NEUROSCIENCE QUARTERLY

WINTER 2014

"As science budgets shrink and competition for research dollars increases, it is vital that our research proposals clearly communicate what we are doing and why it matters."

— Carol Ann Mason
SfN President

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SOCIETY *for* NEUROSCIENCE

SfN Ethics Committee: The Role of Intent

by Peggy Mason

Editor's note: Peggy Mason is the chair of the SfN Ethics Committee. This article is the second in an occasional series focusing on issues related to ethical conduct in publishing. In the following article, the author discusses the role of intent in cases of alleged misconduct.

In research, there is a broad range of potential missteps, ranging from acts that are universally considered unethical, to conduct that elicits disapproval from some or a look away by others, to even the occasional endorsement. Data fabrication falls into the first category. It is an act that is inherently unacceptable within the context of scientific research, always and forever wrong regardless of circumstance. On the other hand, opinions regarding who should be an author on a manuscript, or when an experimental resource should be shared, for example, may vary and can be influenced by circumstances.

Correcting Mistakes and Missteps

Many of the complaints handled by SfN's Ethics Committee do not involve explicitly unethical behavior. For example, one common complaint is that data is re-used without proper citation of the author's original report on that data. When such duplicate

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Message from the President
Communicating about our Science

Carol Mason, SfN President

Neuroscience comes alive when we talk with one another about our work as we did recently at the 2013 SfN annual meeting. We find out what others are doing and share the triumphs and trials of our research. Every poster interaction, every chance encounter in the aisles and eateries brings new thoughts to light and new ways to approach the questions we raise, for students and senior scientists alike.

I believe scientific discourse with the public is equally important. Many of us find ourselves communicating what we do in very simple terms to friends, family, and colleagues in other areas of neuroscience. Even though it takes energy to do so, describing your work to others who don't understand the jargon — from the person next to you on the plane to a broader lay audience — forces you to distill its essence. Even chatting with 5-year-olds, as my colleague Fiona Doetsch frequently does in her son's class, "makes you stand back and see the big picture." Scientists can help lay audiences appreciate what science is, from its great possibilities and beauty, to its inherent complexities and uncertainties.

Why Communicate with Non-Scientists?

Today it is even more critical to have dialogues with non-scientists who aren't familiar with our world. Through engaging and educating the public about neuroscience research, we promote understanding, inspire curiosity, nurture respect for the field, and seed a future generation of scientists. Similarly, communications with legislators about our research gives

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them a window into why our work is important, and why continued funding is necessary.

As science budgets shrink and competition for research dollars increases, it is vital that our research proposals clearly communicate what we are doing and why it matters. Increasingly, both public and private funding dollars rely on our ability to talk about our science to non-scientists. Reviewers of grant applications to foundations may or may not have scientific backgrounds. As Sally Rockey, deputy director for extramural research at NIH, writes in "RockTalk" (April 2013), "Thinking about the relevance of your work to the public should start as early as your NIH application phase…think more broadly, because even reviewers, their scientific background notwithstanding, will benefit from a clear statement of what you are doing and why it is important." In NSF fellowship and grant applications, applicants are required to account for their public outreach efforts in teaching, writing, and speaking in the Broader Impacts section. Universities are increasingly asking their faculty to speak with donors about their research and its applications in the real world. As this trend continues, a number of graduate programs are considering requiring communication and public outreach training for those enrolled in PhD programs. It is apparent that scientists need to become strong communicators in order to access research revenue streams.

But the search for research funding is not the only reason to develop communications skills. As recipients of taxpayer funds, we have a responsibility to explain how our research helps the public. The NIH RePORTER website, for example, includes lay-friendly language about grant awards in its News and More section, and connects visitors to related information about research outcomes, patents, and publications. Private funders, also, need to be informed about the outcomes of science research they support when we thank them for their contributions.

David Eagleman, a 2012 SfN Science Educator Award winner, wrote a compelling article about why we should disseminate scientific knowledge (J. Neurosci. 33:12147, 2013). He challenges scientists as they engage in public communications to inspire critical thinking, debunk "fuzzy thinking," and "stem the flow of bad information" and incorrectly interpreted data, even in reports by science writers and the media. By engaging in discussions of controversial issues, he writes, we help clarify what neuroscience can and cannot offer to make us smarter or cure autism. We can also explain not-so-controversial issues, such as President Obama's BRAIN initiative, and highlight our efforts to understand how the normal brain is wired and functions, what can go wrong, and what that means for our research and the public good.

SfN Science Communications

Many of us already communicate about science during Brain Awareness Week events each year (in 2014, BAW is March 10—16). We meet with students and educators to bring neuroscience to the classroom, science fairs, and other venues, for students at all grade levels. But every day can be a "Brain Awareness Day." Seasoned scientists can hold lectures and symposia for adults in community centers and with other lay groups, speak at senior centers, or write op-ed pieces. You can invite legislators at the local, state, and federal level to attend public events or invite them to your lab. Join in on Capitol Hill Day this year (March 26) to meet with your congressional representatives and their staff, a truly exciting and eye-opening experience for me last year. If each of us aims to participate in such events, we send messages to the public about why brain research is so vitally important.

