers were presented and then published by the Society.[71] To continue the Society's goal of giving neuroscience a public face, the planners regularly planned events for high school students and teachers at the meetings and extended invitations to local journalists.

The Council also introduced a spectrum of prizes to recognize outstanding achievements and to promote public interest and attendance. The first of these awards, presented in 1978, were the Donald Lindsley Prize for Young Investigators and the Ralph W. Gerard Prize for Lifetime Achievement. November 1976 featured a short course on neuroplasticity and recovery of function, presented the day before the Toronto Meeting. The short course required a separate registration, and 285 members participated.[72] 400 people attended the short course on neuroanatomic techniques two years later in St. Louis, while another 200 had to be turned away but could order copies of the syllabus "cookbook" for $4 from the SfN central office.[73] SfN continued to offer short courses in conjunction with the main program and to develop innovative programs such as the neurobiology of disease workshop in 1989.[74]

SfN meetings were also taking on a more international dimension during this period. As one example, SfN and IBRO jointly sponsored a symposium on the reticular formation at the 1978 meeting in St. Louis.[75]

The Annual Meeting was a clearinghouse for job seekers and until 1977 there was a free bulletin board in the registration area that was always covered with job announcements. At the 1977 Meeting in Anaheim, SfN introduced a more formal Placement Service where, for a fee, employers and job seekers could register and schedule interviews.[76] "Although the Society had to subsidize the first Placement Service by some $1,500, its success in assisting employers and candidates to fill job openings was so pronounced that the Council decided to continue it."[77]

As the Society grew, the Program Committee's task became more complicated, as the number of abstracts and themes increased from year to year.[78] In the early days, members submitted all abstracts on paper and creating coherent sessions out of 15,000 abstracts for panels, symposia, and posters had become extremely challenging by the early 1990s. As Carla Shatz (President 1994–95) described her experience on the Program Committee in the 1980s, "there was this crazy shoot-out where we would all come to the Program Committee meeting with

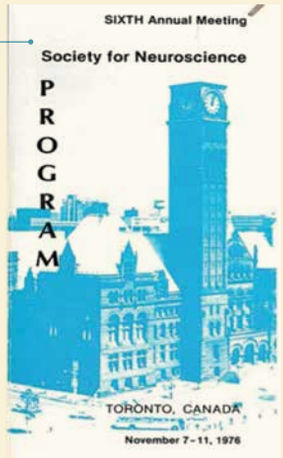


FIGURE 17. Annual Meeting Program, Toronto, 1976.

SfN

SEE VIDEO "8th Annual Meeting" on sfn.org/about/history-of-sfn/1969-2019/videos

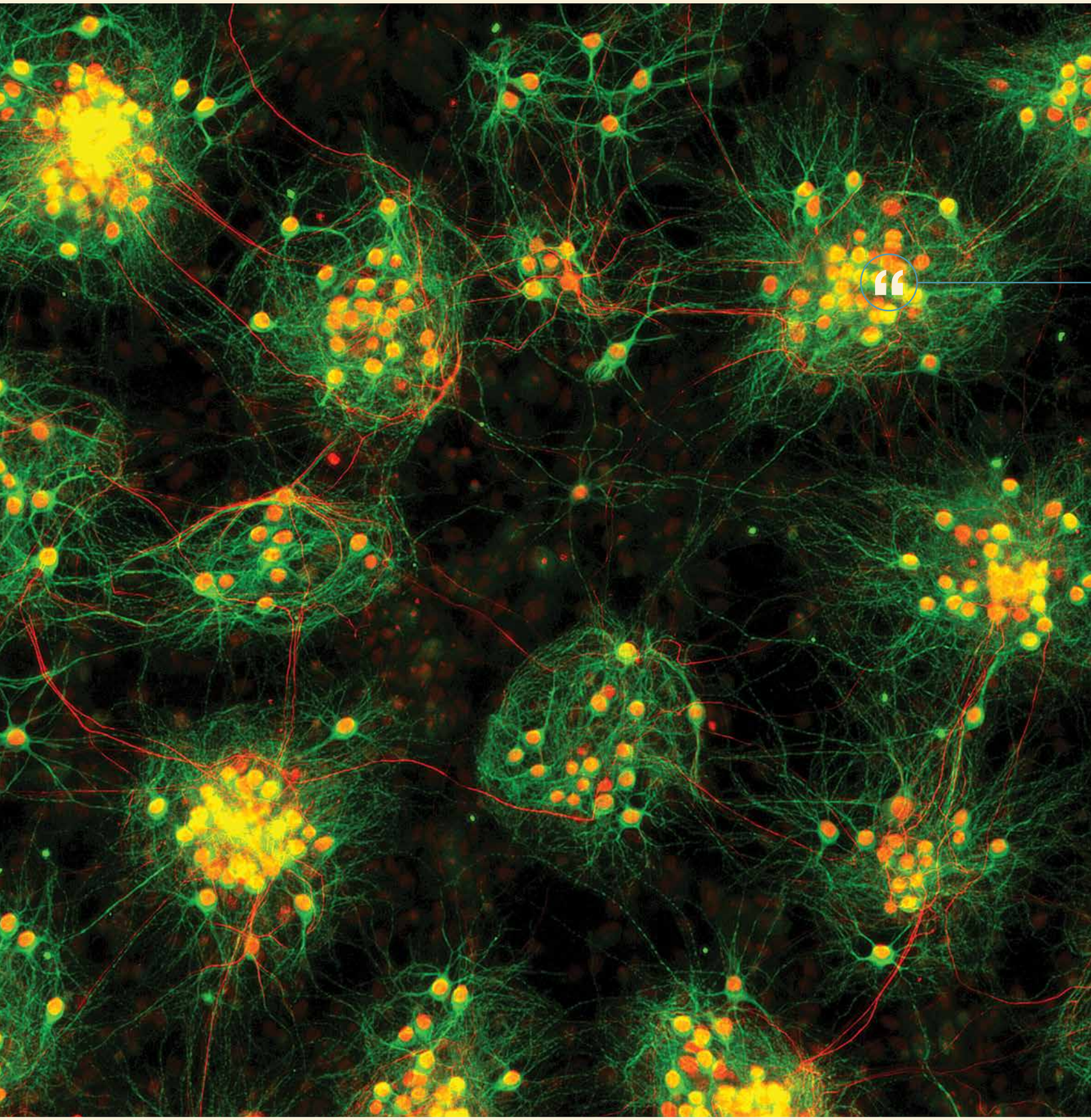
our stacks all in little piles and then we would have to put Post-its up on a wall and try to put our Post-its up to arrange…the schedule for the day so that…something from each theme was represented…It was hilarious."[79] The early small booklet of abstracts from the 1970s grew to two or more huge "telephone books" which members toted around at the meeting in the 1990s.[90] SfN was one of the first organizations to offer a way to search the abstract database electronically; for the 1989 meeting, members could dial in to the database via modem and search by keyword, author, institution, or session title.[81]

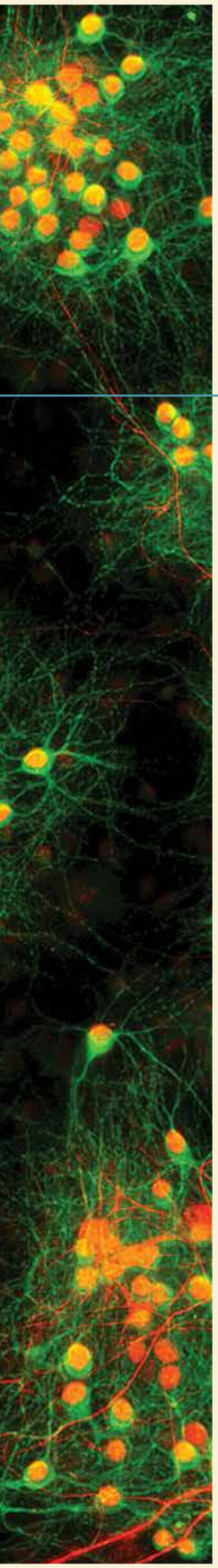
Annual Meeting planners were quick to adapt new technologies for efficiency and novel forms of communication. At the 1977 meeting, Floyd Bloom coordinated the first satellite symposium, linking speakers in Anaheim with an audience in Washington, D.C., "to show that you didn't actually have to physically travel to meetings in the future. You could actually attend by use of electronic means."[82]

The Annual Meeting was an opportunity for interdisciplinary contact, but it was also a chance for special interest groups to meet and share ideas and techniques. Groups on circadian rhythms, new software, and reptile research met at one or more meetings. In 1985, the process was formalized and special interest meetings and dinners were organized around more clearly defined scientific topics.[83]

Other special interest groups explored the less formal side of neuroscience. At the Cincinnati Meeting, a few members met with a local folk dance group. "Looking ahead to the Los Angeles Meeting, they anticipated that a fair number of registrants who are active, closet, or potential folk dancers might be interested in establishing sensorimotor interactions with other neuroscientists." They hoped to schedule a neuroscience folk dance evening workshop and asked interested parties to contact Andy Hoffer at NINDS with information about experience and which country's dances they prefer and/or would like to teach.[84] 70 dancers attended the event, led by neuroscientists John Garti and Bob Lloyd. "Participants ranged from experienced dancers who often had a chance to test out rusty cerebellar circuitry established decades earlier to raw beginners."[85]

Some neuroscientists made it a priority to stimulate their gustatory neurons. At the 1982 meeting in Minneapolis, there was an ancillary special interest dinner to explore "Capsaicin Burns at Both Ends: An evening of Sri Lankan Curry Cuisine…to introduce neurobiologists to one of the delightful uses of capsaicin practiced in Sri Lanka" followed by "a discussion of the present understanding of the neurotoxic effects of capsaicin on nociceptive transmission."[86] And after the 1989 meeting in Phoenix, Reuben Gellman organized a kosher neuroscience club so that those members who observed the kosher dietary laws could arrange for appropriate meals at the Annual Meetings.[87]





The Society would shape the field by its *pluralism of disciplines* connecting to form new insights, and its freedom from elitism.

LOUISE MARSHALL, 1970

Annual Meeting attendance certainly is one core measure of success. From this perspective, SfN was spectacularly successful. As shown in FIGURE 18, Annual Meeting attendance during the 1970s rose far more rapidly than any of SfN's founders could have imagined. A respectable number of 1,400 individuals had attended the 1971 Meeting. By the end of that decade, attendance had increased to almost 6,000, and abstract submissions (FIGURE 19) were about to exceed 3,600.

But this was only the start. By the early 1990s, Meeting attendance had increased by *300–400%*, to 18–22,000 annually, while abstract submissions kept pace, totaling 12,422 by 1995.[88]

To succeed in its early years, the Society faced two seemingly contradictory hurdles. On the one hand, the founders hoped to tie together a disparate group of scientists with the conceptual thread of neuroscience, which at times seemed extremely slender. On the other hand, they saw the organization's diversity as its strength and foresaw a society that fostered a kind of scientific "melting pot," marbling together multiple national and disciplinary traditions and practices, reflecting the cultural ethos of its American birthplace. Efforts to maintain both diversity as well as unity would occupy much of the SfN leadership's energies throughout the 1970s. But also during these early years, the Society found itself called on to define the organization's stance on public issues – those in which neuroscientists had specialized expertise, such as lobotomy, as well as those that involved members as citizens of the world, such as the problem of Soviet dissident scientists.

TAKING POSITIONS ON PUBLIC ISSUES

As part of SfN's mission to represent neuroscience to the general public as socially beneficial and responsible in these early years, the Social Issues Committee alerted the Council to public debates, issues and controversies that were particularly relevant to neuroscientists or to international issues, that affected the scientific community. The psychosurgery debate at the San Diego Meeting in 1973 was SfN's first such foray into public issues. Psychosurgery had become the topic of intense public scrutiny in the 1970s and was one of the most publicly visible issues confronted by SfN in this early period.[89] As with later issues, the SfN approach included expert discussion, consensus polling of the membership, and the readiness to present itself as the scientific authority. The Presidential Symposium featured a debate over a ban on the practice, proposed by the Potomac Chapter and covered in *The New York Times*.[90] In the membership vote that followed, 89% of respondents rejected "the idea of using psychosurgery for the solution of social problems, 73% thought it should be available with safeguards, 82% wanted more research with adequate safeguards, and 76% favored the establishment of a commission to promulgate guidelines."[91] In 1977, Robert Doty submitted this poll in testifying on behalf of the Society before the National Commission for the Protection of Human Subjects in Biomedical and Behavioral Research, and he presented SfN's recommendation "that psychosurgery be made available as a procedure of last resort for the desperately afflicted patient, but only in a context where careful evaluation is possible over a long period of time."[92] The practice was largely abandoned by the 1980s.

Other examples of SfN response to public issues in this period included a 1972 debate at the business meeting of a member-proposed resolution regarding the Soviet Union's emigration policy for Jewish scientists. These discussions forced the SfN leadership to define the boundaries of its democratic identity as they considered moral and ethical issues that were not strictly scientific but nonetheless had an impact on the scientific community at large.[93] Although the Council voted to approve the statement, it also created a Resolutions Committee to vet such politically charged proposals in the future.[94]

The spectacular growth of SfN during the 1970s reflects the self-reinforcing confluence of several factors. First, leaders of SfN brilliantly encouraged diversity while, at the same time, creating a unified identity. Second, federal funding for neuroscience rose rapidly

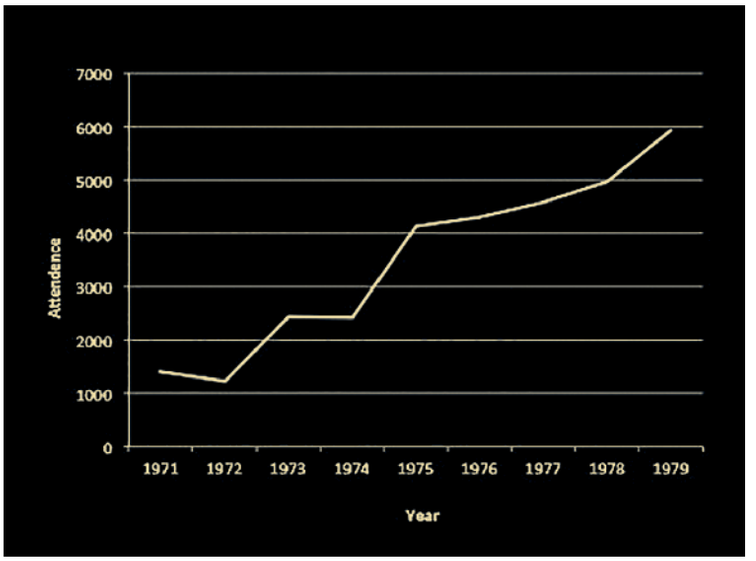


FIGURE 18. SfN Annual Meeting Attendance, 1971–1979.

graph by Joel Braslow

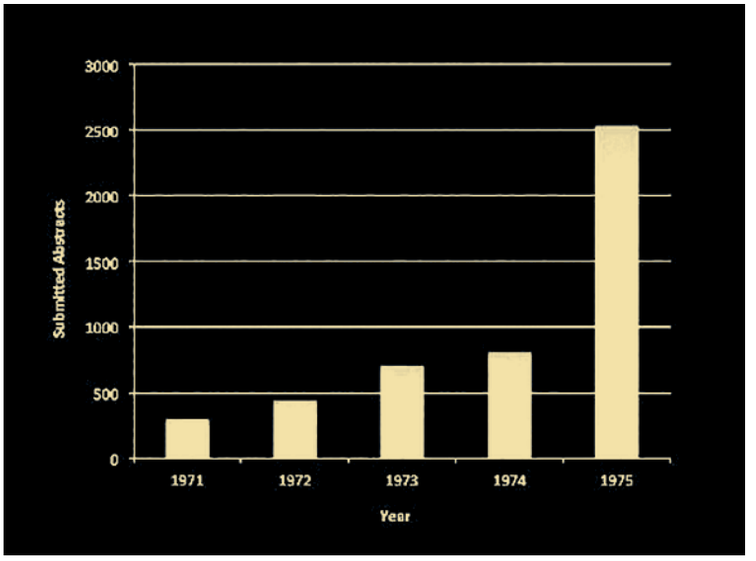


FIGURE 19. SfN Annual Meeting Abstracts, 1971–1975.

graph by Joel Braslow

during this period, a fact not unrelated to SfN efforts. Using the NINDS budget as an example of the growth in neuroscience funding, Congressional appropriations to this institute increased from $97 million in 1970 to nearly $242 million in 1980.[95] Third, neuroscientists had made a number of fundamental discoveries during this period of time. These discoveries not only merited nine Nobel Prizes by the year 2000, but also demonstrated the power of interdisciplinary efforts to understand the relationships between brain and behavior. The early SfN leadership wisely capitalized on this growing research capacity and scientific interest in neuroscience and invested it thoughtfully in programs that would further solidify and diversify the field. By the end of the first decade, the stage was set for the new discipline to come of age.

CENTRAL OFFICE & STAFF

The Washington, D.C. area was the logical location for SfN headquarters and the organization relied on its close link to the National Academy of Sciences during its initial startup period. For two years, the SfN central office was located at the National Academy of Sciences on Constitution Avenue, before moving to offices in the Federation of American Societies for Experimental Biology (FASEB) building in Bethesda, Maryland. FASEB provided SfN with logistical support, particularly for the Annual Meeting, until the Society moved back into Washington, to 11 Dupont Circle, in January 1984. Three years later, SfN moved into larger quarters in the same building, remaining there until 2006, when the Society purchased its current building on 14th Street NW.[96]

From the beginning, the diverse and rapidly growing Society required a significant amount of clerical and organizational assistance. In the fall of 1969, Louise Marshall hired an Executive Secretary, who was the first and, for some time, the only paid staff member. The initial responsibilities of this job included keeping the minutes at Council meetings, coordinating communications for the Annual Meeting, and maintaining membership applications. The first Executive Secretary, Marjorie Wilson, served for 11 ½ years, hiring new staff to assist her as the workload increased; she was much beloved by the SfN leadership and members, and was awarded honorary membership in 1980 in recognition of her devotion and hard work.[97]

As the Society expanded, the staff grew along with it. By 1980, the staff included a membership director/bookkeeping manager, a publications director/newsletter managing editor, an administrative secretary, and a membership secretary. The executive secretary was replaced by an executive director with professional administrative experience, and a special projects coordinator came on board to work with the Committee on Animal Research and the Governmental and Public Affairs Committee. By 1987, there were a dozen individuals in six departments working in the central office at Dupont Circle. (SEE FIGURE 20); these gradually expanded to 50 staff in 12 departments by 1999.

The Central Office Moves Up in the World

The Society's central office has moved up — up four stories, that is — to new headquarters at 11 Dupont Circle, *Suite 500*. The move has allowed expansion of our working space to better serve the Society's growing membership. Society members are invited to visit the new office.

Among the many activities conducted by the central office during the year are the following:

Publications: *Call for Abstracts, Preliminary Program, Program, Abstracts* Volume, *Short Course Syllabi, Restaurant Guide, Neuroscience Newsletter, Neuroscience Training Programs in North America* handbook, *Membership Directory, Chapter Manual, Annual Reviews, The Journal of Neuroscience.*

Committees: 14 Standing Committees, annual Ad Hoc Committees.

Awards and Lectures: Young Investigator Award, Donald B. Lindsley Prize in Behavioral Neuroscience, Ralph W. Gerard Prize in Neuroscience, Grass Foundation Lecture, Warner-Lambert Lectureship for Distinguished Foreign Scientist, Presidential Symposium, Presidential Special Lectures, Special Lectures.

Chapters: Grass Traveling Scientist Program.

Public Information: Science Writers' Seminar, Annual Meeting Press Room services.

Special Projects: Short Courses, Neurobiology of Disease Workshop, Minority Travel Fellowship, BITNET, MINDEX, Annual Meeting Exhibits, Placement Service, IBRO Travel Grants to Budapest, Sustaining Associate members, Audiovisual Tapes/Slides/Cassettes, Continuing Medical Education. Also: sessioning 6,762 abstracts; collecting 11,300 membership dues and numerous *Journal* subscriptions; administrating private grants and contracts; arranging local events at Annual Meeting host cities, satellite and ancillary events, and special interest events; and selling publications.

The Central Office Staff (front row, left to right): Latima McClearn, Receptionist; Vanessa Springfield, Membership Assistant; Lois Morris, Special Projects Coordinator; Nancy Smith, Legislative Aide; (back row, left to right) Nancy Boang, Executive Director; Sharon Debene, Membership Director; Ramona Sawyer, Executive Secretary; Anne Sundermann, Editor/Meeting Assistant; Helen Tsi, Annual Meeting Manager; Tracy Bailey, Administrative Assistant; Arunas Pemkas, Accountant/Bookkeeper; Marianne Glass Duffy, Public Information Manager.

FIGURE 20. SfN Central Office Staff Photo, *Neuroscience Newsletter* vol. 18 no. 4, July/August 1987: 3.

NHA-UCLA.

SFN BUDGETS & FINANCIAL GROWTH, 1970–1995

The Society treasurer's annual reports, which were regularly published in the *Neuroscience Newsletter*, revealed the challenges of a growing organization. SfN in its first year, 1969–70, collected only $8,470 in member dues and relied heavily on a $20,000 grant from the National Academy of Sciences. Fortunately, its expenses were meager, only $6,288 for personnel and another $9,000 for office costs.[98] Another grant from the Sloan Foundation provided an additional cushion the following year, which was needed since the first Annual Meeting set the Society back $4,736, and the second around $10,000. Beginning with San Diego in 1973, however, the Annual Meeting became a revenue generator, earning $20,000 for SfN that year. By 1975, with dues revenues at nearly $60,000 and meeting registrations at $53,000, Treasurer Martin Larrabee was able to report confidently that the Society had become independent of grant support and could maintain a 20% reserve.[99]

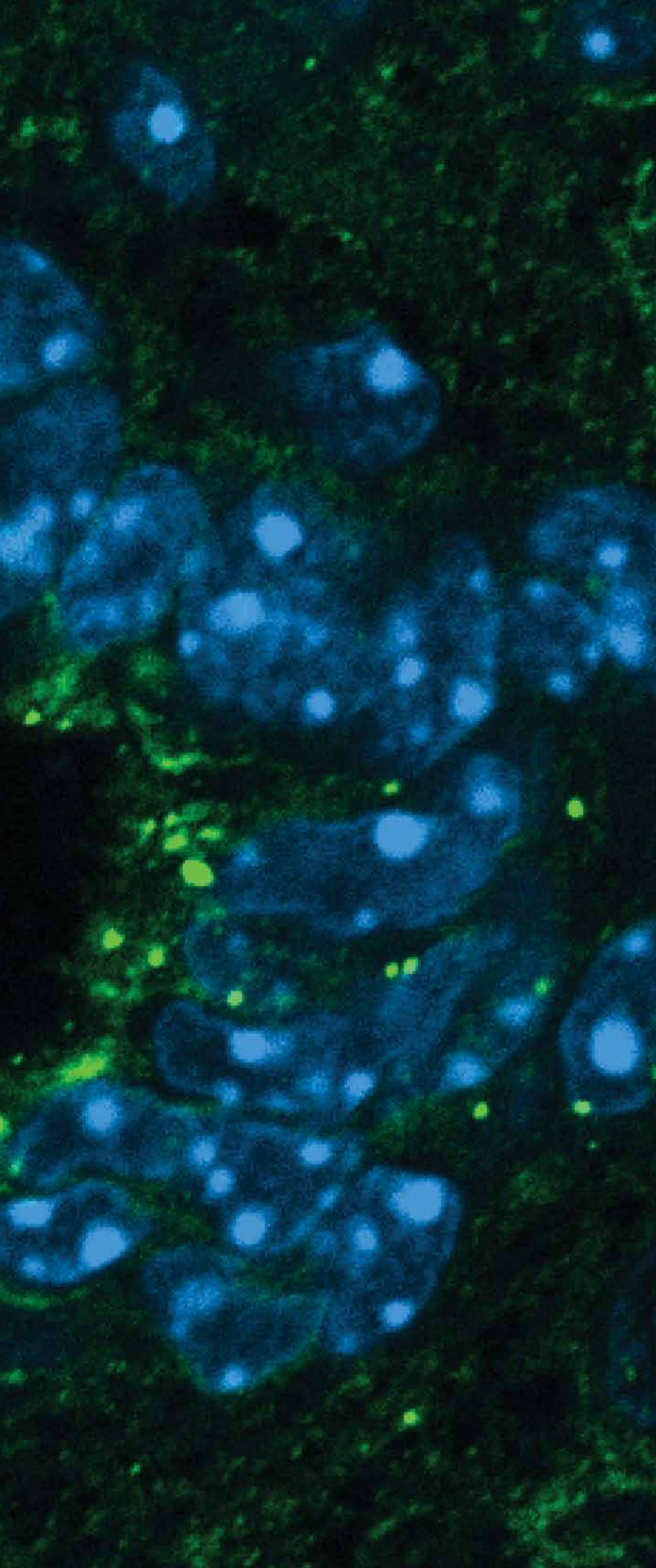
Building and investing a reserve became critically important in the late 1970s; although registration income continued to grow, the costs of printing the meeting program and abstracts book and distributing these to all members also increased, often exceeding Annual Meeting revenues. In fiscal year 1980, for example, Treasurer Bernice Grafstein reported that the costs of Annual Meeting and related publications had resulted in a $19,000 deficit, which would necessarily be covered from the capital reserve fund. Dues, grants, and other income from regular operations adequately covered regular operating expenses.[100]

Over the next decade, continued membership growth, income from exhibitors, and increasingly professional management put the Society on a more stable footing, despite occasional fluctuations. In 1989, the Treasurer was able to report an excess of $332,239 in revenues over expenses, and, in 1990, the lower but still healthy figure of $159,858. Membership dues and Annual Meeting revenues were nearly equal contributors to the total revenue of $3.8 million, but general operations expenses now exceeded Annual Meeting costs by $500,000, with printing and mailing costs outweighing even salaries.[101] Still, maintaining a reserve and ensuring financial viability would remain a challenge for SfN until the new millennium.

CHAPTER
IV

DISCIPLINARY CONSOLIDATION

MID-1970s TO
THE EARLY-1980s



BY 1975, SFN WAS A SUCCESSFUL SOCIETY with a large and rapidly growing membership and a vibrant Annual Meeting, and stood as a growing force within academia and the federal government. Neuroscience, nevertheless, was still developing its disciplinary identity within the larger scientific community. The Society and its leadership worked hard to create an integrated disciplinary identity that, at the same time, allowed for multiple perspectives, experimental approaches and practices, and levels of analysis.

The Society's work in this period may be seen as comparable to that of the professionalization of medicine and the creation of medical specialties in the early 20th century. A profession is usually defined by the degree to which it is able to control entry into its ranks (through definition of educational standards and licensure); control of its working practices, conditions, and standards; and socialization of its members (through education and the creation of ethical and professional codes). Medicine is considered the most successful example of a profession; other professions, such as law, nursing, accounting, and engineering, also meet the criteria, depending on the degree to which they are able to exercise control over working practices and conditions.[102] The status of neuroscience as a true profession may be debated as no one is licensed to pursue this occupation and practitioners must generally seek work in academia, government, or industry (today often true of physicians as well).

The founding of SfN, however, and its creation of a leadership group, an Annual Meeting, and eventually a journal, enabled the members of the field to achieve a measure of professional control. The meetings played an important role in socializing young scientists through introductions to mentors and collaborators and through tacit instruction in the meaning and scope of "neuroscience" and the topics, practices, and productions that would gain legitimacy in the field. The leadership helped to give intellectual and ethical definition to the idea of a neuroscientist by becoming "the public face of neuroscience," ensuring access to scientists from all demographic groups, taking stances on both social and scientific issues, publicizing the important contributions of the field, and, in particular, championing the prerogatives of its members to pursue research on their own terms, with adequate funding and independent governance over their work practices. All these strategies helped the Society to avoid fragmentation and allowed members who were pursuing diverse lines of research to see their work as integrated into a larger whole.

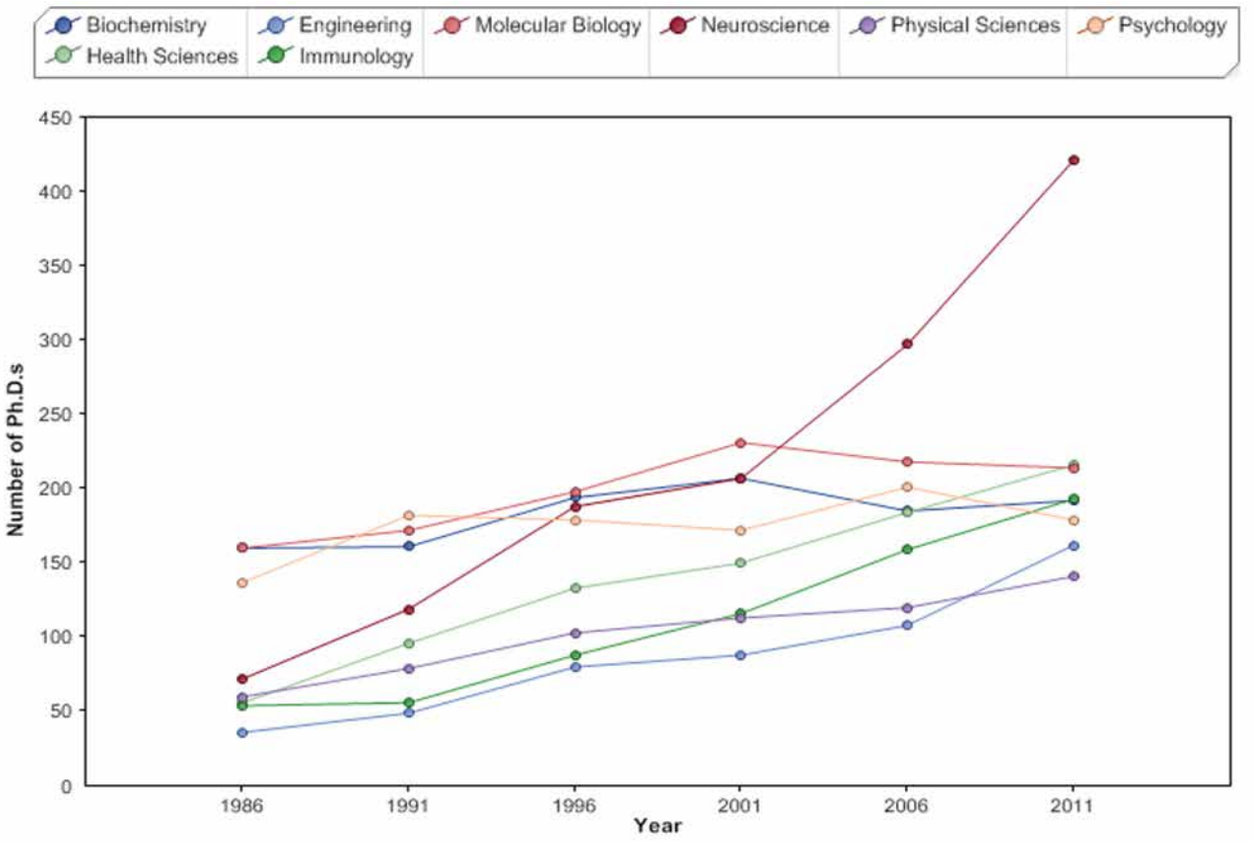
EDUCATING FUTURE NEUROSCIENTISTS

Standardizing educational principles are, of course, a key feature of disciplinary consolidation. The Society, early on, took this as an important aspect of its mission. The Society sponsored surveys of interdisciplinary programs and contributed to manpower studies of neuroscience. The Education Committee, created in 1971, provided resources for setting up new departments of neuroscience at leading academic institutions and produced a directory of neuroscience programs every two years. In 1972, the committee offered its suggestions for recommended subjects for preparing for graduate study in neuroscience, suggesting that students study not only biochemistry, physiology, and experimental psychology, but also statistics and molecular and cell biology.[103] Such rigorous recommendations did not deter students from entering the field. The Society and the field were growing rapidly; neuroscience-related doctorates had increased by about 10% a year from 1970 to 1974.

The number of newly minted neuroscience-related PhDs continued to rise throughout the 1980s and 1990s. As with the 1960s and 1970s, PhDs in neuroscience rose more rapidly than other bioscience PhDs. This was especially the case for those PhDs supported by NIH. FIGURE 21 compares major fields of

FIGURE 21. Major Fields of NIH-Supported PhDs 1986–2011.

From NIH Databook at: http://report.nih.gov/nihdatabook/charts/Default.aspx?chartId=267&catId=21.



study of PhD recipients supported by NIH from 1986 to 2011. As can be seen, the number of neuroscience-based PhDs supported by the NIH increased more rapidly than any other field. By the early 2000s, neuroscience surpassed all other NIH-supported PhDs. Underscoring the importance of neuroscience in the first decade of the 21st century, the number of neuroscience dissertations exceeded molecular biology dissertations, the second most frequent NIH-supported dissertation topic, by a factor of two.[104]

By 1979, SfN membership had soared to more than 6,000. This dramatic expansion is largely attributable to mentoring by Society leaders and elder members, to an expanding funding base, and to the growing excitement of new scientific discoveries in the field during the 1970s, enhanced by several Nobel prizes honoring scientists for their work in neuroscience. Throughout the next five decades, an impressive number of scientists working in diverse disciplines were recognized by the Nobel Foundation for their neuroscience-related achievements or went on after receiving the prize to make major contributions to neuroscience.[105]

FIGURE 22. Nobel Prize Winners (1970–2021) Making Major Contributions to Neuroscience

Sir Bernard Katz, Ulf von Euler, and **Julius Axelrod** were awarded the 1970 Nobel Prize in Physiology or Medicine "for their discoveries concerning the humoral transmitters in the nerve terminals and the mechanism for their storage, release and inactivation."

https://www.nobelprize.org/prizes/medicine/1970/summary

Gerald M. Edelman and **Rodney R. Porter** were awarded the 1972 Nobel Prize in Physiology or Medicine "for their discoveries concerning the chemical structure of antibodies."

https://www.nobelprize.org/prizes/medicine/1972/summary

Baruch S. Blumberg and **D. Carleton Gajdusek** were awarded the 1976 Nobel Prize in Physiology or Medicine "for their discoveries concerning new mechanisms for the origin and dissemination of infectious diseases."

https://www.nobelprize.org/prizes/medicine/1976/summary

Roger Guillemin and **Andrew V. Schally** were awarded the 1977 Nobel Prize in Physiology or Medicine "for their discoveries concerning the peptide hormone production of the brain."

https://www.nobelprize.org/prizes/medicine/1977/summary

David H. Hubel and **Torsten N. Wiesel** were awarded the 1981 Nobel Prize in Physiology or Medicine "for their discoveries concerning information processing in the visual system."

https://www.nobelprize.org/prizes/medicine/1981/summary

Roger W. Sperry was awarded the 1981 Nobel Prize in Physiology or Medicine "for his discoveries concerning the functional specialization of the cerebral hemispheres."

https://www.nobelprize.org/prizes/medicine/1981/summary

Stanley Cohen and **Rita Levi-Montalcini** were awarded the 1986 Nobel Prize in Physiology or Medicine "for their discoveries of growth factors."

https://www.nobelprize.org/prizes/medicine/1986/summary

Susumu Tonegawa was awarded the 1987 Nobel Prize in Physiology or Medicine "for his discovery of the genetic principle for generation of antibody diversity."

https://www.nobelprize.org/prizes/medicine/1987/summary

Erwin Neher and **Bert Sakmann** were awarded the 1991 Nobel Prize in Physiology or Medicine "for their discoveries concerning the function of single ion channels in cells."

https://www.nobelprize.org/prizes/medicine/1991/summary

Stanley B. Prusiner was awarded the 1997 Nobel Prize in Physiology or Medicine "for his discovery of prions – a new biological principle of infection."

https://www.nobelprize.org/prizes/medicine/1997/summary

Arvid Carlsson, Paul Greengard, and **Eric R. Kandel** were awarded the 2000 Nobel Prize in Physiology or Medicine "for their discoveries concerning signal transduction in the nervous system."

https://www.nobelprize.org/prizes/medicine/2000/summary

Sydney Brenner, H. Robert Horvitz, and **John E. Sulston** were awarded the 2002 Nobel Prize in Physiology or Medicine "for their discoveries concerning genetic regulation of organ development and programmed cell death."

https://www.nobelprize.org/prizes/medicine/2002/summary

Richard Axel and **Linda B. Buck** were awarded the 2004 Nobel Prize in Physiology or Medicine "for their discoveries of odorant receptors and the organization of the olfactory system."

https://www.nobelprize.org/prizes/medicine/2004/summary

Osamu Shimomura, Martin Chalfie, and **Roger Y. Tsien** were awarded the 2008 Nobel Prize in Chemistry "for the discovery and development of the green fluorescent protein, GFP."

https://www.nobelprize.org/prizes/chemistry/2008/summary

James E. Rothman, Randy W. Schekman, and **Thomas C. Südhof** were awarded the 2013 Nobel Prize in Physiology or Medicine "for their discoveries of machinery regulating vesicle traffic, a major transport system in our cells."

https://www.nobelprize.org/prizes/medicine/2013/summary

Eric Betzig, Stefan W. Hell, and **William E. Moerner** were awarded the 2014 Nobel Prize in Chemistry "for the development of super-resolved fluorescence microscopy."

https://www.nobelprize.org/prizes/chemistry/2014/summary

John O'Keefe, May-Britt Moser, and **Edvard I. Moser** were awarded the 2014 Nobel Prize in Physiology or Medicine "for their discovery of cells that constitute a positioning system in the brain."

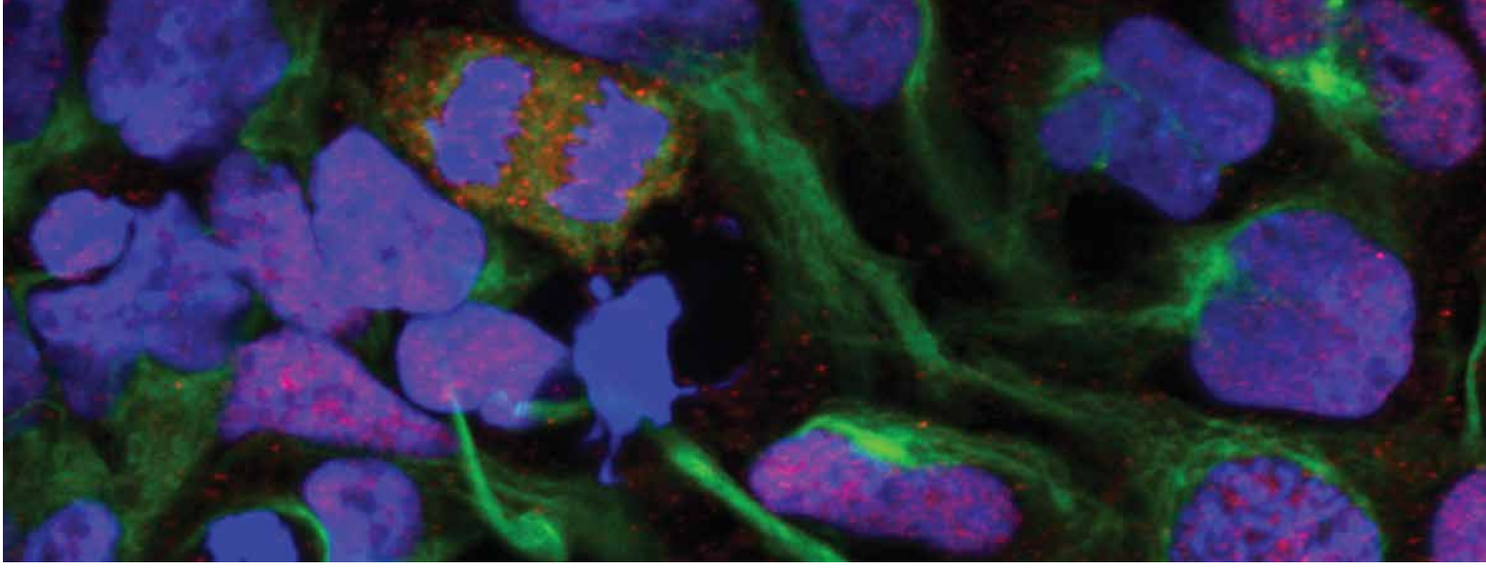
https://www.nobelprize.org/prizes/medicine/2014/summary

Jeffrey C. Hall, Michael Rosbash, and **Michael W. Young** were awarded the 2017 Nobel Prize in Physiology or Medicine "for their discoveries of molecular mechanisms controlling the circadian rhythm."

https://www.nobelprize.org/prizes/medicine/2017/summary

David Julius and **Ardem Patapoutian** were awarded the 2021 Nobel Prize in Physiology or Medicine "for their discoveries of receptors for temperature and touch."

https://www.nobelprize.org/prizes/medicine/2021/summary



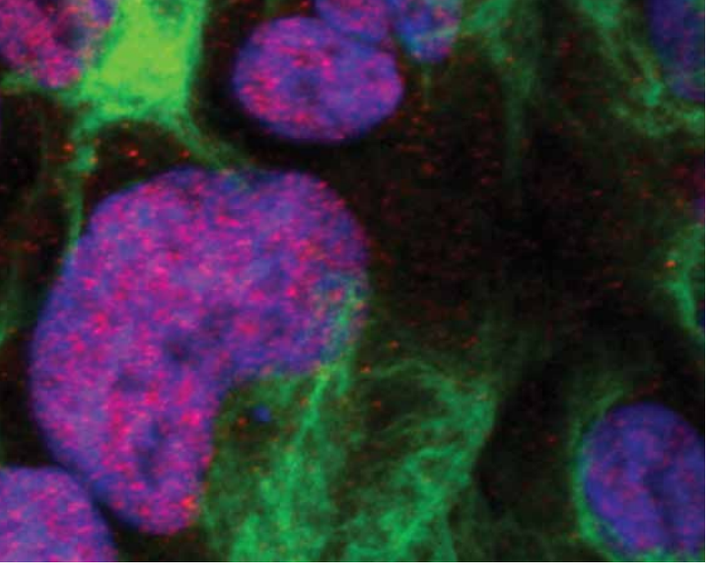
Both established and young neuroscientists were able to explore the brain and nervous system more deeply in the mid-to-late 1970s, making use of new technologies in imaging, including early prototypes of MRI and PET scanners. Other innovative methods were used in molecular biology and chemistry to identify the opioid receptors and the enkephalins and to analyze the acetylcholine receptors as well as in basic neurophysiology, where the patch-clamp technique made possible the recording of subcellular activity.

Researchers of the early 1980s revealed the great versatility of the nervous system by clarifying some of the mechanisms of long-term potentiation and neuroplasticity that underlie learning and memory. These new methodologies and approaches opened up research into many neurological diseases – a good example being the targeted efforts of the Hereditary Disease Foundation team that identified the genetic locus of Huntington's disease in 1983.

For SfN, managing this remarkable rate of growth entailed efforts to promote and facilitate investment in education and research. In September 1978, SfN hosted a three-day meeting in Arlington, Virginia, bringing together representatives of 57 federal and academic organizations with 21 neuroscientists to discuss "Projecting Future Needs of Neuroscience." The conveners announced: "The Society, with an expanding membership that will exceed 6,000 by 1979, is now recognized as the primary professional organization in the basic brain sciences in North America. The phenomenal growth of the Society reflects the explosive development of neuroscience, which promises to remain at the forefront of the life sciences and to make exciting contributions for some years to come." SfN leaders encouraged universities and the federal government to plan for significant investment in the field and felt "obligated to contribute to such planning by utilizing its resources to provide information on the status of the field and to project the future thrusts and needs of neuroscience."[106] Conference participants noted that data on the number of neuroscientists working in the field was still fragmentary, an inadequacy due in part to "the interdisciplinary nature of the field and the fact that 'neuroscience' has not been clearly defined."[107] The field was expanding so fast and its members and research programs were moving in such varied directions that a simple definition remained elusive.

PLANNING AHEAD

By 1981, SfN President David Cohen recognized that although SfN's governance to that point had been characterized by "an imaginative flexibility tempered by an appropriate sense of stability," ongoing self-evaluation was essential to avoid the threat of "over-institutionalization and stagnation" faced by organizations as they reached a certain size. Cohen organized a Long-Term Planning Project in which 43 members participated on 9 task forces to review the Society's



achievements and activities in the previous 10 years and recommend strategies for the future. Their proposals and recommendations were reviewed and in some cases amended by a steering committee, which included Cohen, Floyd Bloom, Jack Diamond, and Dominick Purpura.[108] The Committee reported to the Council in November 1983 with a Long-Range Planning Report, which reaffirmed many of the existing policies and programs. The key recommendations, most of which were implemented, included the following:

1. Augmenting the participation of non-North American scientists at Annual Meetings and enhancing communication with the leaders of international neuroscience organizations.[109]
2. Expanding educational activities in several areas, including training in new methods for members; lectures, workshops, and travel grants for undergraduates; and short lab-based courses for medical students.[110]
3. More specific guidelines for symposia and special lectures and "smaller, more diverse social gatherings" at the Annual Meetings. Strategies for limiting the number of abstract submissions to 3,600 were considered but no consensus was reached. The balance of basic and clinical science topics "should be permitted to self-regulate."[111]
4. Expansion of the Council to include three ex-officio members, one each from Canada, Mexico, and the U.S., to represent the needs of members within their respective countries and investigation of mechanisms to ease restrictions on the use of federal grant funds for scientific travel, particularly between Mexico and the U.S.[112]
5. Development of a pool of senior neuroscientists to assist the Government and Public Affairs Committee in providing congressional testimony and similar advocacy. The task force did not recommend the hiring of a lobbyist.[113]
6. Review of the current committee structure and better definition of the activities of the Social Issues Committee, which was thought to have "languished" for some years, although recently more active.[114]

On balance, the steering committee found that the task forces' recommendations "would lead the Society in an orderly evolution toward better service to its membership and increasingly effective representation of the field of neuroscience," and it hoped that such "regular, thoughtful self-evaluation" of the Society's work and governance would continue.[115] The task forces also made recommendations regarding publications, finance, the central office, regional and sectional issues, and governance structure and membership, in most cases approving the status quo but suggesting ongoing review.[116]

RECOMMENDATIONS OF THE 1983 LONG-RANGE PLANNING TASK FORCES

1. The International Activities Task Force (chaired by Floyd Bloom) recommended augmenting the participation of non-North American scientists at U.S.-based meetings and enhancing communication with the leaders of international neuroscience organizations.[117]

2. The Education Task Force (chaired by Lorne Mendell) proposed expanding educational activities in several areas, including a new Medical Education Committee to compile and assess medical school and post-graduate training in neuroscience; training courses in new methods for members (if the need were documented by a member survey); a fund to assist young neuroscientists; expansion of the Grass Travelling Lectureships; a summer laboratory information bank, as well as lectures, workshops and travel grants for undergraduates; and short lab-based courses for medical students.[118]

3. The Annual Meeting Task Force (chaired by Dale Purves) contributed an extensive set of recommendations, in balance "endors[ing] the status quo with a gradual evolution toward something better." The group felt strongly that the Program Committee should assume more responsibility in ensuring "the scientific quality" of the meetings.[119] In particular, the existing procedures for scheduling symposia appeared "too haphazard." The task force suggested that each Program Committee member generate two symposium proposals; that one symposium focus on "a specific neurological disorder;" and that historical and "other more imaginative" topics be encouraged. The group thought special lectures, including presidential lectures, should be coordinated by the Program Committee, although the steering committee advised that the president and Program Committee should consult together.[120] Similarly, the task force proposed that the Program Committee oversee awards, but the steering committee insisted that this responsibility be retained by the Council. Finally, "smaller, more diverse social gatherings" at the Annual Meetings were suggested.[121] Strategies for limiting the total number of abstract submissions to 3,600 and restricting members from submitting multiple abstracts were considered by the task force and by the steering committee, but no consensus was reached, except for the proposal that no member be allowed to sponsor an abstract submitted by another member.[122] The task force recommended maintaining the existing mix of platform and poster presentations and accepting that the balance of basic and clinical science topics "should be permitted to self-regulate."[123]

4. The Regional and Sectional Issues Task Force (chaired by Donald Humphrey) endorsed continuing and strengthening the existing "mature and successful" chapter structure. This task force also tackled the problems of representation of Canadian and Mexican members, although recognizing that "no mechanism" existed for the Society to fully address these. However, the group proposed the expansion of the Council to include three ex-officio members, one each from Canada, Mexico, and the U.S., to represent the needs of members within their respective countries, and investigate mechanisms to ease restrictions on the use of federal grant funds for scientific travel, particularly between Mexico and the U.S. The steering committee, however, felt the addition of ex officio members to the Council to be inappropriate and suggested as an alternative the creation of an ad hoc committee, including several members from the non-U.S. countries."[124] Some Canadian members had the previous year proposed forming a separate society, which would address in particular research funding for neuroscience by their government. The Council had been very concerned by this possibility and expressed its continued commitment to Canadian (and Mexican) representation on the Council.[125] Addressing the needs and concerns of scientists in the neighboring nations has remained an SfN priority.

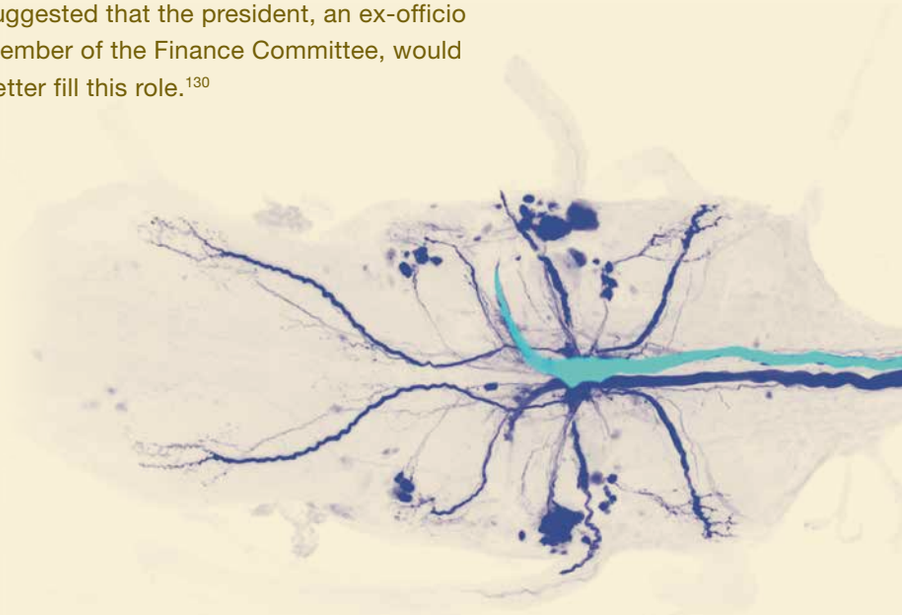
5 The Central Office Organization Task Force (chaired by Bruce Smith) conducted a thorough analysis of the office's existing structure and functions and made a strong case for its professionalization, including a flexible budget; increased discretionary powers for the executive director; increasing the staff over 5 years and improving salaries and benefits; automating many central office tasks and broadening its functions to include those now handled by standing committees, allowing the committees to concentrate on policy; expanding the office space to 2,500 square feet and periodically reviewing the option of purchasing dedicated space. The task force also suggested creating a liaison group of three senior members to review and consult with the central office staff and liaise with the council and committees. The steering committee pointed out that "the Officers of the Society have such a liaison as an important part of their responsibility" and should continue in this role.[126]

6 The Social and Public Policy Task Force (chaired by Daniel Freedman and Robert Dismukes) noted that the work of the Governmental and Public Affairs Committee was "considered crucial," but had up to that time relied on "the loosely coordinated but skilled and energetic efforts" of a few. The task force recommended more consultation with Society leadership, a closer liaison with the public information office and, in particular, the development of a pool of senior neuroscientists to assist the Government and Public Affairs Committee in providing congressional testimony and similar advocacy. The group did not recommend the hiring of a professional lobbyist. This task force also recommended more careful consideration of appointees to and questions to be addressed by the Social Issues Committee to improve the usefulness of that committee, which was thought to have "languished" for some years, although recently more active."[127]

7 The Governance Structure and Membership Task Force (chaired by Michael Bennett) reaffirmed the open membership policy, re-emphasized "the importance of intense involvement" of the Council in all Society business and of regular communication with the standing committees, and recommended review of the current committee structure and periodic review of the bylaws.[128]

8 The Publications Task Force (chaired by Gerald Fischbach) noted that *The Journal of Neuroscience* had "become a respected forum in a remarkably short period of time." The group suggested imposing "even more demanding criteria for acceptance," but also endeavoring to include more non-U.S. papers and suggested possible expansion of *The Journal* to two publications, one on molecular and one on systems neuroscience. Finally, it was recommended that the *Neuroscience Newsletter* be published more frequently and develop "more newsy and scientific" content.[129]

9 The Finance Task Force (chaired by Bernard Agranoff) offered three major recommendations: to extend the treasurer's term to three years, create an office of treasurer-elect and appoint one member of the Finance Committee to liaison with the central office. The steering committee however felt that this "liaison" member would create possible conflicts with the treasurer and suggested that the president, an ex-officio member of the Finance Committee, would better fill this role.[130]



A DISCIPLINE "FREE OF BIAS"

From its inception, the SfN founders had believed the Society would be an integrating force for neuroscience not only in the United States but also globally. Such a society would include members of both sexes and all ethnicities, reflecting their vision of a neuroscience not restricted by disciplinary, national, or demographic boundaries. The social realities of American racial and gender disparities made it especially difficult to create a society that met these aspirations, and both leaders and members worked toward this visionary goal.

SfN was founded at a transformative time of growing feminist and ethnic consciousness in many parts of the world. Responding to the civil rights and feminist movements of the 1950s and 1960s, the American scientific community confronted the problem of female and minority participation in science. Scientific societies examined the role of women in their disciplines, universities struggled to account for the lack of female faculty members, and female scientists helped to found the National Organization of Women. In the early 1970s, U.S. educators and policymakers took concrete steps to encourage more women and racial minorities to study and practice science, culminating in the 1972 passage of the Equal Employment Opportunity Act, which included the famous Title IX, banning sex discrimination in any part of an institution receiving federal funds.[131]

Neuroscience researchers meanwhile compared the percentage of women in their field to their participation in comparable biological and behavioral fields. A 1974 National Research Council survey found that women received 20% of PhDs in neuroscience in 1973, twice the rate of 10 years earlier, and comparable to the 21.5% receiving PhDs in all the biosciences.[132] Louise Marshall, in her 1976 inventory of American neuroscientists conducted with Sloan Foundation support, found that women made up 22% of neuroscience graduate students, but only "12% of the entire personnel pool" in the field. Female students in that year earned 23% of all biomedical degrees and 33% of behavioral science doctorates.[133]

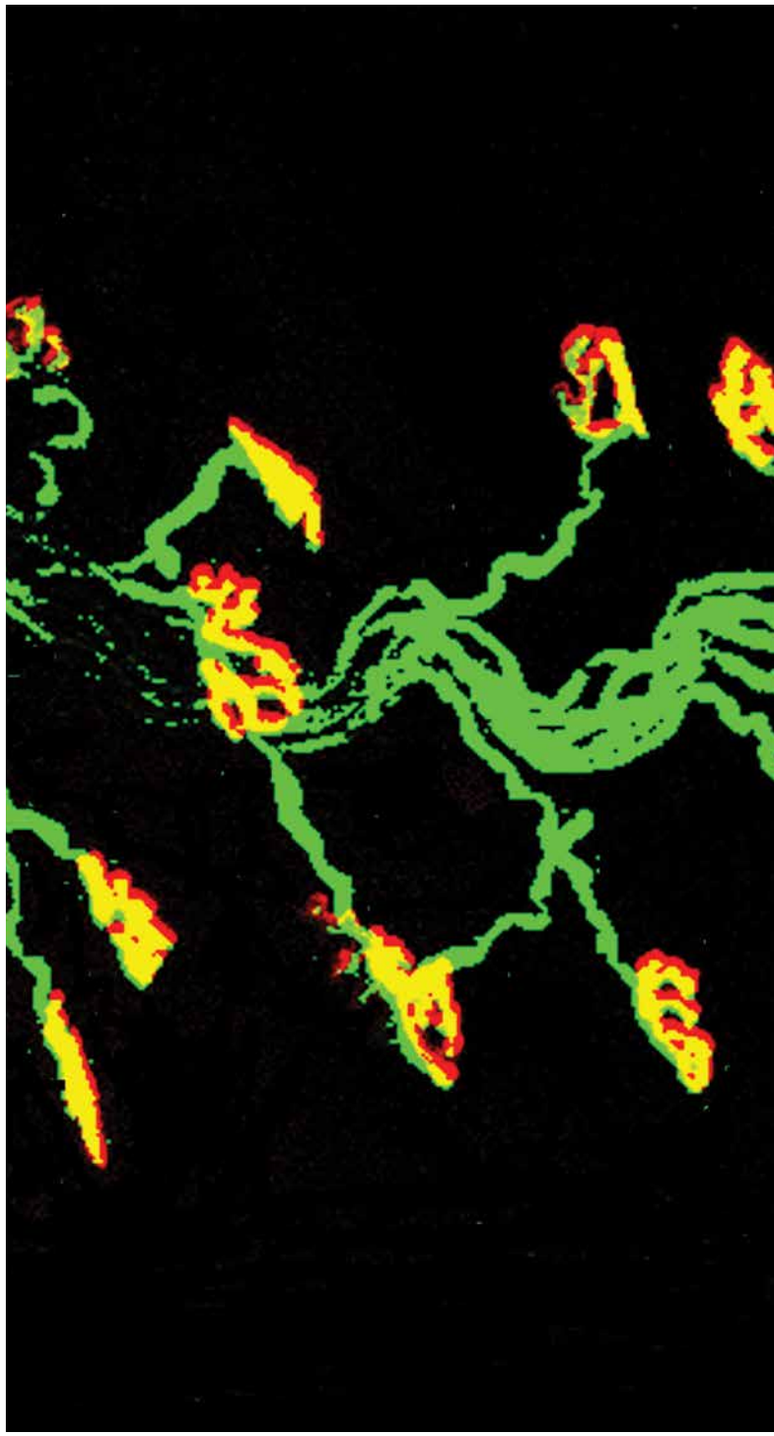
While the bylaws did not explicitly state it, the Society for Neuroscience did not discriminate against women or minorities; membership was open to any scientist regardless of race or gender who was conducting research on the brain and behavior. Women constituted approximately 20% of SfN membership throughout the 1970s. In 1977, however, the Society was asked to take a more public stance. MaryLou Cheal, a researcher from the McLean Hospital in Massachusetts, introduced a resolution at the business meeting in Anaheim, California, suggesting that starting in 1980, the Society only meet in states that had ratified the Equal Rights Amendment (ERA), passed by Congress in 1972. This would prevent the Society from meeting in several large cities, such as Las Vegas, Chicago, and Atlanta. The National Organization of Women had suggested this boycott in an attempt to apply economic pressure on states to ratify the ERA, and several scientific societies including the American Psychological Association and the American Association for the Advancement of Science had chosen to participate.[134]

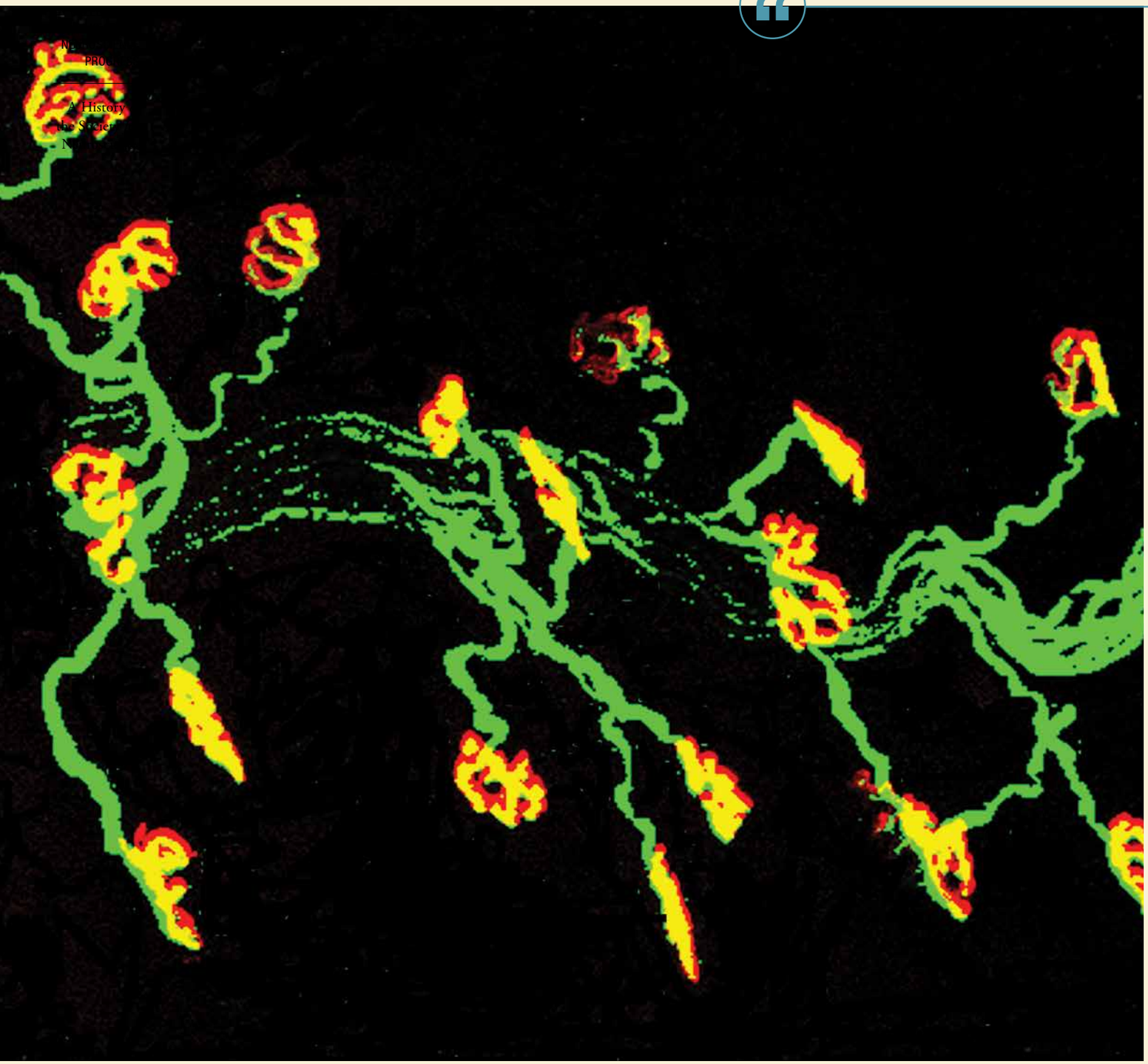
In response to Cheal's resolution, the SfN Council "reaffirm[ed] and resolve[d]" its commitment to equal employment opportunity and that all official business would continue to be "transacted in the spirit of this principle."[135] But since only a small proportion of the membership had attended the business meeting, the Council decided to poll members though the *Neuroscience Newsletter* before acting on a proposal that would have practical and economic effects on the Society. Less than 12% of SfN members responded to this poll, a "disappointing" return, but the majority favored restricting the Annual Meeting to ERA states. Some members expressed "concern about the Society's becoming involved in any form of political activity." Council "delayed taking any formal action on the resolution,"[136] but, after another round of polling, adopted this requirement in 1977 for choosing cities to host the Annual Meeting. SfN met only in ERA states from 1984 until 1987 (the locations for 1980–83 had been scheduled prior to the Council action).[137] The deadline for legislative

ratification passed in 1982, and by the late 1980s it had become impractical for the burgeoning Society to avoid non-ERA states. The Long-Range Planning Committee recommended that the rule be dropped after 1987.[138]

At the 10th Annual Meeting in Cincinnati, meanwhile, more than 200 female neuroscientists attended a reception sponsored by the Association for Women in Science, which "turned out to be both a serious scientific meeting and a group therapy session."[139] This group "unanimously voted to formalize their desire for a women's caucus," to be known as Women in Neuroscience (WiN),[140] and selected five women to serve on an executive committee, with Candace Pert of NIMH serving as chair. In part, the group was motivated by some SfN-sponsored "special interest" events at previous Annual Meetings, in which inappropriate gender-based humor had been the special interest on the agenda. In addition to protecting the interests of female neuroscientists and students in the field, WiN also sought to emphasize the importance of women as subjects of scientific study in neuroscience research. The group made plans to sponsor several professional development events and to provide childcare resources at future Annual Meetings.[141]

After holding their own special interest dinner and discussion at the Los Angeles Meeting in 1981, the WiN Executive Committee focused its attention on "the paucity of women in the upper echelons of the Society for Neuroscience as well as in academic neuroscience."[142] They compiled a national directory to assist federal agencies, universities, and corporations to identify appropriate female candidates for open positions in neuroscience.[143] WiN sponsored scientific and practical programs at every SfN Annual Meeting after 1981, conducted its own analysis of SfN's 1982 membership survey, and, in 1983, published "A Profile of Women in the Society for Neuroscience." This study found that 60% of women held PhD degrees, while only 4% had medical degrees; that men were almost twice as likely as women to have postdoctoral trainees working for them;




A History
the Soccer

FROM ITS INCEPTION, the SfN founders had believed the Society would be an *integrating force* for neuroscience not only in the United States but also globally.