Many neuroscientists believe that it is not their duty or in their skill set to act as science communicators. SfN can help. SfN recognizes that communications with the public are essential, and *BrainFacts.org* makes content available to the public that is vetted by an editorial board of neuroscientists to ensure accuracy and breadth of topics across the field. Use these resources in your outreach! Likewise, Neuroscience Core Concepts can be a resource for members to call on when addressing lay audiences, and many age appropriate materials for teaching are available on *BrainFacts.org*. The Membership and Chapters Committee and the Government and Public Affairs Committee provide funding to support activities for public outreach and can help get in touch with congressmen and their staff. SfN offers a new Early Career Policy Fellows Program for neuroscience students, postdoctoral trainees, and early-career faculty who seek to become effective advocates for science, including training for Hill Day visits. This year, SfN will expand its efforts to provide tools and training to help members communicate with public audiences, using talking points developed by the Public Education and Communications Committee.

Communications Outreach in 2014

I write this message at the turn of 2014, a great time to be making resolutions. I am excited that SfN will begin launching opportunities for training members in science communications this year, and urge you to resolve to engage in more brain awareness every day. As David Eagelman wrote, we should strive to share with the public the "raw beauty of the scientific pursuit," and its vagaries, like a conductor shares music. Whether you are communicating with your mother, a group at your community library, or your Congressman, make a resolution to reach out in new ways and you and society are sure to benefit. I look forward to having you join me in this effort. ■

Congratulations

to the Winners of the 2013 SfN Awards

SfN awarded more than $600,000 to scientists at Neuroscience 2013, recognizing scientific excellence and promise, training and education, and public outreach, as well as support for meeting attendance.

Award for Education in Neuroscience
Keith A. Trujillo, PhD

Julius Axelrod Prize
Supported by Eli Lilly and Company Foundation
Joseph T. Coyle, MD

Ralph W. Gerard Prize in Neuroscience
Carol A. Barnes, PhD

Patricia Goldman-Rakic Hall of Honor
Rita Levi-Montalcini, MD

Bernice Grafstein Award for Outstanding Accomplishments in Mentoring
Jane Roskams, PhD

Peter and Patricia Gruber International Research Award in Neuroscience
Supported by The Gruber Foundation
Dengke K. Ma, PhD
Shantanu P. Jadhav, PhD

Donald B. Lindsley Prize in Behavioral Neuroscience
Supported by The Grass Foundation
Michael Yartsev, PhD

Louise Hanson Marshall Special Recognition Award
Kathie L. Olsen, PhD

Nemko Prize in Cellular or Molecular Neuroscience
Supported by the Nemko Family
Shigeki Watanabe, PhD

Neuroscience Program-of-the-Year
UNDERGRADUATE PROGRAM OF THE YEAR
Central Michigan University
GRADUATE PROGRAM OF THE YEAR
University of Pennsylvania

Next Generation Award
PRE-/POSTDOCTORATE LEVEL
Kasia M. Bieszczad, PhD
Northwestern University: Shoai Hattori, Jessica Wilson, Matthew Schroeder

Mika Salpeter Lifetime Achievement Award
Xandra O. Breakefield, PhD

Science Educator Award
Bobby Heagerty, MA
Martha J. Farah, PhD

Swartz Prize for Theoretical and Computational Neuroscience
Supported by The Swartz Foundation
William Bialek, PhD

Janett Rosenberg Trubatch Career Development Award
Supported by the Trubatch Family
Maria Lehtinen, PhD
Mi Hyeon Jang, PhD

Jacob P. Waletzky Award
Supported by the Waletzky Family
Rita Z. Goldstein, PhD

Young Investigator Award
Supported by AstraZeneca
Randy M. Bruno, PhD

Learn more about nominating colleagues for 2014 awards and prizes at SfN.org/awards.

SfN Society for Neuroscience

Q&A
Daniel Pasini, PhD

Dr. Daniel Pasini, Policy and Programme Officer at the European Commission

Daniel Pasini, PhD, is a Policy and Programme Officer at the European Commission, working in the Horizon 2020 Future and Emerging Technologies (FET) Programme. For more than 20 years he has been closely involved in the development of policy and legal instruments for the construction and operation of European and international research infrastructure, in all fields of science. More recently he joined the FET Programme to follow the FET Flagship Initiatives, in particular the Human Brain Project. This is an extensive project with an estimated budget of €1.2 billion over the next ten years, involving hundreds of scientists and more than 135 European research institutions.

_Q:_ It is an exciting time for neuroscience, and The Human Brain Project is an example of the promise of the field. Can you outline for us the goals and timelines for the project?

The aim of the Human Brain Project (HBP) is to better understand the human brain and its diseases. For this purpose HBP will build six Information Technology (IT) platforms, dedicated to neuroinformatics, brain simulation, high performance computing, medical informatics, neuromorphic computing, and neurorobotics. These IT-based research platforms will be open to the world wide scientific community allowing ground-breaking research into the structure and function of the human brain, the causes, diagnosis and treatment of brain diseases, and the development of new computing technologies such as, for example, low-energy brain-like computing systems.

HBP has formally started on Oct. 1, 2013. However, this follows three years of intensive preparatory work and planning which has produced a 10-year detailed research and technology roadmap. Within 30 months, initial versions of the IT platforms will already be available for use by researchers. The platforms will then receive continuous upgrades to their capabilities over the 10 years of the project. They will be designed to allow reconstruction and simulation of the whole mouse brain by 2020, and of the whole human brain by 2024.

_Q:_ The Human Brain Project has identified six areas of research. Can you talk about how these platforms were chosen?

A key part of the HBP research effort will be dedicated to design, build, and operate its system of six IT platforms; each of them was chosen to address a specific element of the overall program, while working together in an integrated way. The *Neuroinformatics Platform* will give scientists the ability to organise and search massive volumes of heterogeneous data, knowledge, and tools produced by the international neuroscience community. The *Medical Informatics Platform* will federate genetics, imaging, and other clinical data currently locked in hospital and research archives. An important goal will be to use the platform to identify biological signatures of disease. The *Brain Simulation Platform* will provide software tools that will allow researchers to build models of the brain at several levels of detail. The *High Performance Computing Platform* will provide the interactive supercomputing technology neuroscientists need for the data-intensive simulations of the brain models. *The Neuromorphics Computing Platform* will create a new class of hardware computing devices inspired by how the brain works, for running accelerated brain simulations, and for potentially many other IT challenges. Finally, the *Neurorobotics Platform* will offer scientists a software and hardware infrastructure allowing them to connect brain models, implemented through the *Brain Simulation Platform*, with virtual robotic embodiments and virtual environments.

However, the project has also several other important dimensions. It will generate, in particular, strategically selected data on the structure and function of the mouse and human brain at different levels of biological organization (gene expression, cell numbers and morphology, long range connectivity, cognitive function, etc.), which are needed for the models. A significant research effort will also be dedicated to developing the theoretical frameworks necessary to link brain models and simulations, which describe different levels of brain organization. Finally, HBP will also launch a major Ethics and Society activity with the goal of addressing the project social, ethical, and philosophical dimensions.

Read More of Daniel Pasini's Q&A on SfN.org. ■

Q&A
Cornelia Bargmann, PhD and William T. Newsome, PhD

Cornelia Bargmann, PhD, Professor & Co-Director of the Shelby White and Leon Levy Center for Mind, Brain and Behavior at The Rockefeller University

William T. Newsome, PhD, Professor of Neurobiology & Director of the Neuroscience Institute at Stanford University

Cornelia (Cori) Bargmann, PhD, is a Howard Hughes Medical Institute Investigator, and professor and co-director of the Shelby White and Leon Levy Center for Mind, Brain and Behavior at The Rockefeller University. She studies the relationships between genes, circuits, and behaviors in C. elegans.

William T. Newsome, PhD, is a professor of neurobiology and director of the Neuroscience Institute at Stanford University, and Howard Hughes Medical Institute Investigator. His research focuses on the neural mechanisms underlying visually based decision-making and related issues in cognitive neuroscience.

Dr. Bargmann and Dr. Newsome co-chair the NIH BRAIN Working Group.

_Q:_ President Obama announced the BRAIN Initiative last April, describing it as one of the "Grand Challenges" of the 21st century. What basic goals have the NIH Director's working group identified for the initiative? What feedback have you received and what are the next steps?

Our interim report identifies circuit-level analysis of the nervous system as the primary focus of the NIH BRAIN Initiative. The overarching goal is to map the circuits of the brain, measure the dynamic patterns of electrical and chemical activity within those circuits, and understand how their interplay creates unique cognitive and behavioral capabilities. Intrinsic to this is an emphasis on technology development at all levels — molecular, cellular, systems, and behavioral — because new methods and technical resources are accelerating research in all areas of neuroscience, particularly in our rapidly evolving understanding of neural circuit function. (Download the Charge and Interim Report at http://www.nih.gov/science/brain).

Since the interim report was published in September, we have received feedback from many sources, mostly positive, from within and outside the neuroscience community. There is wide agreement that neural circuit function is a critical, underdeveloped link between molecular/cellular neuroscience and 'whole brain' imaging, our most common source of information about the functioning human brain. There is also strong support for developing the revolutionary technologies needed to crack circuit-level problems. The scientific questions we have received fall within three categories: 1) Why didn't we propose a single, one-sentence goal (like recording every action potential in the brain)?; 2) Why aren't various other areas of neuroscience included?; and 3) How will this basic research promote translational and clinical neuroscience?

The first two questions are about focus versus breadth. On the one hand, we need an integrative, multipronged approach to understand how the brain functions across widely different temporal and spatial scales, and under widely varying behavioral conditions. On the other hand, the BRAIN Initiative needs to make a clear, measurable impact with modest resources, and cannot do everything. Our decision to focus on neural circuits is based on the compelling scientific timeliness of this level of analysis, and our decision to focus on technology development is based on its potential benefit to all research fields: everyone benefits from better microscopes, recording methods, molecular tools, and so on. The third question is about connecting basic science to clinical neuroscience. We are consulting with clinical colleagues to learn what fundamental knowledge and tools will most effectively promote progress on specific brain disorders. We do hear from clinicians, too, that circuits are the missing level of understanding, and that they need better technologies for probing brain function.

As for 'next steps,' the June deadline for our final report already looms large in our minds! The interim report focused on getting off the ground, but the final report must take a longer view. We must articulate and prioritize short-,

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Inside Science

Scientists Consider New Ways to Diagnose, Treat Depression

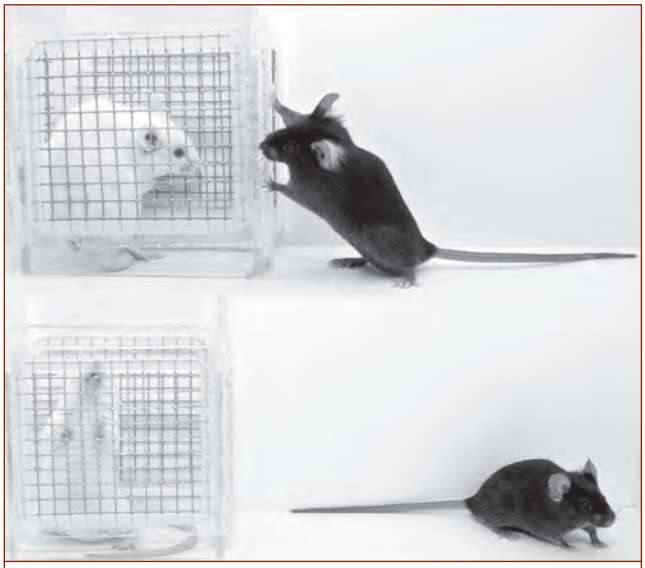
Depression affects hundreds of millions of people worldwide, yet treatment options are limited and basic questions about the root cause of the disease remain.