Such a society would include members of both sexes and all ethnicities, reflecting their vision of a neuroscience not restricted by disciplinary, national, or demographic boundaries.

and that women were more reliant on "soft money" funding sources than men. The WiN analysis concluded that the trends for women in neuroscience were consistent with trends for women in academia in general, with major gains in training and employment since the early 1970s, and a basis for cautious optimism that more women would fill professional and Society roles in the future.[144]

> It will always be the personal effort and commitment of individual members that will *make the difference*.
>
> TORSTEN WIESEL, 1979

Throughout the 1980s, women held leadership positions within the Society. Bernice Grafstein served as the first female president, and women served on the Council and all of SfN's committees. Nevertheless, during these years, women remained a minority in the field. Although 43% of the Society's graduate student members were women, a National Research Council survey of doctorates in 1990 found that women received only 36% of neuroscience PhDs and 38% of postdoctoral fellowships between 1985 and 1990, while data compiled by the Association of Neuroscience Departments and Programs (ANDP) indicated that women made up a mere 18% of applicants and hires for tenure-track positions.[145] This attrition through the scientific pipeline, studied in depth by SfN members Linda Spear and Michael Zigmond, was similar to that in other fields of science; none of the challenges to women's success were unique to neuroscience. In 1991, SfN created an ad hoc committee (eventually named the Committee on the Development of Women's Careers in Neuroscience or CDWCN) to examine this problem in greater detail.[146] Leaders of WIN became automatic members of CDWCN and vice versa; CDWCN helped to formulate questions for member surveys that would generate useful data.[147] This committee was instrumental in shaping the 1995–96 SfN member survey, which found that the number of women had grown to 30% of the total membership.[148] Throughout the 1990s, WIN and CDWCN co-sponsored mentoring events, and WIN established several awards for mentoring.[149]

The status of racial and ethnic minorities in neuroscience did not attract as much attention in the early years of the Society, although they too were underrepresented in every survey. The 1974 Department of Health, Education, and Welfare manpower study had found that the vast majority (94%) of neuroscientists were white; 4.2% were Asian, 0.7% African American, 0.9% were Hispanic and 0.2% were Native American. These statistics were consistent with those in other scientific and academic fields, and state and national lawmakers had implemented various educational programs to try to increase the proportion of these minorities in the U.S. professional labor force. In particular, educational initiatives to encourage African American students to study science and pursue graduate degrees were proposed as strategies to increase scientific manpower for the United States.[150]

In September 1979, SfN President Torsten Wiesel outlined the steps that "we, as members of the Society for Neuroscience, can do to interest young minority students in our field." He listed several NSF and NIH programs designed to support and encourage minority scientists, but he noted that "it will always be the personal effort and commitment of individual members that will make the difference."[151] At the Annual Meeting that year in Atlanta, the Social Issues Committee established a Subcommittee on Minority Affairs, chaired by Catherine Cornwell-Jones, to recruit minority members to the field and the Society and to "expand the role of minorities in the policymaking processes of the Society."[152] These efforts culminated in the establishment of the Minority Traveling Fellowship in 1981, which continued into the 21st century as the Neuroscience Scholars Program.[153]

Despite these efforts, minorities continued to be persistently underrepresented in neuroscience, as in nearly all scientific fields. A 1982 report showed that the percentage of minority SfN members had not changed significantly in the past 10 years. 5% of members were of Asian descent, 2% were Hispanic, 0.5% African American and 0.2% Native American.[154] African American scientists flowed out of all disciplines through the "leaky pipeline", although the greatest attrition apparently occurred at the high school level.[155] In 1999, an ANDP survey found again that Asian Americans consistently made up 3–4% of the neuroscience community, while only 1.9% of predoctoral students, 0.7% of postdoctoral researchers and 0.6% of faculty were African-American, still far below parity with levels in the general population.[156]

COMING OF AGE: THE FOUNDING OF *THE JOURNAL OF NEUROSCIENCE*

The Scientific Revolution of the 17th century transformed natural philosophers into scientists. The scientific journal was critical to this metamorphosis. Founded in 1660, The Royal Society of London for Improving Natural Knowledge was the first society committed to the discussion of science and the practice of experimentation. The first publication of the *Philosophical Transactions of the Royal Society*, under the editorship of German-born Henry Oldenburg (FIGURE 23), followed five years later, making it the first journal exclusively devoted to science.

Although our modern understanding of what it means to be a scientist (and the word itself) would not come into existence for another 200 years, the Philosophical Transactions and the scientific journals that followed played critical roles in creating a social and cultural space for the full-time devotion to an understanding of the natural world through observation and experimentation.

The Society for Neuroscience leadership was well aware of the importance of a journal both as a means of communicating scientific findings and as the necessary glue that would cement disciplinary identity and cohesion. From the beginning, the SfN Council foresaw the need for a journal devoted to an expansive definition of neuroscience.[157] In 1979, President Torsten Wiesel, President-elect Sol Snyder, and Eric Kandel jointly proposed to the Council that the time was right. They felt "it would be better to start afresh with a truly interdisciplinary journal of the highest quality," but they also wanted to ensure that the new journal would not compete with smaller subspecialty journals.

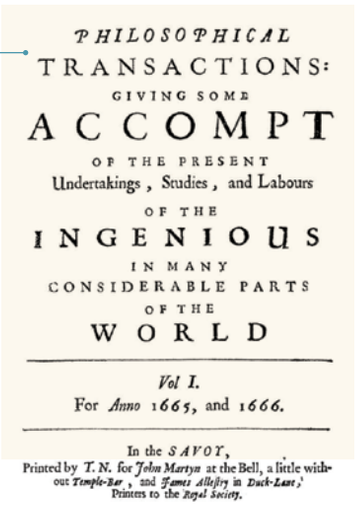

PHILOSOPHICAL
TRANSACTIONS:
GIVING SOME
ACCOMPT
OF THE PRESENT
Undertakings, Studies, and Labours
OF THE
INGENIOUS
IN MANY
CONSIDERABLE PARTS
OF THE
WORLD
Vol I.
For Anno 1665, and 1666.
In the SAVOY,
Printed by T. N. for John Martyn at the Bell, a little without Temple-Bar, and James Allestry in Duck-Lane,
Printers to the Royal Society.

FIGURE 23. First volume of the *Philosophical Transactions*, 1665–66.

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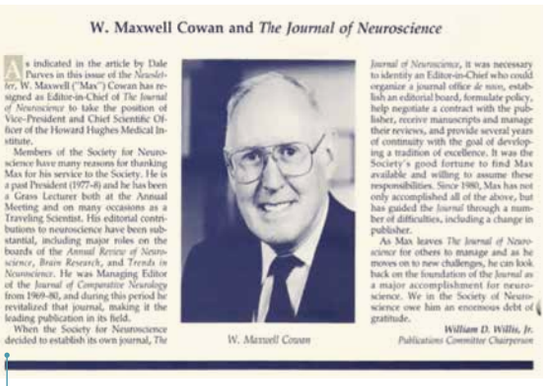

W. Maxwell Cowan and *The Journal of Neuroscience*

As indicated in the article by Dale Purves in this issue of the *Neuroletter*, W. Maxwell ("Max") Cowan has resigned as Editor-in-Chief of *The Journal of Neuroscience* to take the position of Vice-President and Chief Scientific Officer of the Howard Hughes Medical Institute.

Members of the Society for Neuroscience have many reasons for thanking Max for his service to the Society. He is a past President (1977-8) and he has been a Grass Lecturer both at the Annual Meeting and on many occasions as a Traveling Scientist. His editorial contributions to neuroscience have been substantial, including major roles on the boards of the *Annual Review of Neuroscience*, *Brain Research*, and *Trends in Neuroscience*. He was Managing Editor of the *Journal of Comparative Neurology* from 1969-80, and during this period he revitalized that journal, making it the leading publication in its field.

When the Society for Neuroscience decided to establish its own journal, *The Journal of Neuroscience*, it was necessary to identify an Editor-in-Chief who could organize a journal office *de novo*, establish an editorial board, formulate policy, help negotiate a contract with the publisher, receive manuscripts and manage their reviews, and provide several years of continuity with the goal of developing a tradition of excellence. It was the Society's good fortune to find Max available and willing to assume these responsibilities. Since 1980, Max has not only accomplished all of the above, but has guided the *Journal* through a number of difficulties, including a change in publisher.

As Max leaves *The Journal of Neuroscience* for others to manage and as he moves on to new challenges, he can look back on the foundation of the *Journal* as a major accomplishment for neuroscience. We in the Society of Neuroscience owe him an enormous debt of gratitude.

W. Maxwell Cowan

William D. Willis, Jr.
Publications Committee Chairperson

FIGURE 24. *Neuroscience Newsletter* 19:2, March/April 1988, p. 6

SfN

SEE VIDEO "Establishment of *The Journal of Neuroscience*" on sfn.org/about/history-of-sfn/1969-2019/videos

Wiesel, Snyder, and Kandel recommended as the first editor-in-chief Maxwell Cowan,[158] a neurobiologist whose own work integrated neurochemistry, neuroanatomy, and neurophysiology, and who served as the highly regarded editor of *The Journal of Comparative Neurology*.[159]

Nearly an entire issue of the *Neuroscience Newsletter* in June 1980 was devoted to the call for papers for the first issue of *The Journal of Neuroscience*, which would appear in January 1981. The new publication, for which SfN partnered with an external publisher, would include papers representing all areas of the field, and authors were encouraged to submit their papers for review to one of the five section editors: Solomon Snyder, molecular neuroscience; Michael Bennett, cellular neuroscience; Gerald Fischbach, developmental neuroscience; Eric Kandel, behavioral neuroscience; and Edward Evarts and R.W. Guillery, neural systems. These divisions "collectively cover the entire spectrum of neuroscience and reflect the broad, interdisciplinary character of the Society," as it had evolved since 1969 and demonstrated the importance of *The Journal of Neuroscience* as an integrative force in the field.[160]

Although *The Journal of Neuroscience*, which remained under Cowan's leadership until 1987, soon "became recognized as one of the premier periodicals in the field, and most importantly, the one for which many members reserved their best work," both the external publisher, Williams and Wilkins, and the Society initially sustained financial losses from its publication.[161] After some years of negotiation and consideration, the Society signed a new contract with Oxford University Press, effective as of 1986, which reduced subscription costs to individual members and provided more revenue to the Society.[162] This contract remained in force until the Society developed the capability for in-house publication and brought *The Journal of Neuroscience* under its own wing in 1996.

CREATING THE SELF IN AMERICAN CULTURE: NEUROSCIENCE AND THE MEDIA

By any measure, the public exposure to neuroscientific findings increased dramatically over the 1970s and 1980s. FIGURE 26 depicts the occurrences of the word "neuroscience" in *The New York Times* from 1960 to 1999. "Neuroscience" as a word first appeared in The New York Times in a 1965 article titled, "Experts Disagree on a Worm's I.Q," reporting on the work of James McConnell, who reported that regenerated flat worms, *planaria*, retained conditioned learning after they had been severed in half. Despite the frivolous appearing title, the article foreshadowed a new vision of how American


THE JOURNAL OF
NEUROSCIENCE
JANUARY 1981 VOLUME 1 NUMBER 1
THE OFFICIAL JOURNAL OF THE SOCIETY FOR NEUROSCIENCE
CONTENTS

FIGURE 25. *The Journal of Neuroscience*, vol. 1, number 1.

SfN

SEE VIDEO "Taking *The Journal* In-House and Online" on sfn.org/about/history-of-sfn/1969-2019/videos

culture understands the self. The reporter, addressing what would later be taken for granted by educated readers but was far from obvious in the psychologically minded 1950s and 1960s, outlined the importance of this research: "The discovery raised some startling possibilities. Previous theories were expressed in purely psychological terms unrelated to physical structures in the brain." The "startling" finding, according to the article, was that "memory" was *embodied*, "that the act of learning produced a discreet physical change throughout the body."

> The act of learning produced a *discreet physical change* throughout the body.
>
> JAMES MCCONNELL, 1965

If mention in *The New York Times* may be taken as a barometer of cultural and popular significance, the importance of neuroscience grew enormously over the three decades from 1970 to 1999. As the 1965 article suggested, neuroscientific knowledge and the popular diffusion of this knowledge had a deeper significance than simply adding another layer of complexity to Americans' understanding of their brains. The new neuroscience helped to radically remake how the self was (and is) understood. This transformation was graphically illustrated on the covers of *Time* magazine.

A thoughtful Sigmund Freud's first appearance on the cover of Time in 1924 had reflected the growing American romance with psychoanalysis that reached a peak by the mid-to-late 1950s.

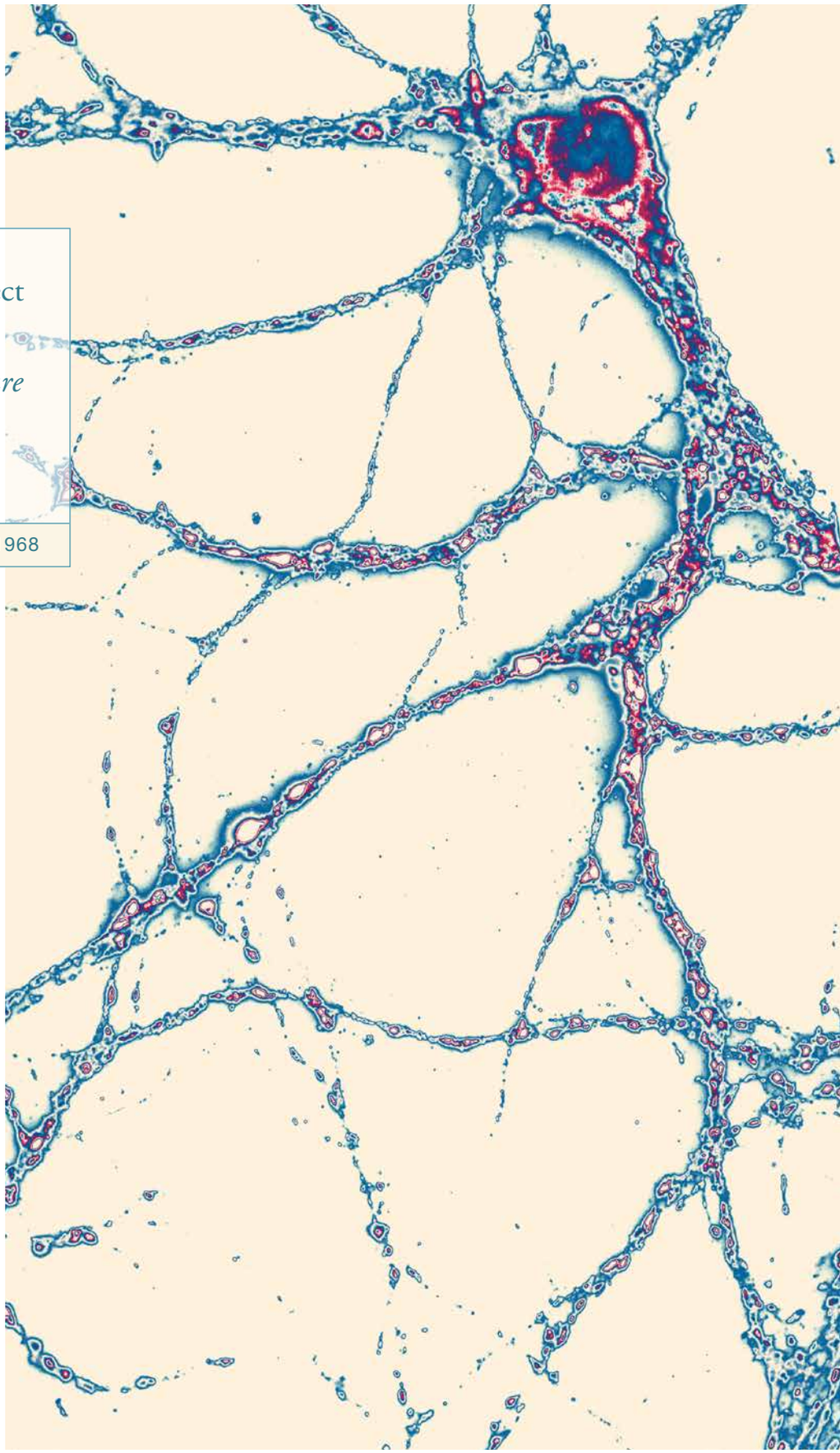
American psychiatrists and émigré European psychoanalysts initiated and then fostered the American embrace of psychoanalysis. In the early decades of the 20th century, the American profession held fairly diverse views regarding the nature of psychological suffering and had no over-arching, dominant theory to guide practice. Psychoanalysis, in contrast, provided psychiatry with a grand synthesis, linking the instinctual drives of the body and individual suffering and the psychosocial world of relationships, meaning, and social life. In short, psychodynamic psychiatry provided a framework that merged, however uneasily, both somatic and psychosocial orientations toward psychiatric illness. For the public, a simplified version of Freud's tenets provided post-World War II Americans with a new and interesting language by which to understand and explain ordinary miseries of everyday life, a discourse that also offered a hopeful solution through psychotherapy and insight.

The last time Freud graced the cover of *Time* was in November 1993 with the question, "Is Freud Dead?" Though psychoanalysis had been quite marginalized over the previous 20 years, this particular depiction of Freud, with his head falling to pieces and the query about his demise, underlines a cultural shift in how Americans understood the self. The *Time* cover of December 3, 2007 leaves little doubt as the direction of this shift – the mysteries of human behavior, of "good/evil," from the soaring heights of Mahatma Gandhi's altruism to the depths of Adolf Hitler's depravity, were depicted as encompassed, not by the theories of psychoanalysis, but directly within the physical brain.

The decline of psychoanalysis from the American cultural landscape has multiple causes. But these images from *Time* suggest, one of the most significant or – at the very least, most visible sources of the near extinction of psychoanalysis – has been the spectacular rise of neuroscience as an identifiable and powerful discipline with an exponentially growing store of new facts at hand to explain behavior as brain based.

This is a story in which SfN played a critical, if not the major role, always in the background, providing the stage and the organizational context within which individual scientists and their findings could become powerful cultural resources as well as pieces of an increasingly complicated neuroscientific puzzle.

> The Society could help direct attention to the importance of neuroscience for the *future intellectual and emotional well-being* of this country.
>
> SIDNEY OCHS, 1968



SfN leaders of the 1970s presciently realized that the Society could "help direct attention to the importance of neuroscience for the future intellectual and emotional well-being of this country."[163] The Society's officers understood that the support of a broad public was essential not just to ensuring funding, but to maintaining public confidence and preserving the freedom of scientists to manage those resources through research for the public benefit. Neal Miller, in particular, as president 1971–72, and subsequently as chair of the Public Information Committee, took steps to increase public understanding of neuroscience through the careful cultivation of media relationships.

In 1975, the Society hired a public relations consultant to highlight neuroscience achievements through press releases and press conferences, as well as to manage publicity for public events.[164] Realizing the importance of science literacy for accurate news reporting on neuroscience, the Public Information Committee sponsored the first Science Writers' Seminar in 1976, funded by the Alfred P. Sloan Foundation and the John and Mary R. Markle Foundation, at Airlie House in Virginia.[165] "In an atmosphere conducive to relaxation and unhurried contemplation of science," 25 writers from newspapers and magazines spent three days learning about specific topics in neuroscience from 16 SfN representatives.[166] The journalists responded enthusiastically; within two weeks, several articles on neuroscience topics appeared in national publications such as *Newsweek*, *The National Observer*, and *Science News*.[167] As FIGURE 26 illustrates, "neuroscience" became a regular news topic soon after SfN began its efforts to educate and intrigue reporters. Thanks to the success of this seminar and those that followed, journalists from a range of media outlets regularly attended the Annual Meetings and identified SfN as the best resource for information about breakthroughs in the field.[168] The 1986 Annual Meeting was particularly successful in this regard: 109 journalists attended and were directed to stories about recent innovative scientific work.[169] Once again, the practical applications of neuroscience attracted the most attention. Major news outlets such as *The New York Times*, for example, featured reports of the discovery by Peter Davies and Benjamin Wolozin at Boston University of a possible antibody test to detect Alzheimer's disease.[170]

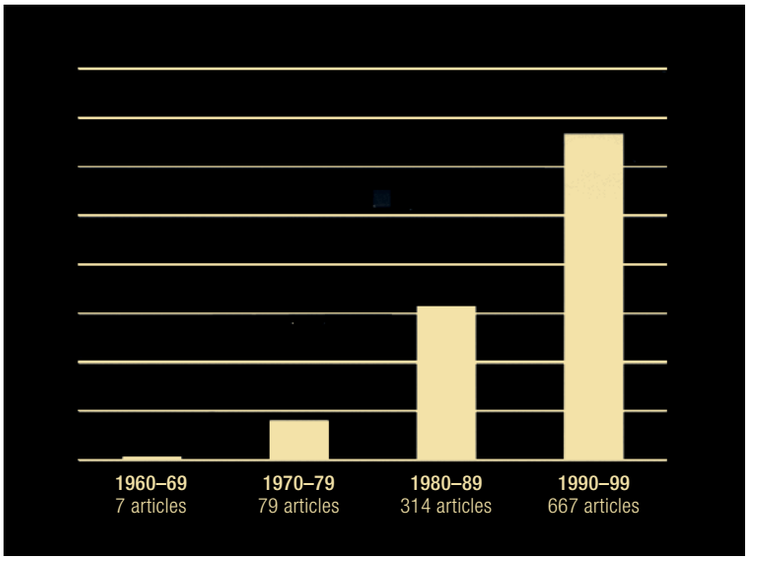


FIGURE 26. Articles that mention the word "neuroscience" in *The New York Times*, 1960–1999.

graph by Joel Braslow

NEUROSCIENTIST AS CITIZEN

For SfN, shaping a positive cultural image in the popular media was not simply a public relations exercise. Despite the aspirations of the 17th-century pioneers – men such as Rene Descartes, Robert Boyle, Henry Oldenburg, and Isaac Newton – who originated the principles of experimental science to devise a method unsullied by the social world, scientists have always been in an active struggle with and sometimes against the larger world in which their practices are embedded.[171] The 20th century made this an especially painful and unavoidable fact. With its horrors of race hygiene, genocide, and the creation of an ever-present specter of mass annihilation by nuclear weapons, World War II elevated this dissonance to potentially nightmarish proportions. The social and cultural turbulence of the 1960s added a new twist to scientists' involvement with social causes, whether it was the Vietnam War, civil rights, the "war on poverty," or nuclear disarmament.

Neuroscientists were not immune to these larger cultural currents and SfN members used the Annual Meeting as an opportunity to examine social issues. Under the chairmanships of Louis Irwin, Linda Hall, and Stephanie Bird in the 1980s, the Social Issues Committee ran roundtable discussions for members, with experts from various disciplines speaking on socially and politically sensitive topics, such as torture as a public health threat, life and death decision making, cognitive enhancers, the clinical use of fetal tissue, and neurotoxins in the diet.

The Committee alerted the SfN Council to public debates that were relevant to neuroscience, such as psychosurgery, or to international events that affected the scientific community.[172]

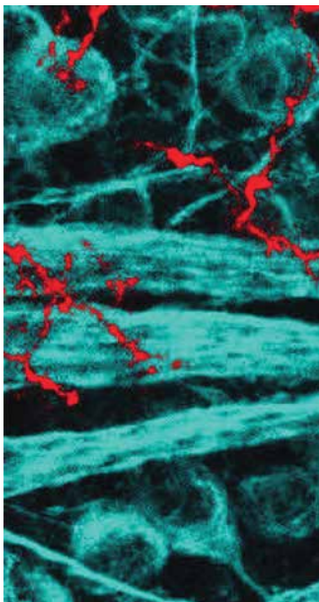
Cold War events also stirred concerns among Society members. In 1980, the Council authorized Sol Snyder to send a telegram to the USSR Academy of Science on behalf of SfN to protest the treatment of Andrei Sakharov, the Nobel Peace Prize winning physicist who was being held under house arrest in Gorky. Not surprisingly, the rationale for intervening on Sakharov's behalf reflected both scientific and Western political cultural values: "This cynical treatment of a world-renowned scientist will further suppress the universality of knowledge and the fundamental rights of human beings at a time of international tension."[173]

On other occasions, the resolutions were purely humanitarian in nature. For example, in 1979, Janice Stevens introduced a resolution in response to the recently reported genocide in Cambodia. Her proposal was brought to the floor and the business meeting voted unanimously to send a telegram to President Jimmy Carter urging him to "save what is left of the Cambodian people."[174]

NEUROSCIENTISTS UNDER SIEGE

The Society's activism on larger social questions did not significantly alter the nature or practices of either the Society or of neuroscience itself. But in the 1980s, the growing animal rights movement aimed

SEE VIDEO "Social Issues Committee" on sfn.org/about/history-of-sfn/1969-2019/videos

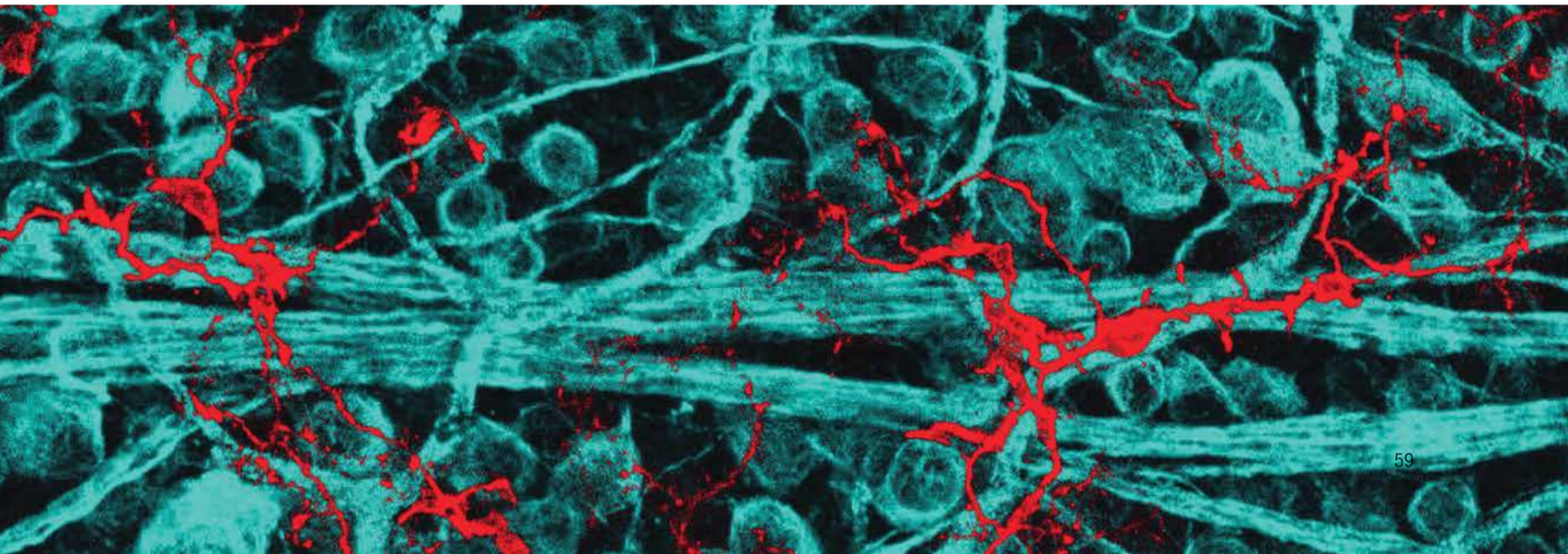


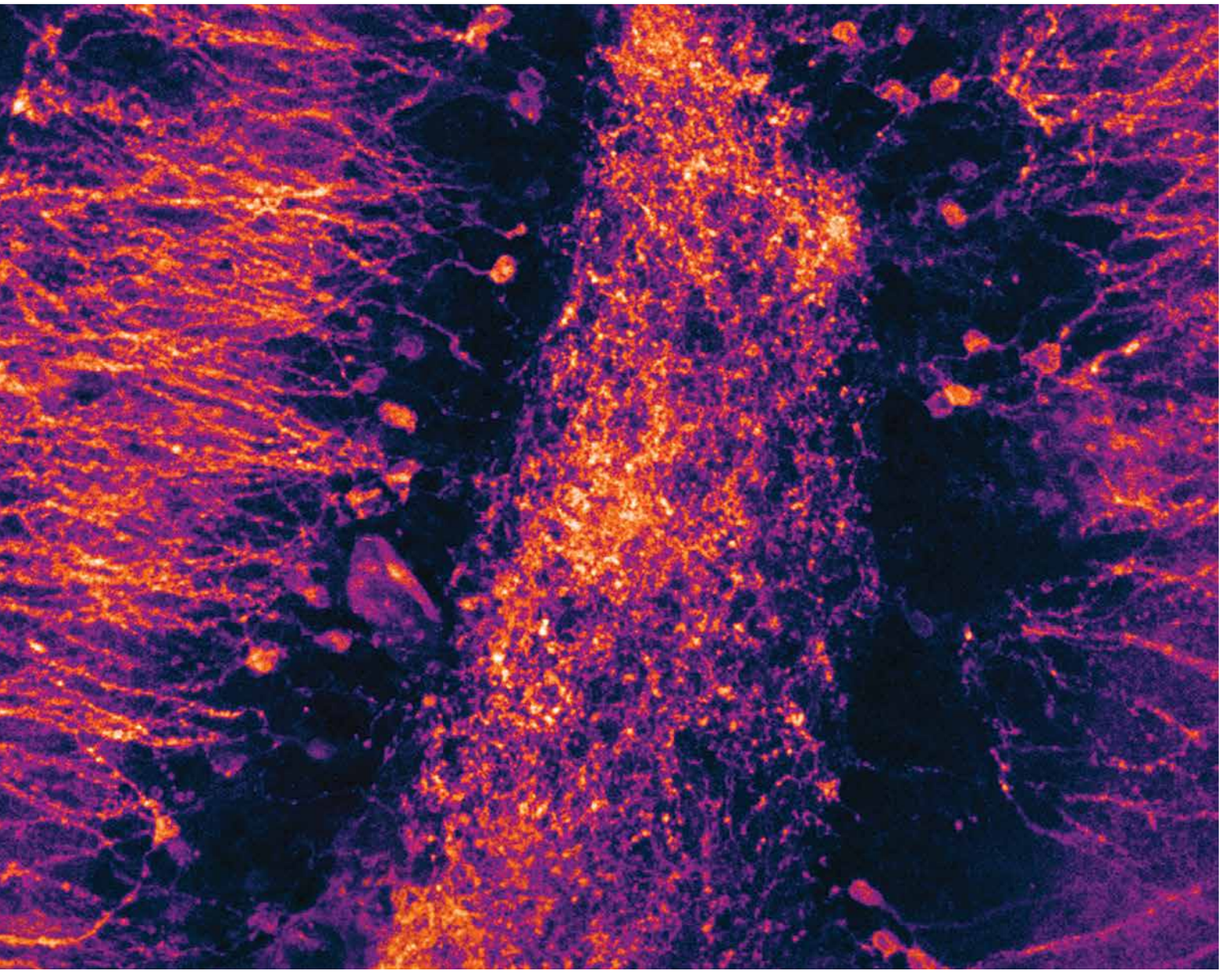
directly at the heart of scientific practice not just the work of neuroscientists but of all researchers whose work involved the use of non-human animals. With this battle, the Society found itself forced to redefine and defend its carefully burnished cultural image, while taking a strong political stance to protect the work and independence of its members.

Though antivivisection has been intertwined with the prevention of cruelty toward farm, circus, and companion animals, the effort to end animal experimentation has its own unique history. The modern history of antivivisectionism has its origins in mid-19th century Europe with the growth of laboratory-based medical science. The wife of French scientist Claude Bernard, a major exponent of animal experimentation, publicly opposed the practice. In 1876, the antivivisectionists persuaded the British Parliament to pass the Cruelty to Animals Act, though the bill was significantly weaker than they had originally hoped because of the organized medical profession's strong opposition. As the U.S. lacked a strong research base in the 19th century, opposition was less strident there than in Europe. During and immediately after World War II, public confidence in science was high, reflecting the introduction of drugs like penicillin and cortisone, life-saving heart and cancer surgeries, and vaccines for polio and other infectious diseases. The rebellious 1960s saw a resurgence of antivivisectionist activity, adapting tactics from the antiwar and civil rights movements. The movement intensified in the 1980s as, with increasing stridency, groups such as People for the Ethical Treatment of Animals (PETA) used legal tactics and sophisticated use of media to draw public attention to animal experimentation, while other organizations, including the Animal Liberation Front, willingly broke the law in order to steal data and release laboratory animals. And as the United States grew into the global center of medical research, the country became the epicenter of antivivisectionism.

The growing visibility of neuroscience and the resonance of animals used as models in pain or spinal injury research made neuroscientists frequent targets of a growing antivivisectionist movement, which described itself as pro-"animal rights." These groups often targeted neuroscientists who used mammals such as primates, dogs, or cats in their research. Some members of the SfN leadership felt that "neuroscientists have a special responsibility to join the discussion of animal rights because of our special knowledge of the nervous system, perception, and behavior." The members of the Social Issues Committee and other SfN groups planned "a serious response" to the practical and philosophical questions raised by the animal rights movement.[175]

However, the Taub case of the early 1980s, in which Maryland behavioral researcher Edward Taub was charged with 119 counts of animal cruelty and failure to provide veterinary care for 17 macaque monkeys used in his studies of the sensorimotor system, forced the Society to





react to unanticipated challenges rather than to attempt to set the tone proactively for a national conversation about the treatment of animals.[176] The Society was unprepared for the ferocity of the animal rights movement and its skilled use of the media. The Taub case vividly highlights the methods of the animal rights movement, which included lab break-ins, seizure of data and animals, and the distribution of graphic and often inaccurate photographs to the media.

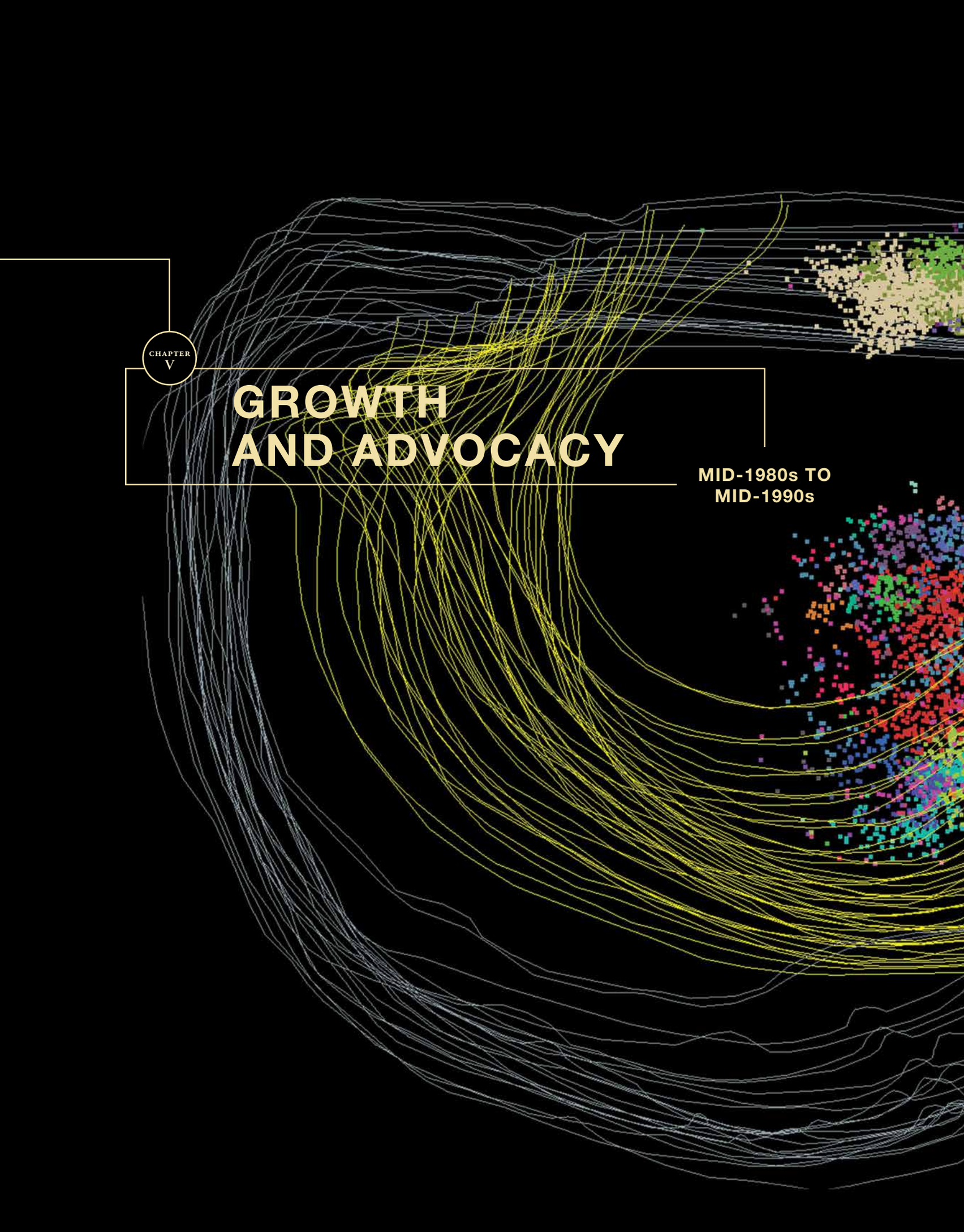
Taub was exonerated of all charges by the courts and his NIH funding was restored after SfN marshaled resources for his defense and enlisted 66 scientific organizations to join a statement of support. He moved to the University of Alabama, where his research findings became the basis for constraint-induced movement therapy, based on the ability, or neuroplasticity, of the central nervous system to remap and functionally readapt, which has often helped stroke victims to regain the use of long-paralyzed limbs. The Society continued to support Taub publicly, citing his work in 2007 as one of the top 10 translational neuroscience accomplishments of the 20th century. The Taub case, however, was a public relations victory for PETA, which has persisted in demonizing NIH and other federal funding sources as the financial

TABLE 7. Animal Research Protests involving SfN Members 1984–1993

DATE	LOCATION	RESEARCHER	ATTACK
1982–84	Behavioral Research Institute Silver Spring, MD	Edward Taub	PETA infiltrated lab and monkeys were removed.
1984–85	University of Pennsylvania Head Injury Clinic Philadelphia, PA	Thomas Gennarelli	ALF broke into the lab, removed videotapes removed and computers and destroyed research data. PETA created "Unnecessary Fuss" video from the footage they stole.
1985	National Institutes of Health Bethesda, MD	–	PETA broke into NIH offices and occupied them for two days to protest the Penn Head Injury Clinic.
1987	Cornell Medical College New York, NY	Michiko Okamoto	Protests outside of Okamoto's lab and university pressure on Okamoto to refuse a federal grant for her research.
1987–88	University of Oregon Eugene, OR	Barbara Gordon-Lickey and Richard Marrocco	ALF broke into two laboratories and stole more than 125 animals and caused $50,000 in property damage.
1988	University of California Berkeley, CA	Richard Van Sluyters	Public relations attack on Van Sluyters.
1989	California Institute of Technology Pasadena, CA	Terry Takahashi	–
1990	University of Pennsylvania Philadelphia, PA	Adrian Morrison	ALF vandalized Morrison's lab and office and stole files, computer discs and other materials.
1991	Uniformed Services University of the Health Sciences Bethesda, MD	Sharon Juliano	Protests outside of Juliano's home, threats to Juliano's family.
1993	University of Pittsburgh Pittsburgh, PA	Robert Schor and Allen Humphrey	–
1993	Boston University Boston, MA	Bertram Payne	–

backers of cruelty to animals, leveraging the negative publicity to persuade lawmakers to pass strict antivivisection laws at the state and national levels.

Adapting a proactive strategy, SfN formed the Committee on Animals in Research (CAR) as a standing committee in 1985.[177] SfN also joined other organizations, including the Scientists' Center for Animal Welfare, American Association of Medical Colleges, Incurably Ill for Animal Research, and the National Association for Biomedical Research (and later its advocacy arm, the Foundation for Biomedical Research), in presenting animal research as a positive, necessary part of modern scientific and medical practice. Council members contacted leaders of other organizations, particularly disease and clinical organizations, to urge them to publicize the importance of animal research.[178] Through the 1980s and 1990s, the Society joined amicus briefs for legal cases in and provided congressional testimony on proposed legislation that would limit access to animals or tighten existing laws against animal cruelty.[179] SfN's initiatives in educating students and the general public about the field were also important strategies to counter the claims of the animal rights activists.



CHAPTER V

GROWTH AND ADVOCACY

MID-1980s TO MID-1990s

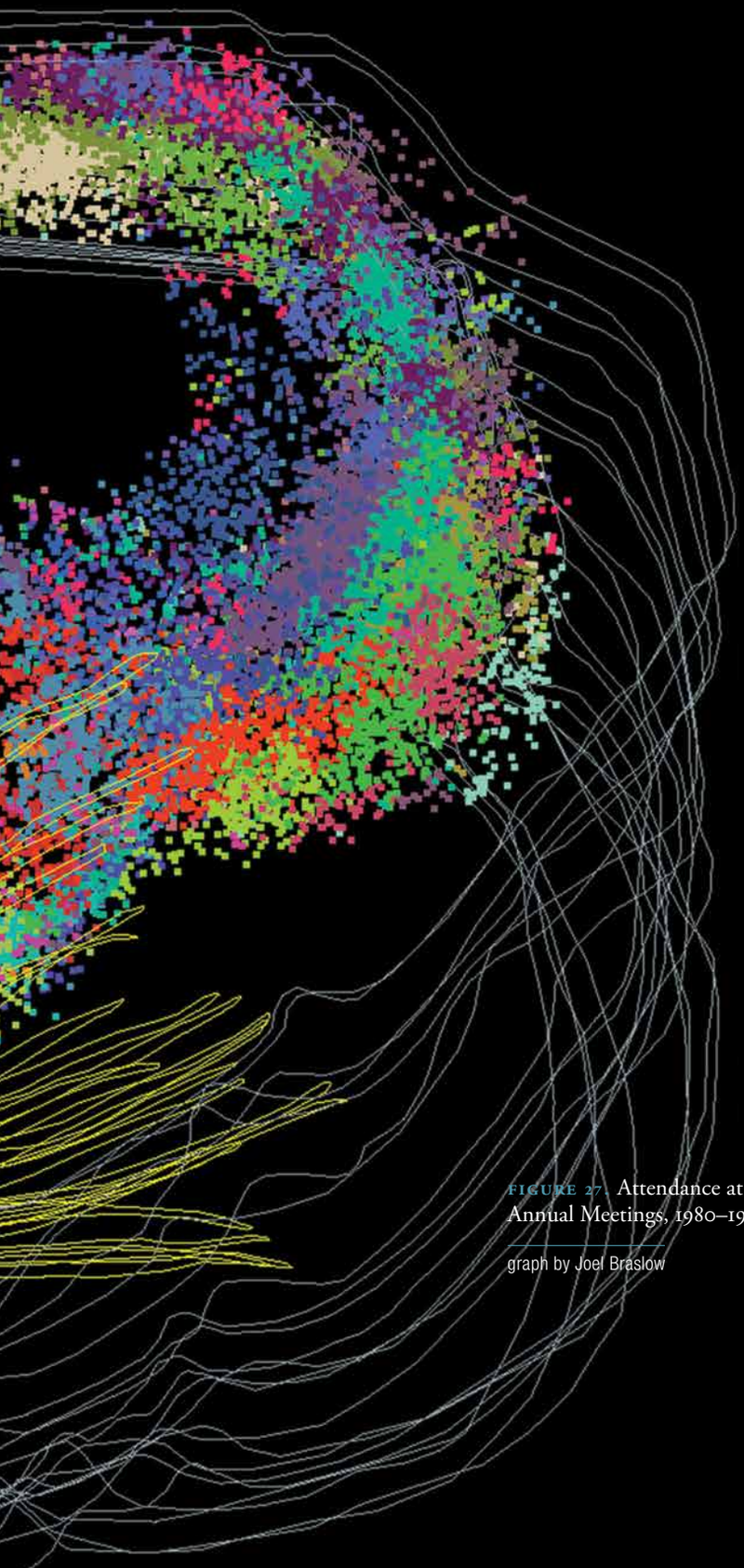
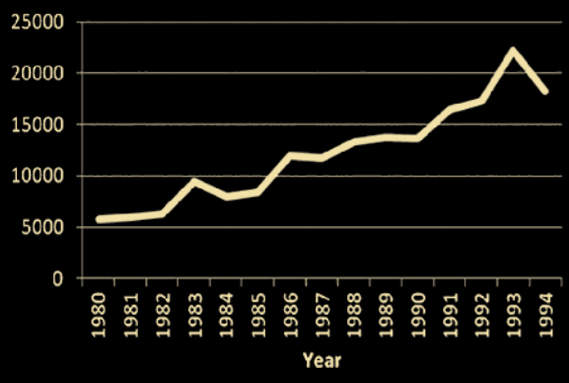


FIGURE 27. Attendance at SfN Annual Meetings, 1980–1994.

graph by Joel Braslow

THE SOCIETY FLOURISHED throughout the 1980s and early 1990s. FIGURE 27 charts attendance at the Annual Meetings from 1980 to 1994. As can be seen, the size of the meetings increased substantially each year except for a slight drop in 1994. The graph reveals a three-fold increase in attendance over those 15 years. SfN continued its significant growth during the 1980s, even as several more established biological societies experienced periods of stagnation. From 1979 to 1989, individual membership more than doubled from 6,351 to 13,433, and the number of chapters grew from 67 to 97.[180] Neuroscience departments and programs flourished as well, increasing from 29 in 1978 to 47 in 1986.[181]



The makeup of the field was also changing and becoming ever more diverse. In January 1982, more than 4,000 SfN members (60% of the total membership) responded to a membership profile questionnaire. This data provided some surprising information about the scope of the field: The vast majority (92%) of neuroscientists worked in at least two broad areas of neuroscience and received research support from a diverse array of government institutions. Approximately half of the field held positions at hospitals or at veterinary or medical schools, while 34% were affiliated with a university or college basic or social science department. The authors of the questionnaire had "greatly underestimated the breadth of departments," listing only 50 choices. However, 376 members reported "other" as their primary departmental affiliation, citing "a profusion of departments ranging from Algology and Allied Health Therapies through Family Medicine, Kinesiology, and Marketing to Physiological Acoustics, Quality Sciences and Women's Studies." Non-primate mammals were the most common research organism (40%) studied by members, followed by humans (16%), vertebrates other than mammals (11%), and cell and tissue cultures (10%); only 9% were using nonhuman primates. Finally, it was not unexpected that, despite the Society's interest in ethnic and gender diversity, 79% of the respondents were men, and 91% were white.[182]

> "Engage intelligently at the interface between *research and its application to the delivery of health care and services*… [along the] continuum from the most basic, the most theoretical to the very practical human disease problems."
>
> DAVID TOWER, 1977

The physiological psychologists, who saw their work in one of the oldest "brain sciences" as a bridge between behavioral and the newer molecular neuroscience, became concerned "that behavior and psychological processes were being relegated to a rather secondary status within the Society," while the cellular, genomic, and molecular work dominated public and academic interest. A group of these researchers wrote an open letter to the Council in 1982, urging it to support better interdisciplinary education and to avoid polarizing the field.[183] Five years later the group reported in *Neuroscience Newsletter* that they were continuing a series of "semi-informal meetings…where the topic of discussion was the direction of the neurosciences and the role that psychology will play in this new discipline." When they analyzed their own participation in the Annual Meetings, and their collaborations with diverse colleagues, these researchers had found "a strong and growing relationship between physiological psychology and neuroscience. Subjective impressions of neuroscience as solely a molecular and reductionist discipline are not supported."[184]

FUNDING DISCOVERY

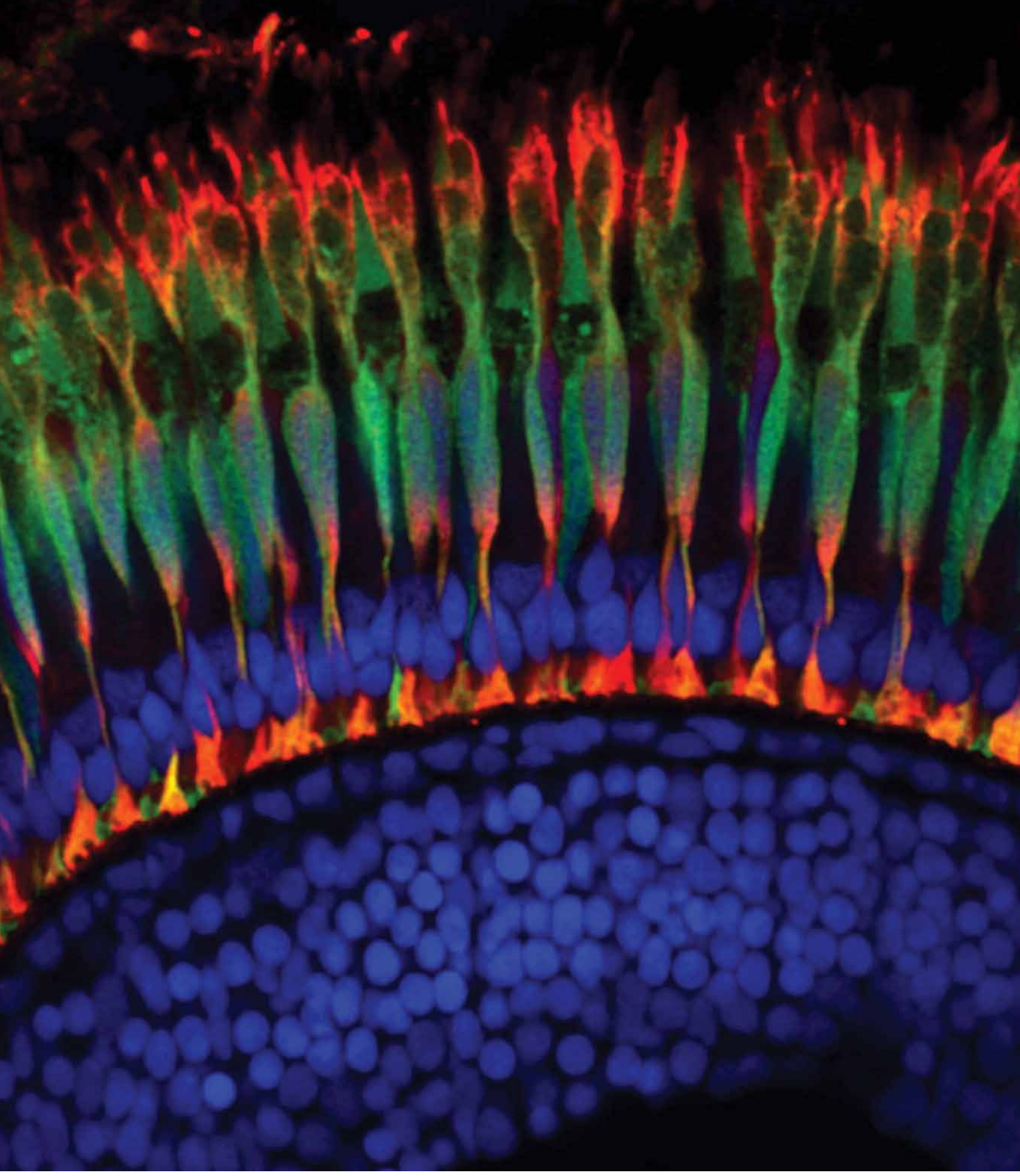
The important promise of neuroscience research is that it will unlock fundamental secrets about who we are as biological organisms and as a species whose intellectual capacities separate us from the rest of the biological world and about how we can correct the disabling neurological disorders that deprive victims of part or all of their human identity. By the late 1980s and early 1990s, some of the keys to those secrets appeared to be within reach, as fMRI and PET imaging opened up the study of human cognitive functions, even emotional learning, and laboratory technologies clarified the processes of neurogeneration and axonal outgrowth. At the molecular level, the field continued to be energized by breakthroughs such as the discoveries of the genes for Huntington's disease and Duchenne muscular dystrophy and the elucidation of

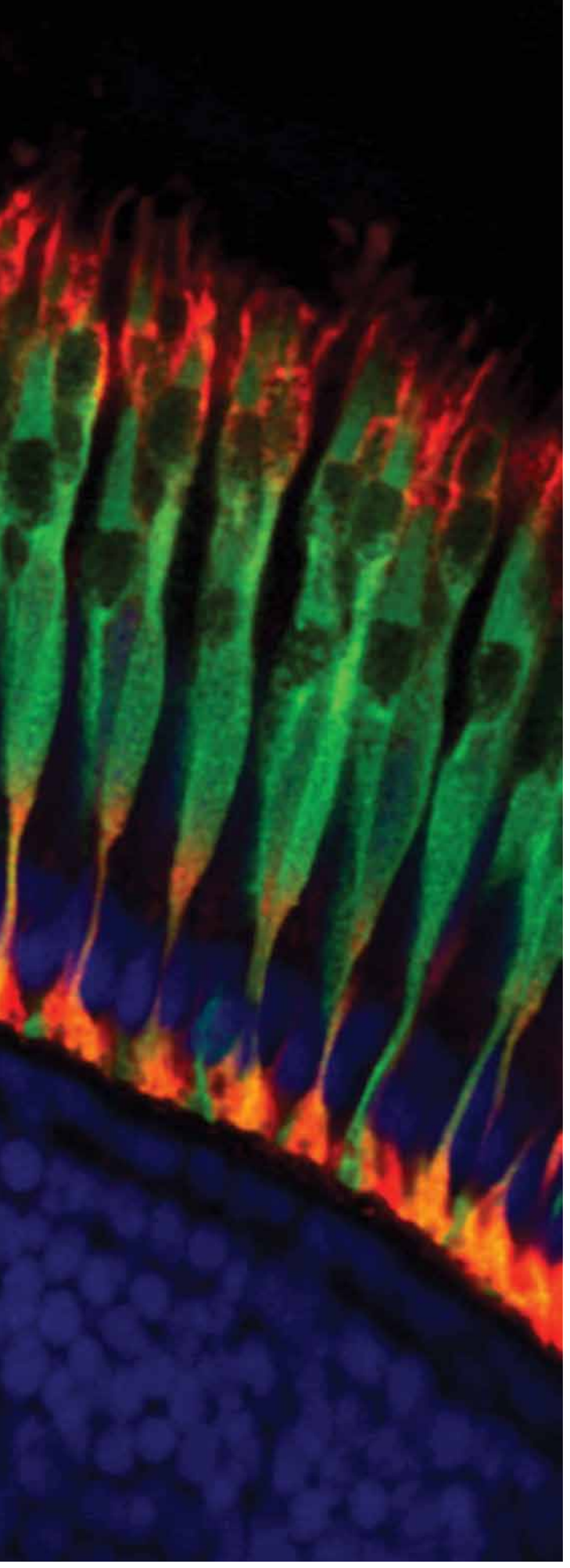
the biological substrates of Alzheimer's and the spongiform encephalopathies. The use of methylprednisolone was one of the first steps toward improved rehabilitation of spinal cord injury victims.

Nevertheless, significant funding for the brain sciences has never been a forgone conclusion and has required major advocacy efforts on the part of individual scientists and of the Society as their premier organization. NIH has provided the bulk of biomedical research dollars over the past 50 years and supported the lion's share of neuroscience research. NIH's extramural grant program originated after World War II, when a small group of medical research grants was transferred from the Office of Scientific Research and Development to the still rudimentary institute. Under the leadership of Directors Rolla Dyer and later James Shannon, NIH evolved the peer-review mechanism to validate the distribution of its largesse as impartial and driven by scientific standards while using the same rhetoric and the memory of major scientific achievements such as penicillin and polio vaccine to obtain ever larger appropriations from Congress. Other federal agencies, such as NSF and the Department of Energy, followed its example, but NIH always led the pack. In the expansive era of the 1950s and 1960s, total NIH funding increased from $52 million to more than $1 billion.[185] These grants built research laboratories, and funded young scientists to start their careers at universities all over the country. Although total appropriations never decreased in the 1970s and 1980s, the annual percentages of increase were reduced as successive Republican administrations called for fiscal restraint. As young scientists started their own labs and hired their own students, they found themselves in tighter competitions for fewer dollars. The Society quickly recognized the need to take a strong stance in focusing government attention on neuroscientific objectives and achievements to maintain, and if possible increase, the share of appropriated grant funds allocated to the National Institute of Neurological and Communicative Disorders and Stroke (NINCDS) and the National Institute of Mental Health (NIMH).

Soon after Floyd Bloom became SfN president in November 1976, he learned that neuroendocrinologist David Hume's NIH training grants were in peril because of congressional budget cuts.[186] An SfN poll conducted a few months later revealed that 95% of the membership received more than 50% of their research support from the federal government; for 82%, federal support constituted more than 80% of their budget. NINCDS contributed the bulk of the funding, while NIMH funded an additional 12%. "The data at hand clearly indicate that the funding for fundamental research is clearly inadequate for the pressure of the field and the growth of its research potential."[187] The Institute directors, themselves members of SfN, also encouraged the Society to take a more active role. In June 1977, David Tower, the director of NINCDS, used the *Neuroscience Newsletter* to address a passionate plea for neuroscientists to articulate the political and social significance of neuroscience. In "Understanding the Nervous System: Man's Last Frontier," Tower exhorted his fellows to "engage intelligently at the interface between research and its application to the delivery of health care and services…

SEE VIDEO "Funding for Neuroscience" on sfn.org/about/history-of-sfn/1969-2019/videos





[along the] continuum from the most basic, the most theoretical to the very practical human disease problems."[188]

Bloom was already in action. He had sent an open letter to SfN members on March 29, 1977, asking them to contact the Senate and House Appropriations Subcommittees and express concern over the lack of funds for basic research. He encouraged them to describe their own work and to explain exactly how a decrease in funding would "halt scientific progress." Bloom also suggested that local chapters invite their members of Congress to attend a chapter meeting, to impress upon them the importance of neuroscience research and to foster a working relationship. These were the talking points: "The work we are doing is important, the quality and rate of progress in the neurosciences has never been greater, and to impair this process through illogical funding practices is intolerable."[189] SfN members responded enthusiastically and reported that their letters had had "unquestionable impact" with congressional staff members.[190]

On April 19, 1977, Bloom and David Cohen testified before Joseph Foley, chairman of the National Committee for Research in Neurological and Communicative Disorders, part of the House Subcommittee on Appropriations for HEW/Labor. They expressed concern about "the erosion of federal support for neuroscience…at a time when research into the basic mechanisms of brain organization is in the midst of its most exciting and productive period." Bloom and Cohen argued for the unique scientific and clinical importance of neuroscience, stressing that fundamental neuroscience research was the key to understanding neurological and mental disorders, which affected some 165 million Americans.[191] This effort was successful, and the subcommittee recommended to the full Appropriations Committee that the NINCDS FY1978 budget be increased to $175 million, $14 million more than President Carter had requested.[192] This represented a 15% increase for the institute, compared with a 12% increase for NIH overall.

The following year, Cohen took up the torch and reported to the SfN Council that, although he was heartened by "the reversal of the negative attitude towards basic research … [and] a thrust toward greater emphasis upon and support for fundamental science," he did not foresee that FY1979 would be "a 'bumper' year for federal support for neuroscience."[193] The Council appointed Cohen, Bloom, and Maxwell Cowan to an ad hoc Committee on Research Resources, which was renamed the Government and Public Affairs (GPA) Committee in 1980.[194] The committee's charge was to maintain contact with the heads of the various funding agencies, to advocate with Congress to maintain or increase neuroscience appropriations, and to encourage members to write letters and speak to their own legislators.

Cohen stressed the urgency and importance of their efforts, writing in *Neuroscience Newsletter* that "while we cannot look forward to a year of real prosperity [in FY1980], we can expect a year of reasonable support; unhappily this is not the case for the biomedical research enterprise as a whole…. Our efforts had a genuine impact on this year's appropriations, and in this regard our thanks are due those Society members who contributed so valuably to educating our national legislators with respect to the importance of brain research."[195]

Cohen, Bloom, and Dominick Purpura led the GPA Committee's efforts through the 1980s. As SfN President in 1981–2, Cohen acted to formalize the committee's advocacy efforts.[196] After his presidency, the three leaders continued to devote considerable time to "Washington-watching," petitioning lawmakers and testifying before Congress on appropriations for neuroscience research.[197] They sounded again and again the call for help to the mentally ill and neurologically impaired and reminded their listeners of the promise of insights into human consciousness and behavior. Cohen regularly published updates on federal funding levels in *Neuroscience Newsletter*, and invited the directors of the relevant agencies, including NINCDS, NIMH, and NSF, to use the newsletter as vehicle for communicating with the SfN membership. Because "legislative tracking [was]…a persistent, moment-by-moment task," Cohen urged the Council to consider hiring a legislative aide as soon as the central office budget allowed for another staff person.[198]

The GPA Committee took advantage of the Society's location in Washington, D.C., to great effect and built coalitions with other groups with similar concerns, such as the National Committee for Research in Neurological and Communicative Disorders, NSF's Interagency Working Group in Neuroscience, the American Association of Medical Colleges, and the Inter-Society Council for Biology and Medicine.[199] SfN representatives joined members of the Association of Neuroscience Departments and Programs each spring to visit members of Congress to discuss the importance of neuroscience funding, a program that by the 1990s was known as "Capitol Hill Day." Although few lawmakers were in the city during the 1986 Annual Meeting, which was held in Washington immediately after the mid-term elections, the GPA Committee took the opportunity to sponsor special neuroscience education events for congressional staff members in the hope that they would facilitate relationships with members of the legislature.[200]

This person-to-person activity relied heavily on a handful of active scientists and GPA members who were in easy commuting distance of Washington. But political issues with neuroscience implications could arise in any part of the country; in

SEE VIDEO "Government and Public Affairs, 1969–1995" on sfn.org/about/history-of-sfn/1969-2019/videos

SEE VIDEO "Government and Public Affairs, 1995–2019" on sfn.org/about/history-of-sfn/1969-2019/videos

1987, SfN launched a grassroots program to encourage more neuroscientists to inform and stay engaged with local politicians and the media.[201] At the same time, Cohen, Bloom, Purpura, and their colleagues urged the Council to consider contracting with professional advocates; even the most politically savvy scientist could not always be attuned to unanticipated political problems or take the time to represent the Society's needs.[202] In 1989, SfN was one of 66 founding members of Research!America, a non-profit education and advocacy alliance of universities, professional organizations, foundations, and medical manufacturers that works to make health-related research a higher national priority.

DECADE OF THE BRAIN

The GPA Committee's crowning achievement in this era was to gain federal recognition of the importance and value of neuroscience through the proclamation of the "Decade of the Brain," which they hoped would trigger major funding increases. In 1987, the National Coalition for Research in Neurological and Communicative Disorders (NCRCD) invited the GPA Committee to collaborate with an NINDS Advisory Council on a proposal that would "set forth basic science and clinical research priorities and establish a framework for a multi-year effort to capitalize on the tremendous progress in brain and nervous system research in recent years."[203] This proposal persuaded Representative Silvio Conte and Senator Donald Riegle to introduce legislation to significantly increase neuroscience funding. At the hearings on the bill, Purpura offered oral testimony on behalf of NCR and SfN. After outlining the most significant advances in treatment of neurological diseases, he warned that recent significant budget cuts could force the scientific output of the United States to fall behind that of other countries.

He urged Congress to support the "Decade of the Brain" initiative, not only to "improve the quality of life for countless millions who suffer from neurological disorders," but also because "neuroscientists are persuaded that understanding [the] brain as the organ of mind and the source of our humanity is the highest priority that humankind has for its own survival."[204] In July 1989,

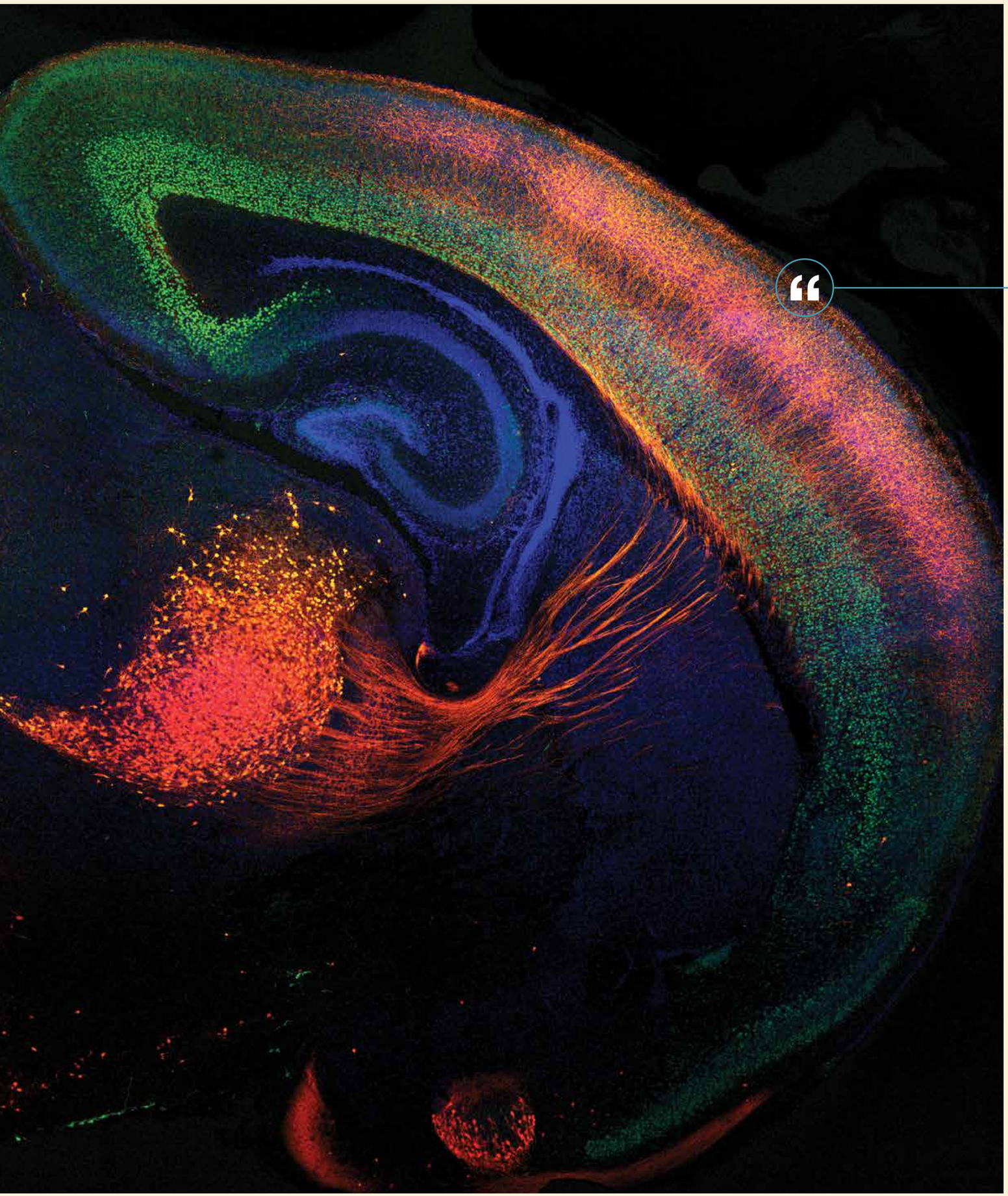
President Bush signs the "Decade of the Brain" resolution with (l-r) Sen. Pete Domenici (R-NM), Sen. Donald Riegle, Jr. (D-MI), Secretary Sullivan, Dr. Lewis Judd, and Rep. Silvio Conte (R-MA, sponsor of the bill).

1990 Begins the Decade of the Brain

FIGURE 28. President George H. W. Bush signs the "Decade of the Brain" resolution, 1989.

Neuroscience Newsletter, vol. 20: 6, Nov–Dec 1989, p. 1; UCLA-NHA).

SEE VIDEO "Decade of the Brain" on sfn.org/about/history-of-sfn/1969-2019/videos



Neuroscientists are persuaded that understanding [the] brain as the organ of mind and the source of our humanity is the *highest priority* that humankind has for its own survival.

DOMINICK PURPURA, 1989

President George H.W. Bush signed a joint congressional resolution designating the 1990s as the "Decade of the Brain." (FIGURE 28)

For SfN, the Decade of the Brain (DOB) was an affirmation of the advocacy work of the Government and Public Affairs Committee and an impetus to strengthen its existing relationships with lawmakers. It was also the perfect occasion for a series of public events showcasing the importance of neuroscience. The Council created an ad hoc DOB Committee to coordinate a Decade of the Brain Symposium for members of Congress every spring, to be followed by a "Capitol Hill Day" of congressional office visits.[205] At each symposium, SfN would honor appropriate members of Congress with a DOB award for their support of neuroscience. Honorees included Representative Silvio Conte (1990), Representative William Natcher (1991), Senator Ernest F. Hollings (1992), Representative Steny Hoyer (1993), Senator Pete Domenici and his wife Nancy Burk Domenici (1994), Representative John Porter (1995), Senator Arlen Specter (1996), Senator Thomas Harkin (1997), and First Lady Hillary Rodham Clinton (1998). Meanwhile, SfN contracted with Frankie Trull, founder and president of the Foundation for Biomedical Research, to coordinate SfN's contacts in Congress and with other government agencies and policymakers.[206] In 1995, SfN's Public Information Office began publishing Brain Waves, a quarterly bulletin for congressional health aides, to communicate "the far-reaching impact of neuroscience research and…the Society's interests to policymakers and other significant lay audiences."[207]

The Decade of the Brain became a powerful rhetorical tool when urging legislators to increase science funding. Purpura invoked the DOB's promise twice in testimony before the Senate Appropriations Committee, asking how the president could put his political weight behind such an initiative if fiscal necessity forced him to propose cuts in relevant NIH funding. In 1990, he reminded the lawmakers that "collective willingness is not enough" and dramatically predicted that if there was adequate research support, then the Decade of the Brain could be "a prelude to the Century of Man, in which humankind will be emancipated from the dread of disability and the stigma of dehumanization that attends dissolution of the human spirit in dementia."[208] His 1991 testimony described the neuroscience community in equally vivid language as "thousands of superbly trained investigators prepared to answer the most important question of the cosmos – how does the brain work?" and insisted that the Decade of the Brain mandated "a level of support that no single health sciences' institute or agency can provide within the current framework of appropriations."[209] A proclamation was not enough; neuroscientists needed secure support if they were to deliver on the promises of the Decade of the Brain. Despite the publicity, significant increases in NIH funding for neuroscience did not materialize until relatively late in the decade, when the NIH budget doubled under President Bill Clinton, thanks to efforts led by Senators Arlen Spector and Thomas Harkin.[210]

NEUROSCIENCE LITERACY

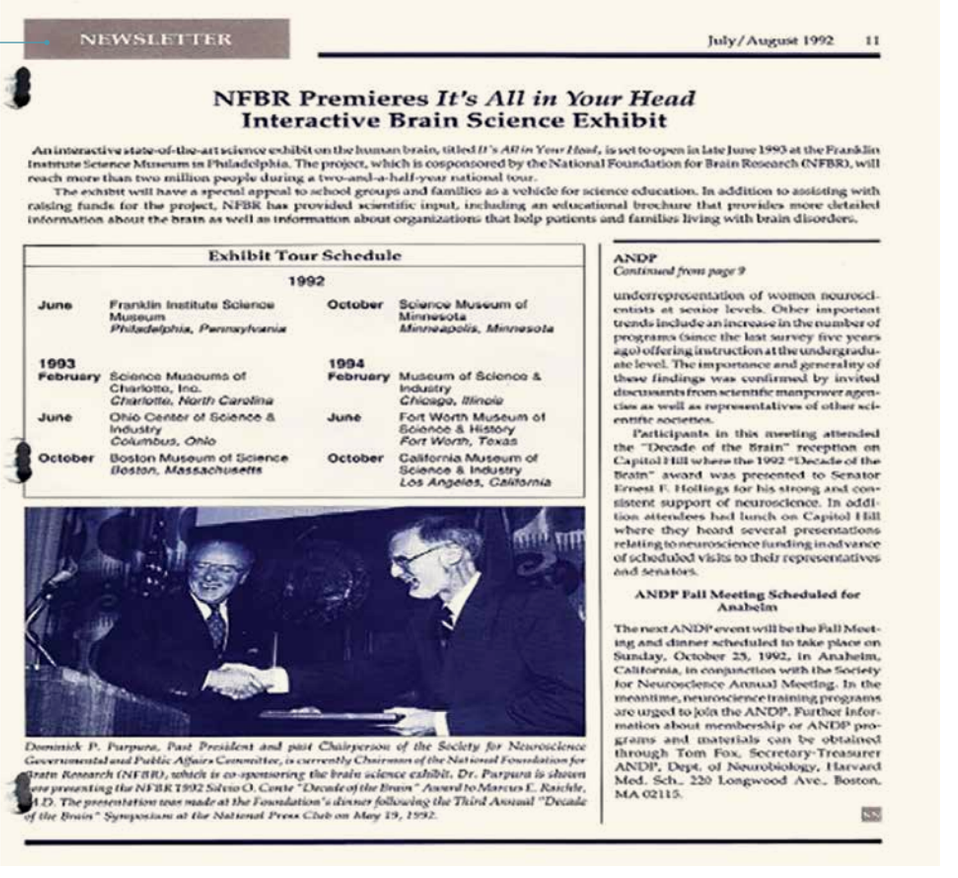
In the early 1990s, SfN also launched a new series of public education initiatives focused intensely on the benefits of neuroscience research, thereby ensuring that the voting public would continue to support neuroscience even after the Decade of the Brain was over. As SfN President Robert Wurtz explained in 1991, "The concerns of many of us in the Society now extend beyond communication within our science to the survival of our science…. Two interacting issues require our attention: the attack on the use of animals in research and a level of funding that lags the growth of neuroscience….The solution to these problems requires long-term effort: the education of the public on the methods, achievements, and benefits of neuroscience."[211]

In April 1989, for the first time, the Council approved a proposal to ask members to contribute $5 for a special Public Education Fund in addition to their annual dues.[212] This income would support a professional

director of public education, who would be responsible for preparing scientific material for lay audiences and for coordinating publicity at the Annual Meeting and throughout the year.[213] Within 6 months, more than 90 members had contributed over $2,000 toward the program and the Council was confident enough in the new initiative to hire Joe Carey, an experienced science writer.[214] The new director produced the first edition of *BrainFacts*, an educational booklet on basic brain and nervous system anatomy for science reporters and the public; regular updated editions followed and electronic and audio versions have been added to the SfN website (culminating in the *BrainFacts.org* website in 2013). He also worked closely with the Committee on Animals in Research to produce special materials for elementary and high school teachers on the importance of animals in research.[215]

The ad hoc Committee on Secondary Education initiated a working partnership with the National Association of Biology Teachers (NABT) to train high school biology teachers in neuroscience methods and develop supplemental curricula on the brain. NABT members received copies of *BrainFacts* and SfN representatives attended the NABT Annual Meeting to discuss specific issues involving animal use in research and teaching.[216] In April 1991, the Council signaled its support for these programs by designating the ad hoc committee as a standing Committee on Neuroscience Literacy (later renamed the Public Education and Communication Committee).[217] The 1991 and 1992 meetings in New Orleans and Anaheim included "Education Day Workshops" on how to talk to children in schools and how to talk to the media.[218]

SfN also worked closely with other institutions and organizations on educational programs. The Society co-sponsored a 1992 traveling exhibit titled "It's All in Your Head" developed by the Franklin Institute in Philadelphia (FIGURE 29)[219] and partnered with the Dana Alliance for Brain Initiatives to reach a larger adult audience for its



NEWSLETTER July/August 1992 11

NFBR Premieres *It's All in Your Head* Interactive Brain Science Exhibit

An interactive state-of-the-art science exhibit on the human brain, titled *It's All in Your Head*, is set to open in late June 1993 at the Franklin Institute Science Museum in Philadelphia. The project, which is cosponsored by the National Foundation for Brain Research (NFBR), will reach more than two million people during a two-and-a-half-year national tour.

The exhibit will have a special appeal to school groups and families as a vehicle for science education. In addition to assisting with raising funds for the project, NFBR has provided scientific input, including an educational brochure that provides more detailed information about the brain as well as information about organizations that help patients and families living with brain disorders.

Exhibit Tour Schedule

1992

June	Franklin Institute Science Museum *Philadelphia, Pennsylvania*	October	Science Museum of Minnesota *Minneapolis, Minnesota*
1993		1994	
February	Science Museums of Charlotte, Inc. *Charlotte, North Carolina*	February	Museum of Science & Industry *Chicago, Illinois*
June	Ohio Center of Science & Industry *Columbus, Ohio*	June	Fort Worth Museum of Science & History *Fort Worth, Texas*
October	Boston Museum of Science *Boston, Massachusetts*	October	California Museum of Science & Industry *Los Angeles, California*

Dominick P. Purpura, Past President and past Chairperson of the Society for Neuroscience Governmental and Public Affairs Committee, is currently Chairman of the National Foundation for Brain Research (NFBR), which is co-sponsoring the brain science exhibit. Dr. Purpura is shown here presenting the NFBR 1992 Silvio O. Conte "Decade of the Brain" Award to Marcus E. Raichle, M.D. The presentation was made at the Foundation's dinner following the Third Annual "Decade of the Brain" Symposium at the National Press Club on May 19, 1992.

ANDP
Continued from page 9

underrepresentation of women neuroscientists at senior levels. Other important trends include an increase in the number of programs (since the last survey five years ago) offering instruction at the undergraduate level. The importance and generality of these findings was confirmed by invited discussants from scientific manpower agencies as well as representatives of other scientific societies.

Participants in this meeting attended the "Decade of the Brain" reception on Capitol Hill where the 1992 "Decade of the Brain" award was presented to Senator Ernest F. Hollings for his strong and consistent support of neuroscience. In addition attendees had lunch on Capitol Hill where they heard several presentations relating to neuroscience funding in advance of scheduled visits to their representatives and senators.

ANDP Fall Meeting Scheduled for Anaheim

The next ANDP event will be the Fall Meeting and dinner scheduled to take place on Sunday, October 25, 1992, in Anaheim, California, in conjunction with the Society for Neuroscience Annual Meeting. In the meantime, neuroscience training programs are urged to join the ANDP. Further information about membership or ANDP programs and materials can be obtained through Tom Fox, Secretary-Treasurer ANDP, Dept. of Neurobiology, Harvard Med. Sch., 220 Longwood Ave., Boston, MA 02115.

FIGURE 29. Franklin Institute exhibit, "It's All in Your Head."

Neuroscience Newsletter, vol. 23: 4, July–August 1992, p. 11; UCLA-NHA.)

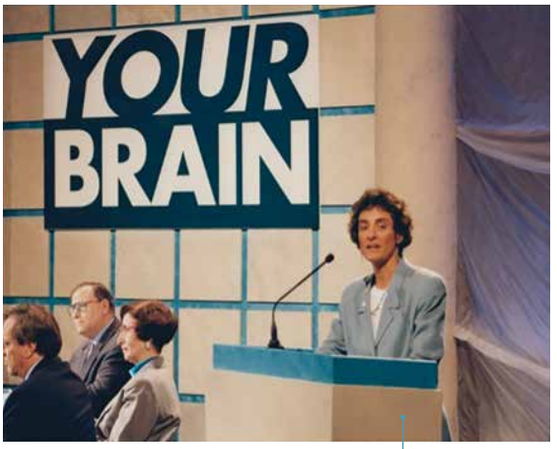


FIGURE 30. Carla Shatz, SfN President, opens Dana Alliance event, 1995.

photo courtesy of Carla Shatz

educational programs.[220] SfN President Carla Shatz opened the Alliance's "Brain Fitness for Life" Forum at the Salk Institute (SEE FIGURE 30) during the 25th Annual Meeting in 1995.[221] Ray Suarez of National Public Radio moderated the panel discussion on brain development and adaptation that took place before more than a thousand attendees and was recorded for broadcast by WHYY, a PBS station in Philadelphia.[222]

The forum proved to be a highly successful public event that laid the foundation for Brain Awareness Week (BAW), first celebrated in May 1996. SfN members participated in over 200 events during the first BAW "national media blitz" and the Society quickly became part of the "core" of the Dana Alliance's BAW partnership, with the potential to reach more than 25 million people each year.[223] Bruce McEwen (President 1996–97), who had helped to develop the 1995 forum as a Council member, was particularly impressed with the Dana Alliance's "town meeting" style programs.[224] He saw BAW as a way to "enliven" SfN chapters and focus the Society's educational programming and chaired the Brain Awareness Steering Committee for several years.[225] SfN staff and leadership invested significant time in BAW planning, hosting a large introductory gathering at every Annual Meeting after 1996 and providing a Brain Awareness Toolkit to interested members.

SEE VIDEO "Dana Alliance" on sfn.org/about/history-of-sfn/1969-2019/videos

As it expanded its outreach to government and to the public, one of the biggest challenges facing the Society in the mid-1990s was the demand to "go digital" rapidly to keep pace with the dramatic rate of technological change in communications, publications, and research practices. SfN overhauled its website in October 1996 to include resources for members and for the general public; and, for several years, the print *Neuroscience Newsletter* included a "Getting Caught on the Web" feature that encouraged members to use the online resources.[226] In August of that same year, The *Journal of Neuroscience* went online on a trial basis, transitioning to regular digital publication in January of 1997; *JoN* was the second biomedical publication to have full-text articles available online.[227] The processes of

submitting abstracts, scheduling sessions, and creating the Annual Meeting schedule also began the transition to digital during this period, as did the *Neuroscience Newsletter.*

'CELEBRATING 25 YEARS OF PROGRESS'

What did the Society for Neuroscience look like as it reached its silver anniversary in 1995? Its membership had exploded, making it one of the largest scientific organizations in the world. Following the first decade in which 5,000 members had joined the Society, SfN had grown nearly fivefold over 15 years, to 23,000 (see FIGURE 31), including many scientists working outside North America.[228]

Membership Committee Chairs Michael Zigmond and Israel Hanin and President Larry Squire proposed another membership survey, the first since 1981, to collect demographic data and understand current needs, as well as to help SfN plan for the future by identifying problems or barriers in training and research. The Membership Committee obtained NIMH funding for a two-part survey in 1995–96; the second part was a detailed statistical sample focusing on career development and issues facing women and minorities.[229] Some interesting changes were reported by the 75% of members who responded: 20% identified as underrepresented minorities (up from 9% in 1981), 30% were women (up from 21% in 1982), and one-third were working in countries outside the U.S. The median age had increased from 37 to 41, with the largest group between 35 and 49. This figure did "not necessarily reflect an aging in the profession, but may indicate that membership now appeals to scientists in a broader range of disciplines," a statement supported by the broad range of primary research interests identified by members. Moreover, students and postdoctoral researchers now accounted for 29% of SfN membership.[230]

SfN membership growth reflected the expansion of funding support and training programs in neuroscience. In 1968, an estimated 238 doctoral dissertations had been awarded in neuroscience-related fields. Less than a decade later, in 1976, U.S. biological science departments graduated 521 PhDs in neuroscience.[231] By the early 1990s, American and Canadian institutions were awarding about 1,000 PhDs per year in neuroscience related fields.[232] SfN had played an important role in the creation of neuroscience departments and of interdepartmental programs that offered PhDs specifically in neuroscience. In 1978, there were 29 interdepartmental neuroscience programs; by 1986, this number had increased to 47.[233] The growth of these programs led to the creation of the Association of Neuroscience Departments and Programs (ANDP) in 1981 to

FIGURE 31. SfN Membership Growth 1971–1993.

graph by Joel Braslow

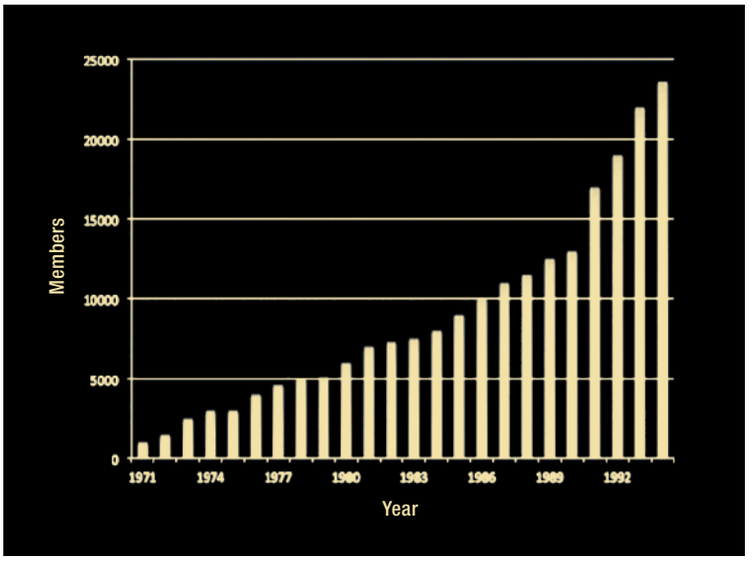
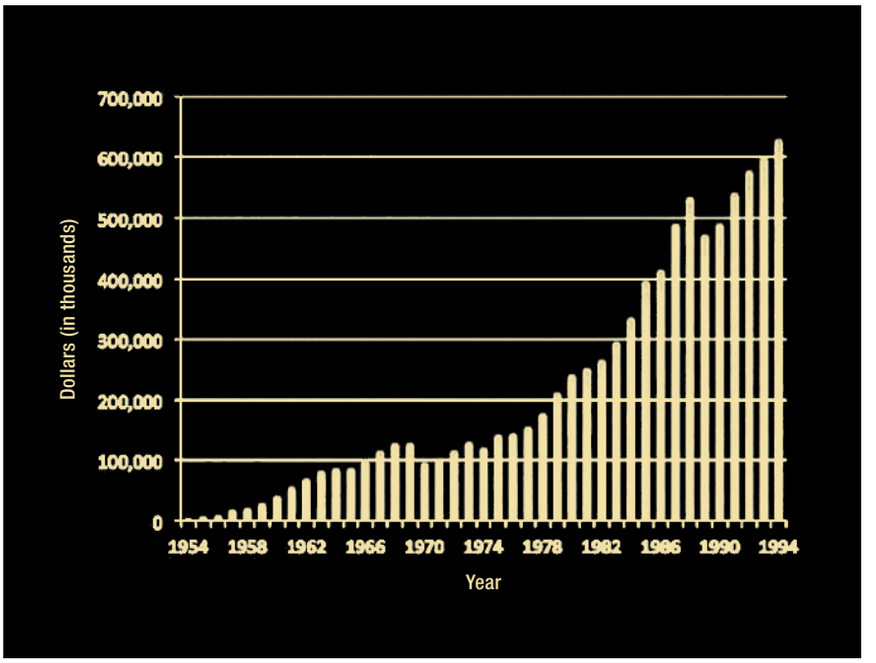


FIGURE 32. National Institute of Neurologic Disorders and Stroke Budget, 1954–1994.

graph by Joel Braslow



help develop curricular standards for graduate programs and track their development.[234]

The dramatic growth of the field would not have been possible without the rapid expansion of federal funding, another area in which SfN leadership proved especially critical. Federal funding for all biomedical research grew at an unprecedented rate following World War II. But while the rise in federal funding for neuroscience mirrored this larger context, SfN leaders had helped to convince Congress of the importance of directing funds toward neuroscience. The National Institute of Neurological Disorders and Stroke (NINDS) budget from the 1950s through the 1990s (see FIGURE 32) illustrates the results of their efforts.

One would be hard pressed to imagine these gains without the advocacy of SfN and its Government and Public Affairs Committee, exemplified by Dominick Purpura's 1990 prediction that, if Congress provided neuroscientists adequate funding, "Humankind will be emancipated from the dread of disability and the stigma of dehumanization that attends dissolution of the human spirit in dementia."[235]

Inside and outside the scientific community, neuroscience flourished and commanded respect. The American Association for the Advancement of Science established a Neuroscience Section in 1994 that quickly grew to one of the largest sections at their annual meeting. Authors and readers consistently regarded *The Journal of Neuroscience* as a prestigious place to publish and undergraduate students began to flock to neuroscience as a major. In 1991, SfN members established the Faculty for Undergraduate Neuroscience (FUN) as a separate organization to help instructors and students take advantage of the resources at the Annual Meeting.[236]

In addition, educational materials such as *Brain Facts, Brain Concepts, Brain Waves,* and *Brain Briefings* reinforced the message

FIGURE 33. Past Presidents of SfN, 1996. *Seated* (*left to right*): Solomon Snyder, Patricia Goldman-Rakic, Ira Black, Carla Shatz, Lorne M. Mendell, David Hubel, Bruce McEwen, Vernon Mountcastle, Torsten Wiesel, Dominick Purpura. *Standing* (*left to right*): Floyd Bloom, Eric Kandel, Larry Squire, Mortimer Mishkin, Robert Doty, William Willis, Albert Aguayo, Robert Wurtz, Bernice Grafstein, Ed Perl.

SfN photo

that SfN was the best source of reliable information about brain research for the public and particularly for lawmakers. Finally, the Society had developed a deep volunteer leadership pool by 1995, thanks to an active nominating committee that drew from the 20 working committees organized to address the priorities and changing needs of the organization.

SfN President Carla Shatz chose the theme "25 Years of Progress" for the 25th anniversary Annual Meeting in November 1995. On the first night of the conference, fireworks lit San Diego Bay "to mark the virtual explosion of discoveries that has characterized the past 25 years of neuroscience" and the concurrent growth of the Society, which now encompassed a rich, diverse, and ever-growing set of subdisciplines and research approaches within a single field.[237]

The Society for Neuroscience established and ensured the disciplinary unity of neuroscience by facilitating communication of novel approaches and techniques while maintaining a clear focus on the brain and behavior; although it began as the U.S. affiliate of IBRO, SfN had transcended its American origins by welcoming members from around the globe. The emphasis at the 25th anniversary celebration was on how the Society had changed and matured to serve the needs of its members from creating formal and informal communication opportunities at the Annual Meeting to creating an integrated publication resource in *The Journal of Neuroscience* to making the case to Congress for the recognition and funding of neuroscience research to creating a meaningful public face for the neuroscience enterprise. But, with the organization growing in size and scope, and the status and visibility of neuroscience in international science and culture expanding as well, SfN was about face significant new challenges as the 21st century dawned.

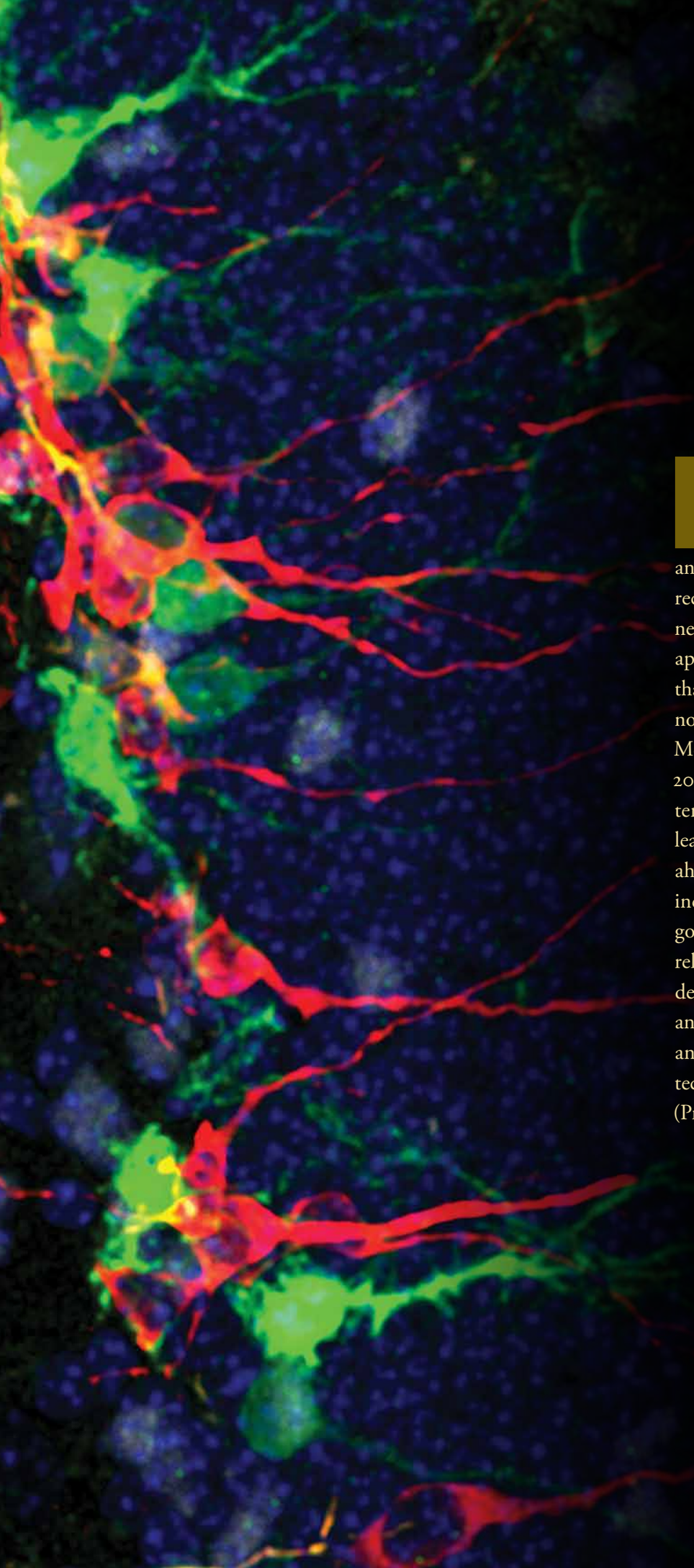
CHAPTER VI

THE CHALLENGES OF REASSESSMENT AND CHANGE

1998–2006

FIGURE 34. The Plastic and Robust Nervous System

Khun et al *Journal of Neuroscience* 2018



IN THE MID-1990s, SFN COULD CLAIM A GROWING AND DIVERSE membership, a strong volunteer leadership, and a record of success in building public recognition and support for the field of neuroscience. But, as the new millennium approached, the leadership began to recognize that the Society's structure and governance were not keeping pace with its growth and mission. Membership plateaued between 1996 and 2001; the financial reserve grew more slowly; tensions developed between the volunteer leadership and staff. SfN faced major challenges ahead, in coping with its own size and increasing diversity, in developing a professional governance that promoted smooth working relationships, in ensuring financial security to develop new programs, in maintaining public and government support for basic research, and in keeping up with the rapid pace of technological and social change. As Eve Marder (President 2007–2008) has commented,

> *SfN as an organization parallels the adult nervous system: It must be both plastic and robust, and this is a never-ending challenge both for the permanent staff and its scientific leadership.*[238]

Presidents Edward "Ted" Jones (1998–99) and Dennis Choi (1999–2000) were among the key early leaders who recognized that SfN's rapid growth, increased global reach, and technological sophistication had outgrown the small-scale governance, staffing, and financial arrangements that had been developed as needed, and often improvised, since 1969. Choi recalled his surprise on becoming SfN Treasurer in 1998 that "an organization that was as scientifically robust and successful as the SfN had been for many years, was actually…running on a pretty lean budget and really at risk to financial red ink should a single Annual Meeting go down for, say, weather conditions." With President Lorne Mendell and President-Elect Jones, he took on the task of improving the Society's financial status, a project continued during his own presidency (1999–2000) and then later with the development of SfN's first Strategic Plan and with new executive leadership from Marty Saggese, under Presidents Price, Gage, and Akil. "[The leadership] was going to have to roll sleeves up and chart some new directions, even though we all knew this was going to be a lot of work, and it was."[239]

Jones and Choi discussed with Council at the Fall 1999 Annual Meeting the problems that had developed when decisions had to be made in the months between the spring and fall Council meetings. SfN had not "grown out of the informality" of the early days, when these were resolved by the Executive Secretary (now the Executive Director) calling the President. The Executive Committee (EC), consisting of the President, Immediate Past President and President-Elect, had been formed to respond to the animal research problem in 1987 and had taken on many operational decisions since then, but the lines of authority were not clear: which decisions could be made by the Executive Committee, which by office staff, and which should be reserved for Council?[240] The results were an amendment to the bylaws to delineate the EC's responsibilities and the creation of a select Self-Assessment Committee (SAC), chaired by Future Treasurer Ray Dingledine, and including Past Presidents Gerald Fischbach (1983–84), Patricia Goldman-Rakic (1989–90), and Bernice Grafstein (1985–86). The SAC, judging that SfN's governance had become "too amateurish" for an organization of its size and scope, developed a working set of principles and goals, interviewed other past presidents, and hired an outside consultant to advise on the next steps.[241] The SAC's report in 2000 and the consultant's in 2001 launched a series of significant changes in the early 2000s, begun under Presidents Don Price, Fred "Rusty" Gage, and Huda Akil: a new membership survey, the development of a Strategic Plan for the Society, the creation of a new committee structure, and an investment strategy, and the purchase of a permanent headquarters building.

TRANSFORMING SFN GOVERNANCE

2001 also saw the retirement of SfN Executive Director Nancy Beang after 20 years of service. The Council retained Auerbach Associates to coordinate the search for a new Executive Director; Auerbach, working with the Search Committee, identified seven goals for the new Executive Director to address. These included staff education, policies, and procedures; reorganization of the staff and Society governance for greater efficiency; and strategic planning.[242] At the November 10, 2001 Council Meeting, President Donald Price announced that Marty Saggese had accepted the position and would begin his tenure in January 2002.[243]

Saggese came to the Society after a twenty-year career in government and non-profit management, attracted by the opportunity to manage SfN's organizational structure in

SEE VIDEO "Professionalizing the Society's Governance and Staff" on sfn.org/about/history-of-sfn/1969-2019/videos

order to maximize its ability to achieve its mission.[244] His perspective that "non-profit is a tax status, not a business model" helped the volunteer leadership transition to adopt a new financial approach that generated income for immediate use to support Society programs and to develop initiatives to serve the members while building financial strength to allow the organization to survive and prosper in perpetuity.

Saggese implemented a number of procedural and structural changes in his first few years to meet the initial executive goals defined by the Search Committee. He reorganized 12 staff departments into 5 divisions under senior directors to support SfN programs and facilitate coordination between the volunteers and professional staff.[245] In 2003, Council agreed to shift the Society's fiscal year from January–December to July–June so that the Annual Meeting would fall earlier in the cycle, making it easier to predict Society expenses and manage cash flow through the fiscal year.[246] That year, Council also accepted the Finance Committee's recommendation to implement a tiered structure for SfN's Sustaining Associate Membership category for industry partners while continuing to cultivate their sponsorship of SfN prizes and awards at the Annual Meeting.[247]

The SfN Council, acting on the recommendations generated by the SAC, commissioned a new membership survey to determine member priorities; conducted extensive interviews with current and former Council members, committee chairs, and staff; and consulted with the firm of McManis and Monsalve to assist with developing the Society's first Strategic Plan. In contrast to the membership surveys conducted in 1982 and in 1995–96 that had focused on collecting demographic information, the 2002 survey asked "members to rate the importance of various Society programs and benefits as well as the quality of its services" in order to clarify SfN's "goals and initiatives."[248]

Nearly 20% of the membership (5,646 individuals) responded to the digital survey.

FIGURE 35. Marty Saggese and Carol Barnes 2007

photo courtesy of Carol Barnes

While SfN leaders were heartened to learn that the members overwhelmingly felt that the Society was "embarking on the strategic planning process from a position of considerable strength," and gave high approval ratings to the Annual Meeting and *The Journal*, respondents did identify several areas for enhancement and improvement. SfN members urged the leadership to take steps to strengthen communication with the members, to provide career support services, to take a stronger stance in support of public policy issues, and to establish the Society for Neuroscience as an "authoritative source on brain science" for the general public. Simultaneously, many members expressed a desire to become more actively involved in local chapters and in national committees, indicating that SfN could tap into a strong pipeline of energetic future leaders.[249]

The Council used the feedback obtained to put together a new Strategic Plan for SfN that aligned the financial goals of the Society with its core mission and values.[250]

The plan focused on four major goals:

- Promote continued development of the field of neuroscience, the integration of research, and translation of discoveries to clinical treatments.
- Provide improved professional development services and educational resources for neuroscience students and scientists at different stages of their careers.
- Expand and improve general public information and education about neuroscience.
- Strengthen SfN's role and influence in public affairs and advocacy.[251]

While none of these priorities were new goals for the Society, their clear articulation helped SfN leaders ensure that current and future activities remained in line with member values. Over the next two decades, the 2002 Strategic Plan became a useful benchmark for measuring the success of various programs as well as a working yardstick to evaluate whether a proposed program promoted the goals and reflected the values of the organization.

The Strategic Plan required a shift in SfN governance and the leadership implemented this transition in several stages over 2003–4. First, Council revised the Society bylaws to accommodate a more flexible committee organizational structure and to define clearly the relationship between the Central Office, Council, the Executive Committee, and the various Committee Chairs.[252] The new organizational scheme included the formation of five temporary working groups of SfN members to develop work plans to implement the goals of the Strategic Plan.[253] The working groups focused on Annual Meeting initiatives; strengthening Society publications, including *The Journal of Neuroscience*; professional development and educational programs throughout the year; public education initiatives for neuroscience literacy, including Brain Awareness Week and *Brain Facts*; and public affairs and government advocacy.[254]

In addition to these working groups, Council established a standing Committee on Committees (CoC) to oversee the nomination of councilors, committee chairs, and committee members.[255] As Thomas Carew (President 2008–09) commented, "Neuroscientists are not great at obeying the rules all the time, and so at some point there was this kind of complexity that required a coordination. And this Committee on Committees was just that."[256]

In 2005, under the leadership of President Carol Barnes and CoC Chair and Secretary Irwin Levitan, Council expanded on the success of the working groups and reorganized SfN's standing committees into five clusters: Financial Management; Information; Membership Development and Benefits; Professional Development, Mentoring, and Diversity; and Public Outreach. The chairs of each committee met as the cluster steering committee to reduce redundancy and improve coordination of programs and scheduling.[257] In the years following the creation of the CoC, the efficiency of the Society's governance improved significantly, with occasional updates to the committee clusters to reflect periodic reevaluations of the Strategic Plan.

TABLE 8. SfN Standing Committees 2019–20

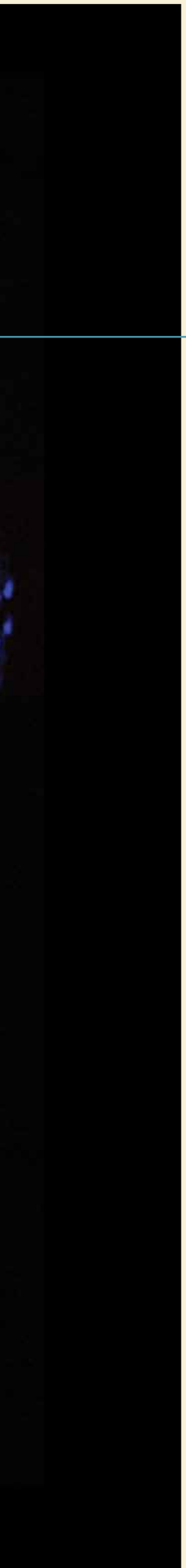
CLUSTER	COMMITTEE
Financial Management	Audit
	Finance
	Investment
Membership Engagement	Global Membership
	Trainee Advisory
Professional Development and Training	Neuroscience Training
	Professional Development
Public Outreach	Committee on Animals in Research
	Government and Public Affairs
	Public Education and Communication
Other Committees	Executive
	Committee on Committees
	Nominating
	Program
	Scientific Publications

DEVELOPING SFN'S FINANCIAL STRENGTH AND LEVERAGE

SfN leaders under Presidents Lorne Mendell, Edward Jones, Dennis Choi, Donald Price, Fred Gage, and Huda Akil also made several key decisions as the new century dawned to ensure the financial well-being of the society in the face of stagnant membership numbers and flat income from dues and to cope with the increasing costs of producing a high-quality scientific journal in the Internet age. The original financial and organizational structure of the Society had worked well when the Society was smaller, but the new policies and procedures reflected the needs of a larger, more diverse, and more digitally focused organization.

Council members had been concerned for some time that the Society did not have enough reserve cash to weather a crisis, and the Finance Committee had engaged a series of investment advisors to strengthen SfN's financial state with varying degrees of success.[258] By 2000, the Society had built up enough in reserve for one year of operations (approximately $9.3 million) for the first time, but its solvency was still vulnerable to market volatility; therefore, the Finance Committee made the critical decision to articulate a coherent investment policy to enable SfN to make rational financial decisions going forward.[259]

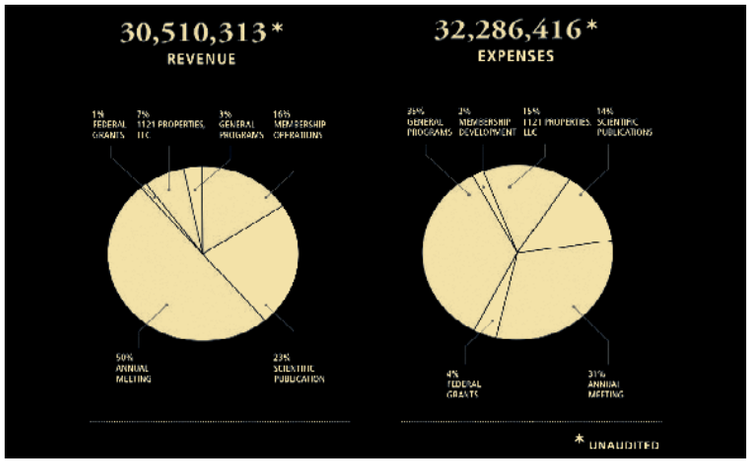
In November 2000, Council approved the creation of a separate ad hoc Investment Committee to consult with financial advisors and recommend investment strategies to ensure the maintenance of sufficient reserves. David Cohen, (who as SfN President in 1981–82 had initiated the Society's first Long Term Planning Report) became chair of the committee in April 2001 and recruited a number of SfN members and outside



The original financial and organizational structure of the Society had worked well when the Society was smaller, but the new policies and procedures reflected the needs of a *larger, more diverse,* and more digitally focused organization.

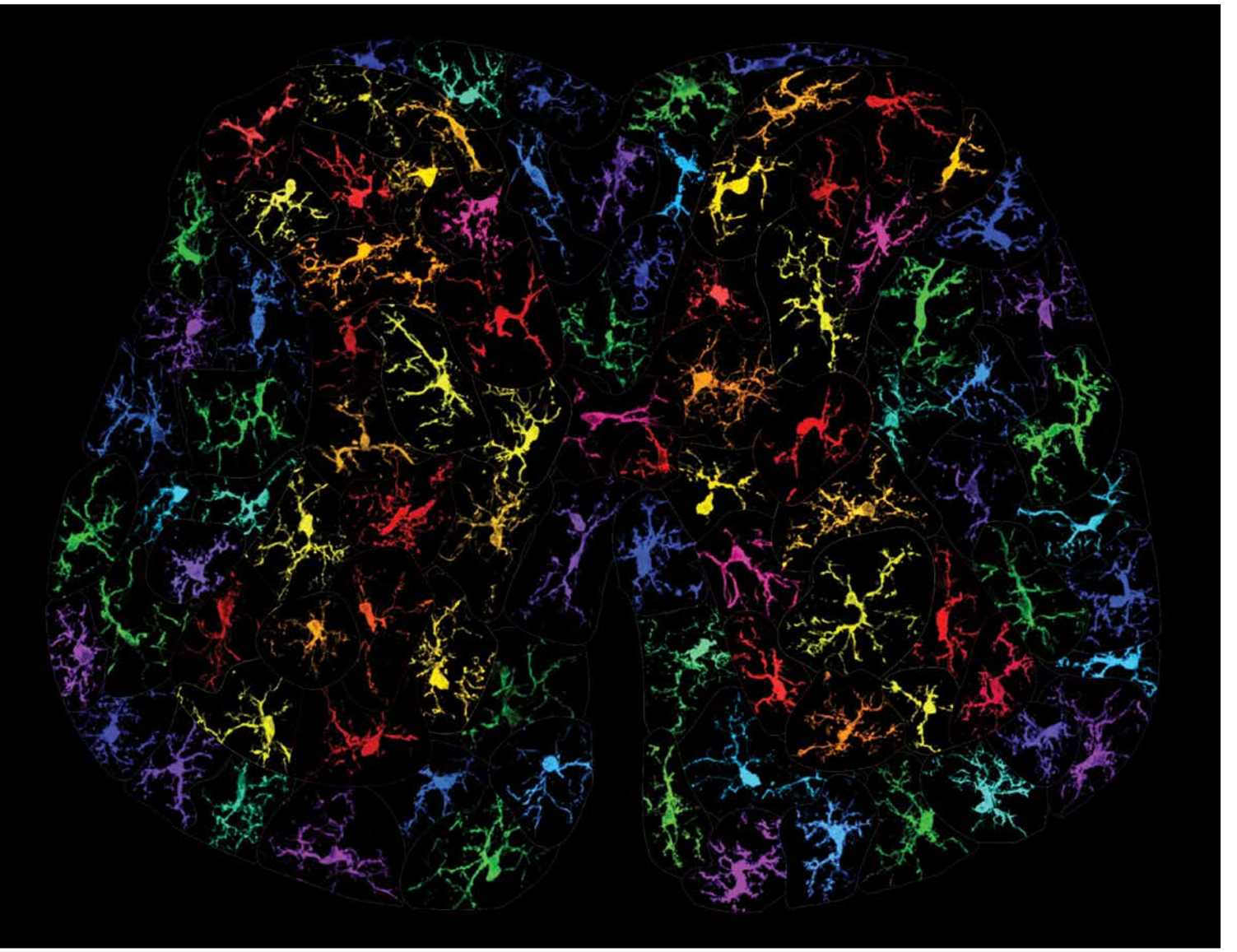
FIGURE 36. Income/Expense Breakdown 2018

SfN Annual Report FY2018[267]



financial experts who were interested in science to serve on this committee.[260] Treasurer (and President-Elect) Huda Akil highlighted the need for substantial reserves at the November 2001 Business Meeting, when members discussed the establishment of the Investment Committee as a standing committee of the Society. She pointed out that, if the devastating events of September 11, 2001 had instead occurred in October, forcing Council to cancel the Annual Meeting, the Society would have "incurred millions of dollars … of loss," a potentially devastating financial blow.[261] While the Investment Committee has updated its focus periodically to reflect the Society's priorities, it has consistently sought and implemented sound financial strategies that have protected SfN from market volatility.