During a press conference at Neuroscience 2013, a team of scientists described recent studies pointing to differences in the brains and bodies of individuals with depression, and possible interventions to treat the disease and related mood disorders. The event was moderated by Lisa Monteggia of the University of Texas Southwestern Medical Center.

Manipulating Immune Response Changes Response to Stress

Although numerous studies suggest stress precipitates depression, individual response to stress can vary greatly. Understanding the molecular basis of susceptibility and resilience to stress may offer key insights into the pathology of depression.

Interested in how molecules in the body differ in those more and less susceptible to stress, press conference presenter Georgia Hodes of Icahn School of Medicine at Mt. Sinai in New York exposed mice to a social defeat test. In this test, a small mouse is repeatedly placed into the home cage of a larger, more aggressive mouse, where it is quickly defeated. After repeated exposure to this test, some mice begin to display depressive-like behaviors. Analysis of blood collected at the beginning of the study showed that the mice displaying depressive-like behaviors after social stress (stress-susceptible) had more circulating white blood cells (WBCs) than the unaffected (stress-resilient) mice even before the social stress test. Their WBCs also released more of the pro-inflammatory cytokine interleukin 6 (IL-6) when stimulated with lipopolysaccharide.



Under normal conditions, a mouse will explore novel mouse (top). However, repeat exposure to a social defeat test leads stress-susceptible to avoid contact with a novel animal (bottom). When scientists gave naïve mice a bone marrow transplant containing immune cells lacking IL-6, the animals showed resistance to stress when exposed to a social defeat stress.

Hodes and her colleagues then irradiated the peripheral immune system of naive mice, destroying the animals' immune cells, and replaced them with immune cells from stress-susceptible or control donors via a bone marrow transplant. The bone marrow from susceptible mice elevated the animals' WBCs and, after exposure to a stress paradigm, led the animals to develop depressive-like behaviors. Conversely, mice that received a bone marrow transplant containing immune cells lacking IL-6 showed resistance to stress when exposed to the social defeat stress.

"These findings show that the peripheral immune system can actually predate and predict depression-associated behaviors," Hodes said.

MicroRNAs Change after Stressful Events

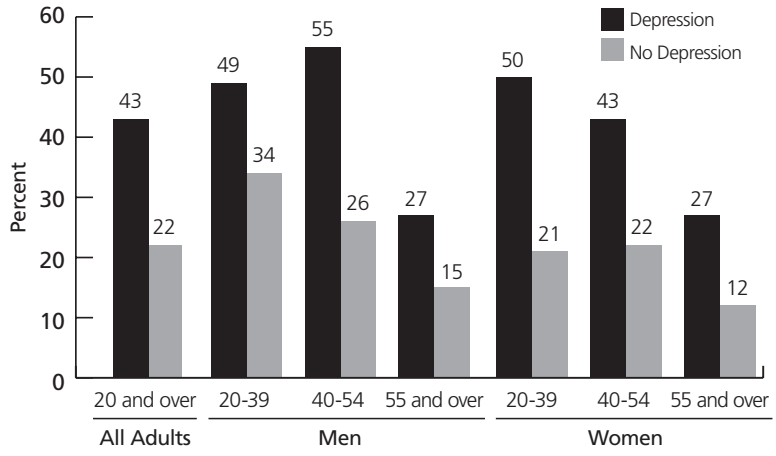
Press conference presenter Karen Scott, a postdoctoral fellow in the laboratory of John Cryan at University College Cork in Ireland, is also interested in stress sensitivity and stress resistance. Scott described her work tracking molecular changes following a stressful event.

Scott measured changes in microRNA (miRNA) levels in the hippocampus of two strains of mice (stress-sensitive BALB/c and stress-resistant C57BL/6J) following 10 days of exposure to the social defeat test. miRNA are tiny snippets of messenger RNA that block or degrade other RNA messages. Following stress, expression of miR-16 — which has been implicated in the development of depression — was elevated in BALB/c mice. Conversely, C57BL/6J showed higher levels of miR-34c.

"These studies show that there is a correlation between behavioral and physiological responses to social defeat," Scott said. However, she noted, future studies will need to explore whether manipulating miRNAs in the brain can alter symptoms of depression.

Nicotinic Receptor Could Provide Target for Antidepressant Treatment

To better understand the brain changes associated with depression and ways to alleviate symptoms of the disease, some scientists are interested in the overlap between depression



Percentage of adults aged 20 and over who were current smokers, by age, sex and depression status: United States, 2005-2008.

The percentage of people who smoke cigarettes is greater among people with depression than those without depression. Yann Mineur of Yale University described his research probing whether directly manipulating the activity of nicotine receptors in the brain reduces depressive-like behaviors in mice.

and other chronic disorders. Press conference presenter Yann Mineur of Yale University described his work exploring the relationship between depression and chronic tobacco use.

Previous studies show that blocking a subtype of nicotinic acetylcholine receptors (nAChRs) called β2 nAChRs has an antidepressant-like effect on behavior and decreases the activity of neurons in the amygdala. Mineur wanted to know if reducing β2 nAChRs expression in the amygdala alone would be enough to produce antidepressant properties.

Compared with control mice, the animals with reduced β2 nAChR expression in the amygdala displayed less depressive-like behaviors and increased stress resilience in the social defeat test. Decreasing β2 nAChRs expression in the prefrontal cortex and hippocampus led to limited behavioral differences, suggesting that this receptor plays an important role specifically in the amygdala.

Identifying Circuits Involved in Anxiety

Nearly 60 percent of people with depression also have anxiety disorders. While previous human and animal studies show a correlation between hyperexcitability of amygdala neurons and anxiety, the circuits involved in anxiety have been unclear, explained press conference presenter Ada Felix-Ortiz of Kay Tye's laboratory at Massachusetts Institute of Technology.

Felix-Ortiz used optogenetic technology to study the functional brain connections in freely-moving mice. The researchers used optogenetics to stimulate or inhibit basolateral amygdala (BLA) neurons projecting to the ventral hippocampus as mice navigated an elevated-plus maze. When BLA neurons were inhibited, the mice spent more time exploring the open arms of the maze, a behavior indicative of reduced anxiety. Conversely, when these neurons were activated, the mice spent more time in the closed, protected maze arms of the maze, indicating an increase in anxiety.

"This is the just the first step to dissecting … the causal relationship between behaviors and functional connections" in the brain, Felix-Ortiz said.

Deep Brain Stimulation Prevents Return of Aversive Memory in Non-Human Primates

Manipulating the activity of cells in the amygdala and prefrontal cortex may help prevent the return of an aversive memory, which can contribute to anxiety disorders, explained press conference presenter Rony Paz of the Weizmann Institute in Israel. Paz and his colleagues used electrophysiology in non-human primates and fMRI in people to observe activity in the amygdala and the cingulate cortex of people after exposure to a surprising aversive stimulus. The researchers found that synchronous activity of the amygdala and the cingulate cortex predicted how hard it would be for study participants to forget the aversive memory.

The cingulate cortex has been shown to excite the amygdala, promoting anxiety and fear. Paz and colleagues hypothesized that reducing the excitability of this region would make traumatic memories more susceptible to extinction. To test this hypothesis, the researchers delivered low frequency deep-brain stimulation (DBS) to the cingulate cortex of non-human primates after the animals were exposed to an aversive stimulus. Animals that received the low-frequency stimulation in combination with behavioral therapy showed no signs of preserving the traumatic memory compared with animals that only received behavioral therapy. According to Paz, the findings suggest that DBS may improve the effects of behavioral therapy.

Although the group of panelists expressed excitement over their work and other recent advances in the field of depression research, they also noted the challenges that lie ahead, including the need to better understand the heterogeneity of depression and related mood disorders between and within individuals.

In closing, moderator Lisa Monteggia added, "Depression is a complex disorder. It's only going to be through talking about mental illness and asking questions that trigger more research that we're going to make clinical advances." ■

… Q&A Bargmann & Newsome , continued from page 5

medium- and long-term goals for the next decade; establish a healthy interaction between technology development and question-driven science; lay out time-lines; and articulate a long-term vision for the research community and the nation that will inspire and enable us all to accomplish more than we dreamed possible.

Q: In December, NIH announced the first six funding RFAs under the BRAIN Initiative. How will these grant opportunities advance the initiative and what impact might they have more broadly on the field?

First, readers might be interested to know that the working group was as curious as the rest of the neuroscience community to see what form the RFAs would take! To prevent conflicts of interest, there is a firewall between the working group's scientific advisory function and the NIH's process for RFAs. NIH staff (and DARPA and NSF staff) were present at all our meetings, and they have translated our recommendations into an excellent set of RFAs. They incorporate the core principles we articulated, including the focus on circuits and technology development, the emphasis on tight interdisciplinary interaction between experimentalists and theorists, and between tool-makers and tool-users, and the importance of integrating animal models with human neuroscience. Several RFAs place special emphasis on assembling collaborative groups with different expertise, which can be both challenging and stimulating. The research funded under these RFAs could empower neuroscientists to do more effective research, but that will only happen if the best people apply and are funded. We encourage all SfN members to read the RFAs, talk to their colleagues, and think creatively about how to advance the field. There is a short turnaround on the RFAs because of the enthusiasm for getting the BRAIN Initiative started.

Q: As we enter a time of unprecedented opportunity in neuroscience, the community also faces real fiscal challenges. How would you address the concerns of some that the BRAIN Initiative will divert resources from other important work in neuroscience, and how can the neuroscience community help ensure a sustained and robust investment across the field?

These are difficult times for NIH-funded researchers, and your question is the single greatest concern about the BRAIN Initiative within the scientific community. The working group believes unanimously that the BRAIN Initiative only makes sense if there is vibrant support for neuroscience as a whole, and we have been vocal in expressing our views to NIH officials. In this first year of the BRAIN Initiative, diversion of resources is not a serious concern — the $40M to be disbursed by NIH in FY2014 is less than one percent NIH's $5.3B investment in neuroscience. If, however, the U.S. is to make a serious, imaginative effort toward breakthrough neuroscience, additional investment is necessary. It is essential that the bulk of this funding be added to, not subtracted from, the NIH budget. Neuroscientists can help by communicating regularly with legislators and the public about the importance of our field to scientific discovery and human health. We have an easier job than most scientists because almost everyone is curious about how the brain works and almost everyone has a personal connection to someone with a brain disorder. There have been numerous positive articles in the press about the BRAIN Initiative from all political perspectives; this is a chance for us to have a positive impact on public support of science.