The leadership also recognized that "money is the engine" that made the scientific mission of the Society possible; that each revenue stream had to be nurtured so that no sudden changes in fees or emergency fundraising drives would be required; and that a healthy reserve created leverage for SfN in dealing with vendors, grantors, and collaborators.[262] Finance and Administration was one of the five major divisions created at the central office in 2001; the Investment Committee later joined the Finance and Audit Committees in the Finance Cluster.[263]



The appointment of a staff Financial Officer and careful use of technology and data management were also critical. While the replacement of hardcopy meeting programs, publications and onsite training sessions with online abstracts and the meeting app, online journals and webinars have created member value at reduced costs, the flexibility of online data has also improved financial forecasting, planning and budgeting; as CFO Cori Spencer commented in 2019, "[W]e are trying to incorporate data analytics in every aspect of our decision making."[264]

Under this careful management, revenues grew from $20–22 million to $32 million annually and the financial reserve increased to more than $78 million (as of February 2020), ensuring the organization's future solvency.[265] The Annual Meeting, *The Journal of Neuroscience,* and membership dues remained the major sources of Society income, but the relative breakdowns changed in the 2000s and 2010s. In 2017, the Annual Meeting contributed 50% of yearly revenues (with support from more than 30 outside organizations), while drawing only 31% of expenses; *The Journal* and other publications contributed 23% to revenues and drew 16%; while membership dues, which had been almost 21% of income in 2005, now represented only 16%. "General Program" expenses, meanwhile, SfN's investments in

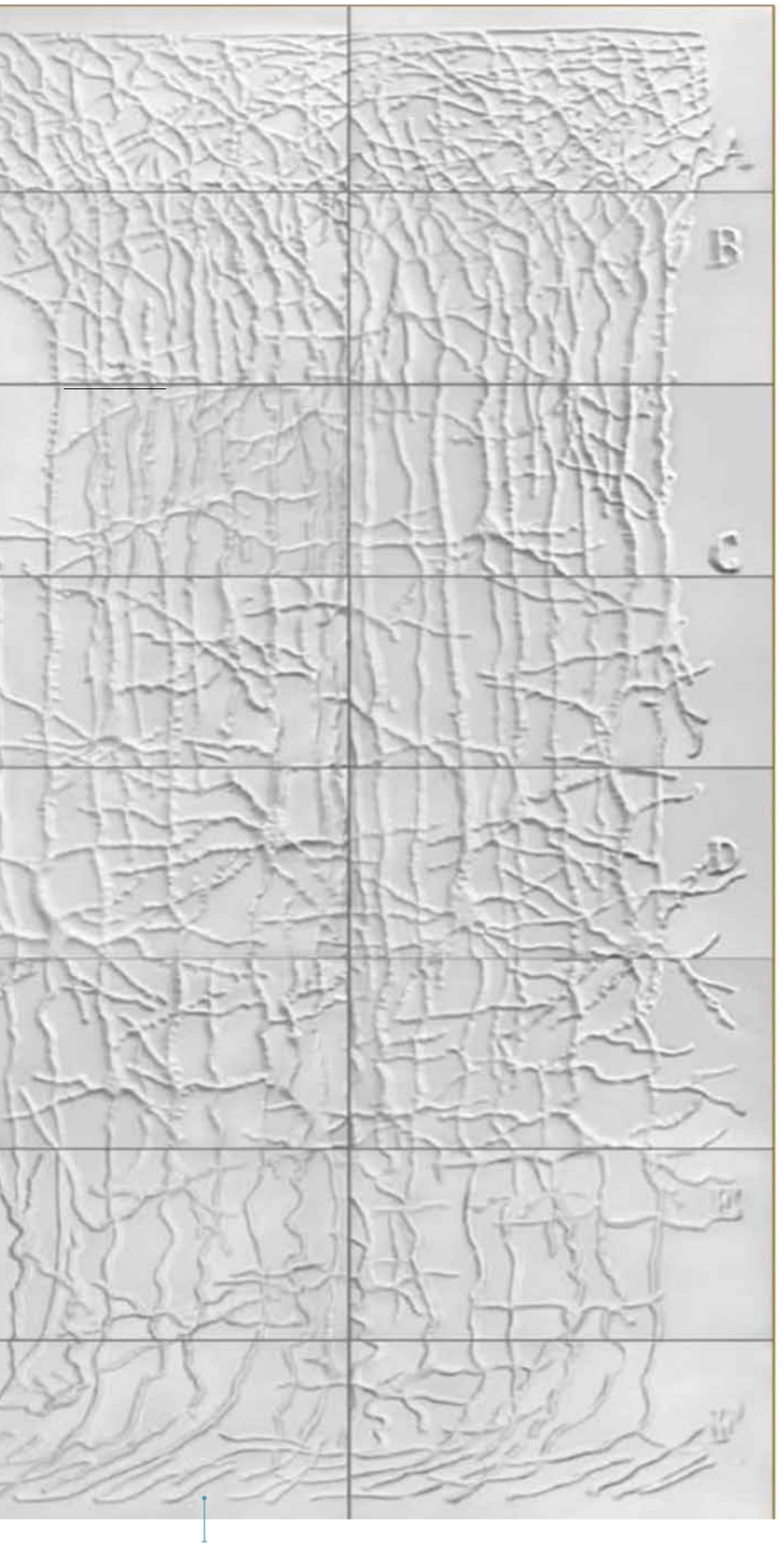


FIGURE 37. The Cajal Mural

SfN NQ Summer 2006

member training programs, public education and advocacy, grew from 21.5% of the budget in 2010 to 35% in 2017.[266]

While the decision to move *The Journal* in-house and the purchase of the headquarters building (SEE A PERMANENT HOME) have contributed to SfN's financial health, these initiatives were possible due to the organization's existing strength, contributing to its ability to negotiate the best terms.[268] The value of stronger financial management was borne out in many other instances. For example, in fall 2013, Council approved the creation of a Strategic Investment Fund to draw up to 1% from the reserve over three years to fund new initiatives, the first of which was *eNeuro*.[269] In approving a three-year budget plan in summer 2016, Council agreed to freeze membership dues and publication fees for two years, recognizing the "continued financial pressures" facing many scientists and to continue strategic investments to support key innovations and avoid the necessity of increasing member costs.[270] These and similar initiatives demonstrated the success of SfN's good financial management and its long-term potential for survival and growth.

A PERMANENT HOME ON 14TH STREET

The most visible change for SfN in this period was the decision to buy a headquarters building rather than continue to rent office space in Washington, D.C.[271] With the lease on the now cramped offices at 11 Dupont Circle due to expire in three years, the SfN Council under the leadership of Presidents Fred Gage and Huda Akil began to explore the idea of buying a building in 2002. The next year, President Anne Young set up an ad hoc committee on real estate and appointed then President-elect Carol Barnes, Treasurer Richard Huganir, Treasurer-elect William Greenough, Past Treasurer Ray Dingledine, Investment Committee Chair and Past President David Cohen, and Councilor Nancy Wexler.[272] If SfN occupied a few floors at the new location and rented out the remaining space, the income generated would be available for member programs, while

the Society would retain the flexibility to expand its offices as necessary. Thanks to the efforts of the Investment Committee, SfN was in a strong financial position and able to secure "highly preferred lending rates" for the mortgage on the building. Once the Society had purchased the new site on 14th Street, the real estate committee chose Envision Design (now a division of Perkins and Will) to design SfN's new office space as a "green" space that "incorporate[d] principles and materials that seek to provide environmentally sensitive, healthy, and productive workplaces."[273] In 2006, SfN's office space received Gold Level Certification from the Leadership in Energy and Environmental Design (LEED)'s green building rating system, a recognition also awarded to the entire building in 2010.[274]

The new offices also provided an opportunity for neuroscientists to collaborate with architects on creative designs that reflect neuroscientific concepts. The main office is inspired by neuroscience. The huddle rooms – "Amygdala," "Cerebellum," "Hippocampus" and "Striatum" – are laid out according to the position of each section in the brain, while the main conference rooms, "Axon" and "Dendrite," combine to form a larger "Neuron" meeting space.[275] The centerpiece of the SfN office is a dramatic three-story mural depiction of Santiago Ramón y Cajal's historic drawing of the mouse neocortex, designed and constructed in collaboration with students from the Catholic University of America's School of Architecture and Planning Design Collaborative. As Carol Barnes commented, "The three stories just lent itself to…the six-layer cortex."[276] At the gala grand opening on May 5, 2006, SfN past presidents, government officials, representatives from the Spanish and Italian embassies, NIH and other scientific leaders, and Ramón y Cajal's family members including his great-granddaughter Teresa Ramón y Cajal Asensio joined in dedicating the new building.[277]

Throughout these transitions, SfN Presidents Dennis Choi, Donald Price, Fred Gage, Huda Akil, Anne Young and Carol Barnes, assisted by a strong Council and volunteer leadership and with the input of Executive Director Marty Saggese, admirably balanced the current and future needs of the organization. Membership grew 50% between 2001 and 2011, to a high of 42,576, before beginning to plateau at around 37,000 over the next few years.

The SfN Council and Executive Committee made well-informed, responsible decisions in the new millennium that ensured that the Society would be able to meet the needs of its members for many years to come. At the same time, SfN volunteers and staff continued their strong advocacy of science and research support and provided legislators and the public with high quality, reliable educational materials about the brain.

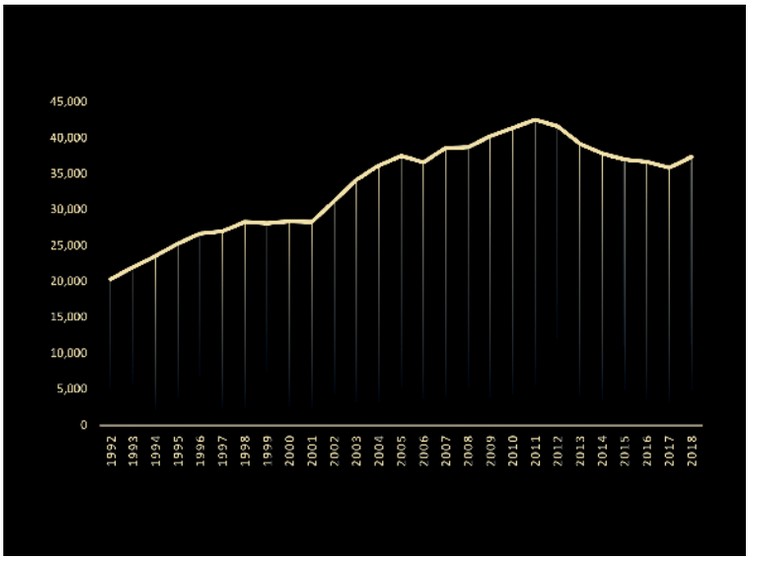
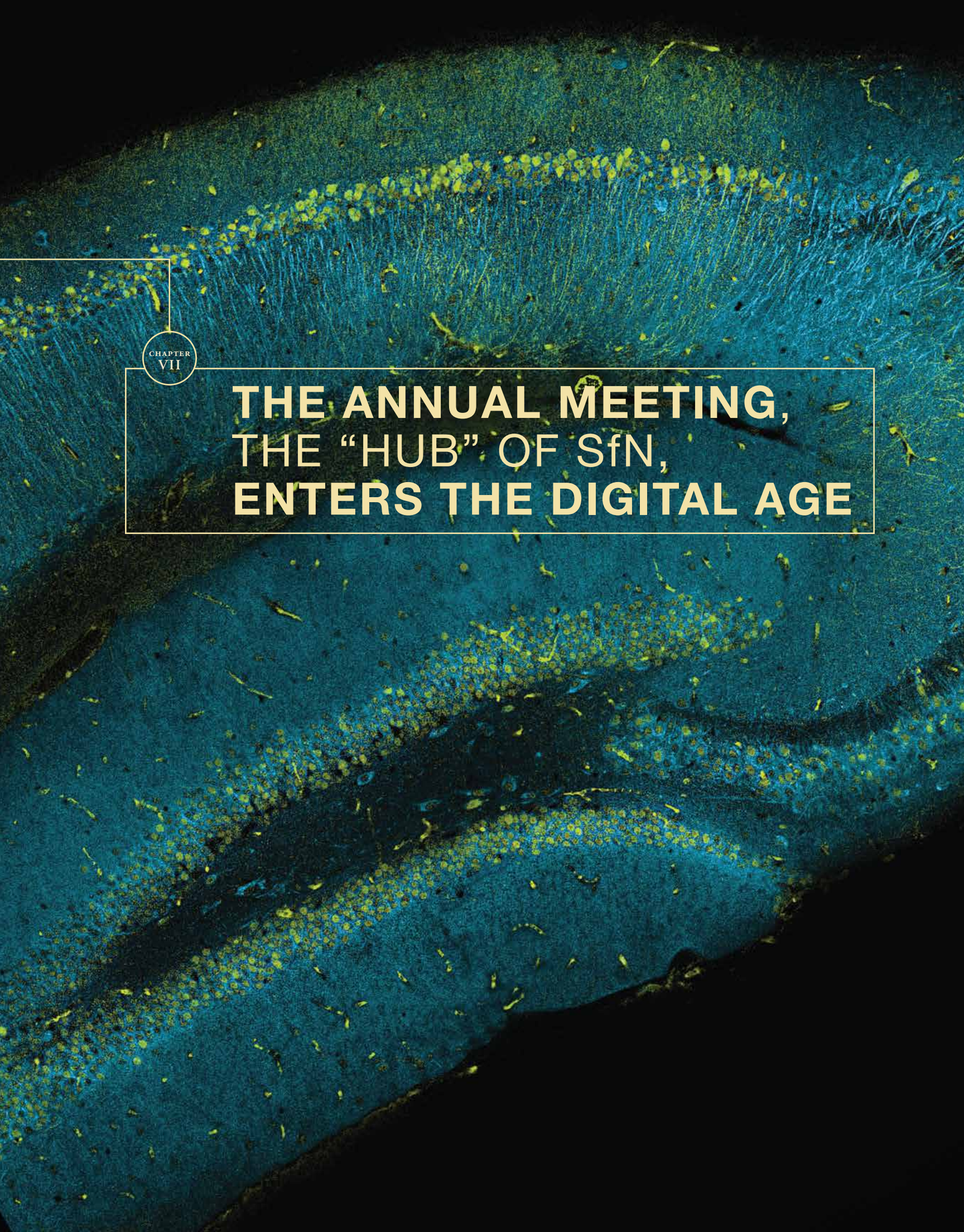


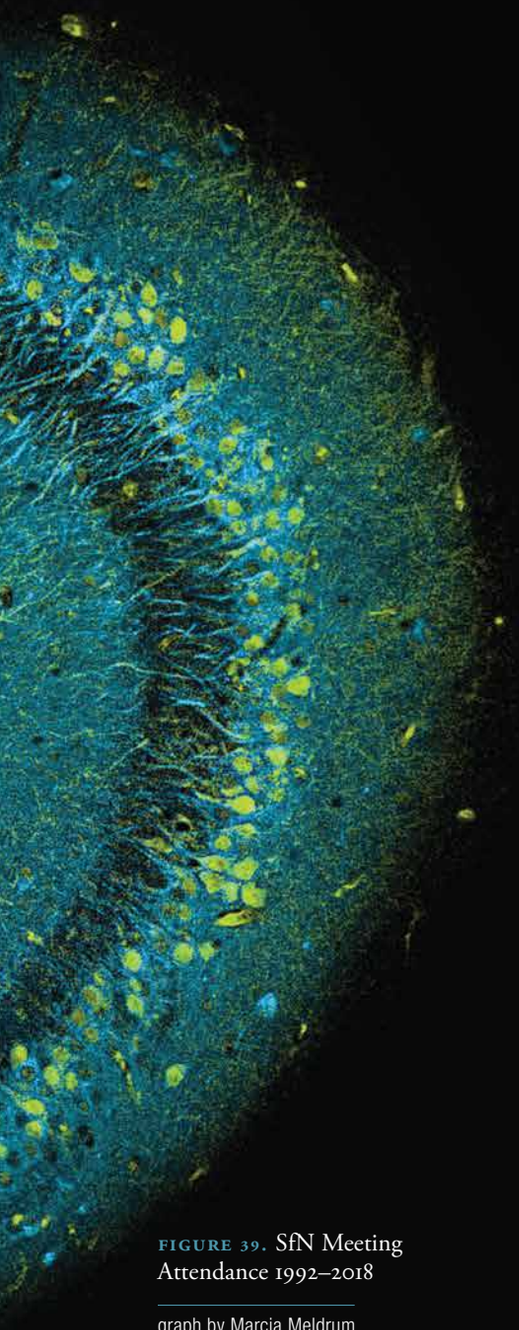
FIGURE 38. SfN Membership Growth 1992–2018

graph by Marcia Meldrum



CHAPTER VII

THE ANNUAL MEETING, THE "HUB" OF SfN, ENTERS THE DIGITAL AGE



MEETING ATTENDANCE CONTINUED TO EXPLODE as the organization grew, increasing another 51% in the ten years from 1995 to 2005, to an all-time high of 34,815, then levelling off to a fairly steady 28,000 to 32,000 over the following decade.

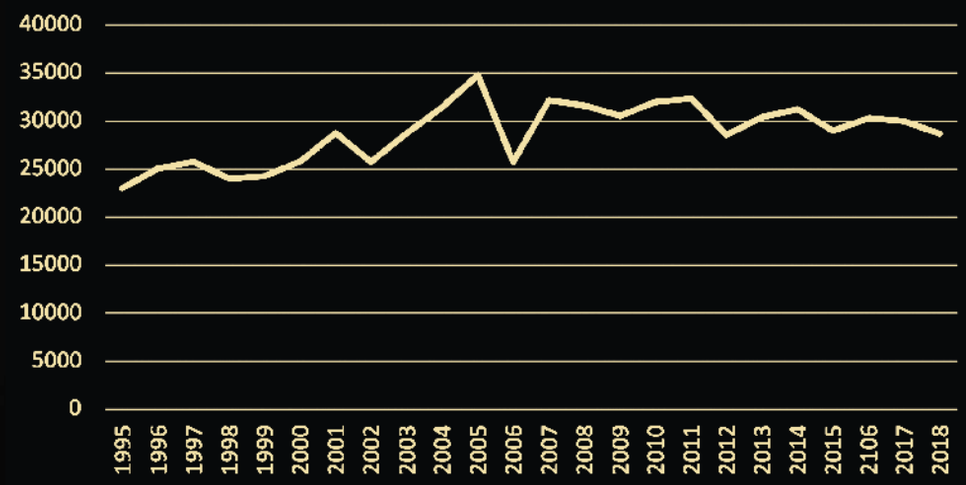


FIGURE 39. SfN Meeting Attendance 1992–2018

graph by Marcia Meldrum

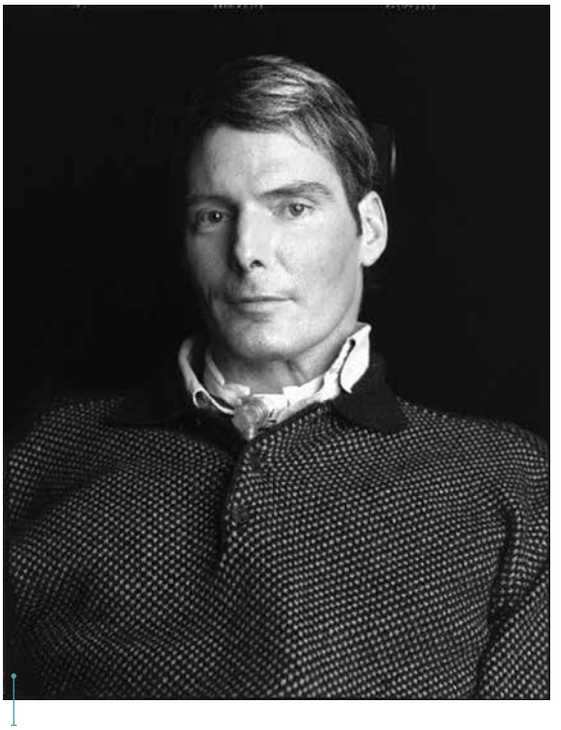


FIGURE 40. Christopher Reeve
1952–2004

portrait by Timothy Greenfield-Sanders,
courtesy of the photographer

SfN leadership and staff worked hard to meet the challenges of retaining dynamism and relevance, as well as unity and diversity, within the annual neuroscience "melting pot," creating a new division of Meeting Services, developing format and scheduling innovations, utilizing digital technology to make the program and meeting experience more manageable, promoting speaker diversity, offering assistance to members with special needs, such as parents and international attendees, adding new content for trainee members and for the general public, and updating data and technology to ensure smooth operations. Ultimately, however, it was the members who kept the meeting fresh and exciting, particularly on the poster floor. As Gordon Shepherd commented, "[T]he posters are where you meet the people who are actually doing the work and where you reach across this divide between senior and junior and male and female and academic and commercial and U.S. versus other countries and to me that's just such an exciting and invigorating part of doing science on this personal basis, where you can really get a sense of actually creating something new from your personal interactions."[278]

SfN leaders also recognized that nonscientists could also offer information and insights that could help to spread the word about brain research and inform members' work. Dennis Choi, as SfN President (1999–2000), made the choice to invite actor and spinal cord injury victim Christopher Reeve to appear at a Presidential Symposium on "Restoring Function after Spinal Cord Injury" at the Annual Meeting in 2000.[279] As Choi enthusiastically reminisced, Reeve

> *was such a spectacularly articulate person with really, wisdom and appreciation for the breadth of neuroscience and the importance of basic neuroscience…he knew right away that curing spinal cord injury was unlikely to come from a single spinal cord injury experiment, but would have to draw on a very large corpus of basic research, and he advocated for the latter…I thought, what a wonderful spokesperson for what we neuroscientists do—what the SfN does….*

FIGURE 41. SfN Mini Symposium

SfN

TABLE 9. SfN Annual Meeting Locations 1996–2019

1996	Washington, D.C.	2008	Washington, D.C.
1997	New Orleans, LA	2009	Chicago, IL
1998	Los Angeles, CA	2010	San Diego, CA
1999	Miami Beach, FL	2011	Washington, D.C.
2000	New Orleans, LA	2012	New Orleans, LA
2001	San Diego, CA	2013	San Diego, CA
2002	Orlando, FL	2014	Washington, D.C.
2003	New Orleans, LA	2015	Chicago, IL
2004	San Diego, CA	2016	San Diego, CA
2005	Washington, D.C.	2017	Washington, D.C.
2006	Atlanta, GA	2018	San Diego, CA
2007	San Diego, CA	2019	Chicago, IL

I recall his speech as really quite profound. It was in the evening; he was on stage, spotlight, and it was silent. And then there were these respirator breaths because he had a very high cervical injury, unfortunately, and he couldn't speak without great difficulty and without drawing on his respirator for air. And he would speak in this respirator-punctuated voice, but it was so steady, so articulate, and everybody was listening and it was really a very important moment, I thought, certainly for me.[280]

The Annual Meeting in San Diego opened the next year with record attendance in the wake of the September 11 attacks; as President Fred Gage noted, "For the neuroscience community, there has never been a more important time for us to work diligently and effectively and to take solace in the fact that, as scientists, we make a difference every day." At the same time, he acknowledged concerns that the meeting was becoming "too large and unmanageable". In response, the Program Committee had developed subcategories within its thematic organization and planned opportunities for "meetings within the meeting" to assist people to meet and interact with others in their areas of special interest.[281] The "meetings within the meeting" debuted at the 2004 Meeting with 27 mini-symposia, covering all 9 of the program themes.[282]

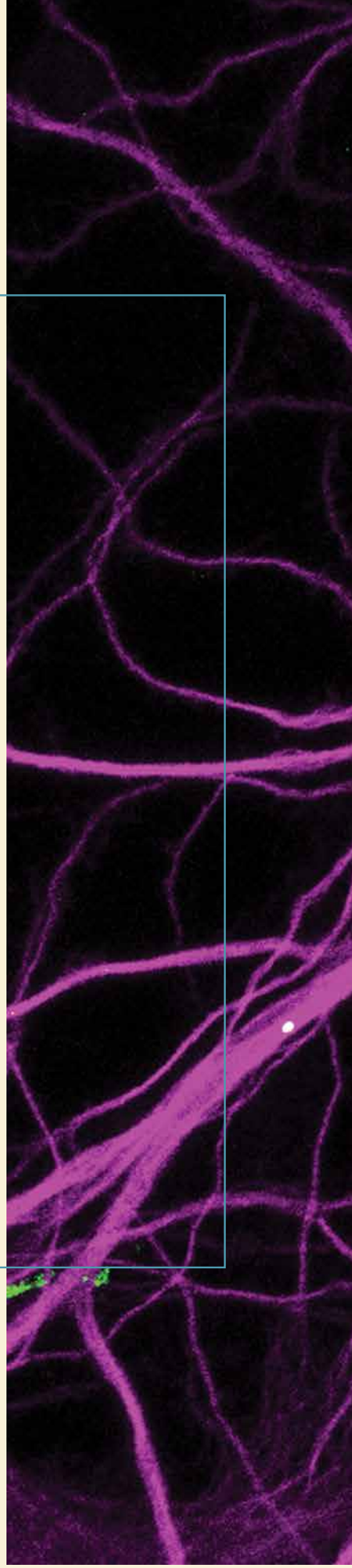
As Eve Marder (President 2007–2008) described the results of these innovations, "[I]t's almost like you have 15 or 20 small meetings running in parallel. So people can bounce back and forth in between the small meetings at the poster sessions of the people in their peer group that they want to meet and find, and they do find each other…and then bounce to a big talk with three or four or five thousand people and get an overview of a whole field. I think SfN has done particularly well at creating the intimacy of a small meeting, housed in this enormous meeting."[283]

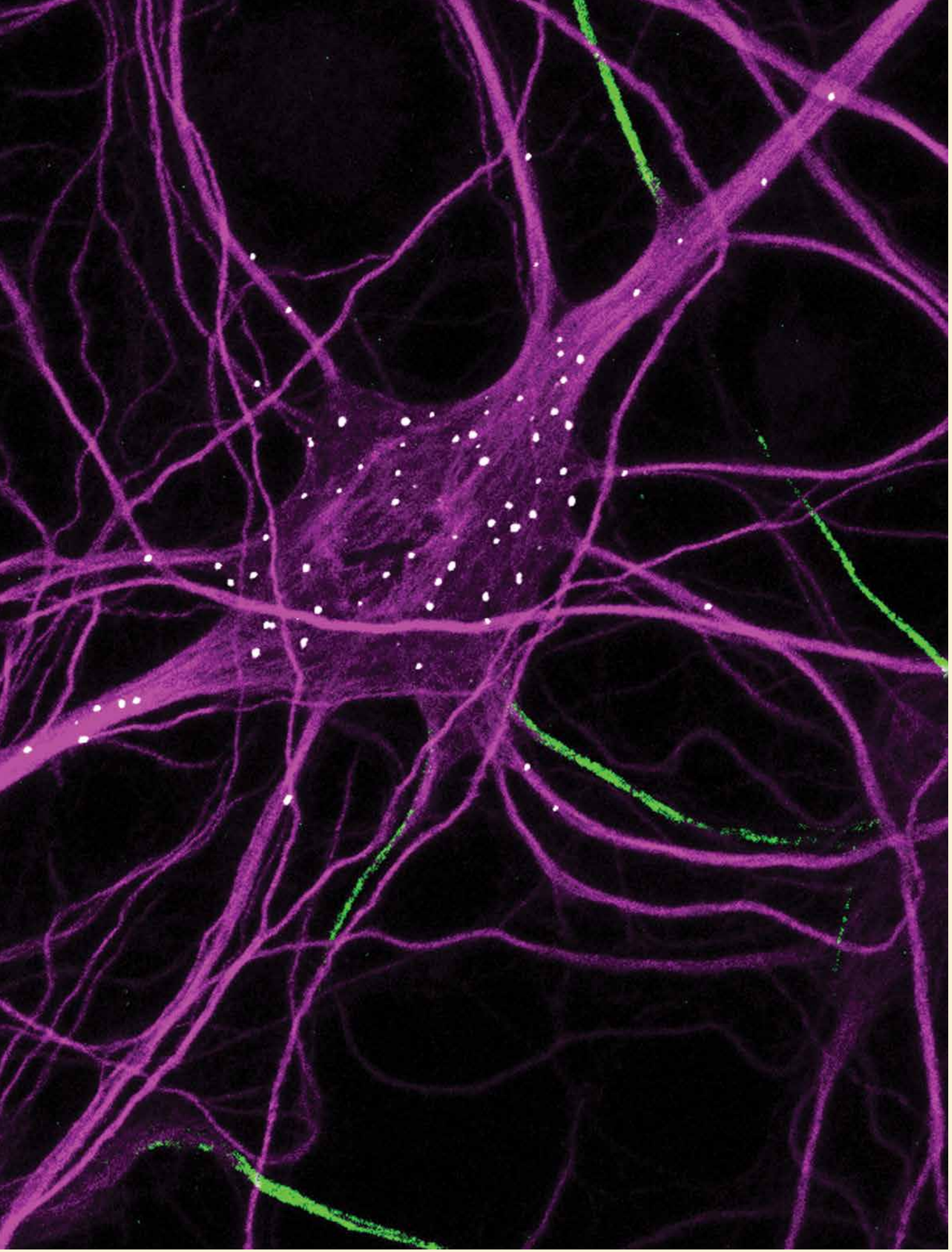
The summer of 2002 saw the creation of a new Meeting Services division as part of the central office reorganization,[284] and the development of the Strategic Planning Initiative, which included an Annual Meeting Initiatives working group, chaired by Richard Huganir, that was specifically charged with

“

For the neuroscience community, there has never been a more important time for us to work diligently and effectively and to take solace in the fact that, as scientists, *we make a difference every day.*

FRED GAGE, 2001





CHAPTER VII

THE ANNUAL MEETING, THE "HUB" OF SFN, ENTERS THE DIGITAL AGE

finding ways to make the meeting more "user-friendly." Some of the suggested changes, already underway or soon to be adapted, were:

- Increasing the number of cross-disciplinary lectures.
- Increasing the amount and quality of Web-based information to help with meeting navigation and program review.
- Providing orientation sessions for first-time attendees.
- Enhancing shuttle bus service to and from accommodations.
- Improving signage, color-coding, and other navigational aids.
- Tasking the Program Committee with continuing to monitor and refine the sections, specializations, and topics used to organize and session the meeting.[285]

The Program was already undergoing major transformation from the original "telephone books" of abstracts. Electronic abstract searching had been introduced in 1989.

Soon after, Moses Chao and Robert Malenka (Program Committee chairs 2002–2003) took the first step in improving schedule access when they and the Program Committee enthusiastically accepted a staff suggestion to develop daily schedule books including "a little, thin pamphlet that had all the talks and all the schedules" for the day.[286] Meanwhile, Program Committee members Harvey Karten and Mickey Goldberg, who also chaired an Ad-Hoc Committee on Electronic Initiatives, had proposed that the Society begin accepting electronic abstracts and distributing them on CDs. Members had the option to submit a paper or electronic abstract for the first time in 1999. Approximately half chose electronic submission, and, as Goldberg had feared, the system crashed when the majority of these arrived in the last half-hour of the final day. After two more years of dual submissions in 2000 and 2001, "electronic submission became the norm" in 2002,"[287] and the CD of abstracts, with a built-in itinerary planner, replaced the "telephone books."[288]

SfN's Program Committee also introduced multiple new types of sessions and formats: for example, around 2000, the first "data blitz" talks, in which members were given one slide and one minute to explain their findings; and in 2009, the first nanosymposia, slide sessions based on "abstracts from multiple labs with a common topical interest", allowed members to organize their own presentations.[289]

In 2014–15, after many years of slotting abstracts into the same areas, the Program Committee re-evaluated the themes and topics and reorganized the way that presentations were organized. The Committee, under the chairmanship of Liqun Luo, undertook this major change "to ensure that the breadth of the field is covered and that no one theme or topic area is over- or under-represented in

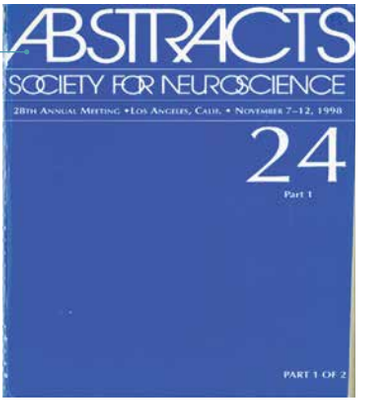


FIGURE 42. Part 1 of the 1998 "Telephone Book"

SfN Archives, UCLA-NHA

FIGURE 43. On the Poster Floor

SfN

the scientific program."[290] The Committee sought to distribute abstracts among topic areas more evenly, including both basic and disease-related research, and to "foster interactions of scientists working on related areas…by placing their topics in the same

> Neuroscience is really a *multi-dimensional structure*, that you have different sub-disciplines that interact with each other in a very rich network.
>
> LIQUN LUO, 2018

themes."[291] In the new structure, for example, "scientists who study basic developmental neurobiology and neurodevelopmental disorders…have their abstracts under the same theme, 'Development,' while a new theme, 'Motivation and Emotion,'… integrate[s] research on mechanisms of motivational behavior with work on mechanisms of drug addiction."[292] As Luo explained,

> [*N*]*euroscience is really a multi-dimensional structure, that you have different sub-disciplines that interact with each other in a very rich network, but themes and topics, you arrange them in a linear sequence. By increasing the proximity of certain disciplines, you also distance others, right? So you want to make the optimum way of using a linear sequence to organize a multi-dimensional, highly complicated network, and you gain some, you lose some…So it was actually a very challenging task.*[293]

He was pleased when 80% of the Committee endorsed the final plan and when members later commented to him, "Oh, for the first time I feel what I do actually fits the sequence!"[294]

Members responded positively to all the various innovations, as shown by a survey in 2012, which reported that most attendees were "satisfied" or "extremely satisfied" with the Annual Meeting. Respondents also expressed interest in additional features, which were already in the works. Dynamic multimedia posters were introduced in 2012. More professional development and networking opportunities became available when the first Graduate School Fair was held that same year,[295] followed in later years with offerings such as coaching on mentor-mentee interactions and panels on effective scientific communication. Meeting navigation tools took shape in a webinar presenting tools "to make the most out of the Annual Meeting" in 2014.[296] Perhaps most importantly, all schedules and other meeting information became available to members in a cell-phone-based app in 2013, completing the digital transformation. Christophe Bernard, who was serving on the Program Committee at the time, remembered that "I insisted a lot to have the app and some people were dubious about the utility of the app. Well, now you can't do anything without the app."[297] In 2018, meeting attendees downloaded the app 26,000 times.[298] As Nick Spitzer and Huda Akil commented, "one learns the tools of navigation for meetings of this size and the society has been very good" in providing digital aids; "everybody else is having a hard time navigating the immensity of it all, so you feel we're all in this together and I think that's actually extremely reassuring and exciting at the same time."[299]

Some major changes in this period involved "difficult and thoughtful" discussions, as when Council decided in fall 2012 to rotate future meetings between three cities with adequate convention and hotel space – Chicago, San Diego and Washington – and to exclude New Orleans because of the "unacceptably high risk" of hurricanes in the autumn months. Members had coped with tropical storms in Miami in 1994 and 1999 and a Level-1 hurricane in New Orleans in 2012 – Marina Picciotto recalled having to "wade down the center of the street in my jeans in water that was definitely above my knees at some point"[300] – but Council had to consider the risk of financial loss in the event of serious hotel or convention center damage, though the decision was not unanimous.[301]

The Annual Meeting of the 2010s remained "an incredibly exciting venue", a place "to hear a world class scientist on something outside of your area", or to "get one good idea [that] can lead to a whole year's work of research or a whole new way of looking at things."[302] Despite the meeting's success, SfN leadership and staff have never stopped looking for ways to enhance and expand member experiences, to maintain the unity and diversity of neuroscience, and to create "an annual meeting environment in which it is possible for everyone in the scientific community to thrive." In spring 2018, for example, Council discussed the financial burdens faced by young attendees beyond just travel and housing, including, for example, the cost of drinks at important networking events, and agreed to spend $50,000 to make such refreshments affordable.[303] In the fall, Council approved the continuance of the new Storytelling Session, in which members shared personal narratives about their scientific experiences. SfN also contacted the three convention centers to stress the need for appropriate facilities for scientists attending with infants and received encouraging responses.[304]

Participation at the 2018 meeting in San Diego showcased the fruits of SfN's ongoing efforts to keep the Annual Meeting fresh, dynamic, inclusive, and user-friendly.

FIGURE 44. On the San Diego poster floor 2018

SfN

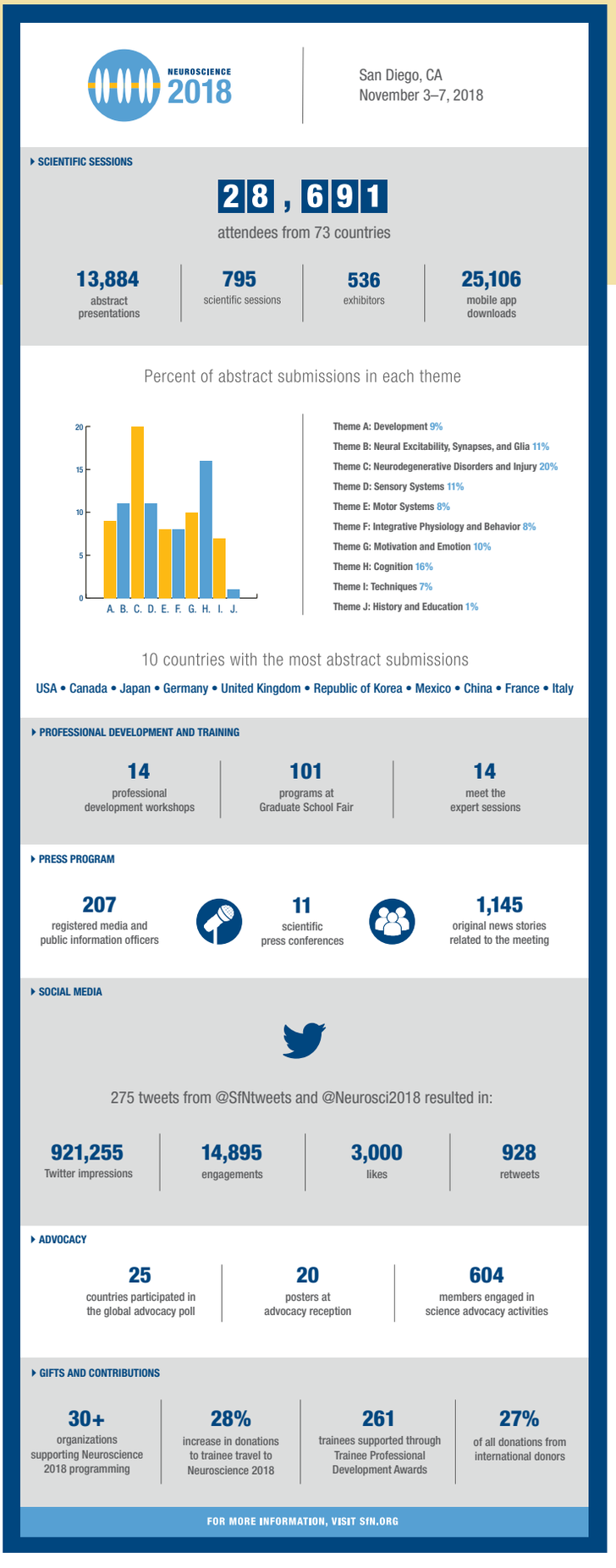


FIGURE 45.
2018 Meeting Infographic

SfN

CHAPTER
VIII

MANY AUDIENCES: PUBLICATIONS AND EDUCATION

"AUTHORITATIVE SOURCE(S) FOR EVERYTHING NEURO": SFN PUBLICATIONS

The Society had published *The Journal of Neuroscience* through Oxford University Press since 1986, but by the early 1990s, the editors and Council were finding this relationship increasingly problematic and expensive. Each year involved "all those tiresome negotiations" over the format, the number of pages, and the availability of color printing, each of which involved additional charges from Oxford.[305] Color printing "was critical to compete for the best papers in neuroscience" and became a major issue with advances in electron microphotography that allowed the visualization of fine cellular detail.[306] Council had discussed the possibility of self-publishing *The Journal* from 1991, under President Joseph Coyle, through Carla Shatz's tenure in 1995–96. "We didn't know whether we could really handle it or not, whether it'd be a disaster financially, or whether we couldn't make a success out of it," remembered Larry Squire (President 1992–93).[307] After "lots of debates, lots of worry, about whether or not this would work," SfN brought *The Journal* in-house in 1996, and, as Carla Shatz explained, "it turned out to be a fairly profitable deal," as well as ensuring that "we, the scientists, had control over the material and the quality control and the process, and also the revenues."[308]

In-house publication also facilitated many other benefits under the dynamic leadership of Editors-in-Chief David Van Essen (1994–1998), Gordon Shepherd (1999–2003), and Gary Westbrook (2003–2007). As Publications Committee Chair Sol Snyder wrote in 1996, "the lag from acceptance to appearance in print is now shorter than for any other competitive journal;"[309] and from 1997, all SfN members enjoyed free access to the online *Journal*, with links to the full text of referenced journal articles and emailed table of contents.[310] The first issue of 1999 introduced "rapid communications" to fast track online-only publication of short articles.[311] Article submission went online in 2001, with immediate online publication of all articles; the following year, SfN authors were able to publish color photographs free with editorial approval (previously the charge had been $300). As in the past, the first and last authors on any submitted articles were required to be members of the Society to qualify for reduced fees. Premium charges for print subscriptions were also required to support the binding and mailing costs of hard-copy issues.[312]

> "The lag from acceptance to appearance in print is now *shorter than for any other competitive journal.*"
>
> SOL SNYDER , 1996

By 2003, the volume of papers submitted was high enough that *The Journal* was appearing weekly. The major question of the new century was the move in the direction of more open-access, allowing public access to all articles after six months. To support the costs involved, mostly editorial and peer-review, the publication charge rose to a flat fee of $750 (previously calculated per page) in 2006.[313] The membership survey in June of that year, with 8,676 respondents, 42% of them *Journal* authors, provided strong overall approval. A huge majority, 92%, reported using the online *Journal* predominantly to access articles and 67% were willing to discontinue the print format altogether. On the question of open-access, more than half the respondents were in favor, with higher author charges the main reason for disapproval.[314] The balance of access versus viability has remained a crucial issue. As new Editor-in-Chief (2008–2015) John Maunsell commented in 2008, "Making *The Journal* open access so that its entire contents are immediately accessible to all interested readers is a worthy goal, but *The Journal* has to operate with sound finances."[315] Under Maunsell, *The Journal* instituted several new policies to benefit authors, allowing them to submit articles as a single, author-formatted .pdf document, including figures, and joining the Neuroscience Peer Review Consortium (NPRC), which facilitates the forwarding of reviews from the journal of initial submission to other publications.[316] And, as of January 2010, a new License to Publish policy returned copyright to the original authors, retaining only the limited rights *The Journal* required to maintain its professional standards.[317]

The Journal editors worked hard to maintain those standards. Complaints of various ethical violations – errors, previously published data, plagiarism – rose from less than one every two weeks in 2008 to nearly 1.5 every two weeks in 2012, prompting Council to create a new Ethics Committee to relieve the burden on the editors and the Executive and Publication

FIGURE 46. January 1996: The First In-House Journal

SfN

Committees. As the first chair, Peggy Mason, commented, "Misconduct by a single scientist… diminishes the public's faith in all scientists… [I]t behooves us to earn the public's respect and confidence."[318] Her committee declined to try to judge a scientist's intent, assuring members that "vanishingly few scientists wake up in the morning with the intent of acting irresponsibly or unethically."[319] But "[t]he accuracy of the scientific record must be protected. Serious errors…must be either corrected or removed through article retraction or manuscript rejection."[320] The Ethics Committee further sought to "prevent future misconduct by making sure that people are clear on the rules and also that they are not negligent, careless, or reckless in their work."[321] The Committee continued in operation through the Annual Meeting in 2017, by which time *The Journal of Neuroscience* had established multiple pathways to deal with ethical issues. Council in spring 2017 "reinforce[d] ethics as being embedded in all of its committees, programs, and activities," and determined that questions outside the purview of specific committees or programs could be referred to the Executive Director for further handling.[322]

By 2014, *The Journal of Neuroscience*, also known as *JNeurosci*, registered more than 33 million page views from readers in more than 140 countries. Authors could expect a decision on manuscripts in an average of 31 days from submission and publication in an average of 46 days from acceptance.[323]

FIGURE 47. The Online Journal 2014

SfN

Working Memory: Delay Activity, Yes! Persistent Activity? Maybe Not

Mikael Lundqvist, Pawel Herman and Earl K. Miller

Journal of Neuroscience 8 August 2018, 38 (32) 7013–7019; DOI: https://doi.org/10.1523/JNEUROSCI.2485-17.2018

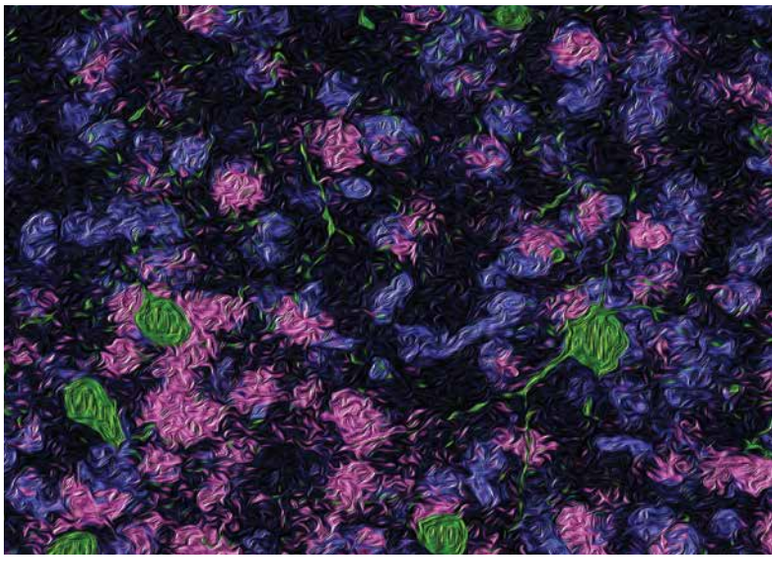
Persistent Spiking Activity Underlies Working Memory

Christos Constantinidis, Shintaro Funahashi, Daeyeol Lee, John D. Murray, Xue-Lian Qi, Min Wang and Amy F.T. Arnsten

Journal of Neuroscience 8 August 2018, 38 (32) 7020–7028; DOI: https://doi.org/10.1523/JNEUROSCI.2486-17.2018

FIGURE 48. Dual Perspectives Papers from 2018

SfN



Under Editors-in Chief Dora Angelaki (2015) and Marina Picciotto (2015–2022), the Society's flagship publication continued to try to offer maximum value to both author-members and subscriber-members.

As Picciotto commented,

> *The thing that I love about* The Journal of Neuroscience *that is not the case in terms of other journals for which I've handled manuscripts or where I've been involved is that people really feel ownership of this journal.* The Journal *is a Society journal; we hold the same values as the Society and the goal is to represent that Society…So what that means is that the editors really are very engaged not only with the editorial process, but with making sure that we reach out to the community.*[324]

New *JNeurosci* features included (in 2016), TechSights, an overview of technical developments in neuroscience; Viewpoints, topical reviews covering a current topic in neuroscience; Dual Perspectives, pairs of short, expert mini-reviews that provide opposite and/or complementary hypotheses related to an important neuroscientific question; and (in 2017) Progressions, a "where are they now" review of highly cited research published in *JNeurosci*, showing how the science has progressed. Also, in 2017, *The Journal of Neuroscience* moved to a modern digital publishing platform and to online early-release publication, at the same time waiving submission fees for SfN members.[325]

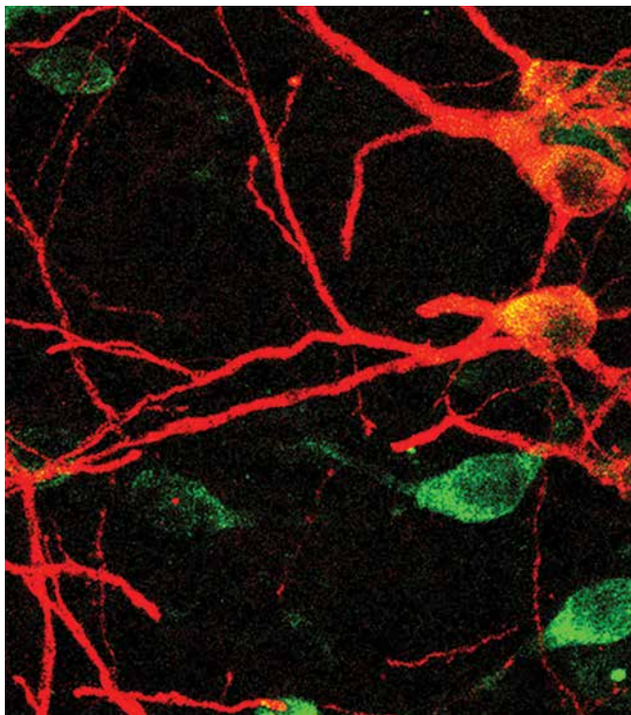
DUAL PERSPECTIVES

Member support for a high-quality open-access journal to complement *The Journal* continued to be strong. Council appointed a working group to develop a model for a new publication in fall 2012. SfN's open-access journal, *eNeuro*, began accepting submissions in August 2014, under Editor-in-Chief Christophe Bernard, supported by an editorial board of more than 40 active neuroscientists, and went online that fall.[326] As Bernard explained its guiding principles, *eNeuro* employed a "fair and transparent" reviewing process, in which the authors and reviewing editor reached consensus on the importance of the reported findings and need for additional experimental evidence. The editors also planned to serve the field through the publication of replication studies, null results, commentaries, and opinion pieces. "I want to be a part of building a journal that would satisfy me as an author, and I want authors to be happy and proud to publish in *eNeuro*," Bernard said.[327] He clarified the different roles of the two SfN publications: "So *The Journal of Neuroscience* is more focused on the mechanism's full stories; we are not. What we want is first to serve the community; we are here to serve the community. And we publish papers…which are important for the field, which bring an important piece of information or piece of the puzzle, and the reviewing editors, who are all active scientists,

FIGURE 49. *eNeuro* Invitation to Authors

SfN

SEE VIDEO "Scientific Publications 1995–2019" on sfn.org/about/history-of-sfn/1969-2019/videos



are the best evaluators of whether a study really brings something."[328]

eNeuro had a highly successful first year, publishing more than 100 papers, 30 more than its closest competitor, and joining the PubMed Central database. Each published paper included a significance statement and, at the authors' option, an abstract in graphic or other visual format.[329] The first set of commentaries, on the issue of scientific rigor, appeared on the *eNeuro* site in the summer of 2016.[330] In early 2018, the open-access journal invited authors to submit Registered Reports of planned study protocols; *eNeuro* editors reviewed the protocols for any methodological issues; once the protocol is accepted, the authors committed to adhere to it and *eNeuro* to publish the results, positive or negative. Authors thus no longer needed to invest time and effort in studies without knowing whether findings would be publishable.[331]

The Journal of Neuroscience meanwhile addressed another critical problem in peer review by introducing a Reviewer Mentoring Program (RMP). Scientific journal editors had often struggled to maintain quality review standards when faced with inexperienced, biased, or too few reviewers. The RMP paired an early-career researcher with a highly respected senior reviewer to work together on an unpublished manuscript from the preprint server bioRxiv and posted their review as a comment.[332] "The hope," Picciotto explained, "is not only to train students to be good reviewers going forward, although that's very important, but also to connect them to *The Journal* and to let them know that this is their place."[333] *JNeurosci* also created a video on the peer review process, while *eNeuro* offered a series of webinars, allowing members to write practice reviews on published papers.[334]

As SfN celebrated its 50th anniversary in 2019, *JNeurosci* and *eNeuro*, publications run by scientists for scientists, were both thriving and together accounted for nearly 25% of the Society's total revenues.[335]

IN THEIR OWN WORDS: THE HISTORY OF NEUROSCIENCE IN AUTOBIOGRAPHY

The History of Neuroscience in Autobiography series was initiated by Larry Squire during his term as President (1993–94) to record personal narratives from leading scientists about their background, education, and scientific work in a format that would incorporate opinion, anecdote, and personal reflection. The first Volume, with 17 chapters including narratives from Julius Axelrod (1912–2004), David Hubel (1926–2013), and Sir Bernard Katz (1911–2003), was published in 1994, with Squire as Editor. To date, 145 chapters have been curated and 10 volumes produced. The series was published by Academic Press (volumes 1 through 5) and then by Oxford Press (volumes 6 and 7). Beginning with volume 8, the series became an in-house publication of SfN; the Publications Committee serves as the oversight board. Thomas Albright joined the project as co-editor, beginning with volume 9. All the chapters are freely available on the Society's website.

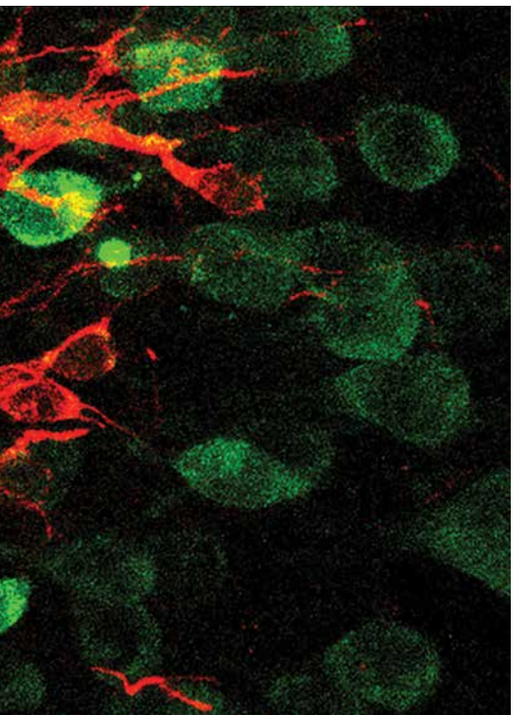
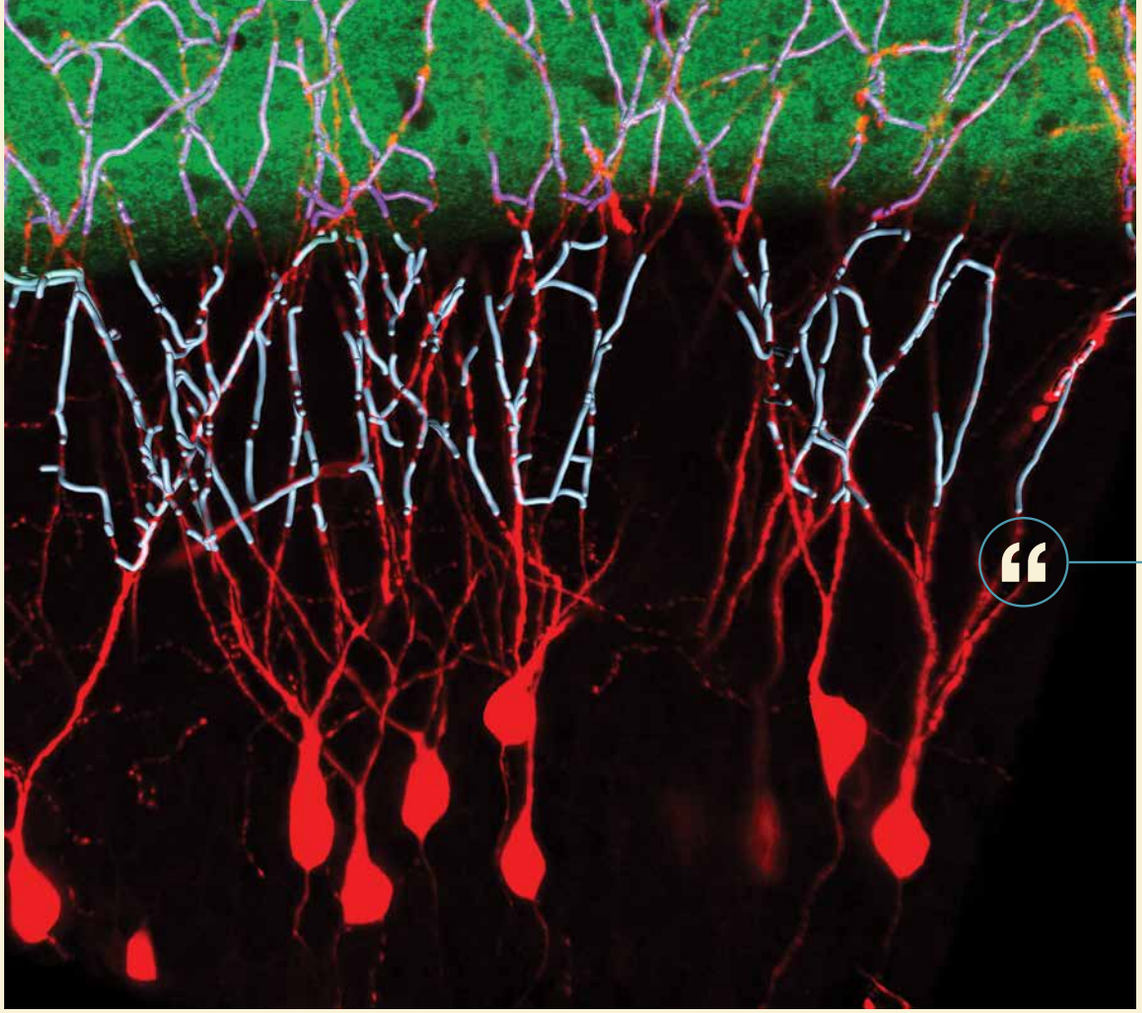
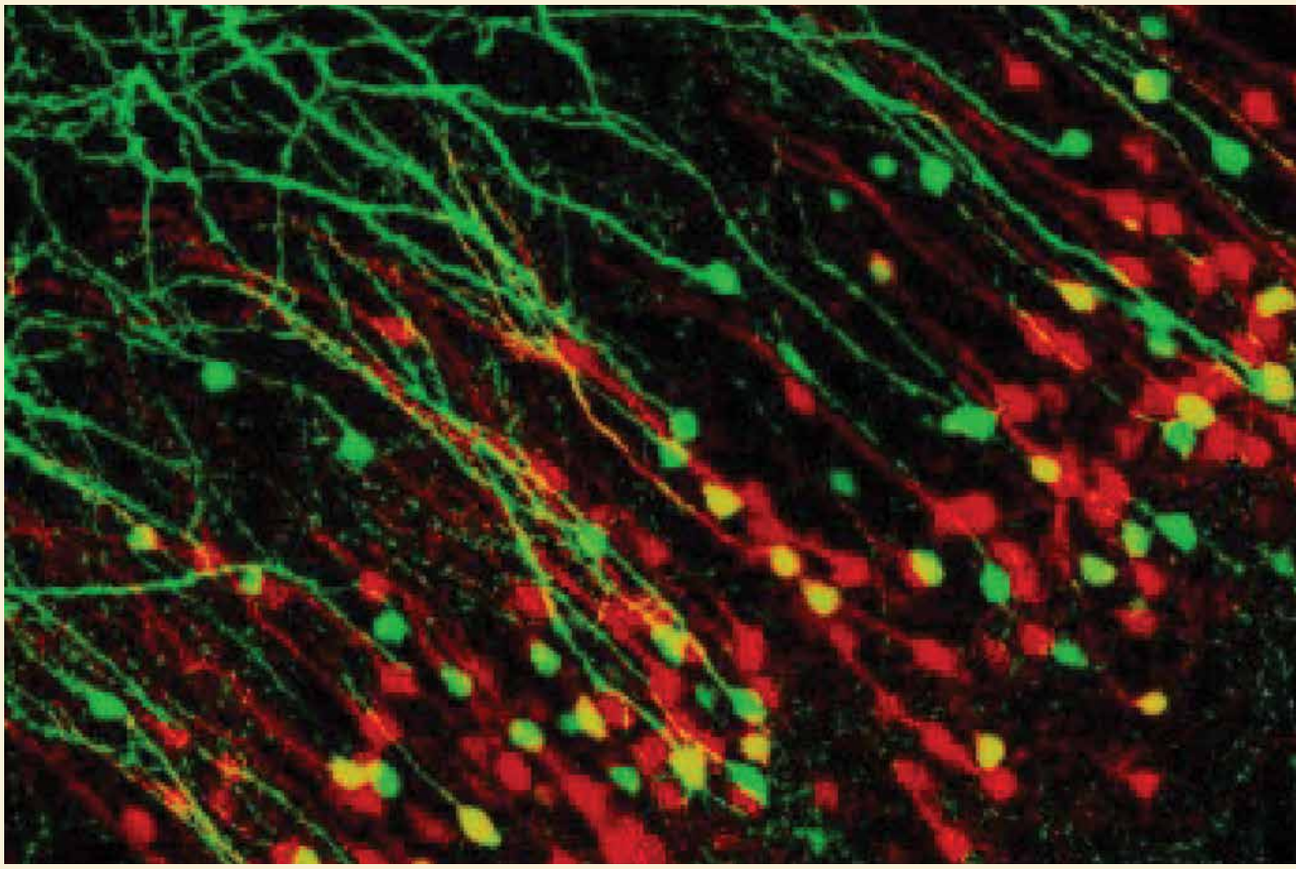


FIGURE 50. *JNeurosci* 25 Sept 2019

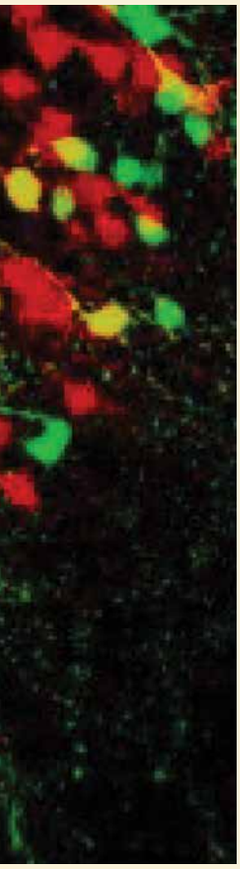
SfN; photo credit: Ryan Fleisher





The editors really are very engaged not only with the editorial process, but with making sure that *we reach out to the community*.