Q: The BRAIN Initiative is one of a number of major global initiatives. How do you see the goals of these efforts in relation to one another, and how can the BRAIN Initiative be integrated with these international efforts?

The international enthusiasm for brain science is timely and gratifying. Understanding how the collective activity of neural circuits gives rise to cognition, behavior, and all of mental life is unquestionably a grand challenge for science in the 21st century! The different international initiatives appear complementary, and not duplicative. For example, the US initiative is grounded in experiment: it envisions integrated cellular, anatomical, and physiological data sets of unprecedented scope, rendered intelligible through theoretical and behavioral analyses. In contrast, the European initiative's primary goal is to supplement empirical knowledge by simulating neural circuit function in *silico*. These two initiatives will inevitably converge, to the benefit of both. Neurotechnology and brain-machine interface initiatives have emerged in Japan and Israel, and China and Japan are poised to make unique contributions in primate transgenic models. It is important to emphasize that basic science is international, and knowledge will flow freely between these players; no country will have a monopoly on its contributions. Whether these international efforts would benefit from formal coordination, or be more effectively served by spontaneous collaborations across the international scientific community, are important issues to work out in the coming years. ■

Super Neuroscience Saturday Event Inspires Students

Nearly 100 twelve to fourteen year old students from DC public schools engaged in hands-on activities designed to teach them about the brain as a part of "Super Neuroscience Saturday," an event organized by the White House Office of Science and Technology Policy (OSTP). SfN was invited to present creative games and displays that would inspire young students to learn and develop a curiosity about neuroscience.

"The students were very interested and engaged in the presentations," said Bobby Heagerty, an SfN member from Oregon Health and Science University who discussed the role of neurons and displayed a human brain. "It was very striking to me that, though most of the students lived right around the corner, many had never been to a museum before. The opportunity to learn about the brain and how it works was a wonderful way to get kids passionate about science, and they seemed very enthusiastic."

The event was held at the Smithsonian Museum of Natural History, where Heagerty and other working neuroscientists set up hands-on learning stations to help students explore concepts such as brain anatomy, attention, and memory. Heagerty's demonstration also engaged the students about the brain's ability to change with experience, and she suggested activities that positively shape the brain. SfN member Mike Burman of the University of New England demonstrated how memory works by teaching students how to employ a mnemonic device called the Method of Loci to remember items on a shopping list, and by leading them through an experience to show how multitasking slows the brain. Another display demonstrated a neuroprosthetic arm, and how it is controlled by signals from the brain. SfN President Carol Mason and neuroscientists from George Washington University and the Applied Physics Laboratory of Johns Hopkins University also attended.

"Super Neuroscience Saturday" continued into the evening with a series of lectures at the American Association for the Advancement of Science on ways to foster communication between neuroscientists, policy makers, and the public. Shari Ling of the Centers for Medicare and Medicaid Services, Elizabeth Albro of the National Center for Education Research, and Hunter Peckham of Case Western Reserve University were guests on the panel moderated by Philip Rubin, the Principal Assistant Director for Science at OSTP. The evening concluded with a poster session showcasing work from scientists at local Washington, DC universities and government agencies. ■

A student learns about the brain's ability to control a prosthetic limb by playing a game that translates brain activity into a ball's movement.

Students are introduced to the brain with a first-hand exploration of the Museum of Natural History's collection of models and specimens.

Friends of SfN Fund: Investing in the Future of Neuroscience

Every year, SfN launches innovative programs to better serve the evolving needs of the domestic and international membership and to cultivate opportunities that promote the field of neuroscience. In recent years, the Friends of SfN Fund was established to provide travel awards to trainees so that they can attend the annual meeting, and to support public education and outreach initiatives such as *BrainFacts.org*, which provides teachers with classroom materials and engages young people, igniting what may have been just a spark of interest in science.

"SfN's young members are a great asset to SfN," says fund contributor Nancy Ip, Dean of Science at the Hong Kong University of Science and Technology, and SfN Councilor. "They are usually on the forefront of cutting-edge technology, and knowledgeable about advances occurring in science and technology in general. They are more flexible and can help bridge the gaps between different disciplines. They are dynamic, resourceful, and eager to learn. They can bring in fresh perspectives and new energy, which is critical at a time when there are so many new developments in the field."

Advancing the Neuroscience Field

Ip says she contributed to the fund because she values investments in the education of the next generation of neuroscientists, and understands how SfN can assist a young members embarking on a career in neuroscience. She says attending the annual meeting is very important. "For a young researcher residing in a country where science and technology may not be as well-developed as in the U.S., and who may not have funds to travel to conferences, SfN membership is a goldmine of resources — from finding mentors, peers, and collaborators, to staying up-to-date on the latest advances in the field," she says. "I believe that the global reach of SfN is essential for development of quality neuroscience around the world."

Neuroscientist-turned-educator Katie Croft says she relies on the teaching resources available on *BrainFacts.org*, including hundreds of articles, videos, and blogs on neuroscience, to teach her students about the brain, and to introduce them to basic science and research. By creatively engaging students on how their memories work, how their eyes focus, or why they get sleepy, features on the site help teach and inspire the next generation of neuroscientists.

SfN Fund Travel Awardees

Trainees who received a travel award from the Friends of SfN Fund have an opportunity to present their research at the annual meeting during the Travel Award Recipients Poster Session. Trainees who received a travel award from the Friends of SfN Fund have an opportunity to present their research and network with colleagues at the annual meeting during the Travel Award Recipients Poster Session.

Lu Jin of Yale University is a travel award recipient for Neuroscience 2013. The travel award was paid for thanks to contributions to the Friends of SfN Fund.