MARINA PICCIOTTO, 2018



SHARING THE KNOWLEDGE WITH THE COMMUNITY: NEUROINFORMATICS

In 2003, the SfN Council, with President Huda Akil acting as "a sort of catalyst," recognized that informatics had become "a key aspect of neuroscience," and created a Brain Information Group, chaired by Floyd Bloom and initially funded by the Wadsworth Foundation. The Group's charge was to survey existing neuroinformatics databases, such as the Human Brain Mapping Project, identify potential challenges to interfacing among these, as well as missing components and "conceptualize a framework for a well-integrated overarching neuroscience superstructure that subsumes current databases and can readily incorporate future ones."[336] The result in 2004 was the development of the Neuroscience Database Gateway (NDG), an online portal to some 75 neuroscience databases, that "var[ied] widely in their complexity and navigability."[337] The NDG, initially housed in SenseLab at Yale University, had transitioned by 2006 out of SfN to the NIH-supported Neuroscience Information Framework.

> We started developing the *core concepts*… the eight things that my mother or even my grandmother should know about the nervous system.
>
> NICK SPITZER, 2018

TABLE 10. Eight Core Concepts

Your Complex Brain
How Neurons Communicate
How Your Brain Processes Information
How Experience Shapes Your Brain
Reasoning, Planning & Solving Problems
The Power of Language
The Source of Curiosity
How Research Benefits Human Health

SHARING THE KNOWLEDGE WITH THE PUBLIC: *BRAINFACTS.ORG*

SfN President Huda Akil in 2003 had envisioned SfN creating a public education website; as she explained, "I see neuroscience as more than just highly intellectualized knowledge, but something that we as scientists can share with others."[338] Her vision was finally realized in 2011, when The Kavli Foundation and the Gatsby Charitable Foundation awarded SfN $1.53 million over six years to create and maintain *BrainFacts.org*, a unique online resource to provide educators, policymakers, and the general public with authoritative, reliable information about the brain and about new advances in brain research. The foundations noted SfN's "extraordinary resources and expertise" and "strong international presence" as key to their decision to invest in the new website, which built on the success of the *Brain Facts* book, by then in its 5th edition.[339] Nick Spitzer, who had worked on the print edition, accepted the job of inaugural editor and recruited an editorial board of eight outstanding scientists from the U.S., U.K., Norway, and Australia.[340]

Spitzer had already recognized that "we really needed to have something that people could get to online, and so…we started developing the core concepts…the eight things that my mother or even my grandmother should know about the nervous system and that was a fascinating time, very energized, the group of us working on that." (SEE TABLE 10) At the same time, the new website "has to be the authoritative source of everything neuro. That has to be our mantra, that has to be our mission, and we have to always make sure that everything on that website is vetted by neuroscientists."[341]

At its launch, the site drew on content from multiple sources, including NINDS, NIMH, IBRO, the Dana Foundation, the Wellcome Trust, the Foundation for Biomedical Research, and the Canadian Institutes of Health

Research.[342] As *BrainFacts.org* took shape under Spitzer and John Morrison (editor from 2014–18), the site evolved "from a kind of static image-based, text-based presentation to a video-based, dynamic presentation with the opportunity to engage in puzzles and games, the value of which is that people learn things without even being aware that they're learning things," in a way that is "painless and fun."[343] The site has attracted additional funding, raising $3.8 million in external support since inception. Morrison was pleased with the way "[i]t expanded rapidly, it went way beyond any of our hopes in terms of what it would become." As of 2018, *BrainFacts.org* had recorded some "nine million users and eighteen million page views;"[344] page views rocketed to more than 25 million by 2020.

A redesign in 2017 included one of Morrison's priorities for the site: a 3D interactive brain, funded by the Wellcome Trust.[345] *BrainFacts.org* also incorporated a section providing accurate information to dispel common "neuromyths" about the brain and another, funded by the Klingenstein Fund, that "raises public awareness and understanding of why animal research is essential to furthering the scientific endeavor…through descriptions of the roles that fruit flies, zebra fish, worms, mice, and a variety of other animals play in advancing understanding of brain mechanisms, processes, and disease."[346]

Both *BrainFacts.org* and the *BrainFacts* book (in its 8th edition in 2018) have retained their emphasis on the eight Core Concepts and on scientific accuracy, while continuing to develop new content to excite and appeal to viewers of all ages, nationalities and backgrounds. As the first *BrainFacts.org* Editor-in-Chief based outside of the United States, Richard Wingate endorsed these principles in 2019, with plans to expand the international audience for the site and to use "the content on the site in imaginative ways so that it can be accessed on different platforms."[347] As John Morrison noted in 2018, "*BrainFacts.org* is dynamic. I don't see it as ever being 'finished.'"[348]

PUBLIC EDUCATION: "NEUROSCIENCE CONCEPTS INTO THE CLASSROOM"

BrainFacts.org addressed a critical need as public interest in neuroscience grew in the U.S. and around the world. The high visibility of celebrities afflicted with neurological disorders such as spinal cord injury (Christopher Reeve), amyotrophic lateral sclerosis (Stephen Hawking), Parkinson's (Michael J. Fox), Alzheimer's disease (Ronald Reagan), as well as the availability of new treatments that expanded the life span for many sufferers and partially eased the burden on their caregivers, increased public awareness and concern about the importance of research. PTSD and chronic pain disorders also spurred

FIGURE 51. How Your Brain Keeps You from Running into Walls

Brainfacts.org

FIGURE 52. Why Neuroscience Turns to Primates

Brainfacts.org

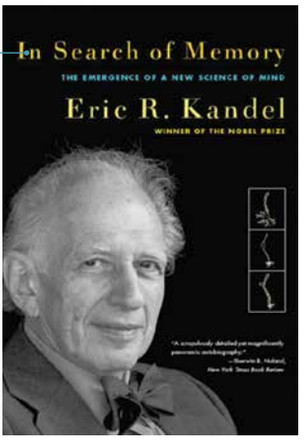


FIGURE 53. Eric Kandel, *In Search of Memory*, 2006

photo courtesy of W. W. Norton & Company

FIGURE 54. Eric Chudler and Neuroscience for Kids 2003

photo courtesy of Eric Chudler

public interest as they affected many Gulf War veterans and disaster victims. Meanwhile, Eric Kandel's (SfN President 1980–81) work and writing for a popular audience interested many in the problem of long-term memory creation and potential for memory enhancement in students, "memory athletes," and the growing population over 65, reflected both in books and articles (Joshua Foer's *Moonwalking with Einstein*) and in advertising for nutritional, "memory-boosting" supplements.

The Nobel Prize-winning work of John O'Keefe and Edvard and May-Britt Moser in 2014 gave rise to a similar spurt of popular interest in "Navigating your Inner GPS." As the public grew familiar with MRI images showing evidence of depression and neurological disorders in the brain, ideas began to circulate about the imaging of genius and criminality as well. In each of these instances, high public interest was coupled with credulous acceptance of myths and distortions, demonstrating the need for effective and reliable public education about the brain.

Even before the launch of *BrainFacts.org*, SfN and its members were at the forefront of harnessing the power of the Internet to promote neuroscience literacy, finding engaging interactive ways to spark student interest in the brain. Beginning in 1996, SfN member Eric Chudler maintained a "Neuroscience for Kids" website that provided reliable information for teachers and students and which SfN helped to promote. A few years later, as Chair of the Committee for Neuroscience Literacy (2001–04), Chudler initiated a teacher-scientist partnership program and provided resources for local chapters to bring high school students to visit the Annual Meeting; "and for neuroscientists who didn't know how to take a neuroscientific concept into the classroom, these would be workshops from neuroscientists who had done this and so they can incorporate that when they went back to their own cities."[349]

Norbert Myslinski meanwhile organized the first Brain Bee at the University of Maryland to coincide with Brain Awareness Week 1998; the first competition outside the U.S. took place in Montreal in 2008 and the event spread rapidly to other nations in the following decade to become the International Brain Bee.[350] The close relationship between SfN and the Brain Bee was formalized in 2018 when SfN was one of five major organizations dedicated to brain research that formally established the International Brain Bee as an independent non-profit educational organization.[351]

SfN continued to be a strong partner in many public education initiatives in the 1990s, 2000s and 2010s, reaching out to students, teachers, the media, and the public.

As Eric Chudler, Chair of the Neuroscience Literacy Committee 2001–04, explained, "[E]veryone, from all walks of life, are going to be affected by neurological disease…So I think it's important that people have the ability to analyze and read just magazines and newspapers so that they understand it."[353] By collaborating the Dana Alliance for Brain Initiatives

FIGURE 54. Winners of the 2018 International Brain Bee[352]

thebrainbee.org

SEE VIDEO "Public Education and Outreach Programs" on sfn.org/about/history-of-sfn/1969-2019/videos

to Brain Awareness Week (BAW), SfN provided members and chapters with many opportunities to educate schoolchildren and adults about neuroscience.

SfN chapters celebrated BAW annually across North America; chapters in South America held their first BAW events in 2001.[354] After fifteen years of successful events in the U.S. and over 30 countries worldwide, the Dana Alliance expanded Brain Awareness Week to a year-round Brain Awareness Program in 2011. Each summer, the Brain Awareness Video Contest invited students and researchers from around the world, from Romania to Israel to Brazil, to compete for prizes that include cash and a free trip to the Annual Meeting.[355] As SfN's second half-century began, BAW remained a popular central component of the Society's Global Public Outreach and Education Strategy, celebrating its 25th Annual Meeting event in 2019.

SfN also established a presence at meetings of science teachers and offered sessions on engaging K–12 students at the Annual Meeting every year.

Thomas Carew, SfN President 2008–09, commented on his interactions with teachers during one such event, "I learned more from teachers than they learned from me in that meeting in terms of the challenges faced and the kinds of constraints on their creativity, and they're the heroes and heroines in my mind."[357]

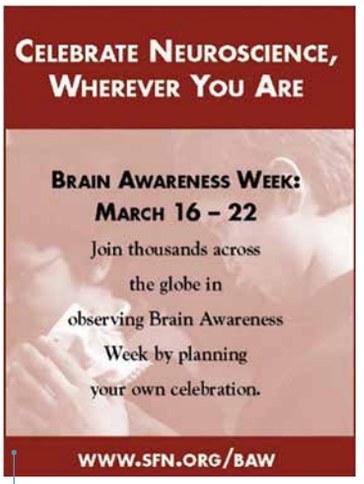


FIGURE 56. Brain Awareness Week

SfN NQ Winter 2009

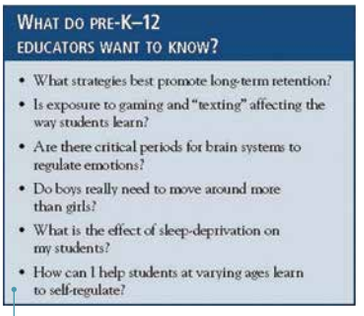


FIGURE 57. What do Pre-K–12 Educators Want to Know?

SfN NQ Fall 2009[356]

DIALOGUES

By 2005, SfN President Carol Barnes had for several years "watched the diminishing numbers at the Public Lecture. People wanted to go out with their friends…in the evening and it just seemed like it needed a boost." She remembered the impact of the Christopher Reeve talk in 2000. She and Eve Marder, the Program Committee Chair, and past-president Huda Akil began "bouncing back and forth the idea of what could we call a series that would be relevant, that would be engaging to the neuroscience community and so forth, and so we thought of the Dialogues between Neuroscience and Society….this will be a kickoff to the meeting, and it will reinvigorate people's ideas." The first Dialogues speaker, the Dalai Lama, helped the scientists "to think about how we could contribute to people becoming more compassionate and kind." 14,000 attended the Dalai Lama's talk.[358] "We had…so many people…that we were actually worried that the fire marshal was going to shut down the convention center."[359]

The second Dialogues in 2006, featuring the architect Frank Gehry, touched on the relevance of neuroscience to creativity and human perception of space and the "built environment." The Dialogues Series quickly became one of the highlights of the Annual Meeting. As Barnes explained, "[I]t actually makes people talk and think. There's a buzz after these Dialogues series and it carries forward in the meeting. It's a good way to start."[360] Some of the most memorable Dialogues speakers included the dancer and choreographer Mark Morris, leader of Dance for Parkinson's, who has "started evolving a whole way of teaching dance for Parkinson's" victims, in 2008; Glenn Close, the actress, who is "interested in removing the stigma from mental health," in 2010; Ed Catmull, the president of Pixar, talking about how to "manage creativity and inspire creativity and innovation," in 2013; and the jazz guitarist and composer Pat Metheny in 2018.[361] Dialogues, Thomas Carew commented, "evolved into just a wonderful way to connect to the public."[362]

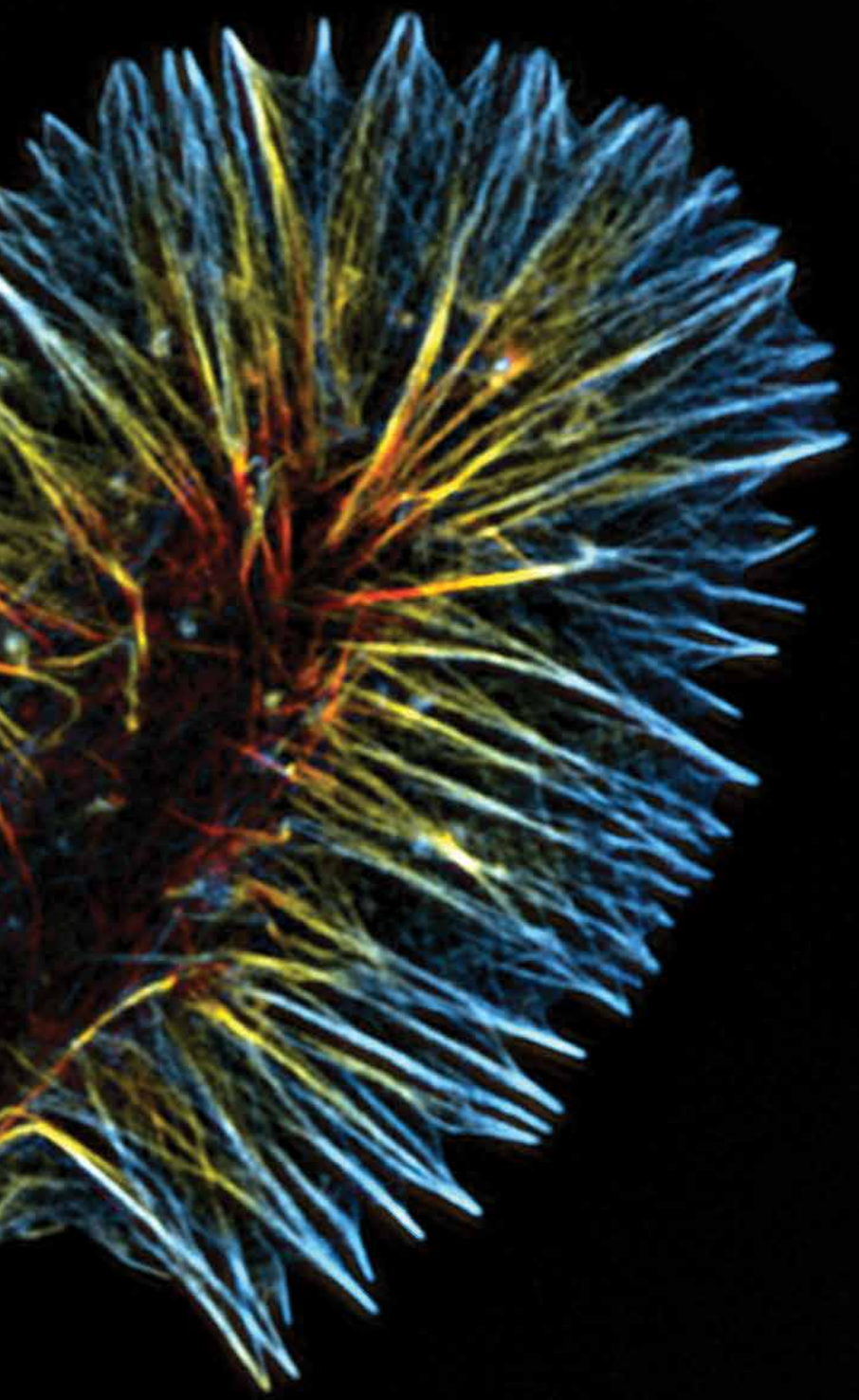
SEE VIDEO "Dialogues Between Neuroscience and Society" on sfn.org/about/history-of-sfn/1969-2019/videos

FIGURE 58. SfN President Carol Barnes and the Dalai Lama

photo courtesy of Carol Barnes

CHAPTER
IX

GOVERNMENT AND PUBLIC ADVOCACY: NOT "JUST A ONE-DAY AFFAIR"



SfN CONTINUED AND EXPANDED ITS ROLE AS AN advocate for neuroscience in the late 1990s and into the new millennium, developing and refining its strategies to have the greatest impact. The initial basic goal of increased research funding developed into a wider advocacy for scientific freedom in research, in the face of political challenges such as crusades against animal research and restrictions on the use of stem cells. Lobbying at the congressional and local levels continued, including the annual "Hill Day" and meetings during legislative recess; but SfN expanded in several directions in its second quarter-century, partnering with disease advocacy groups, training young members for careers in science policy and helping international partners to develop advocacy programs in their own countries. "Over time," Nick Spitzer (Chair, Public Education and Communication Committee, 2006–09) commented, "we have learned how to be sophisticated, how to share the message."[363]

FIGURE 59. Hillary Clinton at the Early Childhood Conference

photo courtesy of William J. Clinton Presidential Library

TABLE 11. SfN Decade of the Brain Awards

1990	Representative Silvio Conte, Massachusetts
1991	Representative William Natcher, Kentucky
1992	Senator Ernest Hollings, South Carolina
1993	Representative Steny Hoyer, Maryland
1994	Senator Pete and Mrs. Nancy Domenici, New Mexico
1995	Representative John Porter, Illinois
1996	Senator Arlen Specter, Pennsylvania
1997	Senator Thomas Harkin, Iowa
1998	First Lady Hillary Rodham Clinton
1999	Vice President Albert Gore and Mrs. Tipper Gore
SPECIAL ACHIEVEMENT	Christopher Reeve

in the 1990s entailed some reassessment of this initiative. "It fostered, I think, greater cohesion, it was heady, it was exciting; but if the goal was to disproportionately increase funding of brain science, it was also a failure," Spitzer observed.[364] Yet there were long-term results – it contributed to a doubling of annual funding for the NIH starting in 1999; the first NSF grant program for neuroscience, announced in 2001; and the 2002 approval to build the Porter Neuroscience Research Center on the NIH campus, a new major site for brain science (the Center opened in 2014).[365] The support of Rep. John Porter, a Republican, was indicative of GPA's bipartisan approach: "We went against conventional wisdom on who might be supportive of NIH-funded research and who might not be supportive, who might be supportive of science and who might not be supportive and we went across the aisle of all of our advocates and champions," John Morrison explained.[366]

As Nick Spitzer recalled, the DOB was the springboard for several important events, such as the April 1997 White House conference on Early Learning and the Brain, hosted by Hillary Clinton, showcasing SfN members Carla Shatz and Patricia Kuhl, and transmitted via satellite to nearly 100 sites in the U.S.,[367] and for some new partnerships, as when the first Advocacy Group luncheon at the 1996 Annual Meeting in San Diego brought SfN together with members of 20 disease advocacy groups.[368]

GPA Chair Joseph Coyle commented on his efforts to partner with these organizations: "If you're going to go to the government and ask support for brain research, they often say why and you say well, we can help cure brain diseases, well, that's what we're going to say, why aren't we there together with these people?"[369] The decade's end was marked by a major event at the National Academy of Sciences in April 2000, at which SfN leaders discussed recent research, Congressional advocates such as Senator Edward Kennedy expressed confidence in future government support for neuroscience, and Vice-President Al Gore, his wife Tipper, and spinal cord injury advocate Christopher Reeve received

the culminating DOB awards.[370]

One of the four major goals of the 2001–02 Strategic Plan was to "strengthen SfN's role and influence in public affairs and advocacy" (SEE TABLE 11). An early initiative was "CapWiz," an online action center that alerted members of pending legislation of significance to neuroscience and requested that they contact their Congressional representatives (later the Rapid Response Network). In March 2002, SfN appealed for support for the Helms Amendment to the Farm Bill, which excluded rats, mice, and birds from some animal welfare regulations; members sent more than 1,360 faxes and e-mails and the amendment passed and became law in May.[371] The Annual Meeting that fall included an Advocacy Forum, where speakers including Rep. Porter, Director Jon Miller of the Center for Biomedical Communications at Northwestern, and SfN advisor Frankie Trull, president of the Foundation for Biomedical Research [FBR], exhorted members that "Science advocates cannot do it alone…Go forth and advocate."[372] SfN further extended its advocacy partnerships when it joined with the American Academy of Neurology (AAN) to establish and contribute support for the American Brain Coalition (ABC), an organization of scientific and patient advocacy groups, in 2004.[373]

A PROACTIVE STANCE TOWARD ANIMAL RESEARCH

The defense of animal research continued to be an important focus in the 2000s. People for the Ethical Treatment of Animals (PETA) and other animal rights groups had grown and established offices around the U.S. by 2006, as well as in other countries, and, since the mid-1990s, the Internet had widened distribution of its ideology even further; these advocates had begun to develop the argument that animals were "persons," with the same rights as humans. Lawyer Michael Socarras explained at a 2003 meeting of SfN's ally the National Association for Biomedical Research that the most effective defense to this argument was philosophical, not scientific, pointing out, for example, that animals lack a sense of morality.[374] SfN's Committee on Animals in Research (CAR), meanwhile, under Chair David Amaral, planned "a much more proactive approach," beginning with a new set of crisis management guidelines for researchers that emphasized a positive stance.[375] The Committee decided that, "[i]nstead of trying to fly under the radar in terms of the issues surrounding animals in research, we would educate the public, we would do outreach programs, we would be very up front about the fact that we do animal research and why we do it and what benefits emerge from it."[376]

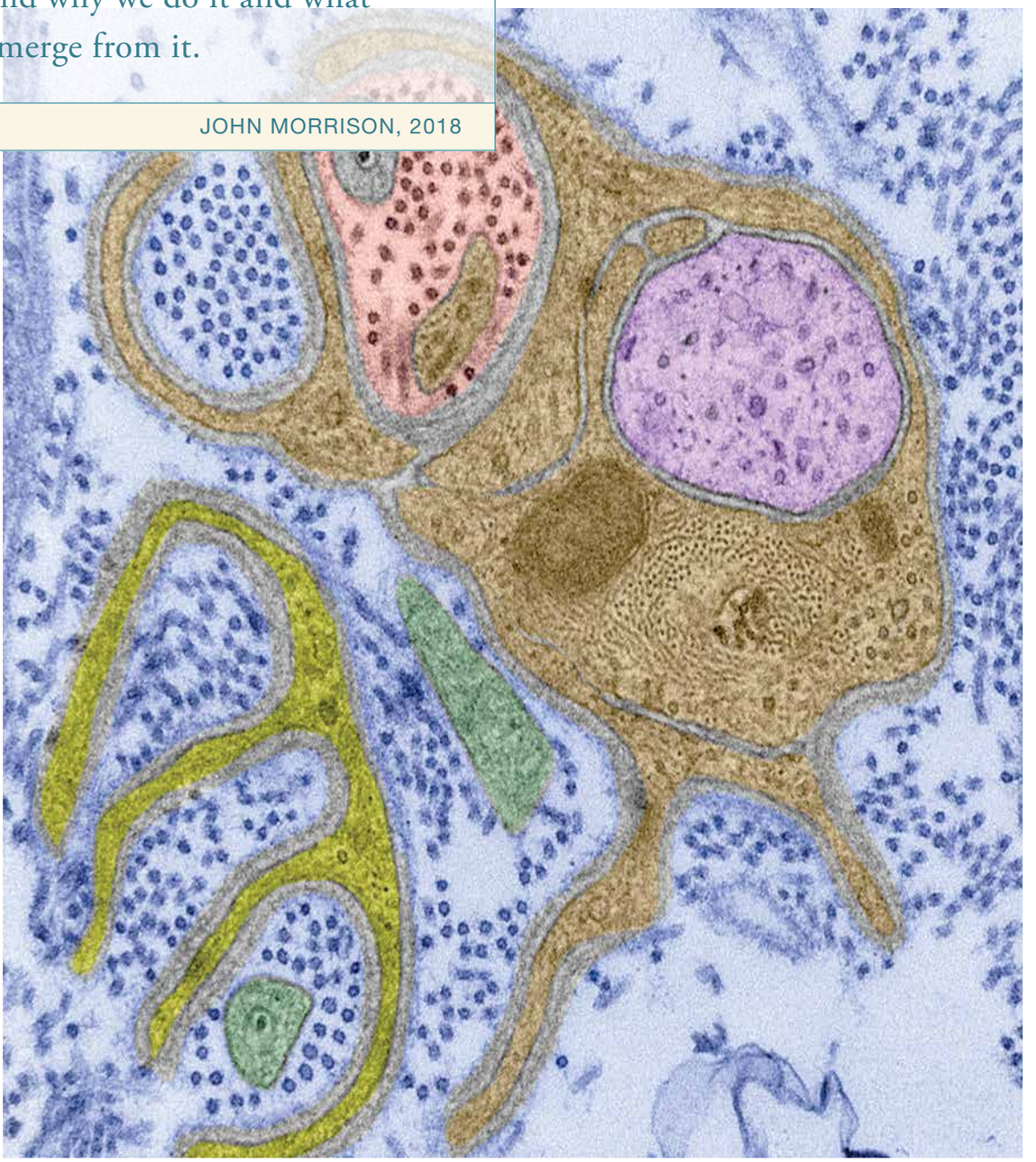
CAR also proposed the development of a list of *Translational Research Accomplishments*, illustrating the many positive benefits of animal research. The initial 2003 list, developed by an ad hoc committee chaired by John Morrison, included such examples as research on polio, retinal degeneration, depression, drug addiction, Parkinson's disease, prions, and the critical period for brain development.[377]

Translational Research Accomplishments was adapted into various formats, including a convenient wallet card edition (later entitled *Animal Research Accomplishments*) that members could carry in a pocket or purse, "so you're always prepared to advocate for

FIGURE 60. Animal Research Wallet Card

SfN

> We would educate the public, we would do outreach programs, we would be very up front about the fact that we do animal research and why we do it and what benefits emerge from it.
>
> JOHN MORRISON, 2018

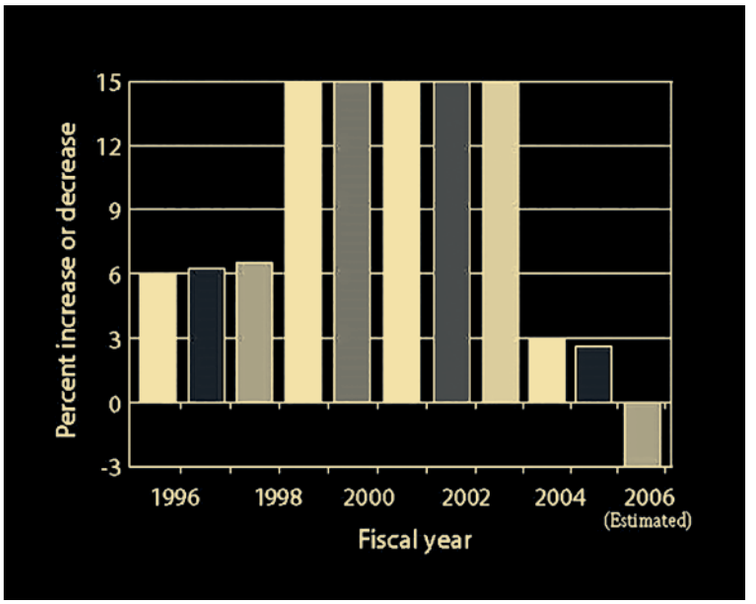


animal research and how it impacts human health."[378] Additional efforts to combat the anti-research message included a May 2005 forum, cosponsored with NIH and States United for Biomedical Research (SUBR), on educating teachers about "the nature of the threat to the appropriate use of animals in research, [disseminating] pro-research materials readily available to K–12 teachers, and [refining] the message the research community sends teachers about the use of animals in research;"[379] and an 80-page handbook for medical students about the value and achievements of responsible animal research, a two-year project CAR began in 2007.[380]

SfN continued its strong advocacy on animal research in 2006 and 2007, years in which the Society recorded multiple activist attacks on individual researchers (6 in 2006, 11 in 2007). CAR Chair Jeffrey Kordower stated forcefully that "[t]he continuing intimidation and threats of violence to which researchers have been subjected are beyond the bounds of acceptable discourse and debate."[381] GPA and CAR successfully joined with NABR to lobby for the passage of the Animal Enterprise Terrorism Act in November 2006, which enabled "federal authorities to help prevent, better investigate, and prosecute individuals who seek to halt biomedical research through acts of intimidation, harassment, and violence."[382] The CAR chair became the key contact for SfN researchers who faced possible attacks; he and CAR members would contact the scientist and his/her home institution to advise on crisis management and support.[383] In February 2008, SfN issued a new publication, *Best Practices for Protecting Researchers and Research*, directed to sometimes hesitant university officials, encouraging them to take a proactive public stance and to strengthen security measures to ensure researcher safety.[384] A few years later, in 2010, *Responding to FOIA Requests: Facts and Resources* advised members on Freedom of Information requests, often used by animal rights groups to identify and get information about protest targets, and best practices for response.[385] SfN and ABC organized a 2014 panel discussion for physicians and staff of patient advocacy groups to explain the critical role of animal research in developing new treatments for brain disorders.[386] SfN meanwhile had participated actively in dialogues with NIH as it reviewed its regulations on the ethical use of nonhuman primates in research, culminating in a September 7, 2016, workshop in Bethesda, where participants emphasized the crucial role of these animals in research benefiting humans. NABR President Frankie Trull pointed out that primates represent only 0.5% of research animals, "[b]ut their impact on our health is enormous."[387] The Society reached out to help scientists in other nations as well, in 2016 submitting a letter to the Australian government to oppose a bill that would have banned the importation of captivity-bred nonhuman primates.[388]

FIGURE 61. NIH Funding Levels 1996–2006

SfN NQ Winter 2005[389]



THE CHALLENGE OF A SHRINKING FEDERAL RESEARCH BUDGET

The NIH budget, meanwhile, had grown 14–15% each year from 1999–2003. The 2004 budget saw a significant drop to a 2–3% increase, which the Bush administration proposed to continue annually, and SfN President Anne Young issued a "Call to Arms": "The Society for Neuroscience (SfN) must be engaged earlier in the budget process and fight harder for available research dollars," she wrote.[390]

In 2004, the Society, in partnership with FASEB (Federation of American Societies for Experimental Biology), joined the Campaign for Medical Research, provided funding for CMR's ongoing efforts to inform and advocate with key Representatives and Senators on both sides of the political spectrum, and strengthened its relationship with the Joint Steering Committee for Public Policy (JSC), another coalition of biomedical research groups (now called the Coalition for the Life Sciences (CLS)). Despite these efforts, the Bush administration proposed a second limited budget for research for 2005. SfN sent the first four publications in its *Brain Research Success Stories* series – stroke, depression, schizophrenia, and PTSD – to legislators during Brain Awareness Week and briefed members on nine "talking points" they could use in writing to or speaking with legislators. These included the need for a "strong public health infrastructure," backed by "a high-quality science base" in the age of bioterrorism and global epidemics; the crucial need for research on diseases affecting baby boomers and the potential high cost of those disorders; and the "substantial dividend" already received from the federal investment in research.[391] Positive signs at this time were California's 2004 passage of a $3 billion ballot initiative to support stem cell research and NIH's creation of a five-year blueprint for neuroscience research.[392]

The tight funding situation in the U.S. persisted throughout most of the early 2000s, while restrictions such as those on stem cell research became prevalent. As Steven Burrill, chair of CMR commented in 2007, "It's tough to get anything funded…Core funding at NIH is not even keeping up with inflation when we need an increase."[393] In response, SFN's new strategic plan of 2006 incorporated a "science policy strategy…an action-oriented plan to prevent further erosion of research prerogatives due to restrictive laws and regulations."[394] Under GPA leadership, members continued regular visits to legislators and administration staff from both major parties, using educational materials developed by GPA, and encouraged leaders in the biomedical industry to participate as well.[395]

FIGURE 62. Engaging Legislators in the Lab 2010

SfN NQ Summer 2010

The 2007 membership survey documented that some 535 members engaged in personal advocacy efforts, while a far larger number, more than 1,400, participated by writing their legislators.[396] Two new tools became available to them in July 2008: the *SfN Advocacy Network* offered members a monthly e-newsletter, updating them on legislative issues of importance to neuroscience, and enabling them to target their letters and contacts; while the *Washington Research Update* was a complementary publication for biomedical business leaders to keep them current on federal research funding trends.[397] The Society's message meanwhile became much more sophisticated. "I think what we've learned as a community is to control the narrative and to make sure we explain in more concrete and hopeful but realistic terms what the steps are between where our science is now and where it has to go," Nick Spitzer (chair, Public Education and Communication Committee, 2006–09) explained.[398] One key tactic taught to member advocates was the "elevator talk," learning to highlight in a few minutes, the length of an elevator ride, the aspects of one's research of interest to laypeople.[399]

A Blackberry text message alerted GPA members at their fall 2008 meeting that an Economic Recovery Act, just introduced in the Senate, included $1 billion in NIH funding, and the SfN advocacy team swung into action. That bill did not pass, but the ARRA Act of 2009 introduced under the Obama Administration, which received strong and immediate support in the form of 19,000 letters from SfN members, included $10.4 billion in increased NIH funding and $3 billion for NSF when signed into law in February. The GPA reminded members that one positive result was not enough and called on them to continue presenting the case for "sustained, bold science funding" in future years.[400] The proposed federal budget for FY2011 included a $1 billion increase in NIH funding, only enough to allow the agency to keep up with inflation, demonstrating the need for ongoing advocacy; the following year, legislators were again talking about cuts in research funding.[401] In response, a new SfN publication offered suggestions to individual researchers for *How to Host Congressional Lab Tours*.[402]

The American Brain Coalition encouraged supportive representatives to organize the bipartisan Congressional Neuroscience Caucus, led by Representatives Cathy McMorris Rodgers, a Republican from Washington, and Earl Blumenauer, a Democrat from Oregon; the inaugural event in June 2011 explained the basic science research that was helping physicians to understand post-traumatic stress disorder and Down syndrome.[403] By 2016,

Neuroscience Caucus members had participated in 17 briefings on subjects such as exercise and the brain, neurodegenerative diseases, traumatic brain injuries, basic science, and, in the wake of the Sandy Hook shooting in December 2012, the relationship between mental illness and violence.[404]

SfN's sustained advocacy showed positive results in 2012, when the White House Office of Science and Technology Policy announced planning for a new Neuroscience Initiative, "a cross-agency effort…to discover significant, transformative opportunities across agencies and between the federal government and the private sector to advance the impact of federal investments in neuroscience to improve health, learning, and other outcomes of national importance." SfN leaders participated actively in giving the OSTP staff an overview of the field and its key issues.[405] President Obama announced the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative in April 2013, with a planned FY2014 funding commitment of over $100 million, "the next great American project."[406]

After two years of discussions with scientists throughout the field, the working group's report, "BRAIN 2025: A Scientific Vision," identified five target areas: perception, emotion and motivation, cognition, learning and memory, and action; and proposed an initial five-year investment in the development of tools and technologies, followed by five years of investment in discovery-driven science using those tools.[408] The BRAIN initiative was exciting news for neuroscientists, during a period of sequestration and funding cutbacks affecting the federal research budget, in which researchers were often discouraged from submitting basic science applications, and pharmaceutical companies shied away from brain research as "too difficult" and unlikely to earn profits within the immediate future.[409]

Still, in the late 2010s, "science budgets remain[ed] very anemic," as SfN President Steve Hyman told the membership in early 2015; he urged scientists not to "succumb to hopelessness…We are our own best advocates."[410] SfN expanded its efforts to work with private funders and philanthropic

FIGURE 63. Obama announces Brain Initiative

photo courtesy of Obama White House[407]

FIGURE 64. Early Career Policy Ambassador Maxwell Zhu with Rep. Joseph Kennedy of Massachusetts 2019

SfN

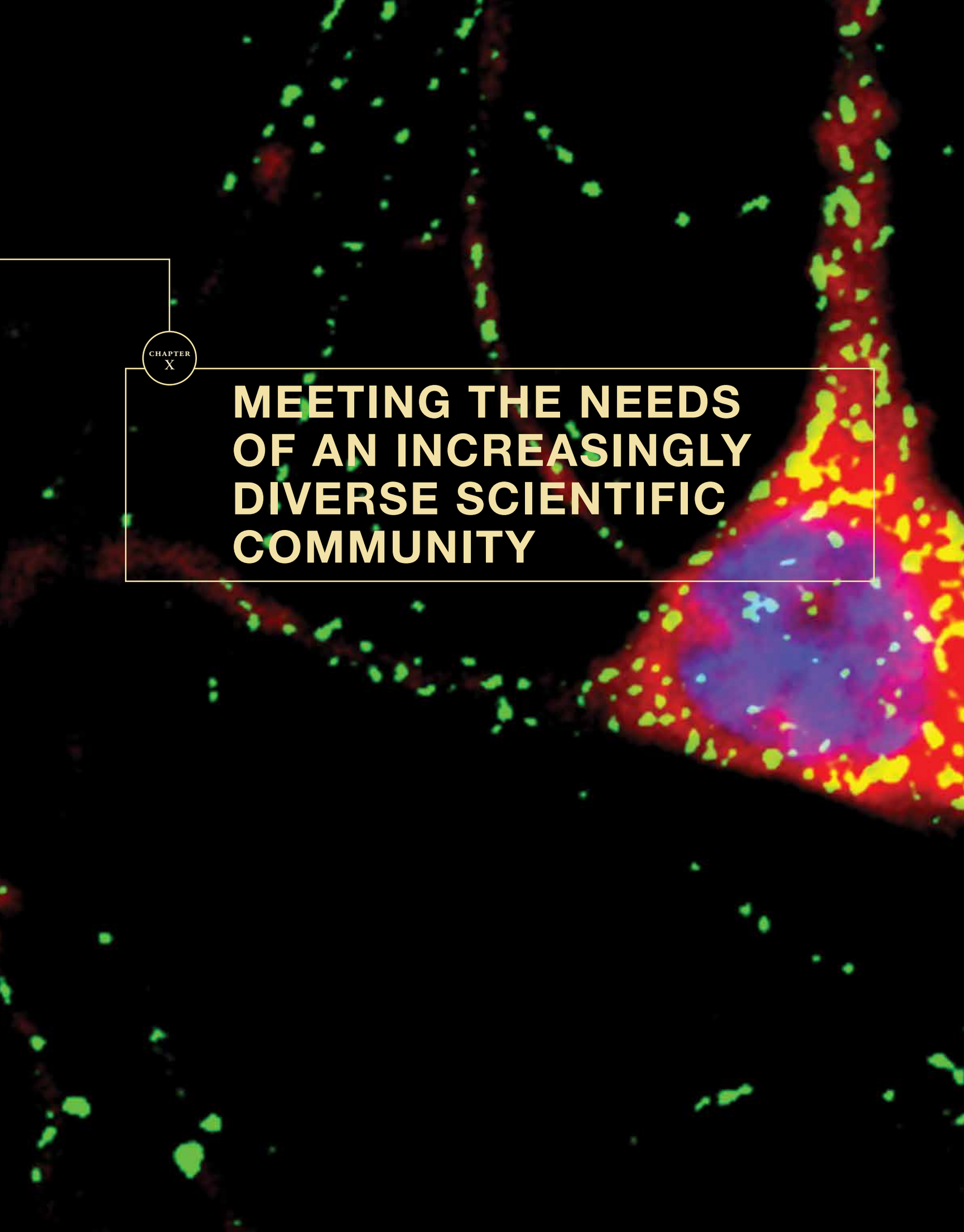
organizations such as the Howard Hughes Medical Institute and the Wellcome Trust, and recruited new manpower from among young members.[411] In 2013, SfN named its first group of "Young Ambassadors," student neuroscientists given the opportunity to work with experienced advocates, participate in Capitol Hill Day, learn how to advocate with legislators and carry out advocacy projects, such as laboratory tours, in their home communities; in 2014, these young advocates were renamed "Early Career Policy Ambassadors."[412] SfN also developed a policy fellowship to enable a graduate student or young scientist to work on advocacy issues as part of SfN's staff for six months and offered a webinar on careers in science policy.[413] These programs made good use of the enthusiasm and energy of young scientists, while also giving them skills that aided them in planning their future careers.

"They can bring in the intellectual involvement and the intellectual ideas that they have learned through their graduate education and apply it to the betterment of human health and disease through reaching out to the public, but also at the same time reaching out to the politicians and Congress," Global Membership Committee Chair (2017–20) Ramesh Raghupathi explained.[414]

As SfN approached its 50th anniversary, its focus on advocacy remained strong, despite an unpredictable administration and contentious legislature. The BRAIN initiative continued, with similar initiatives taking shape in Europe, China, and Japan.[415] "Our advocacy cannot be just a one-day affair," SfN President Eric Nestler reminded his colleagues on Hill Day 2017; that year also saw the "March for Science" in Washington and 400 other sites around the globe.[416] SfN also expanded efforts to reach out to Capitol Hill that year, inviting nine Congressional representatives and their staff to visit the poster floor at the Annual Meeting in Washington. The visitors were amazed and impressed by "the unbelievable size and scope of the conference;" one staffer remarked to an SfN member that he didn't realize "how close we were to living in the future."[417] On March 7, 2019, 48 participants representing 24 states and 6 countries came to Washington for "Hill Day," joining in more than 80 meetings and office visits to lobby Congress to increase NIH funding to $41 billion in the FY2020 budget.[418]

FIGURE 65. SfN President Diane Lipscombe with Early Career Policy Ambassadors 2019

SfN



CHAPTER X

MEETING THE NEEDS OF AN INCREASINGLY DIVERSE SCIENTIFIC COMMUNITY

> When we *stop* talking about diversity, we'll actually consider ourselves successful.
>
> WILLIAM MARTIN, 2018[419]

THE COMMITTEE REORGANIZATION IN 2005 brought together several major functions: the promotion and support of women and minority neuroscientists, services for graduate students and postdoctoral trainees, and support of the global membership, under the Professional Development, Mentoring, and Diversity Cluster, charged with coordinating efforts to implement SfN's diversity strategy.[420] Over time, this strategy became more closely linked with the needs of SfN's many student members, as SfN's strategic plan included a commitment to supporting neuroscientists at all stages of their careers, regardless of gender, race, ethnicity, or geographic location. Diversity and lifespan support became essential factors in the growth of neuroscience and of SfN by 2019, with women and non-Caucasian members consistently at an estimated 45–55% of the membership and trainee membership stable in the 40–45% range. "It's not only because it makes us feel good," Eric Nestler (SfN President 2016–17) explained, "it's not only the right thing to do, it also makes the scientific enterprise better because it means we're better capturing all of the outstanding expertise that exists across humanity."[421]

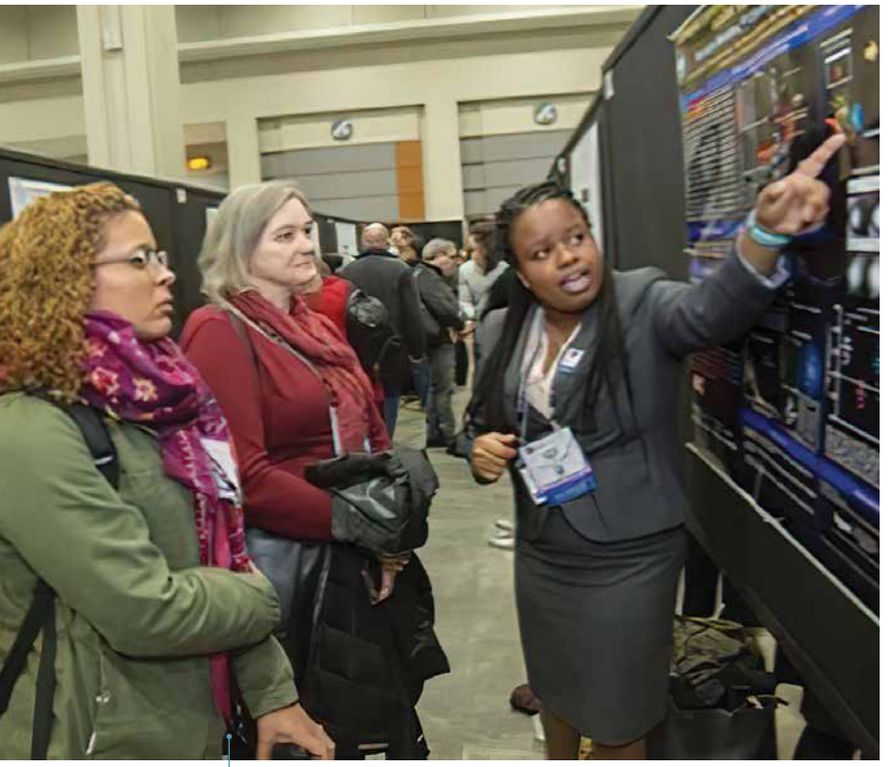


FIGURE 66. Women comprise 50% of Neuroscience Graduate Students

SfN

SEE VIDEO "SfN Listens to Members" on sfn.org/about/history-of-sfn/1969-2019/videos

SfN membership surveys and regular analyses by the Association of Neuroscience Departments and Programs (ANDP) carefully documented the participation of traditionally underrepresented groups in all stages of their scientific careers.[422] All of the data indicated that the problem of the "leaky pipeline" continued to be a key issue in neuroscience as in other scientific disciplines, with promising researchers leaving the field at every level. In 2016, women represented more than 50% of incoming graduate students, 50% of postdocs, but only 30% of faculty in neuroscience programs in the United States.[423] Similarly, although the percentage of racial and ethnic minorities entering graduate programs had increased from 10% in 1997 to 20% in 2016, only 10% of faculty were from these underrepresented groups.[424] These statistics mirrored closely the data collected on women and underrepresented minorities in all areas of science and engineering by the National Center for Science and Engineering Statistics.[425]

SfN took a critical leadership role not only in finding substantive ways to support women and minorities in neuroscience, but also in changing the underlying culture of science so that anyone interested in a career in science will have the chance to pursue it. For example, in 2001, long before NIH Director Francis Collins announced that he would no longer participate in "manels" at scientific meetings, the SfN Council and the Program Committee had approved diversity guidelines that reminded panel and symposium organizers to make every effort to include "appropriate representation of" qualified women and minorities in their events, as well as "broad geographical representation."[426] This type of inclusion policy was a key component in helping women and minorities to advance their own careers and serve as role models for others.[427] Updated several times, the SfN guidelines as of 2019 included the need to balance established speakers with new investigators and stipulated that these principles applied to all of the scientific events at the Annual Meeting.[428]

WOMEN IN NEUROSCIENCE

Since 1980, Women In Neuroscience (WIN) had been an independent organization, adjunct to SfN and made up of SfN members, but without the legal apparatus to make it eligible for grants from the NIH and other federal programs. Despite their modest resources, WIN had sponsored successful mentoring and networking events at the Annual Meeting and provided material and moral support in the form of graduate student scholarships to attend the meeting and supportive venues for female neuroscientists. In 1991, SfN began to take an active stance as an organization to support women researchers, establishing an ad hoc Committee (now named the Committee on the Development of Women's Careers in Neuroscience, or CDWCN) to focus on "enhancing women's roles in neuroscience." Throughout the 1990s, WIN and CDWCN had collaborated in collecting membership data and cosponsoring mentoring events for women scientists.

Two factors identified as crucial in sealing the "leaky pipeline" and promoting successful scientific careers for women are mentors and role models; yet the number of successful women neuroscientists available to serve in these important roles grew slowly. Only three women had served as SfN President in the Society's first thirty years. The years 2002–05 then saw a triumvirate of women Presidents in Huda Akil, Anne Young, and Carol Barnes. Yet in 2008, Eve Marder still described the Annual Meeting program as dominated by "lists of men and lists of men;" she made the decision to choose "four really outstanding" women as Presidential lecturers that year. She received positive feedback for this groundbreaking effort: "The young women saw it as a statement and they really appreciated it."[429]

In 2005, after several years of negotiations over leadership and financial support from SfN, WIN merged with CDWCN to form C-WIN, a permanent SfN Committee. The incoming WIN President became the co-chair of C-WIN, and SfN committed to administering the yearly WIN mentoring awards. The merger meant that WIN programs could be supported with extramural funds and that all members of SfN would "benefit from the combined budgets and unified goals of the two groups and [their] aims to sponsor a wide array of professional development activities."[430] As part of the Professional Development Cluster, C-WIN coordinated its programming with the Minority Education, Training, and Professional Advancement Committee (METPAC, later the Committee on Diversity in Neuroscience, C-DIN) to support women

FIGURE 67. Mentoring Today's Women in Neuroscience

BrainFacts

and minorities as they progressed through their careers.[431] When the Professional Development Committee was incorporated into a broader Professional Development and Training Cluster in 2009, C-WIN and C-DIN became subcommittees of the PDC.[432]

> I think we need to work very hard to attract minorities into neuroscience because neuroscience has gotten so broad in its ken; it deals with social issues, it deals with poverty, it deals with the effects of poverty and diet and drug exposure, and all these things that impact people, *particularly people who are poor and underserved minorities.*
>
> JOSEPH COYLE, 2019

In the 2010s, C-WIN and C-DIN devoted considerable resources to understanding – and overcoming – the structural challenges faced by women and underrepresented minorities in neuroscience, recognizing that scholarships, mentorships, and networking opportunities were only partial solutions. Although the well-documented "leaky pipeline" was a familiar trope, there had been "little change in the representation of women in higher academic positions since 2000," and experts agreed that simple awareness was not enough.[433] To promote equity and diversity more actively, SfN embarked on a three-year program, Increasing Women in Neuroscience (IWiN), in 2010 with support from the National Science Foundation. IWiN provided tools to help academic leaders address the issue of implicit bias.[434] The many forms of implicit gender bias include the tacit, even unconscious, beliefs that truly successful scientists are male, or that women are inherently less competent in varied aspects of their scientific practice.[435] SfN hosted a series of workshops that helped neuroscientists to explore their own biases and identify where these hidden biases could have an adverse effect on a woman's career path.[436] Over the course of the three years, nearly 150 participants spent time examining the problem of implicit bias; these members then brought the exercises and the insights gained back to their home institutions. As the program ended, IWiN hosted a workshop at Neuroscience 2013 on best strategies and practices for recruiting and retaining a diverse faculty and created a "Gender Gap Toolkit" PowerPoint presentation that SfN members, chapters, and departments could download and use as a starting point for discussing bias and promoting inclusion.[437]

A concurrent stimulus for change was the article, "A Tale of Two Sexes," co-authored by SfN President Carol Mason and FENS President Marian Joëls, which appeared in the journal *Neuron*.[438]

FIGURE 68. Increasing Women in Science Toolkits

SfN

FIGURE 41. Neuroscience Scholars 2018

SfN

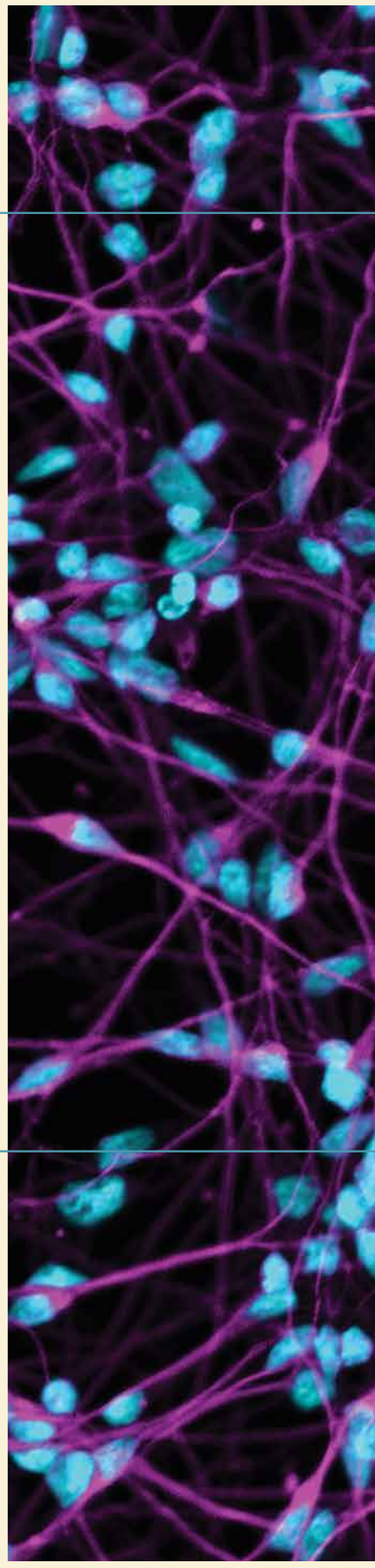
SfN leaders also invested significant financial and institutional resources in programs that would help women not only enter and remain in the field, but would also support them through their working lives as scientists. The Society began offering onsite childcare at the meeting in 2009 and worked with the conference center managers to make sure nursing mothers were comfortable.[439] In Fall 2018, Council voted to include sexual and gender harassment as forms of scientific misconduct under the SfN Code of Conduct, noting that "the entire scientific endeavor is put at risk by misconduct and harassing or harmful behaviors are inconsistent with a healthy environment for scientific progress."[440]

Finally, SfN leaders and nominators made an intentional effort to encourage women to take on positions in SfN leadership including Journal, Committee, and Council positions.[441] Five women scientists served as President between 2008 and 2019. As of 2019–20, moreover, 3 of 7 SfN officers, 6 of 8 Councilors and 6 of 14 Standing Committee Chairs were women, as well as the Editor-in Chief of one of SfN's journals – over 50% of the leadership!

SUPPORTING RACIAL AND ETHNIC MINORITIES

SfN demonstrated a parallel commitment to scientists from underrepresented minority groups beginning in the 1980s, through the "transformative" Minority Training Program, established in 1981, and its successor, the Neuroscience Scholars Program (NSP), part of the Professional Development Cluster. As Joseph Coyle commented, "I think we need to work very hard to attract minorities into neuroscience because neuroscience has gotten so broad in its ken; it deals with social issues, it deals with poverty, it deals with the effects of poverty and diet and drug exposure, and all these things that impact people, particularly people who are poor and underserved minorities. So I see them as bringing a special perspective and energy."[442]

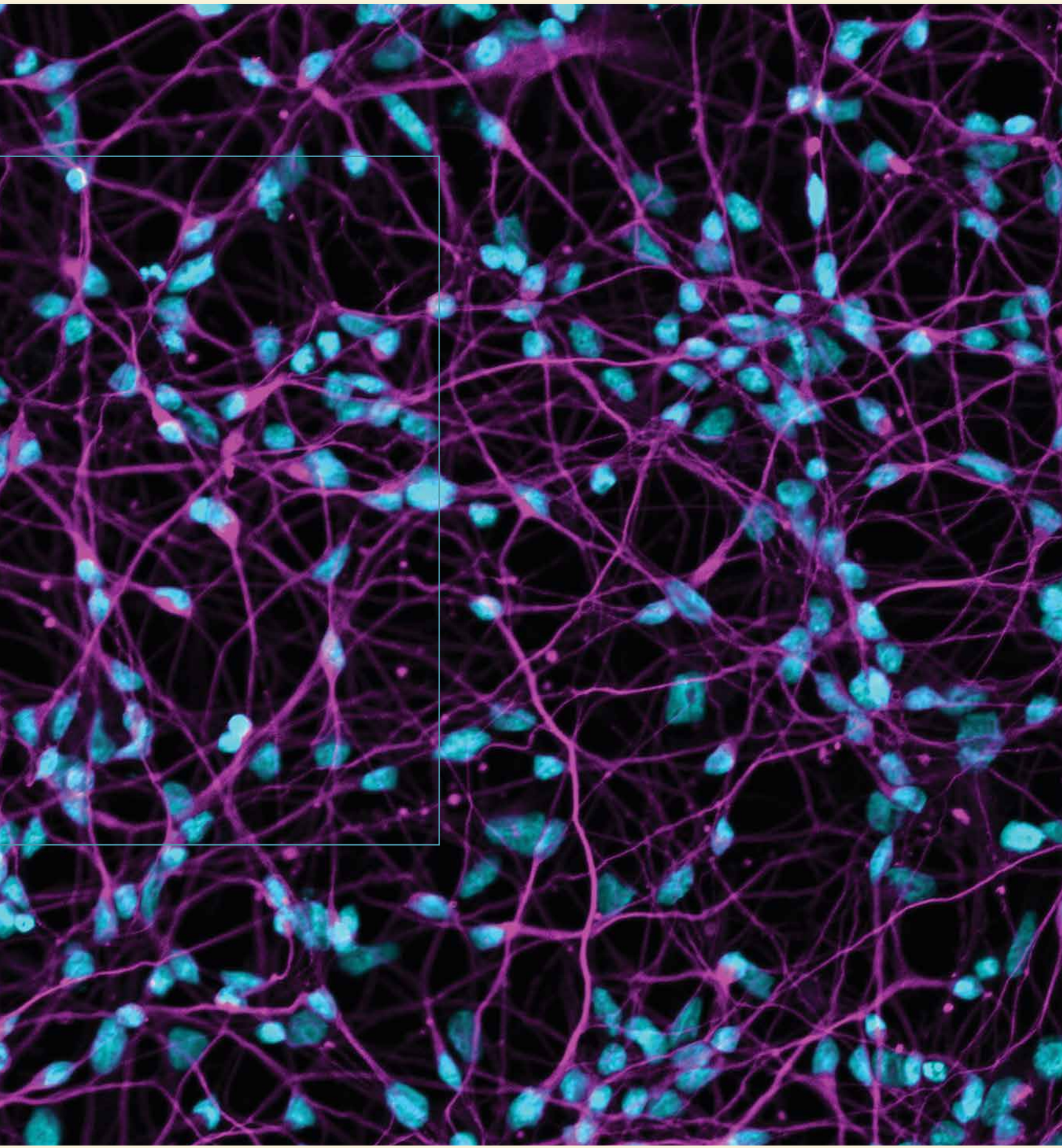
In 1997, increased NINDS support for the Minority Training Grants allowed the Minority Education, Training, and Professional Advancement Committee (MET-PAC) to subsidize five minority students' attendance at the Annual Meeting and to provide these trainees with professional and scientific mentorship for three years rather than one.[443]



“

It’s not only the right thing to do, it also makes the scientific enterprise better because it means we’re better *capturing all of the outstanding expertise that exists across humanity.*

ERIC NESTLER , 2018



NINDS provided more funds in 2000 to initiate the Minority Conference Fellowship, which included pre- and postdoctoral fellowships, as well as support for attending programs other than the Annual Meeting, for an additional 11 individuals.[444] The 2005 committee reorganization with a focus on career development renamed MET-PAC the Committee on Diversity in Neuroscience (C-DIN) and recommitted the Society to the support of diversity in the field.[445]

The NSP expanded its mandate several times and increased its programming to engage the attention of science administrators and educators. In 2007, NSP eligibility expanded to include all undergraduate neuroscience majors; by 2015, the program had grown to include "a tier of resources for all eligible applicants, called Associates. This group gains access to select events at the Annual Meeting, an online library of educational resources and webinars, and an online diversity affinity group of past and current NSP participants for professional networking and guidance."[446] SfN hosted "Preparing the Next Generation of Neuroscience Leaders," the first NSP conference outside of the Annual Meeting, in July 2017, with speakers from NIH and NINDS sharing strategies for inclusion that would benefit all types of scientific institutions.[447] From 1982 through 2019, over 900 neuroscientists benefited from the various NSP grants as fellows and associates.

The innovative program received a Summit Award from the American Society of Association Executives in 2014 and, in 2018, the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring (PAESMEM) from the National Science Foundation and the White House Office of Science and Technology Policy.[448]

FOCUSING ON THE NEEDS OF STUDENTS

The increased emphasis on the "leaky pipeline" meant that SfN had to focus its attention on every part of that pathway, including undergraduate and graduate students, or "trainees." As Ramesh Raghupathi observed, "We want to keep them because that's the next generation, and once we bring them in as a student, as they advance in their career from graduate student to postdoc to faculty, I think we still want to make sure that we provide value to those members."[449] SfN's education committee partnered with the Faculty for Undergraduate Neuroscience (FUN) beginning in the early 1990s; FUN worked closely with ANDP to establish standards for undergraduate neuroscience majors. But for many years, the SfN poster session excluded undergraduate presenters while SfN relied on its external partners to take the lead in addressing student needs.[450]

In 2003, SfN Council voted to create a separate membership category for undergraduates to join the Society, making it easier for them to present their work and to take advantage of the networking opportunities at the Annual Meeting.[451] But the major step forward occurred when SfN merged with the ANDP in 2009 and created the Committee on Neuroscience Departments and Programs (CNDP), "charged with recommending and managing programs, activities, and initiatives that advance education and research training in academic neuroscience."[452] The consolidation necessitated the creation of a new Institutional Program (IP) membership category so that the administrators and heads of departments were able to communicate with members and eligible to participate in SfN events.[453] The Graduate School Fair, a natural extension of the IP member benefits, first appeared at the 2012 meeting, growing from 35 programs in that first year to more than 100 in 2019.[454] While all SfN members benefited from the professional development resources on *Neuronline* following its launch in 2011, important goals of the online membership community included the fostering of mentoring relationships for graduate students and the creation of a centralized location (NeuroJobs) for job postings.[455]

Finally, in 2013, Council approved a planned giving strategy to encourage donations to the Friends of SfN Fund, so that members could earmark support for the Trainee Professional Development Awards and ensure that young scientists would have

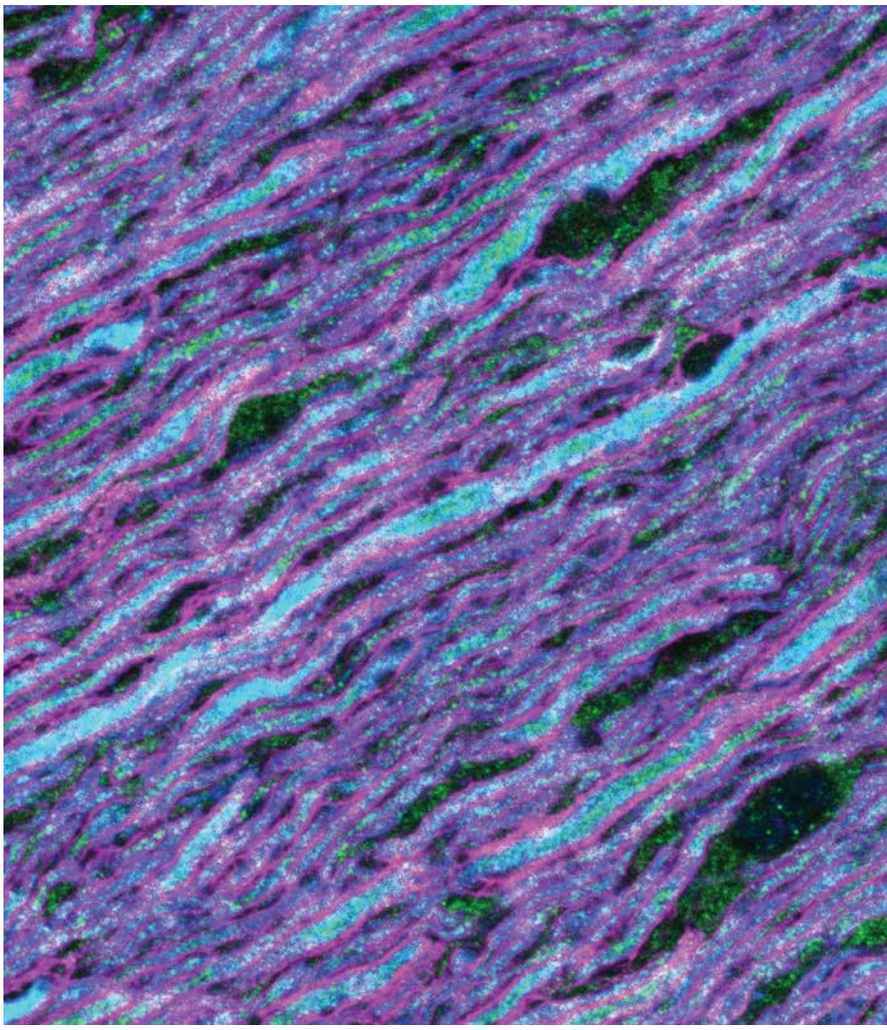
more opportunities to attend the Annual Meeting and present their work.[456]

The leadership structure of the Society had meanwhile gradually begun to integrate its graduate student members. In 2011, Council formed a temporary Trainee Advisory Group to provide early career perspectives on SfN initiatives; two years later, the group became the standing Trainee Advisory Committee (TAC).[457] As Cara Altimus (TAC Chair 2016–19) explained, "We need to be also hearing from the trainees to understand what do you actually need; what do you want; how do we get you there? It needs to be collaborative, so the individuals in power are working with the individuals affected because, ultimately, science is at stake."[458] The TAC and the Global Membership Committee led a task force guiding the 2016 member survey to elicit ways in which SfN can provide year-round member value to neuroscientists throughout their careers.[459] In a complementary effort, *JNeurosci* launched its Reviewer Mentoring Program in 2019 to train graduate students to participate in the peer review process.[460]

SfN leaders, IWiN members, and NSP administrators consistently made the strong point that programs that increase diversity not only benefited the women and minorities who were able to move more easily into and stay within the field, but also the entire scientific community.[461] These types of programs required active collaborations with other scientific organizations, educational institutions, and government agencies, and SfN became a global leader in publicizing the importance of diversity and inclusion throughout science. In 2019, SfN's partnership with FENS helped establish the ALBA network, an international program for promoting diversity and equality in neuroscience by establishing best practices in research and providing venues for underrepresented minorities to present their work.[462] SfN's commitment to ALBA was a prime example of how the organization had expanded its priorities to support global initiatives and sustain its members around the world, as will be explored in the next chapter.

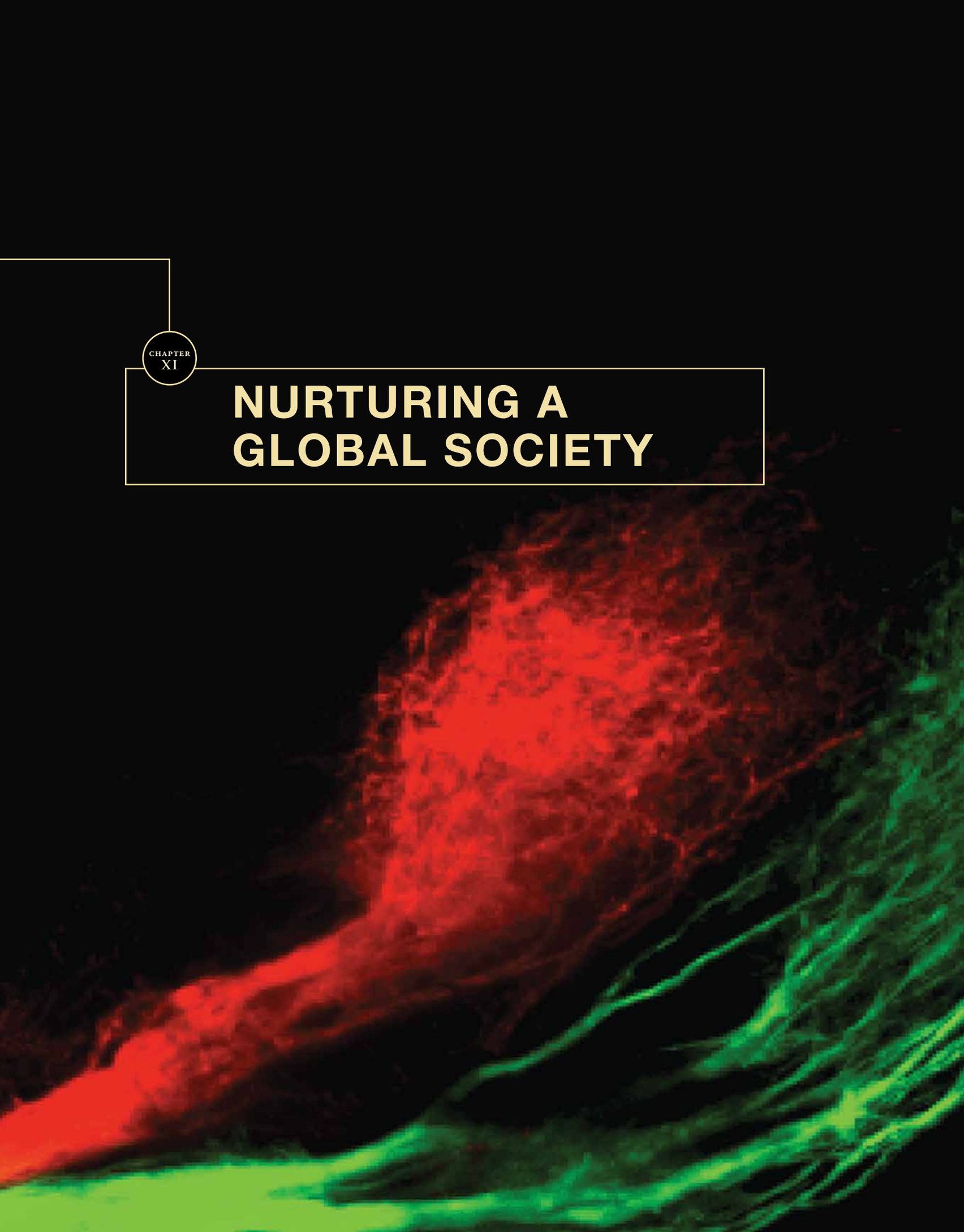
FIGURE 70. *Neuronline* Guidance for Students

SfN

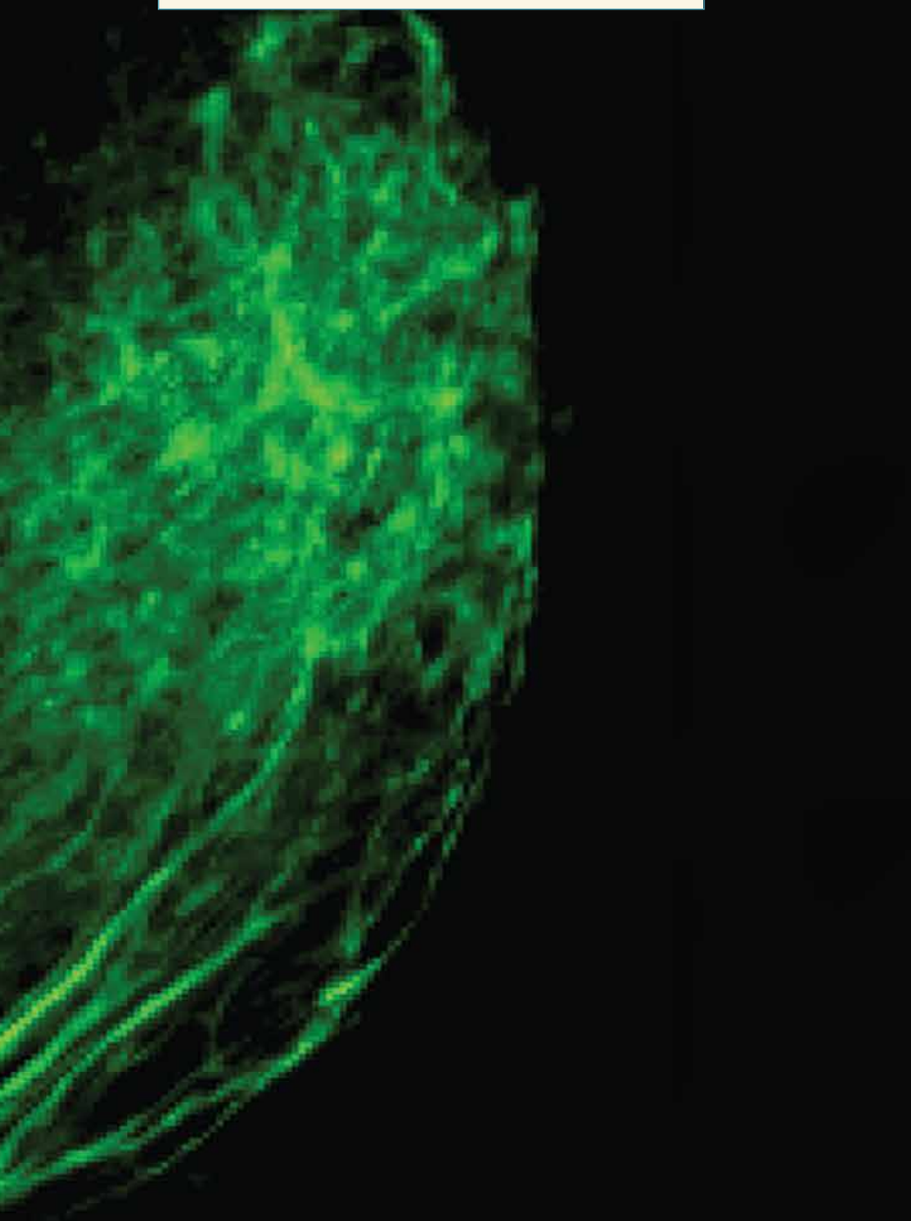


CHAPTER
XI

NURTURING A GLOBAL SOCIETY



> We are committed to the principle that SfN should be useful to its members *wherever they live and work*.
>
> EVE MARDER, 2008[463]



SfN AT THE BEGINNING WAS LARGELY AN AMERICAN story, reflecting that region's dominance in the field, though the leadership envisioned a global society that spoke for all of neuroscience, not just for the parochial interests of neuroscientists in a single country. Major international membership contingents represented the U.K., Canada, Germany and Japan. Even before 2000, *Neuroscience Newsletter* and *Neuroscience Quarterly* consistently reported on the activities of the Canadians Association for Neuroscience, included articles by the presidents of FENS and IBRO, and highlighted how international chapters were celebrating Brain Awareness Week.[464] *BrainFacts.org* was an international resource for reliable facts about the nervous system from its inception, with more than half of the visitors to the site coming from outside the United States.[465] *Neuroscience Quarterly* consistently featured the winners of the International Brain Bee, many of whom attended the Annual Meeting.[466]

In the post-WWII era, North American institutions, laboratories and scientists had driven the development of neuroscience. For example, between 1999 and 2003, U.S. authors contributed 26% of the global output of scientific articles, and the U.S.' share of global research and development expenditures was around 40%. But the 21st century saw these figures begin to shift. But by 2011, the U.S.'s share of global research and development expenditures had declined to 30%, while U.S. authors contributed 21% of the scientific literature published in the 2010s. SfN membership reflected these changes and supporting the global community of neuroscientists was a pillar of every version of SfN's strategic plan from 2002, when the percentage of members from outside the United States had reached 31%.[467] The leadership already fully recognized the Society as an international organization with a role in members' lives across the globe. This commitment only grew stronger as international membership continued to rise, levelling off at 35% by 2020,[468] including 3,000 international members from more than 90 countries, 60% of them regular members. The most recent growth in membership came from Mexico, China, South Korea, and India. Yet international scientists also found themselves facing travel and financial restrictions that hampered them from presenting and publishing their work.

As Steve Hyman, SfN President 2014–15, commented, "[T]he global politics is tending toward fragmentation and nationalism and I think science is a critical glue that will help hold people together."[469]

EMBRACING SfN'S INTERNATIONAL IDENTITY

The International Affairs Committee (IAC), initially established in 2000 as a joint endeavor with the National Academies of Science to act as representatives of North American neuroscience to IBRO, quickly became a key liaison for SfN's international scientific educational programs, fellowships, and the equipment exchange program.[470] With a broad and flexible mandate, IAC claimed a place in both the Membership and Professional Development Clusters as part of the committee reorganization in 2005. The IAC established its independence from IBRO and the National Academies in 2010, as a collaborator focusing on joint educational and advocacy programs on behalf of SfN.[471] As all of SFN's committees began to focus on international members and on global member value, in 2014, the Membership and Chapters Committee and the International Affairs Committee "merged into a single Global Membership Committee."[472]

One key transition to a more global SfN was the elimination of the distinction between North American and 'foreign' members in the by-laws in 2003.[473] As SfN President (2004–5) Carol Barnes noted, "if you're a member, you're a member, you're a regular member," and all members paid the same fees and enjoyed the same benefits.[474] Over the next 10 years, international members became eligible to serve on all committees, as well as on Council and the Executive Committee.[475] While a number of past Presidents had been born outside the United States, 2019 marked the first election of a President from an institution outside North America, Barry Everitt of Cambridge University.

The change in membership status for international members had a dramatic effect. Between 2001 and 2007, "regular international membership grew by 39% and international student membership outside North America grew by a considerable 117%."[476] By the fall of 2010, Council noted that the "fastest growing sectors of the membership are students and those residing outside of the U.S."[477] IAC conducted an international member survey in October 2010 to "identify ways SfN might better serve their professional and career development needs," later collaborating with the Trainee Advisory Committee on surveys of the entire SfN membership in 2011 and 2016.[478]

LEADING THE GLOBAL SCIENTIFIC COMMUNITY

While all SfN members faced challenges in accessing funding for research and conferences, publishing their research, and finding job opportunities, non-U.S. members described

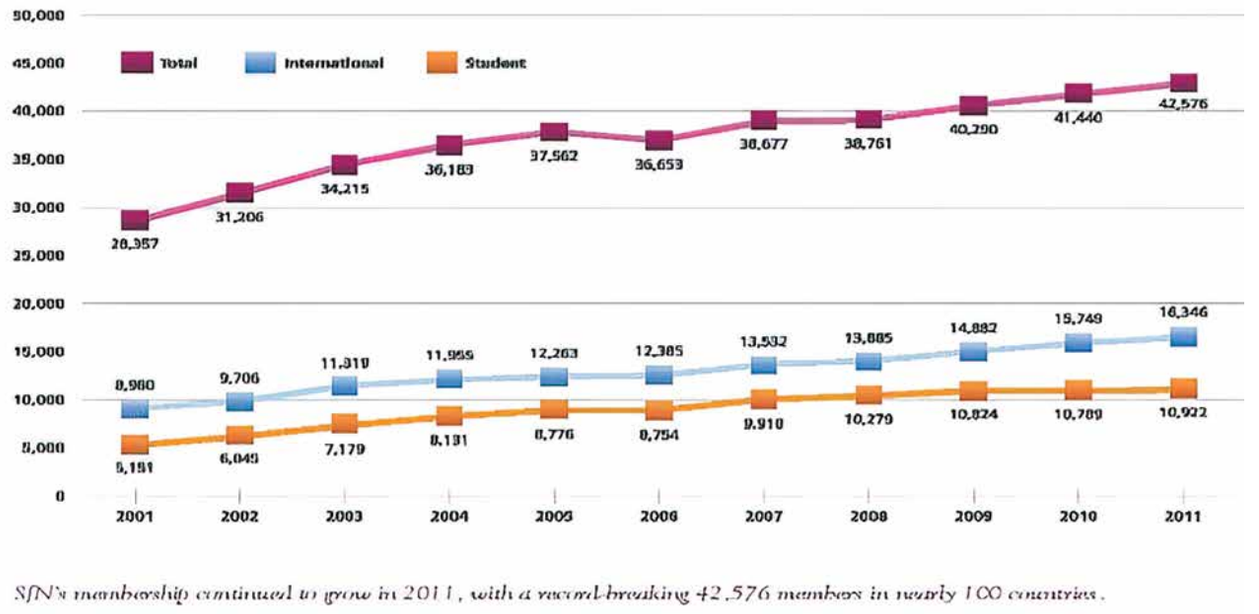


FIGURE 71. Globalization of SfN Membership 2001–2011

SfN Annual Report FY 2012

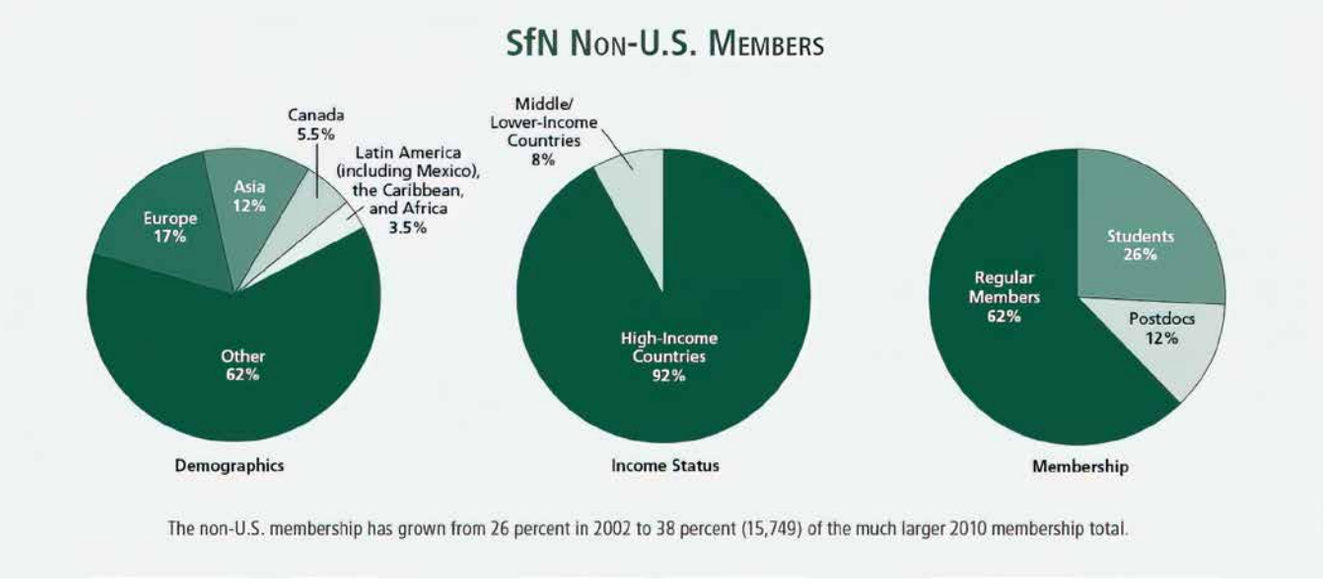


FIGURE 72. International Member Survey October 2010

SfN NQ Spring 2011

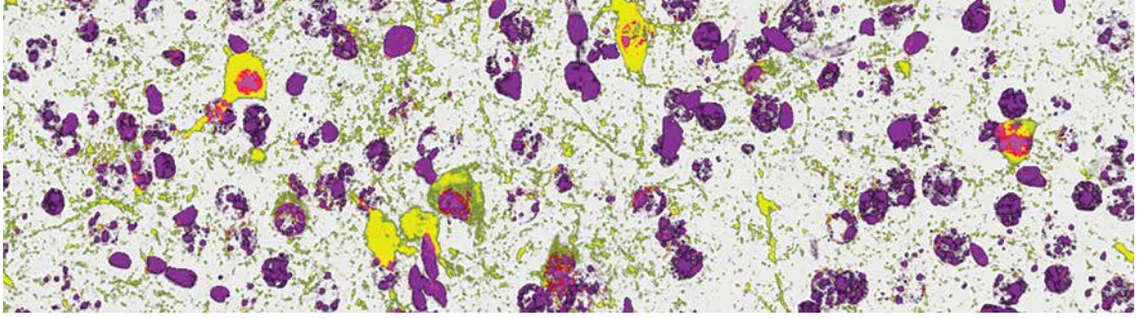
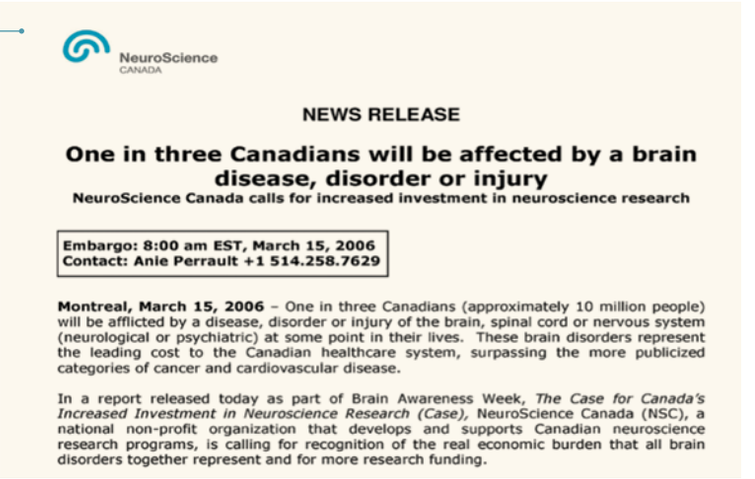


FIGURE 73. The Case for Canada's Increased Investment in Neuroscience Research

braincanada.ca



NeuroScience
CANADA

NEWS RELEASE

One in three Canadians will be affected by a brain disease, disorder or injury

NeuroScience Canada calls for increased investment in neuroscience research

Embargo: 8:00 am EST, March 15, 2006
Contact: Anie Perrault +1 514.258.7629

Montreal, March 15, 2006 – One in three Canadians (approximately 10 million people) will be afflicted by a disease, disorder or injury of the brain, spinal cord or nervous system (neurological or psychiatric) at some point in their lives. These brain disorders represent the leading cost to the Canadian healthcare system, surpassing the more publicized categories of cancer and cardiovascular disease.

In a report released today as part of Brain Awareness Week, *The Case for Canada's Increased Investment in Neuroscience Research (Case),* NeuroScience Canada (NSC), a national non-profit organization that develops and supports Canadian neuroscience research programs, is calling for recognition of the real economic burden that all brain disorders together represent and for more research funding.

"several additional challenges, including lack of access to professional networks for research and scientific exchange and lack of necessary research infrastructure/technologies."[479] The Member Enhancement Plan Working Group addressed these concerns directly in 2012, suggesting that Council increase funding for international members to attend the Annual Meeting and provide year-round resources for training and publishing.[480] SfN leadership also entered into strategic partnerships with its international partners to provide advice and coordinate advocacy programs for science around the world.[481]

Canada was the first beneficiary of such a partnership in the late 1990s and 2000s. The NeuroScience Canada Partnership and Foundation, founded in 1998, provided the initial channel for advocacy support. In 2004, Council approved the translation of the SfN Guide to Public Advocacy into French and agreed to contribute funding to the Canadian Association for Neuroscience (CAN) to support a lobbyist in Ottawa and related activities.[482] "We needed help just [for] guidance of how effective it is. We needed to do it in [the] context … [of] the Canadian government system," CAN leader and SfN Councilor Brian MacVicar explained.[483] NeuroScience Canada published *The Case for Canada's Increased Investment in Neuroscience Research* in 2006 and, in 2011, now renamed BrainCanada, successfully advocated for a dedicated fund for Canadian brain research.[484] In 2018, after several lean years, the hard work of CAN and BrainCanada paid off in an "historic" $3 billion government commitment to research, including a 25% increase in basic science funding and more than $1.7 billion over 5 years to support individual researchers. After the first twelve years of a strong partnership, SfN and CAN signed a memorandum of understanding (MOU) agreeing to three more years of joint support for "advocacy targeting four groups in Canada: neuroscientists, government, media, and the public".[485]

The Society began its science advocacy collaboration with the Federation of European Neuroscience Societies (FENS) in 2011. Fifty

FIGURE 74. French SfN Member and *eNeuro* Editor Christophe Bernard and his Lab Team

photo courtesy of Christophe Bernard

scientists from 29 national societies attended a workshop in Brussels in June, where SfN members presented advocacy strategies, tools and resources, and FENS members gave talks on their experiences and achievements. SfN and FENS then pooled resources to create an Advocacy Grants Program, offering grants to the national groups for projects in "legislative strategy, member involvement, resource creation and adaptation, and strategic partnerships," developed to fit each nation's particular political and cultural situation. The first 10 Advocacy Grants, announced in December, went to projects in Croatia, France, Greece, Hungary, Ireland, Italy, Portugal, Slovenia, Spain, and the UK.[486] As GPA Chair Anne Young commented, "We know national and regional neuroscience societies are uniquely positioned to lead advocacy programs that reflect each country's funding and political systems."[487] By 2015, SfN and FENS had partnered with IBRO in the Global Advocacy Initiative, to encourage societies in all countries to promote science with their legislators and elected officials.[488] IBRO President Pierre Magistretti observed, "Europe is a bit more complicated because we have many nations, not just one nation.... It's not exactly the same kind of context. Yet the message is always the same…promote neuroscience, promote support for neuroscience."[489]

Many critical issues, such as ethics and responsible scientific conduct, required SfN to coordinate with as many global partners as possible. In 2011, SfN, as part of its ongoing effort to promote responsible scientific communication, joined IBRO, FENS, the Japan Neuroscience Society, and the Chinese Neuroscience Society to run three educational programs on ethics, including a panel discussion at the IBRO meeting, a workshop at Peking University and another panel at the Chinese Neuroscience Society meeting.[490] SfN's advocacy leadership, as Magistretti recalled, "actually triggered the establishment of a global advocacy initiative... where IBRO is playing a key role as kind of an umbrella organization."[491]

FIGURE 75. Mexican SfN Member and Councilor Magda Giordano and her Students

photo courtesy Magda Giordano

SUPPORTING NEUROSCIENCE STUDENTS AROUND THE WORLD

SfN initiated a number of programs in the 2010s specifically for graduate students and early career researchers from outside the United States, in Latin America, Europe, and Asia. The four-week Ricardo Miledi Neuroscience Training Program in Mexico, generously funded by the Grass Foundation from 2004–12, evolved into the Latin American Training Program in 2014.[492] The first joint Programme of European Neuroscience Schools (PENS)-SfN was held in Naples in 2010. In 2012, SfN established an exchange program with the Japanese Neuroscience Society, providing shared funding for trainee members of each group to attend the other's meeting.[493] SfN also supported local and regional chapter educational initiatives such as the biannual summer course run by the Turkey Chapter that attracted students from across the Middle East.[494]

From 2014, SfN leadership reinforced the identification of SfN as a global organization, from combining the IAC and Membership Committees into the Global Membership Committee in 2014 to committing to supporting neuroscientists in developing regions of the world.[495]

After the 2016 election, many international scientists were concerned about the effect of the new administration's policies on their ability to present their research at SfN; abstract submissions decreased by 8% the following year. SfN leadership and staff worked hard "to reassure our membership of thirty-six thousand people, from eighty different countries around the world, that SfN stood for an international investment in neuroscience;"[496] as SfN President Eric Nestler stated in his Spring 2017 "Affirmative Attention" message, "scientific innovation has always been an international effort." SfN remained committed to global cooperation and science without borders in the face of increasing nationalism around the world and tougher visa restrictions in the United States. For the first time at the 2019 Annual Meeting, scientists denied a visa to come to the United States were enabled to present their work at a poster, symposium, or nanosymposium, with the aid of volunteers through the Science Knows No Borders program.[497] In September 2019, SfN was a signatory to an AAAS letter to U.S. governmental science agency heads urging them to support measures that "ensure that the U.S remains a desirable and welcoming destination" for researchers from around the world.[498]

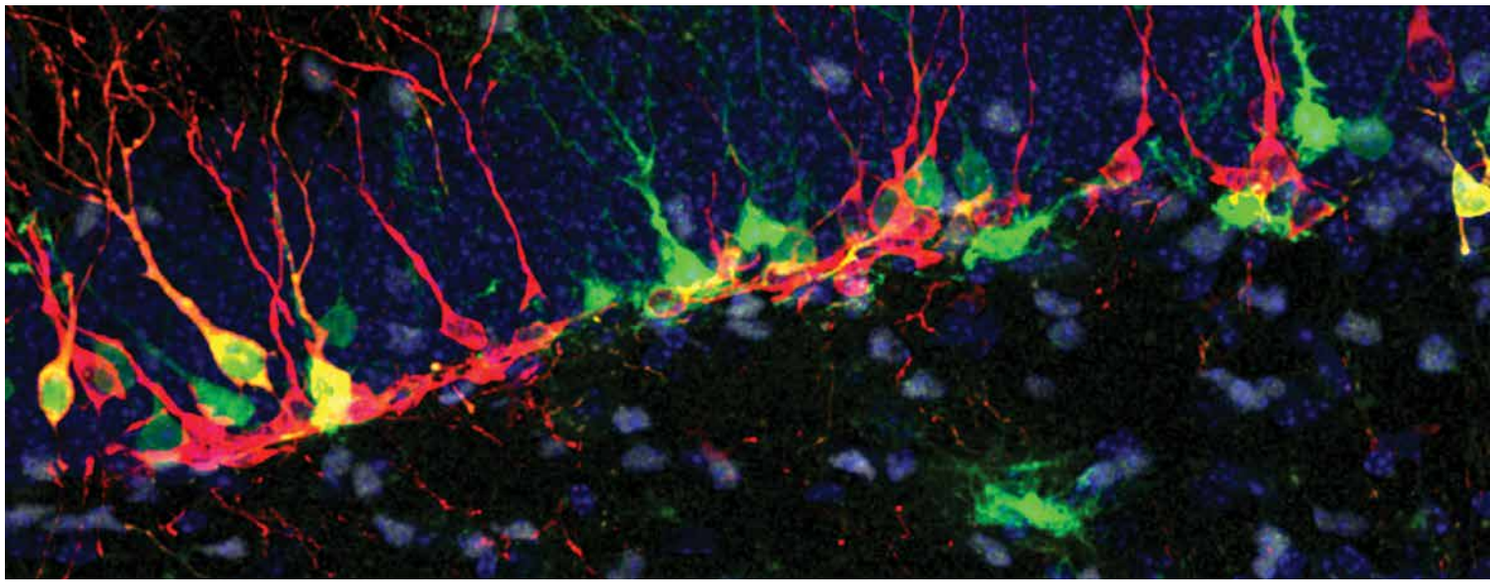
SEE VIDEO "The Society for Neuroscience as a Global Scientific Society" on sfn.org/about/history-of-sfn/1969-2019/videos

CHAPTER XII

SfN AT 50 YEARS: FOCUS ON THE FUTURE

SEE VIDEO "The Power of SfN" on sfn.org/about/history-of-sfn/1969-2019/videos

SfN'S SECOND QUARTER-CENTURY, FROM 1995 TO 2019, was characterized by continuing growth, professionalization of governance, rapid technological change, and an active embrace of the Society's diverse, global identity and perspective, all in the service of championing the field of neuroscience and providing all members with year-round value, regardless of their professional stage or geographical location. As the next 50 years began, these same themes formed the framework for SfN's future planning.



SfN, as an organization, had become a significant leader in the scientific community. As former President Eric Nestler (2016–17) reflected in 2018 on his long engagement with the Society, he commented, "It's really a career-building, laboratory-building, scientific enterprise-building affair, and it means the world to so many of us who have been members for forty years."[499]

In the assessment of former *BrainFacts.org* Editor-in Chief and SfN Councilor Nick Spitzer, "If we do a thought experiment and we take the Society for Neuroscience out of the equation, let's imagine it didn't exist, I don't think the field of neuroscience would be where it is today."[500] Past SfN President Fred Gage (2001–02) shared these positive assessments and saw SfN's continued success as an impetus for reflection and reevaluation.

> *The Society for Neuroscience is a success story when you look at it objectively now. A question for the Society for Neuroscience is: Do we accept who we are right now and sort of stay the same… or try to maintain the same level of effectiveness that we have now or do we change in some way to meet the changes that are happening in science and society? I'm not sure what that is, but it is time to, and I'm sure the Society needs to think what it wants to be in the next 50 years. What do you want to achieve?*[501]

In 2018, in anticipation of the 50th anniversary of SfN and the 50th Annual Meeting in 2020, a number of SfN leaders and longtime staff members shared their perspectives on the successes of the past and described their visions of the future of the Society and the role SfN should play in meeting the ongoing challenges of 21st century science.

MEMBERSHIP VALUE

After its meteoric rise in the first decade of the 2000s, SfN membership dropped after 2011 and appeared to reach a plateau around 37,000, 48% above its 1995 level. SfN's growth had dramatically eclipsed that of other, more established biological research societies. For example, the American Physiological Society, founded in 1887, where many of SfN's original founders had their scientific roots, included about 10,500 members as of 2015. The American Society for Biochemistry and Molecular Biology (separated from the APS in 1906) had a slightly larger membership of 12,000. The American Society for Microbiology was the nearest to SfN in size, at over 30,000.

Yet SfN membership was showing a slight downward trend. Possible reasons included concerns about funding support

in the U.S. and in several European countries and young scientists' perceptions of the organization as one among many venues for annual presentations, rather than as a career homebase. SfN leadership faced the challenge of sustaining its emphasis on providing year-round value for members from all countries,

> I'm sure the Society needs to think what it wants to be in the next 50 years. *What do you want to achieve?*
>
> FRED GAGE, 2018

in all career paths, and at all career stages if the Society was to maintain a membership to fuel, in human energy as well as financial resources, its ability to function as the voice of neuroscience.[502]

AN EVER-EXPANDING FIELD OF SCIENCE

Neuroscience has always been an "umbrella" for a wide range of sub-disciplines from neuroinformatics to genetics to clinical neurology to systems neuroscience.[503] In the 2012 edition of *Principles of Neural Science*, Eric Kandel and his co-authors reflected on the major changes within the field since the publication of the textbook's first edition in 1981. Echoing Francis Schmitt in the 1960s, they defined the ultimate task of neuroscience as "[to] understand how the flow of electrical signals…gives rise to mind." While the 1981 edition could only consider addressing the major questions of neuroscience with the methods of cellular biology, the 2000 edition had caught up with the seismic changes in neuroscience brought about by the molecular biological revolution. Arguably, molecular biological explanations have provided a new intellectual "super glue" to hold the disparate field of neuroscience together. While few neuroscientists have been molecular biologists, molecular biology offered a powerful intellectual resource for investigating and understanding the linkages from gene expression to complex human behaviors, thoughts, and feelings.

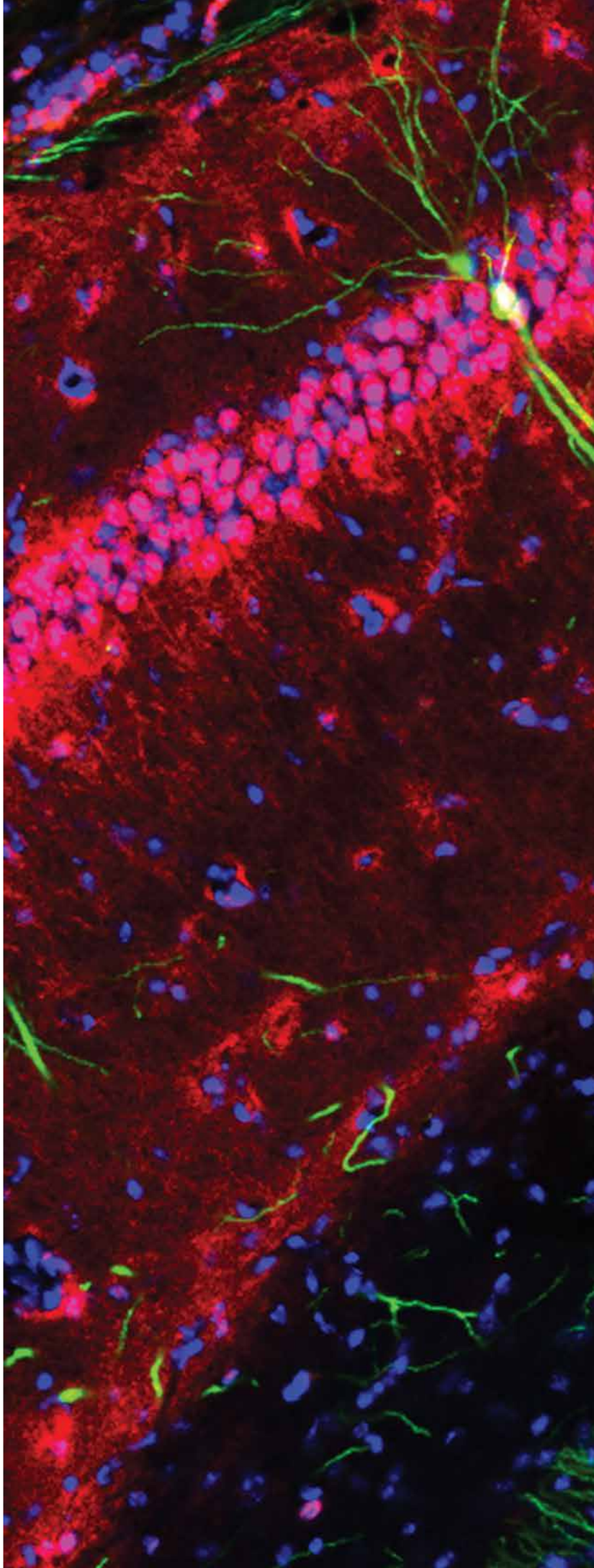
But Kandel and his co-authors emphasized: "Although the cellular and molecular biological approaches emphasized in the previous editions will certainly continue to yield important information, knowledge of the function of assemblies of neurons in defined circuits must be attained to arrive at a comprehensive cognitive neuroscience."[504] The increasing focus on circuitry was accompanied by the growth of larger data sets of genomic, proteomic, and multi-electrode recordings. As the final report of the BRAIN Advisory Committee to the NIH director, released in June 2014, read: "Over recent years, neuroscience has advanced to the level that we can envision a comprehensive understanding of the brain in action spanning molecules, cells, circuits, systems, and behavior."[505] The discipline faced new challenges of cohesion, inclusiveness, and relevance with this growing reliance on complex methods of computer modeling and artificial intelligence, on analysis of observational data sets and on network and systems biology.

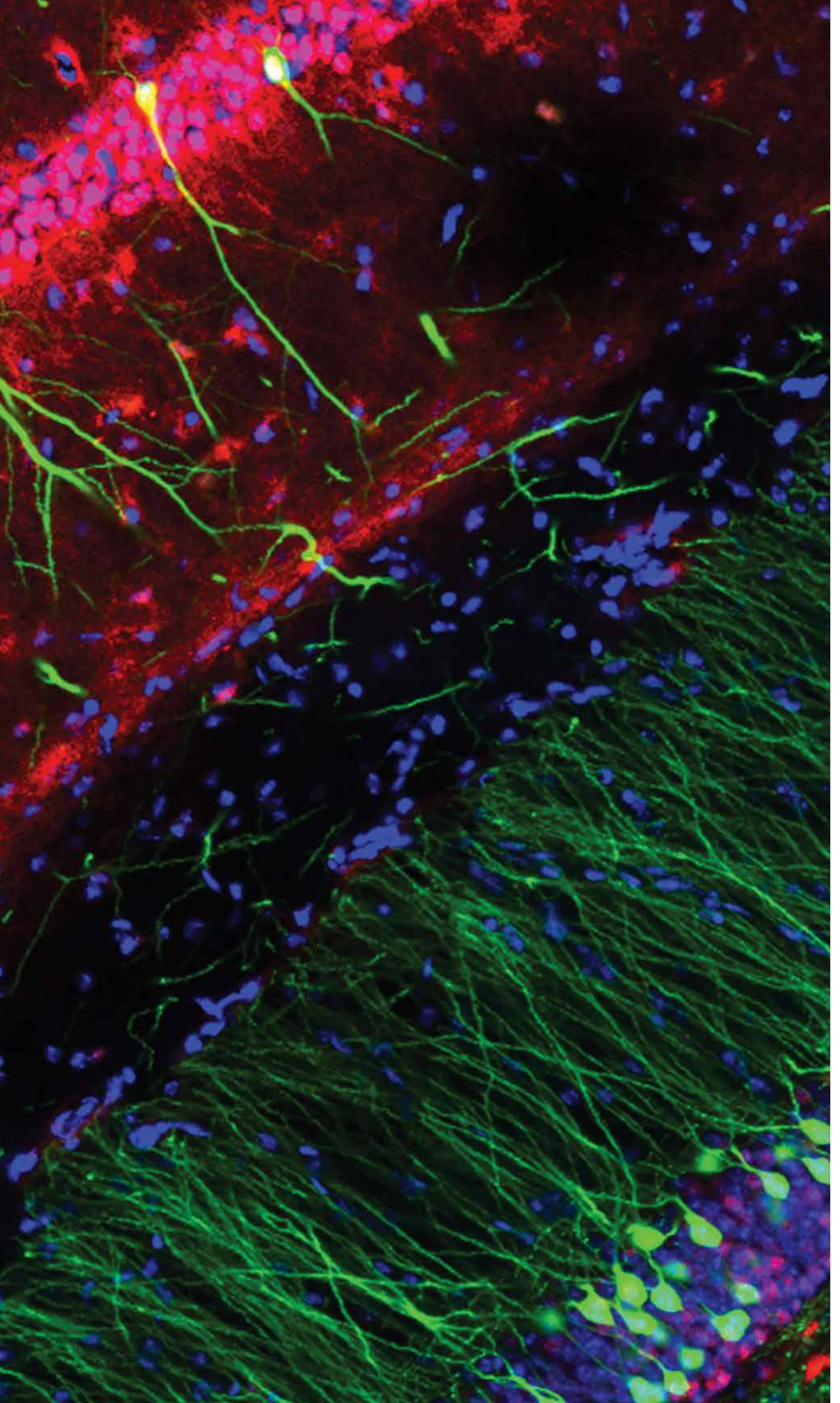
Brian MacVicar, Global Membership Committee Chair and SfN Councilor, saw the maintenance of a "cohesive force" as one of the primary roles for SfN as the discipline becomes more diverse intellectually, technologically, and geographically.[506] Past President Huda Akil (2002–3) cautioned future SfN leaders to remain aware that since neuroscience "sits at a fulcrum of the range of knowledge from the most reductionist, such as math and physics, all the way to the most humanist: social sciences, humanities, music, etc.," it was simultaneously "relevant to almost all types of knowledge," and thus vulnerable to "dilution."[507]

Several leaders saw the emergence of artificial intelligence and computational techniques as particular challenges and opportunities for the field. William Martin (past SfN Councilor and past chair of the GPA Committee and Committee on Diversity in Neuroscience) asked, "So will there be different kinds of constituencies within SfN that are focused on computational approaches

to neuroscience or digital approaches to neuroscience in a way that we haven't really thought about? And how will they be incorporated into the community? How will we maintain the large tent that has made SfN so successful?"[508] As the boundary between computer science and neuroscience blurred, it emerged as vitally important that qualified neuroscientists not only understand how artificial intelligence works, but also participate in the public conversations about the ethics of using AI.[509] The Society in 2019 had the flexibility and resources to accommodate these new approaches. Past President Steven Hyman (2014–5) was confident that SfN's Annual Meeting and publications would continue to "play a critical role in making sure the neuroscience net doesn't fly apart, doesn't succumb to centrifugal forces, but that people continue to talk to each other, interact with each other and in that way will make the best use of our opportunities."[510]

Artificial intelligence and large datasets were not the only technological changes confronting SfN. As educational and research methods became more digitally based, the Society would need to nimbly incorporate those changes into its programs in order to continue to meet the needs of students and researchers.[511] Elisabeth Van Bockstaele (Neuroscience Training Committee Chair 2016–18) described the Society's 2019 initiative to develop a "digital learning platform that really is going to be the future." She noted that "the Society has definitely been a leader in this area because it's been promoting incredibly high-quality programming related to scientific rigor and scientific training."[512] Technology had also provided new and innovative ways to communicate with the public, as showcased by the new 3D interactive brain on *BrainFacts.org*. By simultaneously embracing online tools and maintaining high levels of scientific integrity, SfN had the well-developed potential to be "the flag bearer of standards for neuroscience, both at the training level and at the knowledge level."[513]





CHAPTER XII

SFN AT 50 YEARS: FOCUS ON THE FUTURE

TABLE 12. 50th Anniversary Working Group Goals

1	2
HIGHLIGHTING CRUCIAL HISTORIC ADVANCES AND FUTURE DIRECTIONS in neuroscience, and the Society's role in furthering progress in neuroscience and the broader scientific enterprise.	**HIGHLIGHTING THE IMPORTANCE OF PUBLIC UNDERSTANDING AND SUPPORT** for brain research, and SfN's role in shaping and supporting the public's exploration of "the wonders of the brain and mind."

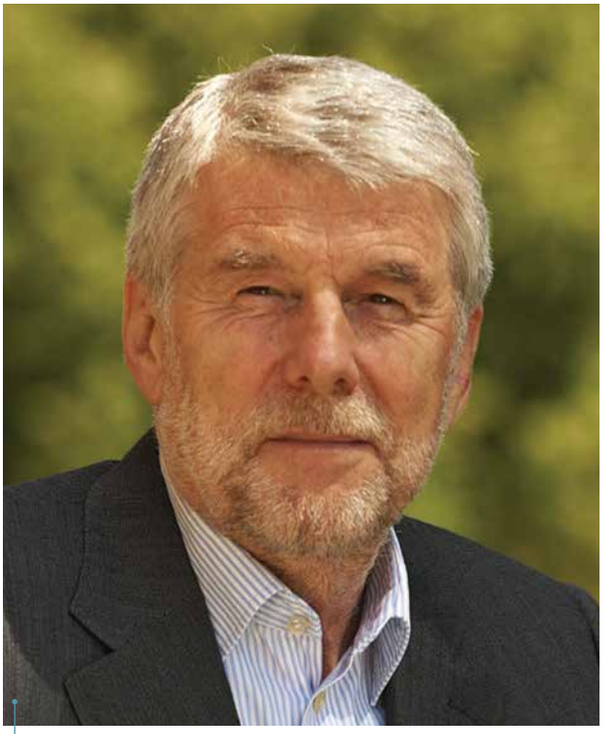


FIGURE 76. Barry Everitt, SfN President 2019–2021

SfN

PROMOTING AND PROTECTING SCIENCE ON THE GLOBAL STAGE

A number of SfN leaders expressed concern about public attitudes towards science in the late 2010s.[514] SfN's successful advocacy programs were proof that neuroscience is a "bipartisan issue,"[515] but a larger climate of skepticism and rejection of scientific evidence had put increasing pressure on the Society to strengthen what former President Carla Shatz (1994–5) termed its "credibility in the context of what neuroscience can do for health and society."[516] In addition to successfully partnering with sister societies around the world to advocate for science funding, SfN would have to defend scientific freedom by supporting scientists in countries whose governments have difficulty "accepting that scientific findings are free of bias and relevant,"[517] through initiatives such as the 2019 Science Knows No Borders program.[518]

From 2003 to 2015, meanwhile, NIH research funding, which fueled the outstanding growth of biomedical science in the postwar era, declined by an estimated 25% in constant dollars, only beginning to increase again slowly from 2016–2020[519]; fundamental structural problems have come to the fore as the number of researchers has expanded in the face of a contracting pool of research dollars. The contraction of fully supported tenure-track and tenured faculty positions further accentuated an already competitive and increasingly insecure research environment.[520] Similar to the growing chasm between rich and poor in American and global society, U.S. neuroscience in 2020 faced a disequilibrium in which fewer scientists controlled the available resources. The Society response to these trends was likely to have significant consequences for the future of neuroscience.

3 THANKING THOSE WHO HAVE HELPED IT REALIZE THE SOCIETY'S LAST 50 YEARS of growth and service, and celebrating those who will lead the next 50 years.

4 ENSURING THAT MEMBERS AROUND THE WORLD ARE AWARE OF THE SOCIETY'S programs, continuing growth, as well as its central role in the life and progress of the field.

In order to combat anti-science attitudes and preserve public funding for research, public education initiatives such as Brain Awareness Week and *BrainFacts.org* would continue to be a high priority. In addition to managing public expectations of what scientific research can provide, SfN was in a prime position to help chapters and individual members to demonstrate the increasing relevance of neuroscience to society. Former President Dennis Choi (1999–2000) observed that as neuroscience has matured, there are "increasing expectations for what neuroscience will do for society, not just in the medical arena, but also in providing meaningful guidance in other arenas, ranging from law to ethics to even art and architecture."[521] Cara Altimus (Trainee Advisory Committee Chair 2016–19) pointed out that neuroscientists are in a position to provide solutions to a number of social and political problems, given that neuroscience:

> *sits in this really unique place, in terms of how the world works, because the brain controls human behavior and so much about why things are the way they are when we think about violence, we think about substance use, we think about the development of children and education, those are huge social topics that all have links back to the brain and neuroscience that almost everyone here is feeding into those discussions without realizing it, without necessarily working on it.*[522]

The BRAIN Advisory Committee had made similar claims for the discipline in 2013: "We are at a unique moment in the history of neuroscience – a moment when technological innovation has created possibilities for discoveries that could, cumulatively, lead to a revolution in our understanding of the brain… Like other great leaps in the history of science – the development of atomic and nuclear physics, the unraveling of the genetic code – this one will change human society forever. Through deepened knowledge of how our brains actually work, we will understand ourselves differently, treat disease more incisively, educate our children more effectively, practice law and governance with greater insight, and develop more understanding of others whose brains have been molded in different circumstances."[523]

INTO THE SECOND HALF-CENTURY

SfN faced multiple challenges as it entered its second 50 years, but could draw on a strong volunteer and professional leadership and a well-earned position of authority and trust. The 50th anniversary celebration, launched at the 49th meeting in Chicago in 2019, was highlighted by the inauguration of Barry Everitt of Cambridge University, the first SfN President based outside North America, and the presentation of extensive new online content, including a special 50th anniversary podcast series celebrating the growth and future of neuroscience. The anniversary activities highlighted the themes of SfN history and vision: global outreach, public education on digital platforms, fostering of scientific progress in cutting-edge fields such as artificial intelligence.

In 2018, SfN Council appointed a five-member working group,[524] chaired by Larry Swanson (President 2012–13) to develop plans for celebrating the Society's 50th anniversary, including activities that honored past achievements, set future directions in motion and incorporated the perspectives of all members, in accordance with four specific goals set by Council.