Lu Jin, a fifth-year graduate student at the Yale University School of Medicine, received a travel award to attend Neuroscience 2013. A native of China, Jin graduated from Zhejiang University in Hangzhou, and was selected in recognition of her research accomplishments in working memory, her work as an assistant to neurobiology professor Amy Arnsten, and her extracurricular activities as a mentor to a student with Asperger's syndrome.

"This is very important and an honor for me," Jin says. "I learned really exciting science in San Diego. When I went to the travel award reception, I got to know the others who won travel awards…It was exciting to meet them," said Jin. "I had good discussions and feedback with other researchers and now I will go back and look through my data again with our discussions in mind. They were very insightful." Jin noted that other grants haven't provided an option to travel to valuable scientific conferences such as Neuroscience 2013.

Travel Benefits

Over the last several years, hundreds of students and early career-stage researchers have benefitted from SfN's Travel Award program. All travel awards are supported through SfN's corporate, foundation, and individual donor contributions because membership dues cover only a portion of costs for these and other SfN programs such as professional development, international outreach and collaboration, public education, and advocacy. A$1,000 contribution offsets costs for one trainee from the United States to attend the annual meeting; a $2,000 contribution offsets costs for a non-US. trainee's travel costs to the meeting. Within the last year, more than 700 SfN members have supported travel awards.

More information about how to support the next generation of neuroscientists with a contribution to the Friends of SfN Fund, or another travel award, is available on the website at SfN.org/support. ■

… Ethics, continued from page 1

publication is limited in scope, it represents a violation of SfN's Guidelines for Responsible Conduct Regarding Scientific Communication, but the omission is likely made because the author was unaware of the rules, rather than from intended deception.

Regardless of the motivation behind a violation, the scientific record must be corrected. Forward progress of the scientific mission depends on all of us building on others' findings to come closer and closer to our ultimate goal of understanding the world in all of its physical and biological intricacy. The literature must therefore be as accurate as possible to prevent wasted efforts based on erroneous data.

It is for this reason that I wrote in my previous column that "intent is immaterial" to our course of action, a view that some have questioned. When it comes to the reliability of the scientific literature, it does not matter whether an error arose from a mistake, breaking rules of which one was unaware, or from malfeasance. Depending on the severity of the violation, manuscripts must be corrected or rejected and articles must be corrected (with a published corrigendum) or retracted. Therefore, the Ethics Committee does not consider the back-story behind misrepresentation of data when considering whether and how to rectify the scientific literature.

A second, perhaps more practical reason for the Committee not to consider intent is our profound uncertainty in determining the motive behind any particular violation. To paraphrase *The Shadow*, "who knows what intentions lurk in the hearts [brains] of neuroscientists?" Short of a confession, we really don't know, in any factual sense, who did what and why. The Committee's approach is to work with complainants, the public record, and with alleged offenders to ascertain, to the best of its ability, the full extent of the problem, and to identify those who bear direct or indirect responsibility. When the violations are extensive or important issues remain unanswered, we may ask the author's institution to investigate. Ideally, institutional investigations involve examination of raw data and laboratory notebooks, along with interviews of laboratory members, ultimately resulting in a sober and objective report. Unfortunately, the reality is that the quality of institutional investigations varies widely; the poorest investigations may result from the inherent conflict of interest that institutions have when investigating their own. All of these considerations lend strength to the strategy of focusing on errors rather than intent.

Preventing Future Missteps

Beyond protecting the quality and reliability of literature, the Ethics Committee also has an interest in preventing repeated and future research misconduct, with the ultimate goal of putting the committee out of business. It tries to prevent repeat misconduct through sanctions, which preclude involvement in SfN activities for a period of time (see Summer 2013 *NQ* article, "*New Committee Addresses Rise in Ethics Complaints*" on SfN.org for information about sanctions).

A person who conducts intentional research fraud must, of course, be held responsible. However, intent is not the only factor that is considered. The committee also holds individuals responsible if they have acted recklessly, for example, through negligent oversight or numerous careless errors. This approach derives from the NIH Office of Research Integrity definition of research misconduct as "fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results," and the requirement that these acts must be committed "intentionally, knowingly or recklessly." The committee does its best to identify those that are responsible but, in acknowledgement of its inability to know all the facts of a case, sanctions are not imposed with the intention of being scientific death sentences. Consequently, the identities of individuals sanctioned by SfN are not made part of the public record. The goal of sanctions is to emphasize the seriousness with which responsible research must be conducted, and to educate presumably well-intentioned colleagues about how to avoid future missteps and mistakes.

Committee's Work Going Forward

I want to close on a personal note, first by thanking the SfN members who have taken the time to contact the Ethics Committee (ethics@sfn.org) with suggestions, comments and questions. Your input pushes us to be as responsive and useful as we can be to the neuroscience community, and I hope that you will continue to send in your thoughts and concerns.