FIGURE 77. Fei-Fei Li of Stanford University

SfN

The celebration was launched at the 49th Annual Meeting in Chicago, which opened with a Dialogue exploring the intersection of neuroscience and artificial intelligence and the transformative potential of AI for human society by Dr. Fei Fei Li, the co-director of Stanford's Human-Centered AI Institute and the Stanford Vision and Learning Lab. Dr. Li, whose work on computer learning was inspired by research into human vision, is also the co-founder of AI4ALL, an organization promoting inclusion and diversity in the AI field, goals that resonate with those of SfN.[525]

The opening of the first *Neuro Space* exhibit, "created at the intersection of art, science, and technology," was another highlight of the celebration. The exhibit showcased scientists' visions of the neurons, their synapses and pathways, from Ramón y Cajal through John Morrison's high-resolution microscopic imaging. *Neuro Space* was created by a collaboration of artists and neuroscientists, led by Dr. Morrison and Los Angeles-based artist Refik Anadol, and through SfN's partnership with exhibition and installation designer ARTECHOUSE .[526]

Major 50th anniversary activities in 2019 also included the publication of a historical essay, *Celebrating 50 Years of Neuroscience Progress: A History of the Society for Neuroscience, 1969–2019*,[527] and a new Neuronline podcast series in which Society leaders including Mickey Goldberg, Bernice Grafstein, Eve Marder, Bianca Jones Marlin, William Martin, Carla Shatz, and Nick Spitzer presented talks on aspects of SfN history, ranging from the disciplines that formed the new field of neuroscience to global advocacy.[528] To engage its chapters around the world, the 50th anniversary working group developed a Chapter Video Challenge, inviting chapters to create a three-minute video answering the question, "Why is brain science so important?" The entries, submitted in advance of the 2019 meeting, were judged by a panel of high-school students, members of the International Youth Neuroscience Association (IYNA), who had participated in a local Brain Bee within the previous three years.[529]

Had they surveyed the organization in 2020, SfN's founding president, Ed Perl (1926–2014) and the Society's first elected president, Vernon Mountcastle (1918–2015), might well have felt enormously proud of the organization that they helped to create. Rooted in a non-dogmatic, rigorously mechanistic view of neuroscience, SfN had over 50 years clearly articulated to the public why brain science mattered and, just as importantly, made an intellectual home for a new species of scientist, the neuroscientist. SfN's strengths flowed from its intellectually democratic view of neuroscience in which facts and rigorous experimentation ultimately won out over any particular fashion, method, or discipline. In a world becoming ever more complex in the 21st century, the Society for Neuroscience continued to offer the promise of a better understanding of, in Mountcastle's words, "what makes man human."[530]

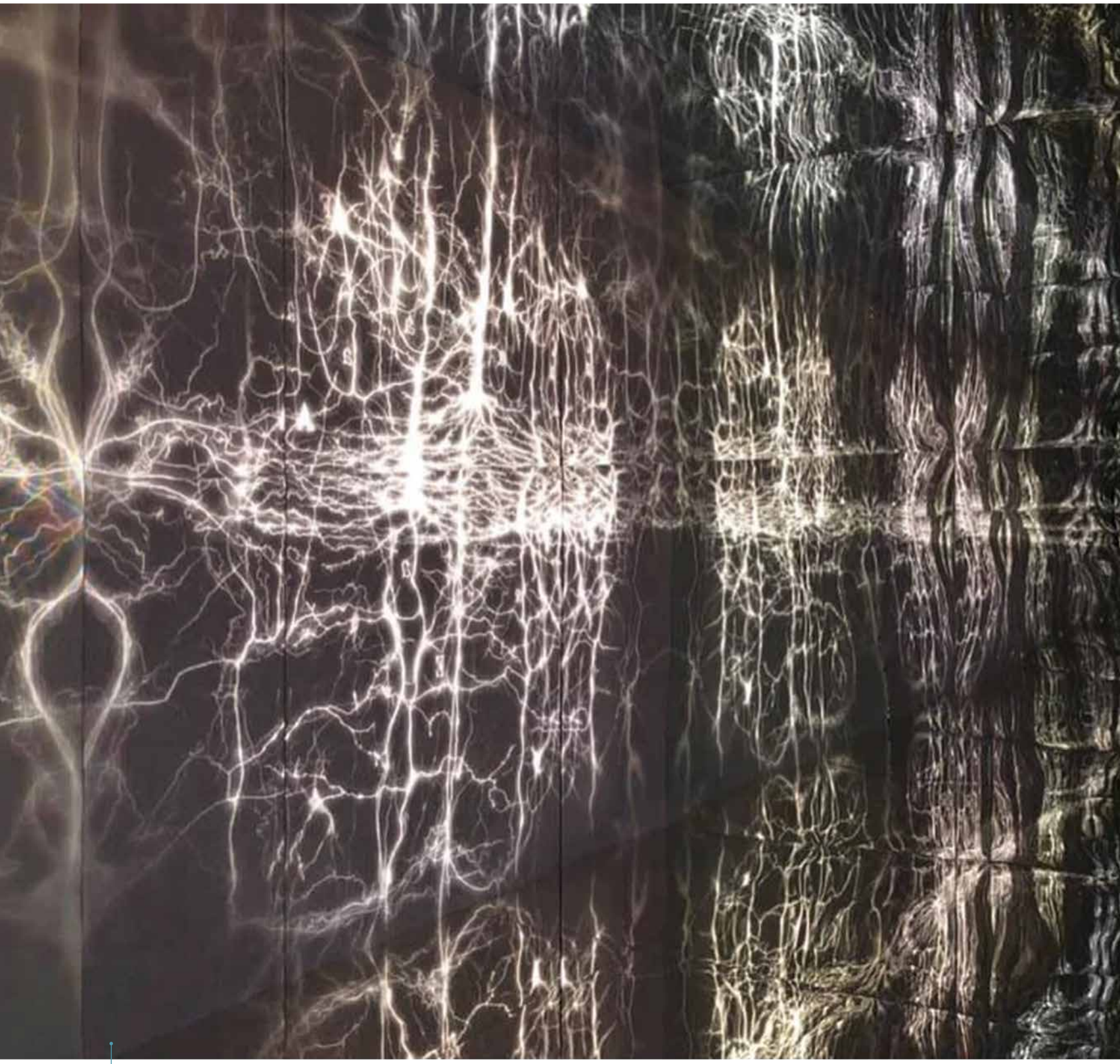
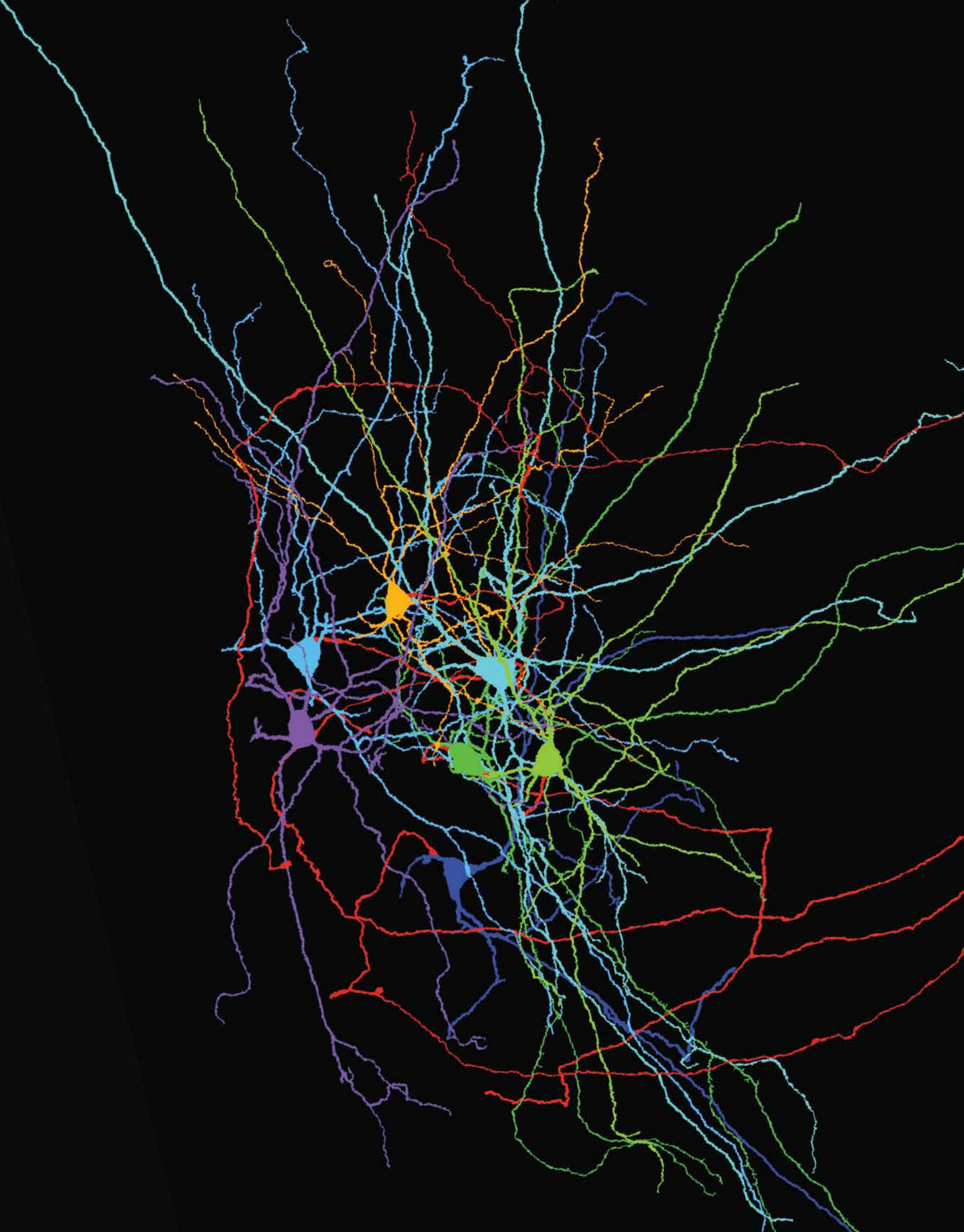
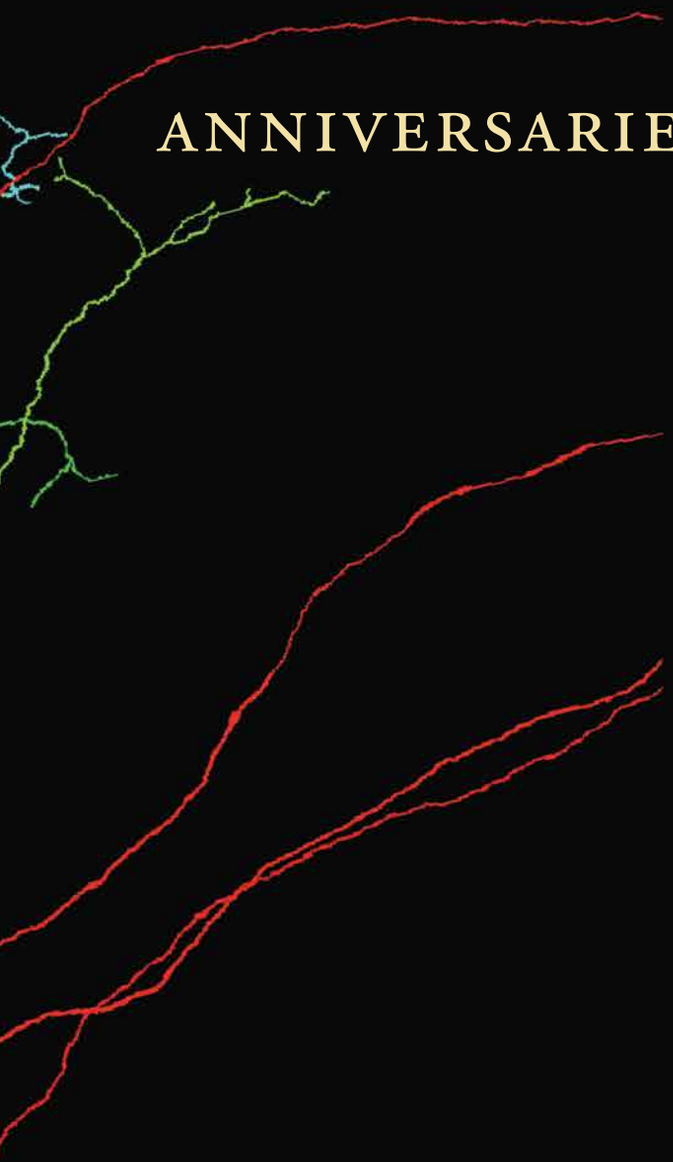


FIGURE 78. A 30-foot high, 3-D walkthrough image of a primate neuron in the *Neuro Space* exhibit, created by the Morrison lab, in partnership with Artechouse, a digital exhibit space.[531]

SfN





ANNIVERSARIES encourage *reflection*.

EPILOGUE

ANNIVERSARIES ENCOURAGE REFLECTION— and this essay has offered the opportunity to look back on the history of the Society with an eye to celebrating what's to come. As Neuroscience 2020 approached and SfN celebrated its 50th year as a Society, events didn't quite follow the original vision. SfN's 50th year, so thoughtfully planned and considered, served as a reminder that you cannot plan for everything. In January 2020, news outlets in the United States first started reporting about a novel coronavirus circulating in China. By March, COVID-19, the disease resulting from that coronavirus, was declared a global pandemic, with hundreds of thousands of cases around the world. Things changed quickly with regards to the Society's day-to-day business. Washington, D.C., where SfN is headquartered, saw cases rising rapidly and began a "stay-at-home" order that lasted for months. SfN staff began working remotely full-time, like most offices worldwide. Meanwhile, labs around the globe shut down in a matter of days, suspending research without a clear picture of how or when things would restart.

A pandemic on the scale of COVID-19 is a once-in-a-generation upheaval that rattled the foundation of cultures worldwide. It also brought into focus the ongoing importance of science. In the words of Barry Everitt, SfN President, in his spring 2020 *Neuroscience Quarterly* letter: "I am reminded in this time of the value of scientific exchange for the world at large." While some researchers left the lab to serve on the front lines, using their specialized training to save lives; still others were called into the all-hands search for a vaccine or medical treatment. Labs donated personal protective equipment to those on the frontlines at hospitals and healthcare facilities—signaling that overall, neuroscientists were leaders in understanding we are all in this together.

The Society continued to think creatively about how to support members and the field. Through upheaval and uncertainty, planning for the future required adaptability and creative thinking, as well as focusing on the core of SfN's mission: advancing scientific exchange, supporting the neuroscience community, educating and engaging the public, and advocating for the field. SfN, like many other organizations, ensured that virtual offerings were front and center, while continuing to build out the infrastructure to support members worldwide without the need to travel. With the global pause to business requiring everyone to freeze in place, SfN was well-positioned to continue to support its global membership with digital programs and content, as well as bringing neuroscience content to the science-interested public through *BrainFacts.org*.

In the vein of large-scale creative thinking, SfN continued to push forward in celebrating the field. Debuting at Neuroscience 2019, the innovative installation *Neuro Space* took visitors through a technology-based evolution of how scientists view neurons as a meditation on the power of art to reflect those structures we have come to find through science—while also illuminating the vastness of what remains unknown. *Neuro Space* was the first collaboration between SfN and ARTECHOUSE—a 21st century innovative art exhibition dedicated to showcasing the work of new media artists and producing cutting-edge art exhibitions that merge art, technology, and science. The *Neuro Space* exhibit brought together a group of scientists led by Dr. John Morrison of the University of California, Davis; and

artists led by Los Angeles-based media designer, artist, and spatial thinker Refik Anadol. Building on the success of *Neuro Space*, ARTECHOUSE and SfN moved forward on the larger-scale *Life of a Neuron* exhibit that will combine a variety of digital resources with an in-person experience to celebrate the power and beauty of neuroscience, along with 50 years of SfN.

In an uncertain world, what is known is that there will always be a need for science, and that is paired with the need to support the work of the neuroscience field. The Society continues to play an important role, guiding the field through periods of rapid growth and investment, alongside displaying calm and steady leadership in times when attention is required to turn to different concerns. With 50 years of facilitating scientific exchange in the rearview mirror, SfN continues to look to what's to come with the optimism that science imbues: while we are far from knowing everything, the important work will continue to understand the brain and nervous system and make the world a better place to live.

Beginning in March 2020 when the near-global COVID-19 lockdown began to reshape our world, Council began been meeting virtually every month. Our focus was to determine the impact of the pandemic on our members and SfN as an organization.

The decision with the greatest impact on members and SfN concerned the fate of the annual meeting. One of the first steps Council took was to delay abstract submission for Neuroscience 2020 from April to July. At that time, it made no sense to ask members to spend time on an abstract they may never get to present. SfN then began a lengthy process of working with the Walter E. Washington Convention Center and Washington, D.C. Mayor's office. The goal was to determine if hosting the annual meeting would be permitted given the public health and travel restrictions in place, let alone feasible. Multiple factors led Council to delay abstract submission again, this time to mid-August. However, in early August it became clear that the in-person meeting could not take place in Washington, D.C., and we announced the cancellation of Neuroscience 2020.

Despite cancellation of the annual meeting, we were able to preserve the 2020 awards program. Award winners were announced and honored October 26–29, 2020.

When it comes to Neuroscience 2021, it was possible to preserve much of the 50th anniversary programming slated for 2020 for Neuroscience 2021 in order to be able to plan an a 50th annual meeting celebration. With vaccines becoming rapidly available across the U.S. and more slowly across the rest of the world, progress in the fight against COVID is being made, although in summer 2021 continuing variants and other developments indicate that the pandemic is far from over. The opportunity to hold Neuroscience 2021 in a hybrid format, with a full virtual meeting taking place prior to what will hopefully be a full in-person meeting, opens the opportunity for this annual meeting to not only be a 50th celebration but also SfN's most inclusive meeting ever. As with many other things, the pandemic has forced change, but there are bright spots to some of these new ways. Whether virtually or in-person, we look forward to neuroscientists from around the world once again gathering to do the work of scientific exchange and to celebrate the ongoing growth and success of the field of neuroscience and SfN.

APPENDIX I: LIST OF SFN PRESIDENTS, 1969–2021

YEARS	PRESIDENT
1969–70	Edward R. Perl, MD (appointed)
1970–71	Vernon Mountcastle, MD
1971–72	Neal E. Miller, PhD
1972–73	Walle J.H. Nauta, MD, PhD
1973–74	Theodore H. Bullock, PhD
1974–75	Edward V. Evarts, MD
1975–76	Robert W. Doty, PhD
1976–77	Floyd E. Bloom, MD
1977–78	W. Maxwell Cowan, MD, PhD
1978–79	Torsten N. Wiesel, MD
1979–80	Solomon H. Snyder, MD
1980–81	Eric R. Kandel, MD
1981–82	David H. Cohen, PhD
1982–83	Dominick P. Purpura, MD
1983–84	Gerald D. Fischbach, MD
1984–85	William D. Willis Jr., MD, PhD

YEARS	PRESIDENT
1985–86	Bernice Grafstein, PhD
1986–87	Mortimer Mishkin, PhD
1987–88	Albert J. Aguayo, MD
1988–89	David H. Hubel, MD
1989–90	Patricia S. Goldman-Rakic, PhD
1990–91	Robert H. Wurtz, PhD
1991–92	Joseph T. Coyle, MD
1992–93	Ira B. Black, MD
1993–94	Larry R. Squire, PhD
1994–95	Carla J. Shatz, PhD
1995–96	Pasko Rakic, MD, PhD
1996–97	Bruce S. McEwen, PhD
1997–98	Lorne M. Mendell, PhD
1998–99	Edward G. Jones, MD
1999–2000	Dennis W. Choi, MD, PhD
2000–01	Donald L. Price, MD
2001–02	Fred H. Gage, PhD
2002–03	Huda Akil, PhD

YEARS	PRESIDENT
2003–04	Anne B. Young, MD, PhD
2004–05	Carol A. Barnes, PhD
2005–06	Stephen F. Heinemann, PhD
2006–07	David C. Van Essen, PhD
2007–08	Eve Marder, PhD
2008–09	Thomas J. Carew, PhD
2009–10	Michael E. Goldberg, MD
2010–11	Susan Amara, PhD
2011–12	Moses Chao, PhD
2012–13	Larry W. Swanson, PhD
2013–14	Carol A. Mason, PhD
2014–15	Steven Hyman, MD
2015–16	Hollis T. Cline, PhD
2016–17	Eric Nestler, MD, PhD
2017–18	Richard Huganir, PhD
2018–19	Diane Lipscombe, PhD
2019–21	Barry Everitt, PhD

APPENDIX II:
LIST OF MEMBERS INTERVIEWED FOR THIS HISTORY PROJECT

SPECIAL THANKS to those who shared their time and memories to contribute to this history.

NAME OF CONTRIBUTOR	INSTITUTION
Huda Akil, PhD	University of Michigan
Thomas Albright, PhD	Salk Institute
Cara M. Altimus, PhD	Milken Institute
Susan Amara, PhD	National Institute of Mental Health
Rita Balice-Gordon, PhD	Muna Therapeutics
Carol A. Barnes, PhD	University of Arizona
Christophe Bernard, PhD	INSERM, Aix-Marseille University
Stephanie Bird, PhD	Independent Consultant, MIT-Retired
Floyd Bloom, MD	Scripps Research Institute
William Cameron, PhD	Oregon Health Sciences University
Patricia Camp, PhD	Rahway School District
Thomas J. Carew, PhD	New York University
Don Caspary, PhD	Southern Illinois University
Alcmene Chalazonitis, PhD	Columbia University
Moses Chao, PhD	New York University
MaryLou Cheal, PhD	Arizona State University
Dennis W. Choi, MD, PhD	Stony Brook University
Eric H. Chudler, PhD	University of Washington
David Cohen, PhD	Columbia University
Suzanne Corkin, PhD	Massachusetts Institute of Technology
Joseph T. Coyle, MD	Harvard University

NAME OF CONTRIBUTOR	INSTITUTION
Jacqueline Crawley, PhD	University of California, Davis
Melissa K. Demetrikopoulos, PhD	Institute for Biomedical Philosophy
Reha S. Erzurumlu, PhD	University of Maryland School of Medicine
Fred Gage, PhD	Salk Institute
Edgar Garcia-Rill, PhD	University of Arkansas
Magda Giordano, PhD	National University of Mexico
Michael E. Goldberg, MD	Columbia University
Bernice Grafstein, PhD	Weill Cornell Medical College
D. Bruce Gray, PhD	Simmons College
Steven Henriksen, PhD	Western University of Health Sciences
Karl Herrup, PhD	University of Pittsburgh
Richard Huganir, PhD	Johns Hopkins University
Steven Hyman, MD	Broad Institute
Louis Irwin, PhD	University of Texas – El Paso
Frances Jensen, MD	University of Pennsylvania
Leslie Sargent Jones, PhD	Appalachian State University
Sofia Jurgensen, PhD	Pareto Frontier, LLC
Eric Kandel, MD	Columbia University
David Kaplan, PhD	University of Toronto
Yevgenia Kozorovitskiy, PhD	Northwestern University
Alexxai Kravitz, PhD	Washington University St. Louis
Larry Kruger, PhD	University of California, Los Angeles

APPENDIX II (continued)

NAME OF CONTRIBUTOR	INSTITUTION
Joseph C. LaManna, PhD	Case Western Reserve University
Irwin Levitan, PhD	Thomas Jefferson University
Diane Lipscombe, PhD	Brown University
Liqun Luo, PhD	Stanford University
Brian MacVicar, PhD	University of British Columbia
Pierre Magistretti, MD, PhD	King Abdullah University of Science and Technology
Robert C. Malenka, MD, PhD	Stanford University
Eve E. Marder, PhD	Brandeis University
Daniel Margoliash, PhD	University of Chicago
William J. Martin, PhD	Janssen Pharmaceutical Companies of Johnson & Johnson
Carol A. Mason, PhD	Columbia University
Kenneth I. Maynard, PhD	Takeda Pharmaceuticals
Bruce S. McEwen, PhD	Rockefeller University
James O. McNamara, MD	Duke University
Lorne Mendell, PhD	Stony Brook University
Lisa Monteggia, PhD	Vanderbilt University
John Morrison, PhD	University of California, Davis
Norbert Myslinski, PhD	University of Maryland, Baltimore
Eric J. Nestler, MD, PhD	Icahn School of Medicine at Mount Sinai
Marina Picciotto, PhD	Yale University
Dominick Purpura, MD	Albert Einstein College of Medicine

NAME OF CONTRIBUTOR	INSTITUTION
Ramesh Raghupathi, PhD	Drexel University
Pasko Rakic, MD, PhD	Yale University
Robert T. Rubin, MD, PhD	University of California, Los Angeles
Michael Selzer, MD, PhD	Temple University
Carla J. Shatz, PhD	Stanford University
Gordon Shepherd, MD, DPhil	Yale University
John Simpson, PhD	New York University
Solomon Snyder, MD	Johns Hopkins University
Nicholas Spitzer, PhD	University of California, San Diego
Larry Squire, PhD	University of California, San Diego
Michael Stryker, PhD	University of California, San Francisco
Abraham Susswein, PhD	Bar-Ilan University
Larry Swanson, PhD	University of Southern California
Anna Taylor, PhD	University of California, Los Angeles
Elisabeth Van Bockstaele, PhD	Drexel University
Howard Wachtel, PhD	University of Colorado, Boulder
Torsten Wiesel, MD	Rockefeller University
Christina L. Williams, PhD	Duke University
Benjamin Wolozin, MD, PhD	Boston University
John Yeomans, PhD	University of Toronto
Hermes H. Yeh, PhD	Dartmouth College

ENDNOTES

Introduction

[1] Ernst von Feuchtersleben, quoted in M. Dominic Beer, M. D. Psychosis: from mental disorder to disease concept. *History of psychiatry* 6, 177–200 (1995), p. 179

[2] Ibid, 168.

[3] Francis O. Schmitt, quoted in Joelle M Abi-Rached and Nikolas Rose. "The Birth of the Neuromolecular Gaze." *History of the human sciences* 23, no. 1 (2010): 11–36. p. 23.

Chapter I: Neuroscience Before Neuroscience, 1945–1969

[4] Recuerdos de mi vida, Vol. 2, Historia de mi labor scientífica. Madrid: Moya, 1917, p. 76. quoted in: http://en.wikipedia.org/wiki/Golgi%27s_method.

[5] Golgi, quoted in López-Muñoz, Francisco, Jesús Boya, and Cecilio Alamo. "Neuron Theory, the Cornerstone of Neuroscience, on the Centenary of the Nobel Prize Award to Santiago Ramón Y Cajal." Brain Research Bulletin 70, no. 4–6 (2006): doi:10.1016/j.brainresbull.2006.07.010, p. 400.

[6] Cajal, quoted in Lopez-Munoz, p. 401.

[7] Judith P. Swazey, "Forging a Neuroscience Community: A Brief History of the Neurosciences Research Program" in Frederic G. Worden, Judith P. Swazey, and George Adelman, eds. *The Neurosciences: Paths of Discovery* Cambridge: MIT Press, 1975, p. 529–546

[8] George Adelman, "The Neurosciences Research Program at MIT and the Beginning of the Modern Field of Neuroscience" *Journal of the History of the Neurosciences: Basic and Clinical Perspectives* 19:1 (2010), 15–23, p. 16.

[9] Adelman, "The NRP," p. 17–19.

[10] Letter from Neal Miller to Louise Marshall, March 17, 1981, Letter to CBS members re: Society for Neuroscience 1981 Folder, Louise H Marshall Papers, Neuroscience History Archives, UCLA.

[11] Adelman, "The NRP," p. 21.

[12] "Evolution of the Axonologists," *NN* 3:2, June 1972, p. 6; Candace Hsieh, "The Founding of the Society for Neuroscience" Unpublished research paper, June 1998, courtesy of Candace Hsieh and Bernice Grafstein.

[13] Karl Frank (1916–1993) was the Section Chief of the Section on Spinal Cord of the NIMH Laboratory of Neurophysiology and one of the first to observe and report presynaptic inhibition.

[14] Novera Herbert Spector, "Comment" *NN* 17:6, December 1986, p. 5. See also "Evolution of the Axonologists."

[15] Robert Doty, "Neuroscience" in *The History of the APS: The First Century, 1887–1987*, American Physiological Society, 1987, pp. 427–434, p. 428; Ed Perl, "Society for Neuroscience – A History of Beginnings" *NN* 17:6, July/August 1986, p. 1, 3–5, p. 3.

[16] Louise H. Marshall, et. al, " Historical Report: Early History of IBRO: The Birth of Organized Neuroscience" *Neuroscience* Volume 72, No. 1, 1996, p. 283–306; Robert Doty, "Neuroscience" in *The History of the APS: The First Century, 1887–1987*, American Physiological Society, 1987, pp. 427-434, p 430; Susan Cozzens, "IBRO in National and International Perspectives" in Marshall, "Early History of IBRO" *Neuroscience* Volume 72, No. 1, 1996, p. 283–306, p. 302.

[17] Louise Henson Marshall (1908–2005) was educated at Vassar and at the University of Chicago, where she received her Ph.D. in physiology in 1935. After some years teaching and raising a family, she joined the wartime Aviation Medicine Unit at NIH, and then conducted renal physiology research for twenty years at the National Institute of Arthritis and Metabolic Disorders, before joining the NAS-NRC staff in 1965. In 1975, she moved to UCLA, where she served as the editor of *Experimental Neurology* and co-founded the Neuroscience History Archives with Horace W. Magoun in 1980, serving as the Archives Director until her death.

[18] G. Krauthamer, "World Survey of Resources and Needs in Brain Research" in Marshall "Early History of IBRO" *Neuroscience* Volume 72, No. 1, 1996, p. 293–298.

[19] Doty, "Neuroscience" p. 430.

[20] Marshall, L H, J A Rivera, and H W Magoun. "The Institutional Base for Education and Research Neuroscience." *Experimental Neurology* 49 (1975): 14–23.

[21] Figures 7, 8 and 9: H W Magoun, "Neuroscience Doctorates in the Sixties." *BioScience* 1972; 22 (8): 457–460. Figure 9 graphic drawn by Ron Clement of the *Los Angeles Times*.

Chapter II: Establishing the Society for Neuroscience, 1968–1970

[22] Minutes, Committee on Brain Sciences No 5, 15–16 June 1967, p. 4. Neuroscience History Archive.

[23] Letter from Sidney Ochs to Ralph W. Gerard, June 7, 1968, Organization of Brain Scientists: 1st meeting 1967–1969 Folder, Louise Marshall Papers, UCLA.

[24] Robert Doty "Dear Colleague" letter, July 1969 Organization of Brain Scientists: 1st Meeting 1967-1969 Folder, Louise Marshall Papers, UCLA; Ed Perl, "Society for Neuroscience — A History of Beginnings" *NN* 17:4, July/August 1986, p.1, 3–5, p, 1.

[25] Doty, "Neuroscience" p. 431.

[26] Perl, "A History," p. 3; Doty, "Neuroscience" p. 431

[27] Letter from Ed Perl to Nancy Beang, May 30, 1995, SfN Archive

[28] Perl, "A History," p. 3.

[29] Perl and Marshall later quibbled over minor details of this description, but their basic recollections are consistent. Letter from Louise Marshall to Stan Mims, March 21, 1995, SfN — Early History — Schatz, Mims 1995 Folder, Louise Marshall Papers, UCLA; Perl, "A History," p. 4 and Letter from Ed Perl to Nancy Beang, May 30, 1995, SfN Archive

[30] Letter from Ralph W Gerard to Sidney Ochs, July 31. 1968, Organization of Brain Scientists: 1st Meeting 1967–1969 Folder, Louise Marshall Papers, UCLA; Perl to Beang letter, May 30, 1995, p. 4; Perl, "A History," p.4

[31] Perl, "A History," p. 4

[32] Hsieh, "The Founding of the Society for Neuroscience" p. 11; Letter from Victor Denenberg to LHM June 12, 1981, Letter to CBS members re: Society for Neuroscience 1981 Folder; Louise Marshall History of Society for Neuroscience Notes October 14, 1984, and LHM's account of NS history/autobiography [on reading the current issue of NS Newsletter] 11/21/94, History of the Society for Neuroscience, 1968–1994 Folder, Louise Marshall Papers, UCLA.

[33] Eliot Stellar to LHM April 3, 1981, Letter to CBS members re: Society for Neuroscience 1981 Folder, Louise Marshall Papers, UCLA.

[34] David Bodian to LHM April 1, 1981, Letter to CBS members re: Society for Neuroscience 1981 Folder, Louise Marshall Papers, UCLA.

[35] First Council Meeting Minutes, October 1969.

[36] Edward R. Perl, in Larry R. Squire, ed., *History of Neuroscience in Autobiography, vol. 3.* Society for Neuroscience, 2001: pp. 399.

[37] First Council Meeting Minutes, October 1969.

[38] See for example, Rena Selya, "Defending Scientific Freedom and Democracy: The Genetics Society of America's Response to Lysenko" *Journal of the History of Biology* 45 (2012): 415–442.

[39] Second Council Meeting Minutes, January 22, 1970. SfN Archives.

[40] Ed Perl, 1986 NN article.

Chapter III: A New Interdisciplinary Approach to the Brain, 1970–1974

[41] Minutes of Second Council Meeting, January 22 1970, p. 1, SfN Archive

[42] Minutes of Third Council Meeting, April 15, 1970, p. 3.

[43] "New Committee on Chapters," *NN* 2:2, June 1971, p. 4; "Chapter Activities" *NN* 2:4, December 1971, p. 4–5.

[44] Society for Neuroscience By-Laws, Article II: Membership, p. 1, June 16, 1969. SfN Archives.

[45] "Taking Stock — An Editorial" *NN* 3:1, March 1972 p. 2; LHM October 14, 1984 handwritten notes for talk in Anaheim – 2nd Draft, History of the Society for Neuroscience, 1968–1994 Folder.

[46] "Membership Committee" *NN* 7:1, March 1976, p. 2, 4.

[47] "Progress Report" *Neuroscience Newsletter* Volume 1 Number 1, April 1970, p. 2.

[48] "Election Results" *Neuroscience Newsletter* Volume 1 Number 1, April 1970, p. 1.

[49] "Council Meeting" *Neuroscience Newsletter* Volume 1 Number 1, April 1970, p. 1

[50] "Progress Report" *Neuroscience Newsletter* Volume 1 Number 1, April 1970, p. 2

[51] Letter from Louise Marshall to David Cohen, February 11, 1977, Society for Neuroscience To File 1977–1993 Folder, UCLA

[52] "Editorial" *Neuroscience Newsletter* Volume 1 Number 1, April 1970, p. 2

[53] "The Logo" *NN* 2:2, June 1971, p. 2.

[54] "The Logo" *Neuroscience Newsletter* Volume 2 Number 3, September 1971, p. 3 and 8.

[55] "The Logo" *Neuroscience Newsletter* Volume 2 Number 4, December 1971, p. 8. The last issue of Volume 14 has a new layout and title banner.

[56] "First Annual Meeting" *Neuroscience Newsletter* Volume 1 Number 3, October 1970, p. 1.

[57] The National Institute of Neurological Diseases and Stroke (NINDS), founded in 1948 as the National Institute of Neurological Diseases and Blindness, was renamed in 1968 when the National Eye Institute became a separate entity. From 1975, it was known as the National Institute of Neurological and Communicative Disorders and Deafness (NINCDS) and then became the National Institute of Neurological Disorders and Stroke (again NINDS) in 1988, when the National Institute of Deafness and other Communicative Disorders was founded.

[58] "First Annual Meeting" *Neuroscience Newsletter* Volume 1 Number 3, October 1970, p. 1.

[59] "Taking Stock: An Editorial." *Neuroscience Newsletter* 3:1, p. 2.

[60] Ibid.

[61] Letter from Maxwell Cowan to Fred Worden, November 15 1971, Early SfN Annual Meetings 1969–1973; 1986 notes folder, Box: SfN early. LHM Papers.

[62] Program, Society for Neuroscience Sixth Annual Meeting, November 7–11, 1976, p. 102.

[63] Interview with Floyd Bloom, May 6, 2014

[64] "Second Annual Meeting" *Neuroscience Newsletter* 3:1, March 1972, p. 1, 3.

[65] "Committees" *NN* 3:2 June 1972, p. 3.

[66] Second Annual Meeting Announcement and Press Release, September 15, 1972, SfN Archives. Preliminary Program, NHA, UCLA

[67] 1229 people were registered at the Second Meeting, compared to 1394 at the first. http://www.sfn.org/Annual-Meeting/Past-and-Future-Annual-Meetings/Annual-Meeting-Attendance-Statistics/AM-Attendance-1970s

[68] "Special Interest Dinners" *NN* 4:3, September 1973, p. 1.

[69] Interview with Floyd Bloom, May 6, 2014.

[70] Programs, Interview with Floyd Bloom, May 6, 2014.

[71] Order Form for Neuroscience Symposia Volume 1, *NN* 7:2, June 1976, p. 7.

[72] "Highlights of the Toronto Council Meetings" *NN* 7:4, December 1976, p. 2.

[73] "1978 Short Course Syllabus: Neuroanatomical Techniques" *NN* 9:4, December 1978, p. 7.

[74] Edward A. Kravitz, "Neurobiology of Disease Workshop" *NN* 12:1, p. 3–4.

[75] "1976 SN Annual Meeting Highlights" *NN* 7:3, p. 1; "SN 1978 Annual Meeting Announcements" *NN* 9:3, September 1978, p. 6.

[76] "Annual Meeting Notes: Placement Service" *NN* 8:3, September 1977, p. 6.

[77] "Society News" *NN* 9:4, December 1978, p. 7–8.

[78] Email exchange with Jack Diamond, January 9 and 13, 2014.

[79] Interview with Carla Shatz, November 5, 2018.

[80] Interview with James McNamara, November 5, 2018; Interview with Michael Goldberg, November 6, 2018.

[81] "Searching the 1989 Neuroscience Abstract Database" *NN* 20:5, September/October 1989, p. 8.

[82] RS interview with Floyd Bloom, May 6, 2014.

[83] See, *NN* 12:5, September 1981, *NN* 13:3, May, 1982, p. 8. 1985?

[84] "Neuroscience Folk Dance Workshop" *NN* 12:3, May 1981, p. 8.

[85] "Neuroscience Folk Dance Workshop" *NN* 13:4, July/August 1982, p. 7.

[86] "Errors in preliminary program" *NN* 13:5, September/October 1982, p. 4.

[87] "Kosher Neuroscience Club" *NN* 21:3, May/June 1990, p. 9; Interview with Abraham Susswein, November 2013.

[88] SfN data.

[89] Constance Holden, "Psychosurgery: Legitimate Therapy or Laundered Lobotomy?" *Science* New Series Volume 179, Number 4078, March 16, 1973, pp. 1109–1112, p. 1110.

[90] Harold M. Schmeck, "Research Backed in Psychosurgery" *The New York Times* November 9, 1973;

[91] "Brain Death and Psychosurgery" and "Draft Position Paper on Psychosurgery" *NN* 4:3, p. 2–3; "Psychosurgery's Torturous Path" *NN* 4:4, December 1973, p. 3; "Psychosurgery Finale" *NN* 5:2, June 1974, p. 6;

[92] Testimony of Robert W. Doty (Society for Neuroscience) in "Use of Psychosurgery in Practice and Research: Report and Recommendations for the Protection of Human Subjects of Biomedical and Behavioral Health" *Federal Register* Vol 42 NO 9 Part III, May 23, 1977, p. 26328

[93] Correspondence between Walle Nauta and Lawrence Kruger, October 31 and November 7 1972, Society for Neuroscience 1972 Folder, Lawrence Kruger gift to UCLA Biomedical Library.

[94] Minutes of the 7th Council Meeting, November 7, 1973, p.1–2

[95] http://www.nih.gov/about/almanac/appropriations/part2.htm. Accessed August 1, 2014.

[96] NN 2:2, p. 2; NN 15:2.

[97] NN 12:3 May 1981 p. 7; Minutes of November 13, 1980 Council Meeting.

[98] Treasurer's Report, *Neuroscience Newsletter* 1:3, October 1970: 3.

[99] Martin Larrabee, *Neuroscience Newsletter* 7:1, March 1976: 3.

[100] Bernice Grafstein, Treasurer's Report, *Neuroscience Newsletter*, 12:2, March 1981: 1.

[101] Treasurer's Report, *Neuroscience Newsletter*, 22:6, November/December 1991:2.

Chapter IV: Disciplinary Consolidation, Mid-1970s to the Early-1980s

[102] Talcott Parsons, "The Professions and Social Structure." In *Essays in Sociological Theory.* New York: Free Press (1954): 34-49; Andrew Abbott, "The Future of Professions." In *Research in the Sociology of Organizations* 8 (1991): 17–42; Ivan Waddington, "The Movement Toward the Professionalization of Medicine." *British Medical Journal* 301 (October 3, 1990): 688–690.

[103] Minutes of August 4, 1972 Education Committee Meeting, Neuroscience and Education 1971–1975 Folder, Louise Marshall Papers, UCLA.

[104] http://report.nih.gov/NIHDatabook/Charts/Default.aspx?showm=Y&chartId=267&catId=21

[105] Louise H. Marshall, "Neuroscientists: Present Status and Future Needs." *NN* 9:1, March 1978, p. 4–5; Louise H. Marshall, "Maturation and Current Status of Neuroscience: Data from the 1976 Inventory of U.S. Neuroscientists" *Experimental Neurology* 64 (1979): 1–32 AND OTHERS

[106] David H. Cohen "Conference on Projecting the Future Needs of Neuroscience" *NN* 9:2, June 1978, p. 3. Agencies represented at the meeting included the National Institute on Aging, National Eye Institute, National Institute of Neurological and Communicative Disorders, National Science Foundation, National Academy of Sciences, American Psychological Association, American Association of Medical Colleges, Veterans Administration, Office of Science and Technology Policy Assessment (White House).

[107] Barry H. Smith and David H. Cohen "Society for Neuroscience Conference: Projecting Future Needs of Neuroscience" *NN* 9:4, December 1978 p. 1, 3.

[108] David H. Cohen, Floyd Bloom, Jack Diamond and Dominick Purpura, "Preliminary Report of the Steering Committee for Long-Range Planning." November 1983: p. 19.

[109] "Preliminary Report of the Steering Committee for Long-Range Planning," p. 2.

[110] "Preliminary Report of the Steering Committee for Long-Range Planning," p. 5.

[111] "Preliminary Report of the Steering Committee for Long-Range Planning," p. 6–8.

[112] "Preliminary Report of the Steering Committee for Long-Range Planning," p. 13.

[113] "Preliminary Report of the Steering Committee for Long-Range Planning," p. 15.

[114] "Preliminary Report of the Steering Committee for Long-Range Planning," p. 14–17.

[115] "Preliminary Report of the Steering Committee for Long-Range Planning," p. 19.

[116] "Preliminary Report of the Steering Committee for Long-Range Planning."

[117] "Preliminary Report of the Steering Committee for Long-Range Planning," p. 2

[118] "Preliminary Report of the Steering Committee for Long-Range Planning", p. 5

[119] "Preliminary Report of the Steering Committee for Long-Range Planning", p. 6.

[120] "Preliminary Report of the Steering Committee for Long-Range Planning", p. 7.

[121] "Preliminary Report of the Steering Committee for Long-Range Planning", p. 8.

[122] "Preliminary Report of the Steering Committee for Long-Range Planning", p. 6.

[123] "Preliminary Report of the Steering Committee for Long-Range Planning," pp. 6–8

[124] "Preliminary Report of the Steering Committee for Long-Range Planning," p. 12–13.

[125] Minutes of Council Meeting, November 13, 1980, pp. 3–4.

[126] "Preliminary Report of the Steering Committee for Long-Range Planning," p. 9.

[127] "Preliminary Report of the Steering Committee for Long-Range Planning," p. 15.

[128] "Preliminary Report of the Steering Committee for Long-Range Planning," pp. 17–18.

[129] "Preliminary Report of the Steering Committee for Long-Range Planning," p. 3.

[130] "Preliminary Report of the Steering Committee for Long-Range Planning," p. 4.

[131] See Margaret W. Rossiter, *Women Scientists in America, Volume 2: Before Affirmative Action, 1940–1972*, Chapter 16 "Path to Liberation" (Baltimore: The Johns Hopkins University Press, 1995).

[132] *Manpower in Basic and Communicative Sciences: Present Status and Future Needs* DHEW Publication No. (NIH) 78–1469, 1977, p. 72–4.

[133] Louise H. Marshall, "Maturation and Current Status of Neuroscience: Data from the 1976 Inventory of U. S. Neuroscientists" *Experimental Neurology* 64 (1979): 1–32, p. 11–2.

[134] Margaret W. Rossiter, *Women Scientists in America, Volume 3: Forging a New World since 1972,* Baltimore: The Johns Hopkins University Press, 2012, p. 13–14.

[135] "Highlights of the Anaheim Council Meetings" *NN* 8:4, December 1977, p. 1.

[136] W. Maxwell Cowan, "Response to ERA Opinion Poll" *NN* 9:2, June 1978, p. 3.

[137] Minutes of 17th Council Meeting, November 5, 1978, p. 3

[138] "Preliminary Report of the Steering Committee for Long-Range Planning" November 1983, p. 8. SfN Archives.

[139] Laurel L. Haak, "Women In Neuroscience (WIN): The First Twenty Years" *Journal of the History of the Neurosciences* 11 (2002): 70–79, p. 70.

[140] In its early days, Women in Neuroscience used the acronym "WIN". "WiN" is the current acronym.

[141] "Women in Neuroscience" *NN* 12:3, May 1981, p. 6.

[142] Nancy Oley, "Women in Neuroscience" *NN* 13:5, September/October 1982, p. 6.

[143] Jennifer Buchwald, "Women in Neuroscience: 1980–1983" *NN* 14:4, July/August 1983, p. 7.

[144] Nancy Oley, "A Profile of Women in the Society for Neuroscience" *NN* 14:1, January/February 1983, p. 4–5, 16.

[145] Michael J. Zigmond and Linda P. Spear, "Neuroscience Training in the USA and Canada: observations and suggestions" *TINS* 15 (1992): 379–383; Marcia Barinaga, "Profile of a Field: Neuroscience" *Science* 255 (March 10, 1992): 1366–7. Dean O. Smith, "Gender Disparity in the Academic Pipeline: Women in Neuroscience" *Synapse* 14(1993):332–4.

[146] Laurel L. Haak, "Women In Neuroscience (WIN): The First Twenty Years" *Journal of the History of the Neurosciences* 11 (2002): 70–79, p. 74.

[147] "Ad Hoc Committee on Women's Issues in Neuroscience" *NN* 22 (July/August1991): 3.

[148] "Early Results of the 1995 Membership Survey" *NN* 27:5, September/October 1996, p. 6.

[149] Laurel L. Haak, "Women in Neuroscience (WIN): The First Twenty Years," *Journal of the History of the Neurosciences* 11 (2002): 70–79, p. 74; SfN Council Minutes October 23, 1999, p. 16–17.

[150] *Manpower in Basic Neurologic and Communicative Sciences,* p. 73; Adolph Y. Wilburn, "Careers in Science and Engineering for Black Americans" *Science* 184 (June 14, 1974): 1148–1154.

[151] Torsten Wiesel, "Neuroscience Programs for Disadvantaged Students" *NN* 10:3, September 1979, p 3, 9. See also Minutes of 19th Council Meeting, April 17, 1979, p. 9–10 and Minutes of 20th Council Meeting, November 2, 1979, p. 6.

[152] "Social Issues Committee" *NN* 10:4, December 1979, p. 4–5.

[153] http://www.sfn.org/~/media/SfN/Documents/Professional%20Development/NSP/NSP_brochure_cover.ashx

[154] William Hodos, "A Profile of the Society for Neuroscience" *NN* 13(6), November/December 1982, p. 1–2.

[156] Willie Pearson, Jr., "The Flow of Black Scientific Talent: Leaks in the Pipeline" *Humboldt Journal of Social Relations* Vol 14 (1/2 Black America in the 1980s) 1987: 44–61.

[157] Zigmond and Spear, "Neuroscience Training" p. 379; Daniel G. Solorzano, "The Doctorate Production and Baccalaureate Origins of African Americans in the Sciences and Engineering" *The Journal of Negro Education*, Vol. 64, No. 1 (Winter, 1995): 15–32.

[158] See for example Minutes of 7th Council Meeting, November 1973, p. 9; 8th Council Meeting, October 20, 1974, p. 9–11;

[159] Minutes of 20th Council Meeting, November 2, 1979, p. 16–17.

[160] "Dr. W.M. Cowan, 70, Scientist with Hughes Medical Institute, Dies," *The New York Times,* July 8, 2002. Accessed May 23, 2014.

[161] "*Journal of Neuroscience* Instructions to Authors," *Neuroscience Newsletter* Volume 11 Number 2, June 1980, p.1, 3.

[162] Dale Purves, "Society Chooses New Publisher for *The Journal of Neuroscience*" *NN* 16:4, July/August 1985, p. 1–2, 6.

[163] "Search for New Editor-In-Chief of *The Journal of Neuroscience" NN* 19:1, January/February 1988, p. 5; William J. Willis, Jr., "W. Maxwell Cowan and *The Journal of Neuroscience*" and "*The Journal of Neuroscience in Transition*" *NN* 19:2, March/April 1988, p. 6–7.

[164] Sidney Ochs to Ralph W. Gerard, June 7, 1968, Organization of Brain Sciences, 1st Meeting, 1967–69 Folder, Marshall Papers, UCLA. Fifth Annual Meeting Publicity Materials, SfN Archive; "Public Information Committee" *NN* 7:1 March 1976, p.4.

[165] "Science Writers' Seminar — Reverberations" *NN* 7:3, September 1976, p. 6.

[166] "SN Science Writers' Seminar – Success" *NN* 7:2, June 1976, p. 4.

[167] Matt Clark, "Drugs and Schizophrenia," *Newsweek*, May 17, 1976; Patrick Young, "Natural Painkiller" *The National Observer* May 15, 1976 (both cited in "Science Writers' Seminar — Reverberations" *NN* 7:3, September 1976, p. 6.); "Pain as a Passion" *Science News* Volume 109, Number 20, May 15, 1976, p. 309–310; "Neuroscience: An Explosive Arena" *Science News* Volume 109, Number 21, May 22, 1976, p. 330

[168] Barry H. Smith, "Seminar for Science Writers" *NN* 12:3, May 1981, p. 6; Barry H. Smith, "1983 Science Writers' Seminar" *NN* 14:3, May/June 1983, p. 4; "New Annual Science Writers' Seminar" *NN* 18:1, January/February 1987, p. 4.

[169] Thomas Woolsey and Marianne Glass Duffy, "Press at the Meeting: Meeting the Press" *NN* 18:1, January/February 1987, p. 1–2.

[170] Lawrence K. Altman, "Doctor's World: Alzheimer's Progress in the Midst of Despair" *The New York Times* November 18, 1986; Deborah M. Barnes, "Neurosciences Advance in Basic and Clinical Realms: A Possible Diagnostic Test for Alzheimer's?" *Science* New Series, Vol 234, December 12, 1986, p. 1324; Interview with Benjamin Wolozin, November 2013.

[171] Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life*, Princeton University Press, 1985; Steven Shapin, *The Social History of Truth: Civility and Science in Seventeenth-Century England*, University of Chicago Press, 1994.

[172] Stephanie J. Bird, "Life and Death Decisions: A Role for Neuroscience?" *NN* 17:5. September/October 1986, p. 6–7, 13; Linda M. Hall and Martin Chalfie, "Social Issues Committee Urges Neuroscientists to Join Campaign to Abolish Torture." *NN* 16:5, September/October 1985, p. 8. Next draft: Transcripts from SfN 2013 interviews.

[173] "SN Protests Action Against Sakharov," *NN* 11:1, March 1980, p.1.

[174] "Cambodian Resolution," *NN* 10:4, p. 2.

[175] Louis Irwin and Key Dismukes, "Animal Welfare: Public Issues and Scientists' Concerns" *NN* 12:6, November 1981, p. 2.

[176] Working at the Institute of Behavioral Research in Silver Spring, Maryland, Taub ligated the sensory afferent ganglia linking the monkeys' arms to their brains and was attempting to train them to use the limbs despite the lack of sensation. PETA member Alex Pacheco had been working undercover at the lab and provided the information leading to the police raid, seizure of the monkeys and charges against Taub. After some ten years in limbo, the Supreme Court rejected PETA's final appeal and the remaining monkeys were sacrificed and dissected. Major cortical remapping was found in their brains; Taub was able to use this data to develop constraint-induced movement therapy in his new research, leading to the rehabilitation of stroke and paralysis victims. See Norman Doidge, *The Brain That Changes Itself* (Viking 2007).

[177] 1984–5 Committee on Animals in Research Report to Council, June 1985, CAR Files, SfN.

[178] Memorandum from William D. Willis to SfN Council, July 30, 1985, CAR Files, SfN Archive.

[179] For examples, see: Testimony of Donald J. Reis, published in Neuroscience Newsletter 17:3, May/June 1986, p. 1, 3–6.

Chapter V: Growth and Advocacy, Mid-1980s to Mid-1990s

[180] "Society Membership Continues to Climb" *NN* 20:5, p.1

[181] Zigmond, Michael J, and Linda P Spear. "Neuroscience Training in the USA and Canada: Observations and Suggestions." *Trends in Neurosciences* 15, no. 10 (1992): 379–383.

[182] William Hodos, "A Profile of the Society for Neuroscience" *NN* 13:6, November/December 1982, p. 1–2.

[183] Eliot Stellar and Alan Epstein, "Open Letter to the Council" *NN* 14:2, March/April 1983, p. 2.

[184] Hasker P. Davis, Carol Elkins and Mark R. Rosenzweig, "The Role of Physiological Psychology in Neuroscience," *NN* 18:1, January/February 1987, p. 6–7.

[185] http://www.nih.gov/about/almanac/appropriations/part2.htm. Accessed August 1, 2014.

[186] Interview with Floyd Bloom, May 6, 2014.

[187] "Federal Support of Neuroscience Research in 1977: Preliminary Results of membership Poll" *NN* 8:2 June 1977, p. 5.

[188] David B. Tower, "Understanding the Nervous System: Man's Last Frontier" *NN* 8:2, June 1977, p. 6–8.

[189] Open letter to SfN Members from Floyd E. Bloom, March 29, 1977, SfN Archive.

[190] "The Funding of Neuroscience Research and Training" *NN* 8:2, June 1977, p. 1.

[191] "Statement of Prepared Testimony by Floyd E. Bloom, M.D. and David H. Cohen, Ph.D. Representing the Society for Neuroscience in Testimony before the Subcommittee on Appropriations for HEW/Labor House of Representatives 95th Congress, 1st Session, April 19, 1977." *NN* 8:2, June 1977, p. 2–6; original in SfN Archive.

[192] "Last Minute News of Success" *NN* 8:2, June 1977, p. 3.

[193] David H. Cohen, "Commentary on Neuroscience Funding Prospects in FY 1979" *NN* 9:1 March 1978, p. 2.

[194] Council Minutes April 1980; November 9, 1980, p. 9.

[195] David H. Cohen, "Neuroscience Research Support for FY 1980" *NN* 10:3 September 1979, p. 1.

[196] Minutes of 27th Council Meeting, October 22, 1981.

[197] David H. Cohen, "All's Well that Ends [Almost] Well," *NN* 14:2, March/April 1983, p. 1; Cohen interview May 22, 2014.

[198] David Cohen, "Government and Public Affairs Committee 1983–4 Report to Council" p. 1, GPA Files, SfN Archives. Susan Sauer was hired in 1985 (see 1985 GPA Report to Council)

[199] David H. Cohen and Joe Dan Coulter, "Governmental and Public Affairs Committee 1982 Report to Council," *NN* 14:4, July/August, 1983, p. 2-5; Government and Public Affairs Committee 1985 report to Council, and Government and Public Affairs Committee 1986 Report to Council, GPA Files, SfN Archive.

[200] David Cohen, "Governmental and Public Affairs 1986 Report to Council"

[201] This was to support both the GPA and the Committee in Animal Research, see discussion below.

[202] Floyd Bloom, "Governmental and Public Affairs Committee 1988 Report to Council" GPA Files, SfN Archives.

[203] Murray Goldstein, "The Decade of the Brain: Opportunities and Challenge" *NN* 21:1, January/February 1990, p. 3.

[204] Dominick Purpura, "Oral Testimony, NINDS, April 25, 1989, Public Witness for NCR and Society for Neuroscience." GPA Files, SfN Archive.

[205] "Society Holds Decade of the Brain Symposium" *NN* Volume 21:3, May/June 1990, p. 1;

[206] Council Minutes April 27, 1995, p 10; Frankie Trull was Vice President for Government Affairs at Capitol Associates, and then started Policy Directions, Inc. *NN* 26:1, January/February 1995, p. 3 and *NN* 26:4, July/August 1995, p. 7.

[207] "Society Expands Outreach Initiatives" *NN* 26:5, September/October 1995, p. 1, 5.

[208] "Purpura Testifies on Neuroscience Appropriations" *NN* 21:3, May/June 1990, p. 4.

[209] Dominick Purpura, "Statement of Dominick P. Purpura, M.D. for the Society for Neuroscience Concerning FY 1992 Appropriations" April 19, 1991, p. 2.

[210] Robert Pear, "Medical Research to Get More Money from Government" *The New York Times* January 3, 1998.

[211] Robert W. Wurtz, "Report from the President" *NN* 22:1 January/February 1991, p. 1.

[212] Minutes of Council Meeting April 15, 1989, p. 6.

[213] Edward Perl, "Society Launches Expanded Program in Public Education" *NN* 20:4, July/August 1989, p. 4.

[214] "Public Education Program Receives Generous Contributions" *NN* 21:2, March/April 1990, p. 5.

[215] "Council Approves Public Education Initiatives" *NN* 21:1, January/February 1990, p. 4

[216] David Friedman "Society for Neuroscience And National Association of Biology Teachers Forge a New Relationship" *NN* 22:2, March/April 1991, p. 1–2; Council Minutes April 17, 1991, p. 2, 4.

[217] Council Minutes April 17, 1991, p. 2–3

[218] "New Events for Education Day in New Orleans" *NN* 22:5, September/October 1991, p. 1; J. G. Collins, "Workshop for Secondary School Students Proved Successful" *NN* 23:2, March/April 1992, p. 1–2.

[219] Council Minutes April 29, 1992, p. 13.

[220] Council Minutes November 13, 1994, p. 6

[221] "SfN Members Reach out to Public during Brain Awareness Week" *NN* 27 (March/April 1996): 1–2.

[222] "Public Forum Draws Standing Room Only Crowd" *NN* 27:1, p. 19.

[223] "SfN Members Reach out to Public during Brain Awareness Week" *NN* 27 (March/April 1996): 1–2; "Brain Awareness Week Meeting Draws Large Attendance" *NN* 28 (January/February 1997): 1, 13.

[224] Council Minutes April 18, 1994, p. 5; April 27, 1995 p. 1.

[225] Interview with Bruce McEwen, November 4, 2018, p. 6; "Celebrating the Success of Brain Awareness Week" *NN* 29 (November/December 1998): 4.

[226] R. Cliff Young, "Society Web Site Gets Facelift," *NN* 27 (November/December 1996):1–2.

[227] Sol Snyder, "What Makes for Prestigious Publishing" *NN* 27 (November/December 1996):5, 11; "Trial Period of Online *Journal* Comes to an End Access Becomes Exclusive Privilege of SFN Members" *NN* 28 (January/February 1997): 3.

[228] Society for Neuroscience, "SfN Membership Growth Graph," *Catalyzing Change in Our Environment: FY2007 Annual Report*, p. 20.

[229] Council Minutes April 18, 1994, p. 5–6; Council Minutes November 17, 1994, p. 7; Israel Hanin, "Committee Prepares Membership Survey" *NN* 26:2, March/April 1995, p. 4.

[230] "Early Results of the 1995 Membership Survey" *NN* 27:5, September/October 1995, p. 2–3, 6.

[231] Marshall, Louise H. "Maturation and Current Status of Neuroscience: Data From the 1976 Inventory of US Neuroscientists." *Experimental neurology* 64, no. 1 (1979): 1–32.

[232] Zigmond, Michael J, and Linda P Spear. "Neuroscience Training in the USA and Canada: Observations and Suggestions." *Trends in Neurosciences* 15, no. 10 (1992): 379–383.

[233] Cohen, David H. "Coming of Age in Neuroscience." *Trends in Neuroscience* (1986): 450–452.

[234] ANDP, established as a separate organization, focused on the development of resources to extend and improve graduate and professional training in neuroscience. As part of its mission, it carried out periodic surveys of program characteristics, faculty, student diversity and financial support. ANDP would merge with SFN in 2009; see Chapter X.

[235] Hearings before a Subcommittee of the Committee on Appropriations, U.S. Senate, 101st Congress, 2nd Session, on H.R. 5257. U.S. Government Printing Office, Washington, D.C. (1991): p. 191.

[236] Julio J. Ramirez and Larry Normansell, "A Decade of FUN: The First Ten Years of the Faculty for Undergraduate Neuroscience," available at funfaculty.org.

[237] "Celebrate 25 Years of Progress at the Annual Meeting" *NN* 26:3, May/June 1995, p. 1. Carla Shatz, "25 Years of Progress and Beyond" *NN* 26:6, November/December 1995, p. 1, 15, 18.

Chapter VI: The Challenges of Reassessment and Change, 1998–2006

[238] "Eve Marder" in Thomas D. Albright and Larry R. Squire, eds, *History of Neuroscience in Autobiography* vol. 10 (2018), 420–455, p. 448.

[239] Interview with Dennis Choi, November 5, 2018.

[240] SfN Council Minutes, October 23, 1999, pp. 20–26;

[241] SfN Council Minutes, October 27, 1999, p. 6, p. 14, and November 4, 2000, p. 13. The consultant hired by the SAC was Steve Carey of Association Marketing and Management Resources.

[242] The Search Committee, consisting of Joseph Coyle, Fred Gage, Don Price, Huda Akil, Patricia Goldman-Rakic, Kristen Harris, Bruce McEwen, Carla Shatz and Sol Snyder, met with and interviewed nine candidates in Boston and four in D.C. SfN Council Minutes, November 10, 2001; SfN Council Minutes April 25, 2002, p. 1–4.

[243] "Search for Society Executive Director Under Way" *NN* 32 (May/June 2001): 1; SfN Council Minutes, November 10, 2001, p. 1; "New Executive Director Joins Society" *NN* 33(January/February 2002): 1.

[244] "First Impressions: An Interview with Marty Saggese," *NN* 33 (March/April 2002):6.

[245] "Society for Neuroscience Reorganizes Structure of Central Office," *NN* 33 (July/August 2002):8. The new divisions were Planning & Membership, Communications & Public Affairs, Finance & Administration, Scientific Programs, and Meeting Services. As of 2012, SfN employed 102 staff in 16 departments under Saggese and five directors.

[246] SfN Council Minutes August 5, 2003, p. 3, item IX; SfN Council Minutes October 22, 2004, p. 1, p. 5. SfN Archive.

[247] This membership category had been in place since 1973, and was primarily made up of pharmaceutical companies. The expansion with Gold and Silver level memberships was reflected in the list of Sustaining Associate Members published in the back of the *Neuroscience Quarterly,* starting with the Summer 2003 issue. A non-profit category was added the next year. See "New Associate Members," *NN* 4 (September 1973), p. 2; Council Meeting Minutes November 7, 1973, p. 5; Fall Council Meeting Minutes November 7, 2003, section VII; "SfN Receives $650,00 from the Eli Lilly and Company Foundation for Award Honoring Julius Axelrod," *NQ* Winter 2007, p. 23.

[248] Fred H. Gage, "Message from the President," *NN* 33 (May/June 2002): 3.

[249] "Membership Survey Results" and "SfN President-Elect Huda Akil Discusses Membership Survey," *NN* 33 (September/October 2002): 3, 6.

[250] "Strategic Plan," SfN Council Minutes November 14, 2001, p. 11-12, SfN Archive; Gage, "Message"; Fred H. Gage, "Strategic Planning Initiative" *NN* 33 (September/October 2002): 1–2.

[251] Gage, "Strategic Planning Initiative," p. 2

[252] Summary based on SfN Council Minutes August 2002, p. 2–6. The current by-laws (http://www.sfn.org/About/What-We-Do/Bylaws) were revised in 2008.

[253] See for example, SfN Council Minutes August 2003, p. 3–5.

[254] "Working Groups will Implement Goals of Strategic Plan" *NQ* Winter 2003: 12–13.

[255] "Committee on Committees Formed," *NQ* Winter 2003:9.

[256] Interview with Thomas Carew, November 3, 2018.

[257] "SfN Council Approves Committee Realignment, Adds Clusters" *NQ* Spring 2006: 5; Interview with Irwin Levitan, November 4, 2018.

[258] See for example, Treasurer's Report, SfN Council Minutes, April 15, 2000, p. 7, SfN Archive.

[259] Treasurer's Report, SfN Council Minutes, November 4, 2000, p. 11–12; Business Meeting Minutes, November 2001, p. 2.

[260] Society Finances Report, SfN Council Minutes, November 10, 2001, p. 7, SfN Archive; "President's Message," *NN* 33 (January-February 2002): 12; See also "Planning Ahead," History of SfN, Chapter 1V, http://www.sfn.org/About/History-of-SfN/1969-1995/Chapter-IV.

[261] SfN Business Meeting Minutes, November 2001, p. 3.

[262] Interview with Marty Saggese, September 18, 2019.

[263] "Society for Neuroscience Reorganizes Structure of Central Office," *Neuroscience Newsletter* July-August 2002: 8; "SfN Council Approves Committee Realignment, Adds Clusters," *Neuroscience Quarterly* Spring 2006: 5.

[264] Interview with Cori Spencer, January 20, 2019.

[265] Reserve figure from SfN Finance Department, February 2020.

[266] "Investing in Global Connections for Scientific Progress," FY2018 Annual Report; "Building for the Future," SfN FY2005 Annual Report.

[267] "Investing in Global Connections for Scientific Progress," FY2018 Annual Report.

[268] Interview with Marty Saggese, September 18, 2019.

[269] "Fall Council Roundup," *Neuroscience Quarterly* Winter 2014: 13.

[270] "Summer Council Roundup," *Neuroscience Quarterly* Fall 2016.

[271] SfN Council Meeting November 6 2002 p. 1.

[272] "SfN to Acquire New Headquarters" *NQ* Fall 2004:1, 4;

[273] "SfN to Acquire New Headquarters" *NQ* Fall 2004:.1, 4; "SfN President-elect addresses building purchase" *NQ* Fall 2004: 4, 15. Several SfN leaders were also involved in the establishment of the Academy of Neuroscience for Architecture at this time as well. http://anfarch.org/about-2/history

[274] "Think Green" SfN brochure.

[275] Interview with Melissa Garcia, January 24, 2019.

[276] Interview with Carol Barnes, November 5, 2018.

[277] "The Cajal Mural" SfN brochure; "SfN Celebrates Opening of its New Headquarters Building in Washington," *NQ* Summer 2006:1,15; "Cajal Mural Dedicated Inside Society's New Office Space," *NQ* Summer 2006: 4,12.

Chapter VII: The Annual Meeting, the "Hub" of SfN, Enters the Digital Age

[278] Interview with Gordon Shepherd, November 3, 2018.

[279] "Christopher Reeve Among Annual Meeting Speakers" *NN* 31 (July/August 2000): 1

[280] Interview with Dennis Choi, November 5, 2018.

[281] "Neuroscience: Making a Difference Every Day," *Neuroscience Newsletter* January-February 2002: 1, 12.

[282] "Neuroscience 2004 Promises Exciting Science and Improved Services; Minisymposia Are Added." *Neuroscience Quarterly* Fall 2004: 12.

[283] Interview with Eve Marder, November 3, 2018.

[284] "Society for Neuroscience Reorganizes Structure of Central Office," *NN* 33 (4) July/August 2002: 8.

[285] Working Groups will Implement Goals of Strategic Plan," *Neuroscience Quarterly* Winter 2003: 12.

[286] Interview with Robert Malenka, November 6, 2018.

[287] Interview with Michael Goldberg, November 6, 2018; "Michael E. Goldberg," in Thomas D. Albright and Larry R. Squire, *History of Neuroscience in Autobiography,* vol. 10, 2018: 304–351.

[288] "Abstracts Volume goes Electronic Only" *NN* 33 (January/February 2002): 2

[289] "New in 2009: Nanosymposia, Networking, Public Outreach," *Neuroscience Quarterly* Summer 2009: 12;

[290] "SfN Adjusts Themes and Topics for Future Annual Meetings," *NQ* Fall 2015

[291] "SfN Adjusts Themes and Topics,"

[292] "SfN Adjusts Themes and Topics"

[293] Interview with Liqun Luo, November 6, 2018.

[294] Interview with Liqun Luo, November 6, 2018.

[295] "Annual Meeting Survey Uncovers New Opportunities," *Neuroscience Quarterly* Fall 2012: 3.

[296] "Annual Meeting Preview: Optimize Your Time at Neuroscience 2014," *Neuroscience Quarterly* Fall 2014: 1, 10–11.

[297] Interview with Christophe Bernard, November 6, 2018.

[298] Interview with Paula Kara, January 10, 2019.

[299] Interview with Nick Spitzer, November 5, 2018; Interview with Huda Akil, November 7, 2018.

[300] Interview with Marina Picciotto, November 4, 2018.

[301] "Fall Council Roundup," *Neuroscience Quarterly* Winter 2013: 3.

[302] Interview with Lisa Monteggia, November 6, 2018; Interview with Larry Swanson, December 13, 2018.

[303] "Spring Council Roundup," *Neuroscience Quarterly* Summer 2018.

[304] "Fall Council Roundup," and "Changes to SfN Ethics Policy and Code of Conduct Aim to Support Scientific Dialogue and Foster Welcoming Community," *Neuroscience Quarterly* Winter 2019.

Chapter VIII: Many Audiences: Publications and Education

[305] Interview with Joseph Coyle, November 5, 2018.

[306] Interview with Gordon Shepherd, November 3, 2018.

[307] Interview with Larry Squire, November 6, 2018.

[308] Interview with Carla Shatz, November 5, 2018.

[309] Solomon Snyder, "What Makes for Prestigious Publishing?" *NN* 27 (November/December 1996): 6, 11.

[310] "Trial Period of Online *Journal* Comes to an End Access Becomes Exclusive Privilege of SFN Members" *NN* 28 (January/February 1997): 3; "*The Journal of Neuroscience* Online Boasts New Features" *NN* 28 (September/October 1997):8

[311] "New Online Only Section of *Journal* Will Provide Fast-Track Venue for Short Articles" *NN* 29 (July/August 1998): 1, 6.

[312] "Free Color for Members" *NN* 33 (March/April 2002): 8; "Changes at *The Journal of Neuroscience*" *NQ* Winter 2004: 17.

[313] "*The Journal* Increases Access to Articles; Raises Fees for Submission, Publishing" *NQ* Winter 2006: 1.

[314] "Results of Member Survey Indicate Comfort With Open Access, Online Publishing; 92 Percent Read Electronically" *NQ* Fall 2006: 10.

[315] "Q&A: John Maunsell, Editor-In-Chief, *The Journal of Neuroscience*" *NQ*, Fall 2008: 1, 6.

[316] "Q&A: Maunsell," p. 6.

[317] "*The Journal* Implements License to Publish" *NQ* Winter 2010: 15.

[318] Peggy Mason, "New Committee Addresses Rise in Ethics Complaints" *NQ* Summer 2013: 5, 10.

[319] Peggy Mason, "SfN Ethics Committee: The Role of Intent" *NQ* Winter 2014: 1, 11, p. 11.

[320] Mason, "Ethics Complaints" p.10

[321] Mason, "Intent" p. 11.

[322] Minutes, Spring 2017 Council Meeting, p. 16.

[323] "Q&A: Editor-in-Chief Shares Vision for The *Journal of Neuroscience*." *NQ* Spring 2015

[324] Interview with Marina Picciotto, November 4, 2018.

[325] "SfN Journals Grow to Advance the Field," *NQ* Winter 2017

[326] Christophe Bernard, "*eNeuro,* SfN's New Open-Access Journal: Excellence *and* Innovation" *NQ* Summer 2014: 10–11.

[327] Christophe Bernard, "Q&A: *eNeuro*: An Innovative, Open-Access Publishing Venue for Excellent Science." *NQ* Fall 2014: 4–5.

[328] Interview with Christophe Bernard, November 6, 2018.

[329] "*eNeuro* Starts Strong" *NQ* Winter 2016

[330] "*eNeuro* Promotes Scientific Rigor with Commentary Series" *NQ* Summer 2016

[331] "SfN Journals Lift the Curtain on Peer Review" *NQ* Winter 2018.

[332] "SfN Journals Training the Next Generation of Reviewers" *NQ* Winter 2019.

[333] Interview with Marina Picciotto, November 4, 2018.

[334] "Journals Lift the Curtain"

[335] "SfN Journals: Scientist-Run, Society-Owned" *NQ* Summer 2019.

[336] Interview with Huda Akil, November 7, 2018; Huda Akil, "Message from the President: Neuroscience Databases: What We Have, What We Need, How We Might Get There." *NQ* Fall 2003: 1–4, 19.

[337] "New Neuroscience Database Gateway Underway" *NQ* Spring 2004: 7.

[338] "*BrainFacts.org* Launches as an Authoritative Source for Public Outreach" *NQ* Summer 2012: 1, 8–9.

[339] "SfN Awarded $1.3 Million to Create *BrainFacts.org*" *NQ* Spring 2011: 1, 12.

[340] "*BrainFacts.org* Editorial Board Members Named" *NQ* Winter 2012: 11.

[341] Interview with Nick Spitzer, November 5, 2018.

[342] "*BrainFacts.org* Launches" p. 9.

[343] Interview with Nick Spitzer, November 5, 2018.

[344] Interview with John Morrison, November 5, 2018.

[345] Interview with John Morrison, November 5, 2018.

[346] "Q&A: BrainFacts.org Editor Discusses Public Outreach Efforts" *NQ* Fall 2015.

[347] "Q&A with BrainFacts.org Incoming Editor-In-Chief Richard Wingate" *NQ* Winter 2019.

[348] "Q&A: BrainFacts.org Editor Highlights Revamped Website" *NQ* Winter 2018.

[349] Interview with Eric Chudler, November 4, 2018.

[350] https://thebrainbee.org/about/#history; See also interview with Norbert Myslinski, November 2013.

[351] "Educating and Engaging the Public," in *Investing in Global Connections for Scientific Progress:* FY 2018 Annual Report; and materials on the IBB website https://thebrainbee.org/about/#history, https://thebrainbee.org/news/#launch-of-ibb-organization

[352] First prize winner Piotr Oleksy, 18, from Poland; second prize winner Giovanni De Gannes, 14, Grenada; and third-prize winner Huai-Ying Huang, 17, Canada.

[353] Interview with Eric Chudler, November 4, 2018.

[354] "Brain Awareness Week Meeting"; "Brain Awareness Week" *NN* May/June 2002 p. 7

[355] "Educating and Engaging the Public," in *Investing in Global Scientific Venues:* FY 2015 Annual Report p. 12.

[356] "SfN Education Summit Advances Collaboration Between Educators and Scientists," *Neuroscience Quarterly*, Fall 2009, page 8.

[357] Interview with Thomas Carew, November 3, 2018.

[358] "Record Attendance at Neuroscience 2005 in Washington, D.C." *Neuroscience Quarterly* Winter 2006: 5.

[359] Interview with Paula Kara, January 10, 2019.

[360] Interview with Carol Barnes, November 5, 2018.

[361] Interview with Eve Marder, November 3, 2018; Interview with Michael Goldberg, November 6, 2018; Interview with William Martin, November 5, 2018.

[362] Interview with Thomas Carew, November 3, 2018.

Chapter IX: Government and Public Advocacy: Not "Just a One-Day Affair"

[363] Interview with Nick Spitzer, November 5, 2018.

[364] Interview with Nick Spitzer, November 5, 2018.

[365] "NSF Launches First Neuroscience Program" *NN* 32 (Sept–Oct 2001): 14; "Government Affairs Update" *NN* 33 (May-June 2002): 10.

[366] Interview with John Morrison, November 5, 2018.

[367] "White House Conference Melds Neuroscience and Public Policy" *NN* 28 (July–Aug 1997): 1–2.

[368] "Society Brings Together Advocacy Groups and Members at Annual Meeting" *NN* 28 (Jan–Feb 1997): 5.

[369] Interview with Joseph Coyle, November 5, 2018.

[370] "Society Event 'Neuroscience 2000' Captures Attention of Policymakers, Public and Press; Helps Forge New Alliances." *Neuroscience Newsletter* 30 (May/June 1999): 1, 3, 28.

[371] "Government Affairs Update." *NN* 33 (May–June 2002): 11.

[372] "Experts Focus on Science Advocacy at Neuroscience 2002." *NQ* Winter 2003: 1–3.

[373] "American Brain Coalition Launches in San Francisco" *NQ* Summer 2004: 1. The ABC was originally founded by the American Academy of Neurology as the One Voice Neurological Coalition in 2001.

[374] "Latest Animal Rights Strategy: Animals as Persons," *NQ* Spring 2003: 1–2.

[375] "New Crisis Management Guidelines Will Help Members Deal with Animal Rights Activists." *NQ* Summer 2003: 13.

[376] Interview with John Morrison, November 5, 2018.

[377] "SfN Identifies Translational Animal Research Accomplishments," *NQ* Fall 2003: 11.

[378] "SfN Releases *Translational Neuroscience Accomplishments* in Wallet Card Form." *NQ* Summer 2004: 9; Interview with John Morrison, November 5, 2018.

[379] "Forum Addresses the Use of Simple, Positive Message to Teachers About Animals in Research," *NQ* Summer 2005: 5.

[380] "SfN Charts New Approaches to Combat Attacks by Animal Rights Activists," *NQ* Winter 2007: 1, 5–6.

[381] "New SfN Document to Help Universities Protect Researchers," *NQ* Spring 2008: 1, 12, p.1.

[382] "New Approaches," p. 6

[383] "New Approaches," p. 5

[384] "New SfN Document"

[385] "SfN Partners with Research Organizations to Provide FOIA Guidance," *NQ* Spring 2010: 1, 13.

[386] "Patient Groups Highlight Need For Animal Research," *NQ* Spring 2014: 9.

[387] "SfN Illustrates Importance of Nonhuman Primate Research at NIH Workshop," *NQ* Fall 2016.

[388] "SfN Supports Scientists Conducting Animal Research," *NQ* Spring 2016.

[389] "2005 Funding Levels for NIH, NSF, and VA Do Not Keep Pace With Biomedical Research Inflation," *Neuroscience Quarterly* Winter 2005: 5.

[390] "Message from the President: 'A Call to Arms' for Federal Biomedical Research Funding," *NQ* Winter 2004: 1–3.

[391] "President's FY 2005 Budget Squeezes NIH, NSF, and VA," "Talking Points for Advocating for Biomedical Research," "*Brain Research Success Stories* Debut," *NQ* Spring 2004: 1, 6–9, 12.

[392] "Expert on Stem Cells Outlines Implications of California's Stem Cell Initiative," "NIH Blueprint for Neuroscience Research Emphasizes Sharing of Resources and Expertise Across Institutes," *NQ* Winter 2005: 4, 6.

[393] "An Interview with G. Steven Burrill of the Campaign for Medical Research," *NQ* Fall 2007: 1, 5.

[394] "SfN Council Adopts New Strategic Plan to Renew Focus on Changing Needs, Ensuring to Serve Members Better," *NQ* Spring 2006: 4.

[395] "SfN Supports New White Paper Calling for Sustained, Increased Federal Support for Biomedical Research," *NQ* Summer 2007: 6.

[396] "Society Explores Changing Membership," *NQ* Winter 2008: 4, 16.

[397] "Advocacy: Engaging Members and Industry," *NQ* Fall 2008: 7.

[398] Interview with Nick Spitzer, November 5, 2018.

[399] "SfN Members Advocate for Increased Science Research," *NQ* Spring 2014: 8.

[400] "SfN Advocacy Supports Visionary Science Funding in U.S. Stimulus Bill," *NQ* Spring 2009: 1, 6–7.

[401] "Council Roundup: Spring 2010 Meeting," *NQ* Summer 2010: 5; "Council Roundup: Spring 2011 Meeting," *NQ* Summer 2011: 13.

[402] "Engaging Legislators in the Lab" *NQ* Summer 2010: 8.

[403] "Advocacy Update," *NQ* Summer 2011: 9.

[404] "Lawmakers Support Neuroscience on Capitol Hill," *NQ* Winter 2016.

[405] "Q&A: Exploring the White House Neuroscience Initiative," *NQ* Fall 2012: 4–5.

[406] Story C. Landis and Thomas R. Insel, "The NIH BRAIN Initiative," *NQ* Summer 2013: 1, 13.

[407] "About the Brain Initiative," https://Kavlifoundation.org/about-brain-initiative.

[408] "Message from the President: The Promise of BRAIN," *NQ* Summer 2015.

[409] Ibid.

[410] "Message from the President: Becoming a Science Advocate," *NQ* Winter 2015: 1–2.

[411] "Message from SfN President Hollis Cline: Basic Science in the Pipeline," *NQ* Winter 2016.

[412] "Get Inspired to Advocate by SfN's Early Career Policy Ambassadors," *NQ* Fall 2016.

[413] "Policy and Advocacy Careers: Making Change at a Large Scale," *NQ* Fall 2015.

[414] Interview with Ramesh Raghupathi, November 4, 2018.

[415] "Message from President Eric Nestler: Strengthen Your Focus on Advocacy," *NQ* Winter 2017. For more on global advocacy, see Section 7.

[416] "SfN Expands Advocacy Efforts to Amplify Need for Funding," *NQ* Spring 2017; https://www.sfn.org/marchforscience

[417] "Policy Makers Connect with Researchers at Neuroscience 2017," *NQ* Winter 2018.

[418] "Spring Council Roundup," *NQ* Summer 2019.

Chapter X: Meeting the Needs of an Increasingly Diverse Scientific Community

[419] Interview with William Martin, November 5, 2018.

[420] "SfN Council Adopts New Strategic Plan to Renew Focus on Changing Needs, Ensuring to Serve Members Better," *NQ* Spring 2006:4; "SfN Council Approves Committee Realignment, Adds Clusters," *NQ* Spring 2006:5.

[421] Interview with Eric Nestler, November 3, 2018.

[422] Until 2009 ANDP was a separate but related organization with its own leadership structure and legal charter.

[423] Executive Summary of Report of Neuroscience Departments & Programs Survey Academic Year 2016–2017, p. 3 http://www.sfn.org/Careers/Higher-Education-and-Training/Neuroscience-Training-Program-Survey

[424] Lesly Huffman, Robert E. Fellows, and Ronald I. Schoenfeld, "The1998 ANDP Survey of Neuroscience Graduate, Postdoctoral, and Undergraduate Programs" p. 10 http://www.sfn.org/Careers/Higher-Education-and-Training/Neuroscience-Training-Program-Survey

[425]National Science Foundation, National Center for Science and Engineering Statistics. *Women, Minorities, and Persons with Disabilities in Science and Engineering: 2019.* Special Report NSF 19–304. Alexandria, VA. Available at https://www.nsf.gov/statistics/wmpd.

[426]Francis S. Collins, "Time to End the Manel Tradition," June 12, 2019 https://www.nih.gov/about-nih/who-we-are/nih-director/statements/time-end-manel-tradition; "New Diversity Guidelines for Meetings and Conferences" *NQ* May/June 2002: 15; Interview with Moses Chao, December 19, 2018.

[427]Virginia Valian, "Invite Women to Talk," *Nature* 495 (March 7, 2013): 36.

[428]"Council Acts on Education and Advocacy Initiatives, Diversity Guidelines and More at Neuroscience 2004," *NQ* Winter 2005: 14–15; http://www.sfn.org/Meetings/Meeting-Policies-and-Guidelines/Guidelines-for-Participating-in-SfN-Events

[429]Interview with Eve Marder, November 3, 2018.

[430]"New Committee Promotes Women in Neuroscience," *NQ* Spring 2005: 12.

[431]Council Minutes August 5 2004, p. 5–6.

[432]"SfN Professional Development and Higher Education: Evolving to Meet Changing Member Needs," *NQ* Summer 2009:1,10–1

[433]Moses Chao, "Gender Inequality: Biases and Challenges," *NQ* Summer 2012: 2–3, p. 2

[434]"SfN Promotes Equity and Diversity in Academia" *NQ* Summer 2010: 12–13.

[435]Jennifer Raymond, "Most of Us Are Biased," *Nature* 495 (March 7, 2013): 33–34.

[436]Chao, "Gender Inequality: Biases and Challenges," p. 2–3.

[437]"IWiN Working to Advance Women in Neuroscience," *NQ* Summer 2013: 11; "SfN Creates Toolkit to Address Gender Gap in Science," *NQ* Fall 2015.

[438]Marian Joëls and Carol Mason, "A Tale of Two Sexes," *Neuron* 82 (18 Jun 2014): 1196–1199.

[439]The topic was first discussed in the Spring 2003 Council meeting but insurance issues prevented offering onsite childcare for several more years.

[440]"Fall Council Roundup," *NQ* Winter 2019.

[441]Carol Mason, "Message from the President: Women in Neuroscience: A Call to Action" *NQ* Spring 2014: 1–2

[442]Interview with Joseph Coyle, November 5, 2019.

[443]"1997 Minority Conference Fellows Usher in Expanded Program" *NN* 29 (January/February 1998): 17.

[444]"Society Offers New Training Fellowship for Minority Neuroscientists," *NN* 31 (July/August 2000): 13; "Society Maintains Long-Standing Commitment to Advancing Minority Representation," *NN* 32 (September/October 2001): 11.

[445]SfN Council Minutes November 12, 2005; SfN Strategic Planning Meeting Minutes July 27–28, 2005; "SfN Council Approves Committee Realignment, Adds Clusters" *NQ* Spring 2006: 5. As described in the section on Women in Neuroscience, in 2009 C-WIN and C-DIN became subcommittees (WINS and DINS) of the Professional Development Committee in the Professional Development and Training Cluster.

[446]"30 Years of Advancing Diversity in Science" http://www.sfn.org/Initiatives/Diversity-Programs/Neuroscience-Scholars-Program; "Neuroscience Scholars Program Broadens Reach" *NQ* Summer 2015

[447]"Message from SfN President Eric Nestler: 'Affirmative Attention' to Increase Diversity" *NQ* Spring 2017; "SfN, NIH Experts Discuss How Diversity Advances the Field," *NQ* Summer 2017.

[448]"Neuroscience Scholars Program Broadens Reach" *NQ* Summer 2015; "Presidential Award Recognizes Value of Neuroscience Scholars Program" *NQ* Fall 2018.

[449]Interview with Ramesh Raghupathi, November 4, 2018.

[450]Ramirez and Normansell, "A Decade of FUN"; Jean C. Hardwick, Michael Kerschner, Barbara Lom, Julio J. Ramirez, and Eric P. Wiertelak, "From Faculty for Undergraduate Neuroscience: Encouraging Innovation in Undergraduate Neuroscience Education by Supporting Student Research and Faculty Development," *CBE — Life Sciences Education* 5 (Summer 2006): 86–90.

[451]"Society Membership Growth Invigorated by New Measures" *NQ* Summer 2003: 9.

[452]Stricker, Edward M. "2009 Survey of Neuroscience Graduate, Postdoctoral, & Undergraduate Programs." In *2009 Survey Report FINAL.pdf.* The 2009 merger with SfN came at the ANDP's request and was a key component to implementing the Council's adoption of a new Higher Education Strategy in the Strategic Plan. By 2019, CNDP had become the Neuroscience Departments and Programs Subcommittee under the Neuroscience Training Committee, part of the Higher Education and Training Cluster. See "SfN Professional Development and Higher Education: Evolving to Meet Changing Member Needs," NQ Summer 2009: 1, 10–11 for the details of the initial transition into the SfN committee structure.

[453]"Council Round-Up: Fall 2009 Meeting," *NQ* Winter 2010:4; http://www.sfn.org/Membership/Member-Benefits/Institutional-Program-Member-Benefits

[454]"New! Graduate School Fair" *NQ* Winter 2013: 11; http://www.sfn.org/Careers/Higher-Education-and-Training/Grad-School-Fair

[455]"SfN's Online Presence: Building Value, Making Connections," *NQ* Spring 2011: 1, 8–9.

[456]"Organizational and Financial Highlights" FY 2013 Annual Report, *Creating Value in Challenging Times,* p. 19; "Q&A: Spotlight on Donors and the Friends of SfN Fund," *NQ* Fall 2017.

[457]Summer 2012 Council Minutes, p. 4; "Council Roundup: Spring 2013 Meeting" *NQ* Summer 2013: 4.

[458]Interview with Cara Altimus, November 7, 2018.

[459]"Exploring the Changing Needs of SfN Members," *NQ* Fall 2016.

[460]"SfN Journals: Training the Next Generation of Reviewers" *NQ* Winter 2019.

[461]Chao, "Gender Inequality: Biases and Challenges," p. 3.

[462]"Spring Council Roundup: Sustaining Global Partnerships" *NQ* Summer 2019. See also http://www.alba.network/activities.

Chapter XI: Nurturing a Global Society

[463]Eve Marder, "Message from the President: Seeking Synergy Between Local and Global Scientific Cultures," *NQ* Winter 2008: 1–3, p. 3.

[464]See "BAW 1999: An International Campaign," *NN* 30 (May/June 1999): 6, for example.

[465]"*BrainFacts.org* Celebrates Its First Anniversary," *NQ* Summer 2013: 12; "Educating and Engaging The Public," *Creating Value in Challenging Times:* FY2013 Annual Report, p. 13; "Educating and Engaging the Public," *nvesting in Global Connections for Scientific Progress* FY2018 Annual Report.

[466]https://thebrainbee.org/about/#history

[467]"New Diplomatic Efforts Support a Growing International Membership" *NQ* Fall 2010: 1, 8

[468]"A Global Perspective: SfN Surveys Non-U.S. Members," *NQ* Spring 2011:10–11, p.10; international membership peaked at 38% in 2010. More recent figures courtesy of SfN Operations.

[469]Interview with Steve Hyman, November 4, 2018.

[470]"Joint Committee to Represent SFN and National Academy on International Affairs," *NN* 31 (July/August 2000):1, 17; "International Affairs Committee Launches Equipment Exchange and other Initiatives," *NN* 32 (September/October 2001):23.

[471]SfN Fall Council Minutes, November 17, 2010, p. 7.

[472]"Message from the President: International Collaborations Can Strengthen Neuroscience," *NQ* Winter 2005:1–3; "New Strategic Plan," p. 4; "Council Roundup Summer Meeting" *NQ* Fall 2014:1, 9.

[473]"Society Membership Growth Invigorated by New Measures" *NQ* Summer 2003:9.

[474]Interview with Carol Barnes, November 5, 2018.

[475]"Fall 2008 Council Roundup," *NQ* Winter 2009:3; "A Global Perspective: SfN Surveys Non-US Members," *NQ* Spring 2011: 10–11; "Council Roundup: Spring 2014 Meeting," *NQ* Summer 2014:13.

[476]"Society Explores Changing Membership" *NQ* Winter 2008: 4.

[477]"Council Roundup," *NQ* Fall 2010: 1, 14–15.

[478] "A Global Perspective: SfN Surveys Non-US Members," *NQ* Spring 2011:10–11; "Exploring the Changing Needs of SfN Members" *NQ* Fall 2016.

[479] "A Global Perspective: SfN Surveys Non-US Members," *NQ* Spring 2011:10–11

[480] "Council Roundup" *NQ* Summer 2012: 12; "Council Roundup: Summer 2014 Meeting," *NQ* Fall 2014:1, 9.

[481] Interview with Brian MacVicar, November 5, 2018; "Message from the President: Seeking Synergy Between Local and Global Scientific Cultures," *NQ* Winter 2008:1–3; "Message from the President: Serving Members Worldwide, Forging Global Partnerships," *NQ* Fall 2011:1–2, "Message from the President: The Importance of Global Advocacy and Communication to Ensure the Long-Term Strength of Neuroscience," *NQ* Spring 2013:2–3; "European Advocacy Grants Program Announces First Recipients," *NQ* Winter 2012:1,8; "Global Collaboration Bolsters Support for Research," *NQ* Summer 2017.

[482] "Message from the President: International Collaborations," p. 3.

[483] Interview with Brian MacVicar, November 5, 2018.

[484] "Q&A: Brain Canada and Canadian Neuroscience Funding," *NQ* Spring 2016.

[485] "Advocacy Investment Achieves Billions for Canadian Research and Development," *NQ* Summer 2018.

[486] "European Advocacy Grants," p. 8.

[487] "FENS and SfN Announce 2013 Advocacy Grant Recipients," *NQ* Winter 2013:1, 9, p. 9.

[488] "Message from the President: Becoming a Science Advocate," p.2.

[489] Interview with Pierre Magistretti, November 6, 2018.

[490] Susan Amara, "Serving Members Worldwide, Forging Global Partnerships," *NQ* Fall 2011:1–2; "SfN's Global Collaboration on Responsible Scientific Communication," *NQ* Fall 2011: 8, 14–15.

[491] Interview with Brian MacVicar, November 5, 2018; Interview with Magda Giordano, November 7, 2018; Interview with Pierre Magistretti, November 6, 2018.

[492] "First Class Completes Miledi Training Course," *NQ* Spring 2005:13; http://www.sfn.org/Initiatives/Diversity-Programs/Latin-American-Training-Program

[493] "New International Partnership Expands European Training Program" *NQ* Fall 2009:6; "International Exchange Program Benefits Japanese, North American Trainees" *NQ* Winter 2014:12.

[494] Interview with Reha Erzurumulu, November 4, 2018.

[495] "Council Roundup: Summer 2014 Meeting" "Summer Council Roundup" *NQ* Fall 2015.

[496] Interview with Eric Nestler, November 3, 2018.

[497] "Neuroscience 2019: A Melting Pot for New Scientific Discoveries" *NQ* Spring 2019 and http://www.sfn.org/Meetings/Neuroscience-2019/Abstracts/Science-Knows-No-Borders

[498] "Multisociety Letter on Foreign Influence" September 4, 2019, https://www.aaas.org/sites/default/files/2019-09/Multisociety%20Letter%20on%20Foreign%20Influence_9-4-2019.pdf

Chapter XII: SfN at 50 Years: Focus on the Future

[499] Interview with Eric Nestler, November 3, 2018.

[500] Interview with Nick Spitzer November 5, 2018.

[501] Interview with Fred Gage December 20, 2018.

[502] Interview with Marty Saggese, September 18, 2019.

[503] Interview with Lisa Monteggia November 6, 2018.

[504] Kandel, Eric R.; Schwartz, James H.; Jessell, Thomas M.; Siegelbaum, Steven A.; Hudspeth, A.J. (2012–10–05). *Principles of Neural Science*, Fifth Edition (ebook) (Principles of Neural Science (Kandel)) (Kindle Locations 1672–1674). McGraw-Hill Education. Kindle Edition.

[505] Brain Research Through Advancing Innovative Neurotechnologies (BRAIN) Working Group. Advisory Committee to the NIH Director interim report. http://www.braininitiative.nih.gov/09162013-Interim%20Report_Final%20Composite.pdf. Accessed November 11, 2014.

[506] Interview with Brian MacVicar November 5, 2018. Reha Erzumulu made a similar point in his November 4, 2018 interview as well.

[507] Interview with Huda Akil November 6, 2018.

[508] Interview with William Martin, November 5, 2018.

[509] Interview with Karl Herrup, December 17, 2018; Interview with Gordon Shepherd November 3, 2018; Interview with Steven Hyman November 4, 2018.

[510] Interview with Steven Hyman, November 4, 2018.

[511] James McNamara, John Morrison, Larry Swanson, Melissa Garcia, and Cori Spencer all touched on this topic in their November 2018 and January 2019 interviews.

[512] Interview with Elisabeth Von Bockstaele, November 7, 2018.

[513] Interview with Ramesh Raghupathi, November 4, 2018.

[514] Alexxai Kravitz, Carol Barnes, Irwin Levitan, Eric Chudler, Michael Goldberg, and Ramesh Raghupathi all expressed concern about this issue in their November 2018 interviews.

[515] Interview with John Morrison November 5, 2018; Interview with Eric Nestler, November 3, 2018.

[516] Interview with Carla Shatz, November 5 2018.

[517] Interview with Marina Picciotto, November 4, 2018.

[518] The Science Knows No Borders Program enabled scientists who had been denied a US travel visa to attend the 2019 Annual Meeting to share their research and engage with colleagues through virtual poster, symposium, nanosymposium, and minisymposium sessions.

[519] https://www.aaas.org/programs/r-d-budget-and-policy/historical-trends-federal-rd

[520] Alberts, B, M W Kirschner, S Tilghman, and H Varmus. "Rescuing US Biomedical Research From Its Systemic Flaws." *Proceedings of the National Academy of Sciences* 111, no. 16 (2014): doi:10.1073/pnas.1404402111.

[521] Interview with Dennis Choi, November 5, 2018.

[522] Interview with Cara Altimus, November 7, 2018.

[523] Brain Research Through Advancing Innovative Neurotechnologies (BRAIN) Working Group. Advisory Committee to the NIH Director interim report. http://www.braininitiative.nih.gov/09162013-Interim%20Report_Final%20Composite.pdf. Accessed November 11, 2014.

[524] The members of the 50th Anniversary Working Group, in addition to Larry Swanson, included Tom Albright, Larry Squire, Lisa Monteggia and Amy Bastian.

[525] https://profiles.stanford.edu/fei-fei-li/.

[526] https://www.sfn.org/about/50th-anniversary/artechouse-exhibit.

[527] https://www.sfn.org/about/history-of-sfn/1969-2019.

[528] https://neuronline.sfn.org/listen.

[529] https://www.sfn.org/membership/chapters/2019-chapter-video-challenge.The challenge winners were the Michigan Chapter, Greater New York Chapter, and the Kiev Chapter.

[530] Mountcastle, Vernon B. "Brain Science at the Century's Ebb." Daedalus 127 (Spring, 1998), p. 1.

[531] https://www.themorrisonlab.org/news.

SCIENCE PHOTOGRAPHY CAPTIONS

Cover

This image shows a retinal ganglion cell that was biolistically labeled in an adult mouse. Cytosolic expression of fluorescent protein tdTomato (blue) reveals cellular morphology, while coexpression of YFP-tagged PSD95 (yellow) labels excitatory postsynaptic sites within the same neuron. The left portion of the image represents the rendered volume of fluorescent signals expressed by the cell, gradually blended with its digitized representation of the dendritic arbor's skeleton (blue lines) and synaptic loci (pink spheres).

Courtesy with permission: Yvonne Ou, Rebecca E. Jo, Erik M. Ullian, Rachel O.L. Wong and Luca Della Santina, 2016, *Journal of Neuroscience*, 36 (35) 9240–9252

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This image shows cone photoreceptors directly contacting microglia within the outer plexiform layer of the human retina. The tissue was immunolabeled with antibodies against calbindin (green) and peanut agglutinin (blue), and microglia were labeled with monocyte marker ionized calcium-binding adapter molecule 1 (red). Microglia, photoreceptor interaction plays an important role in postnatal photoreceptor maturation, with loss of fractalkine-Cx3cr1 signaling leading to an altered distribution of cilium proteins, failure of outer segment elongation, and cone photoreceptor loss.

Courtesy with permission: Andrew I. Jobling, Michelle Waugh, Kirstan A. Vessey, Joanna A. Phipps, Lidia Trogrlic, Una Greferath, Samuel A. Mills, Zhi L. Tan, Michelle M. Ward and Erica L. Fletcher, 2018, *Journal of Neuroscience* 38 (20) 4708–-4723

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This image shows specialized functional domains along myelinated axons in mouse sciatic nerve. Immunostaining for neurofascin (blue) is present in the axolemma at nodes of Ranvier (strong staining of NF186) and in paranodal glia (weak staining of NF155). Immunolabeling of contactin-associated protein (green) reveals paranodes, and immuolabeling of voltage-gated K+ channels (red) shows juxtaparanodes.

Courtesy with permission: Keiichiro Susuki, Daniel R. Zollinger, Kae-Jiun Chang, Chuansheng Zhang, Claire Yu-Mei Huang, Chang-Ru Tsai, Mauricio R. Galiano, Yanhong Liu, Savannah D. Benusa, Leonid M. Yermakov, Ryan B. Griggs, Jeffrey L. Dupree and Matthew N. Rasband, 2018, *Journal of Neuroscience*, 38 (27) 6063–6075

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This image shows mature cochlear heminodes beneath hair cells and nodes of Ranvier within osseous spiral lamina in adult mouse auditory nerve. The nodes and their flanking paranodes were immunolabeled for neuronal cell adhesion molecule (NrCAM, green) and contactin 1 (Cntn1, red), respectively. Myelin of the auditory nerve (following the heminodes) was detected by immunolabeling for myelin basic protein (MBP, blue; nuclei were counterstained with DAPI also in blue). The integrity of myelin and nodal structures in the cochlea is needed for fast transfer of sound information from the hair cells to the brain.

Courtesy with permission: Clarisse H. Panganiban, Jeremy L. Barth, Lama Darbelli, Yazhi Xing, Jianning Zhang, Hui Li, Kenyaria V. Noble, Ting Liu, LaShardai N. Brown, Bradley A. Schulte, Stéphane Richard and Hainan Lang, 2018, *Journal of Neuroscience*, 38 (10) 2551–2568

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This image shows a cross section of a day 28 human forebrain organoid, showing FOXG1-expressing neural precursors (Red), surrounding a ventricle-like structure outlined by N-Cadherin staining (Green). DAPI staining is blue.

Courtesy with permission: Ai Tian, Julien Muffat and Yun Li, 2020, *Journal of Neuroscience*, 40 (6) 1186–1193

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This live Airyscan image shows a zebrafish neuromast with hair cells expressing the red calcium indicator RGECO1 (magenta) and the innervating afferent process expressing GFP (neurod: EGFP, green).

Courtesy with permission: Lavinia Sheets, Xinyi J. He, Jennifer Olt, Mary Schreck, Ronald S. Petralia, Ya-Xian Wang, Qiuxiang Zhang, Alisha Beirl, Teresa Nicolson, Walter Marcotti, Josef G. Trapani and Katie S. Kindt, 2017, *Journal of Neuroscience*, 37 (26) 6299-6313

Page 17 (top image)

This image shows mitochondria (magenta) in the processes of primary oligodendrocytes expressing myelin basic protein (green). The oligodendrocytes were purified via magnetic activated cell separation and cultured for 10 days in vitro.

Courtesy with permission: Kelly A. Chamberlain, Kristen S. Chapey, Sonia E. Nanescu and Jeffrey K. Huang, 2017, *Journal of Neuroscience*, 37 (6) 1479–1492

Page 17 (middle image)

These vasoactive intestinal peptide (VIP)-expressing interneurons in mouse somatosensory cortex were targeted with a modified rabies virus system to label their brain-wide monosynaptic inputs. Many VIP-expressing interneurons exhibit a striking bipolar morphology, with primary neurites that run perpendicular to the cortical surface.

Courtesy with permission: Nicholas R. Wall, Mauricio De La Parra, Jordan M. Sorokin, Hiroki Taniguchi, Z. Josh Huang and Edward M. Callaway, 2016, *Journal of Neuroscience* 36 (14) 4000–4009

Page 17 (bottom image)

Abundant α-synuclein inclusions (green) localize throughout axons (magenta).

Courtesy with permission: Laura A. Volpicelli-Daley, Hisham Abdelmotilib, Zhiyong Liu, Lindsay Stoyka, João Paulo Lima Daher, Austen J. Milnerwood, Vivek K. Unni, Warren D. Hirst, Zhenyu Yue, Hien T. Zhao, Kyle Fraser, Richard E. Kennedy and Andrew B. West, 2016, *Journal of Neuroscience*, 36 (28) 7415–7427

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This image acquired with super resolution STED microscopy shows a fixed cortical axonal growth cone stained for F-actin (magenta) in the growth cone periphery and microtubules (cyan) in the center. The entry of single microtubules into filopodia and extension along actin filament bundles is regulated by the microtubule associated protein tau.

Courtesy with permission: Sayantanee Biswas and Katherine Kalil, 2018, *Journal of Neuroscience*, 38 (2) 291–307

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This image shows a cortical neuron from an embryonic day 14 wild-type mouse grown in culture for 7 days. The cell was immunostained with antibodies against phosphorylated Src/Fyn (pY527, green), Src (red), and the microtubule-associated protein MAP2 (blue) antibodies. The pY527 signal is localized in dendritic growth cones. Sema3A stimulation decreases the pY527 signal in wild-type neurons, but not in those lacking the protein tyrosine phosphatase Ptpδ.

Courtesy with permission: Fumio Nakamura, Takako Okada, Maria Shishikura, Noriko Uetani, Masahiko Taniguchi, Takeshi Yagi, Yoichiro Iwakura, Toshio Ohshima, Yoshio Goshima and Stephen M. Strittmatter, 2017, *Journal of Neuroscience*, 37 (30) 7125–7139

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This watercolor, inspired by the drawings of Ramón y Cajal, shows an oligodendrocyte ensheathing two axons, accompanied by illustrations of the different maturation stages through which the oligodendrocyte progenitor cells pass before becoming mature, myelinating oligodendrocytes. The GTPases R-Ras1 and R-Ras2 are essential regulators of oligodendrocyte development and myelination. Drawing by Daniel Belchi.

Courtesy with permission: Miriam Sanz-Rodriguez, Agnès Gruart, Juan Escudero-Ramirez, Fernando de Castro, José María Delgado-García, Francisco Wandosell and Beatriz Cubelos, 2018, *Journal of Neuroscience*, 38 (22) 5096–5110

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This image shows a network of cultured cortical neurons that developed with pharmacologically stimulated Protein Kinase C activity and was stained with antibodies against MAP2 (dendrites and somata; green) and neurofilament (axons; red). Cover art by Samora Okujeni.

Courtesy with permission: Samora Okujeni, Steffen Kandler and Ulrich Egert, 2017, *Journal of Neuroscience*, 37 (14) 3972–3987

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This image shows the expression of connexin 43 (Cx43, green) in the ependyma of the spinal cord of a neonatal mouse. Nuclei are stained with DAPI (blue). Communication among ependymal cells via gap junctions decreases in adulthood when the ependymal stem cell niche becomes quiescent but is restored after spinal cord injury suggesting a role of connexin signaling in the resumption of proliferation.

Courtesy with permission: Gabriela Fabbiani, Cecilia Reali, Adrián Valentín-Kahan, María Inés Rehermann, Jimena Fagetti, María Victoria Falco and Raúl E. Russo, 2020, *Journal of Neuroscience*, 40 (11) 2246–2258

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This image shows neuronal precursor cells obtained from induced pluripotent stem cells stained for neuronal markers Nestin (green) and Sox2 (red), as well as nuclear marker DAPI (blue).

Courtesy with permission: Caterina Montani, Mariana Ramos-Brossier, Luisa Ponzoni, Laura Gritti, Andrzej W. Cwetsch, Daniela Braida, Yoann Saillour, Benedetta Terragni, Massimo Mantegazza, Mariaelvina Sala, Chiara Verpelli, Pierre Billuart and Carlo Sala, 2017, *Journal of Neuroscience*, 37 (28) 6606–6627

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The image shows co-injection of two tracers into the Giant Fiber Interneuron (GFI) of the *Drosophila* thoracic ganglia. TRITC (red) labels the injected neuron while the smaller neurobiotin (yellow) passes through gap junctions to reveal the extensive connectivity of the neural circuit. This brain lacks Fragile X Mental Retardation Protein (FMRP) which results in a selective increase in neurobiotin uptake via a mechanism unrelated to gap junctions.

Courtesy with permission: Tyler Kennedy and Kendal Broadie, 2017, *Journal of Neuroscience* 37 (41) 9844-9858

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Neuromuscular junction of epitrochleoanconeus (ETA) muscle. ETA muscles of P30 C57/BL6 mouse were stained with neurofilament and synapsin antibodies to visualize motor axons (green) and CF568 α-BTX to visualize AChR clusters (red).

Courtesy with permission: Kai Zhao, Chengyong Shen, Yisheng Lu, Zhihui Huang, Lei Li, Christopher D. Rand, Jinxiu Pan, Xiang-Dong Sun, Zhibing Tan, Hongsheng Wang, Guanglin Xing, Yu Cao, Guoqing Hu, Jiliang Zhou, Wen-Cheng Xiong and Lin Mei, 2017, *Journal of Neuroscience*, 37 (13) 3465–3477

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This image shows a cultured hippocampal neuron that was nimmunolabeled for the vesicle SNARE protein synaptobrevin 2. The original image has been artificially colored with a gradient map for artistic effect. The transmembrane domain of synaptobrevin 2 influences the flow of neurotransmitter through synaptic fusion pores.

Courtesy with permission: Chung-Wei Chiang, Che-Wei Chang and Meyer B. Jackson, 2018, *Journal of Neuroscience*, 38 (32) 7179–7191

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Confocal image of flat-mounted adult mouse retina showing Iba1-positive ramified microglia (red) of naïve retina. Co-immunostaining for βIII-tubulin (cyan) was used to detect retinal ganglion cells and their axons in the ganglion cell layer.

Courtesy with permission: Alexander M. Hilla, Heike Diekmann and Dietmar Fischer, 2017, *Journal of Neuroscience*, 37 (25) 6113-6124

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This image shows expression of an optimized hybrid voltage sensor (hVOS) probe in the dentate gyrus of an Ai35 hVOS:: FOS mouse, viewed with 2-photon microscopy. Neurons expressing the voltage probe were activated by exposing the mouse to a novel environment. The hVOS probe enabled fluorescence imaging of voltage changes in these neurons.

Courtesy with permission: Peter O. Bayguinov, Yihe Ma, Yu Gao, Xinyu Zhao and Meyer B. Jackson, 2017, *Journal of Neuroscience*, 37 (38) 9305–9319

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This image shows the results of a clustering model using 20 cortical targets ontology and 29 basal forebrain cell clusters. Each cluster is indicated by a different color. Left is lateral (globus pallidus), right part is medial septum). The brain-model is viewed from an anterior view that is slightly rotated lateralwards. Yellow wireframe: corpus callosum, white: contour of the brain.

Courtesy with permission: Laszlo Záborszky, Peter Gombkoto, Peter Varsanyi, Matthew R. Gielow, Gina Poe, Lorna W. Role, Mala Ananth, Prithviraj Rajebhosale, David A. Talmage, Michael E. Hasselmo, Holger Dannenberg, Victor H. Minces and Andrea A. Chiba, 2018, *Journal of Neuroscience*, 2018, 38 (44) 9446–9458

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

Courtesy with permission: Wei Fang, Chuanyu Guo and Xiangyun Wei, 2017, *Journal of Neuroscience*, 37 (11) 2834–2848

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A thalamocortical slice from a 4-dayold mouse brain in which neurons in the ventrobasal thalamus express Cre recombinase and tdTomato, allowing visualization of thalamocortical axons (red) innervating the barrel cortex. Layer 6 corticothalamic neurons (green) were labeled by an antibody to the transcription factor TBR1, and all other cell bodies were counterstained with ToPro (blue). The same Cre line was crossed with a channelrhodopsin reporter for optogenetically guided dual recording experiments from connected thalamic and cortical neurons.

Courtesy with permission: Hang Hu and Ariel Agmon, 2016, *Journal of Neuroscience*, 36 (26) 6906-6916

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This image shows the mouse adult hippocampus with neurogenesis markers. EYFP (green) is expressed in radial glia-like neural stem cells and their progenies. Adult-born neurons and neural stem cells/neural progenitors are stained with Doublecortin (red) and Sox2 (white), respectively. DAPI labeling is blue.

Courtesy with permission: H. Georg Kuhn, Tomohisa Toda and Fred H. Gage, 2018, *Journal of Neuroscience*, 38 (49) 10401–10410

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This confocal image shows a coronal slice of the entire olfactory bulb from a mouse in which EGFP (green) was expressed in calretinin-expressing (CR+) periglomerular (PG) cells, the most abundant interneurons in the glomerular layer, and a tdTomato-expressing plasmid (red) had been electroporated into the dorsal subventricular zone at birth to label newborn neurons. Blue DAPI labeling shows nuclei. New work suggests that postnatally generated CR+ PG cells

continuously supply the olfactory bulb with a large pool of neurons that have unconventional properties.

Courtesy with permission: Nuria Benito, Elodie Gaborieau, Alvaro Sanz Diez, Seher Kosar, Louis Foucault, Olivier Raineteau and Didier De Saint Jan, 2018, *Journal of Neuroscience*, 38 (46) 9870–9882

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Spinal microglia are critical mediators in the development of opioid tolerance. In this image, a variety of individual Iba1-labelled microglia from rat spinal dorsal horn sections are re-colored and compiled to form a cross-section of the lumbar spinal cord. Each microglia cell is unique and they show a variety of morphologies representative of the dynamic and reactive nature of microglia.

Courtesy with permission: Heather Leduc-Pessah, Nicholas L. Weilinger, Churmy Y. Fan, Nicole E. Burma, Roger J. Thompson and Tuan Trang, 2017, *Journal of Neuroscience*, 37 (42) 10154–10172

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This image is an artistic rendering of mouse hippocampus, stained with antibodies against α-synuclein (yellow) and the sphingolipid glucosylceramide (blue). α-Synuclein interacts with select sphingolipids in the context of GBA-associated Parkinson's disease.

Courtesy with permission: Yumiko V. Taguchi, Jun Liu, Jiapeng Ruan, Joshua Pacheco, Xiaokui Zhang, Justin Abbasi, Joan Keutzer, Pramod K. Mistry and Sreeganga S. Chandra, 2017, *Journal of Neuroscience*, 37 (40) 9617-9631

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Unprocessed pro-Neuregulin 1 (type I) accumulates as discrete puncta on the soma and proximal dendrites of cultured hippocampal neurons at contact sites, known as subsurface cisterns, between the somatic plasma membrane and the ER (white). Note that Neuregulin puncta are absent from axons (initial segments labeled with Ankyrin G, green) and more distal dendrites (labeled with MAP2, magenta). In response to NMDAR activity pro-NRG1 is processed and released.

Courtesy with permission: Detlef Vullhorst, Tanveer Ahmad, Irina Karavanova, Carolyn Keating and Andres Buonanno, 2017, *Journal of Neuroscience*, 37 (21) 5232–5249

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This image provides a sagittal view of white matter fiber tracts in the human brain obtained using Diffusion Spectral Imaging, a technique explored by the NIH Human Connectome Project and advanced by BRAIN Initiative projects. The work from which the image originated was from the lab of BRAIN-funded investigator, Lawrence Wald, Ph.D. (MGH/Martinos Center for Biomedical Imaging) Setsompop et al., 2013, Neuroimage. The image was provided by the National Institutes of Health, one of the federal agencies supporting the Initiative.

Courtesy with permission: Walter Koroshetz, Joshua Gordon, Amy Adams, Andrea Beckel-Mitchener, James Churchill, Gregory Farber, Michelle Freund, Jim Gnadt, Nina S. Hsu, Nicholas Langhals, Sarah Lisanby, Guoying Liu, Grace C.Y. Peng, Khara Ramos, Michael Steinmetz, Edmund Talley and Samantha White, 2018, *Journal of Neuroscience*, 38 (29) 6427–6438

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This image is an artistic rendering of a confocal image depicting parvalbumin-positive inhibitory interneurons (green) intermingled with medium spiny neurons expressing D1 dopamine receptors (pink) in the nucleus accumbens. DAPI labeling is blue. Interneurons are strongly activated by hippocampal input and provide robust feed-forward inhibition to both D1-positive and D1-negative medium spiny neurons.

Courtesy with permission: Samantha L. Scudder, Corey Baimel, Emma E. Macdonald and Adam G. Carter, 2018, *Journal of Neuroscience*, 38 (42) 9091–9104

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This image shows immature neurons in layer II of sheep cerebral cortex. Neurons labelled in red express the cytoskeletal protein Doublecortin, typically found in immature or newly-generated cells. The marker of mature neurons HuC/D (green) is present in several nerve cells of the same layer, and shows a faint immunoreactivity only in a subset of Doublecortin-positive cells, thus indicating the existence of different degrees of immaturity.Neurons generated embryonically but remaining immature in adults are particularly abundant in large-brained, long-living mammals such as sheep.

Courtesy with permission: Matteo Piumatti, Ottavia Palazzo, Chiara La Rosa, Paola Crociara, Roberta Parolisi, Federico Luzzati, Frederic Lévy and Luca Bonfanti, 2018, *Journal of Neuroscience*, 38 (4) 826–842

Page 106 (top image)

This composite image shows channelrhodopsin-expressing axons of the lateral perforant path (green) targeting dendritic segments of granule cells (red) in the outer molecular layer of the mouse hippocampus. Laminar-specific activation showed that newborn cells receive strong preferential input from the lateral perforant path, despite showing similar spine density and dendritic length in the middle (light blue) and outer (light purple) molecular layer, a feature that may support their unique role in pattern separation.

Courtesy with permission: Nicholas I. Woods, Christopher E. Vaaga, Christina Chatzi, Jaimie D. Adelson, Matthew F. Collie, Julia V. Perederiy, Kenneth R. Tovar and Gary L. Westbrook, 2018, *Journal of Neuroscience*, 38 (26) 5843–5853

Pages 106/107 (bottom image)

This image shows ventral CA1 hippocampal (vCA1) neurons that project to either the mPFC (green) or amygdala alone (red), as well as vCA1 neurons that project to both areas (yellow). The vCA1 neurons were labeled using a dual retrograde viral tracing approach.

Courtesy with permission: Woong Bin Kim and Jun-Hyeong Cho, 2017, *Journal of Neuroscience*, 37 (19) 4868–4882

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This image shows the spatial distribution of F-actin in a growth cone, as revealed using structured illumination microscopy (SIM), one type of superresolution microscopy. Colors indicate the height from the substrate.

Courtesy with permission: Michihiro Igarashi, Motohiro Nozumi, Ling-Gang Wu, Francesca Cella Zanacchi, István Katona, László Barna, Pingyong Xu, Mingshu Zhang, Fudong Xue and Edward Boyden, 2018, *Journal of Neuroscience*, 38 (44) 9459–9467

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In the sympathetic trunk of a CNPMyrAkt mouse, an unmyelinated Schwann cell (brown) engulfs one axon (violet) but also collagen fibers from the extracellular matrix (blue, orange). Next to it, long processes from another unmyelinated Schwann cell (yellow) are starting to wrap extracellular matrix.

Courtesy with permission: Enric Domènech-Estévez, Hasna Baloui, Xiaosong Meng, Yanqing Zhang, Katrin Deinhardt, Jeff L. Dupree, Steven Einheber, Roman Chrast and James L. Salzer, 2016, *Journal of Neuroscience*, 36 (16) 4506–4521

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This image shows a dopaminergic neuron immunostained for cytosolic tyrosine hydroxylase (red), plasma-membrane-bound dopamine transporter (green), and nuclear DAPI staining (blue). The neuron was generated from BMP5/7-treated human induced pluripotent stem cells. The BMP/SMAD pathway has a critical role in the formation of dopaminergic neurons in vivo and from human stem cells.

Courtesy with permission: Vukasin M. Jovanovic, Ahmad Salti, Hadas Tilleman, Ksenija Zega, Marin M. Jukic, Hongyan Zou, Roland H. Friedel, Nilima Prakash, Sandra Blaess, Frank Edenhofer and Claude Brodski, 2018, *Journal of Neuroscience*, 38 (7) 1662–1676

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This image shows human neurons derived from embryonic stem cells (H9), at 21 days after differentiation. Nuclei are stained with DAPI and the neuronal microtubules are stained with an antibody against β-III-Tubulin. These cells were used to test candidate modifiers of α-Synuclein levels.

Courtesy with permission: W.C. Rousseaux, Gabriel E. Vázquez-Vélez, Ismael Al-Ramahi, Hyun-Hwan Jeong, Aleksandar Bajić, Jean-Pierre Revelli, Hui Ye, Emily T. Phan, Jennifer M. Deger, Alma M. Perez, Ji-Yoen Kim, Laura A. Lavery, Qikia Xu, Mamie Z. Li, Hyojin Kang, Jean J. Kim, Joshua M. Shulman, Thomas F. Westbrook, Stephen J. Elledge, Zhandong Liu, Juan Botas and Huda Y. Zoghbi, 2018, *Journal of Neuroscience*, 38 (43) 9286–9301

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Longitudinal section of adult rat optic nerve, immunostained for Thr286-phosphorylated CaMKII (pT286; green), myelin basic protein (MPB; magenta), and axonal neurofilaments (SMI-312; blue). pT286 localizes to axons and not to myelin, as SMI-312 and pT286 colocalization generates cyan within profiles circumscribed by MBP. The axon diameters range between small and large. A few large gaps between axon fascicles show some pT286 immunopositivity, but no signal for MBP or SMI-312.

Courtesy with permission: Gloria J. Partida, Anna Fasoli, Alex Fogli Iseppe, Genki Ogata, Jeffrey S. Johnson, Vithya Thambiaiyah, Christopher L. Passaglia and Andrew T. Ishida, 2018, *Journal of Neuroscience*, 38 (37) 8087–8105

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Retinal ganglion cell axons from the ventral (green) and dorsal (red) retina are segregated in the developing optic tract of zebrafish embryos. This sorting is disrupted when the RNA-binding protein Hermes is knocked down.

Courtesy with permission: Hörnberg, Jean-Michel Cioni, William A. Harris and Christine E. Holt, 2016, *Journal of Neuroscience*, 36 (50) 12697–12706

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Immunohistochemical labeling of parvalbumin-expressing inhibitory interneurons (yellow) and cell nuclei (DAPI, purple) in the somatosensory cortex of a postnatal day 15 Dp(16)1Yey/+ mouse (a mouse model of Down syndrome). Photoshop was used to adjust the hue and contrast of the image.

Courtesy with permission: Joseph W. Goodliffe, Jose Luis Olmos-Serrano, Nadine M. Aziz, Jeroen L.A. Pennings, Faycal Guedj, Diana W. Bianchi and Tarik F. Haydar, 2016, *Journal of Neuroscience*, 36 (10) 2926–2944

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This image shows two human astrocytes derived from embryonic stem cells stained with F-actin (green). The astrocytes were exposed to Cy-3 labeled alpha-synuclein oligomers (red) for 24 hours, washed and cultured for additional three days. During the 24 h of exposure, the astrocytes engulf large amounts of oligomeric alpha-synuclein that are subsequently accumulated in the cells. The stressed astrocytes respond by sending out tunneling nanotubes, enabling intercellular transfer of alphasynuclein.

Courtesy with permission: Jinar Rostami, Staffan Holmqvist, Veronica Lindström, Jessica Sigvardson, Gunilla T Westermark, Martin Ingelsson, Joakim Bergström, Laurent Roybon and Anna Erlandsson, 2017, *Journal of Neuroscience*, 37 (49) 11835–11853

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This image shows the mouse adult hippocampus with neurogenesis markers. EYFP (green) is expressed in radial glia-like neural stem cells and their progenies. Adult-born neurons and neural stem cells/neural progenitors are stained with Doublecortin (red) and Sox2 (white), respectively. DAPI labeling is blue.

Courtesy with permission: H. Georg Kuhn, Tomohisa Toda and Fred H. Gage, 2018, *Journal of Neuroscience*, 38 (49) 10401–10410

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This image shows neurons (green) and ephrin-B1 immunoreactivity (red) in mouse hippocampal area CA1 of adult mice that overexpress ephrin-B1 in astrocytes. Cell nuclei are labeled with DAPI (blue).

Courtesy with permission: Jordan Koeppen, Amanda Q. Nguyen, Angeliki M. Nikolakopoulou, Michael Garcia, Sandy Hanna, Simone Woodruff, Zoe Figueroa, Andre Obenaus and Iryna M. Ethell, 2018, *Journal of Neuroscience*, 38 (25) 5710–5726

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Reconstruction of a cluster of seven simultaneously recorded neurons in the subthalamic nucleus. Dendrites and somata of each cell are a different color, but axons of all cells are red. New work shows that subthalamic nucleus neurons operate as independent and parallel processing units.

Courtesy with permission: Leon Amadeus Steiner, Federico J. Barreda Tomás, Henrike Planert, Henrik Alle, Imre Vida and Jörg R.P. Geiger, 2019, *Journal of Neuroscience*, 39 (13) 2470–2481

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