There are numerous points at which scientists can err in the design, performance, analysis, interpretation, and reporting of experiments. My service as chair has led me to observe that many of the errors that scientists make are not ethical in nature, but instead concern best scientific practices – proper experimental design, statistical power, controls, statistical analysis, reporting, citation and the like. Moreover, I firmly believe that vanishingly few scientists wake up in the morning with the intent of acting irresponsibly or unethically. Therefore, discussions of personal motives, culpability, and blame are unlikely to be of benefit to anyone. Instead, the forward progress of our scientific mission will be optimally served by open discussions that focus on best scientific practices. ■

International Exchange Program Benefits Japanese, North American Trainees

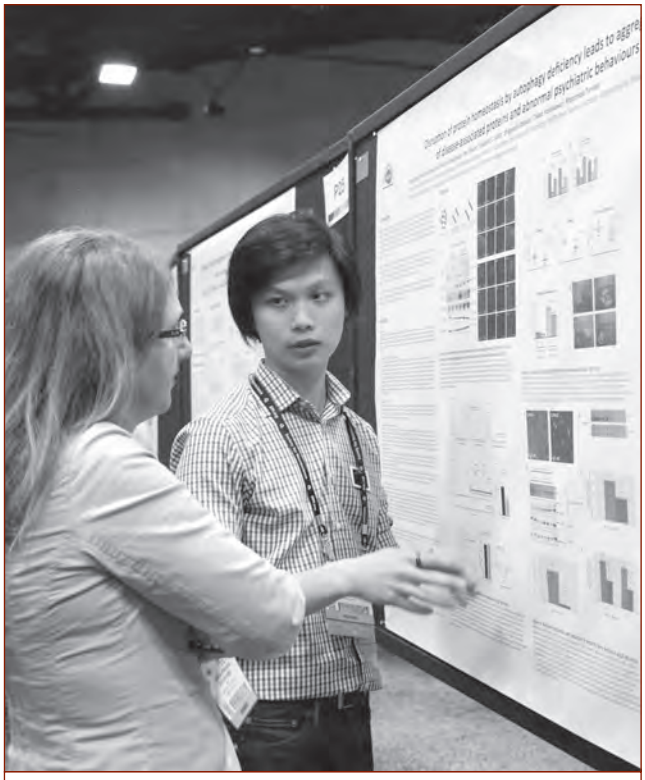
For the second year, ten young scientists engaged in a scientific exchange program as part of a joint Society for Neuroscience-Japan Neuroscience Society initiative. Meant to encourage international cooperation between neuroscientists, the program sponsors five North American students and post-doctoral trainees for travel to the JNS meeting, and travel for five students from Japan to Neuroscience 2013. The JNS meeting was held in June 2013 in Kyoto.

Kelvin Kai-Wan Hui, a postdoctoral researcher at the RIKEN Brain Science Institute, was one of the five students from Japan who travelled to Neuroscience 2013 in November, courtesy of JNS, to present a poster. Kai-Wan Hui said attending the SfN meeting is essential to staying abreast of current ideas in the field. "I'm in the later-half of data collection and one of the benefits of a big meeting like this is getting feedback," Kai-Wan Hui said. He presented a poster on his team's investigation into a link between protein misfolding and psychiatric disorders.

Another Japanese participant, Tomomi Karigo, said she takes advantage of the SfN meeting to both explore the boundaries of thinking within her own field of research — production of pituitary hormones — and to examine other fields for insights into how she might move forward in her career. Karigo is a graduate student at The University of Tokyo Graduate School of Science.

Several U.S. students also described their experiences in the program. "I think these kinds of collaborations — sharing resources and information — allow science to happen that might not otherwise be possible, and I think it should grow in that direction," said Jason Dwyer, a fifth year doctoral student at Yale University. Dwyer said he is impressed by the collaboration at JNS among researchers not only within Japan, but also internationally. "Obviously, there are a lot of similarities with the SfN meeting, but it is smaller," Dwyer said. "You almost can't help but have a personal interaction with just about everyone there." While in Japan, Dwyer learned a new technique for optical control of neuronal networks which he said will benefit his research.

Another U.S. trainee, Eugenie Suter, agreed with Dwyer's observations, adding that the collaborations she witnessed at the Japanese meeting are worth modeling as she moves forward in her career. Suter is studying memory and training for both a medical degree and a PhD in neuroscience at Northwestern University. The Kyoto meeting was an invaluable opportunity, she said, to solicit



Kelvin Kai-Wan Hui of RIKEN Brain Science Institute in Japan presents his poster at Neuroscience 2013.

input from researchers she had previously only read about. Suter intends to pursue collaborations with several JNS presenters she met through the JNS meeting.

Ji Hyun, a post-doctoral researcher at the Feinstein Institute for Medical Research in New York, says he learned about important animal research developments underway in Japanese neuroscience, and received feedback on his presentation on the placebo effect on patients with Parkinson's disease. "I got good comments, interesting comments," Hyun said. "I also met a professor whose work I frequently cited in my paper. He is quite well known in my field, so that was interesting."

The next JNS meeting is scheduled for Sept. 11-13, 2014, in Yokohama, Japan, and SfN's annual meeting will be Nov. 15-19 in Washington, DC. Winners of the SfN-JNS travel award are selected each spring on the merit of their abstracts, CVs, and letters of recommendation. Applications are accepted from January through March. More information about the JNS award and other travel awards is available at SfN.org. ■

Fall Council Roundup

During its annual fall meeting at Neuroscience 2013, SfN Council met with committees to discuss key accomplishments and future directions in programming and services.

Council reviewed a successful annual meeting, which surpassed 30,000 attendees, included a rich scientific program, and provided strong revenue for the Society's ongoing activities. The Financial Management Cluster reported continued fiscal strength with strong investments, record-breaking exhibit numbers, and increases in subscriptions to *The Journal of Neuroscience*. These successes offset some budget pressures from lower membership numbers. Council approved the creation of a Strategic Investment Fund, which will draw up to one percent from reserves for the next three years to support endeavors that further the mission and enhance member value. The first funded initiative is the creation of a new, open access, online-only, rapid publication journal, which is expected to launch as early as fall 2014.

With regard to membership engagement and professional development & training, Council discussed expanding selected programs to serve more members. A renewal application for the Neuroscience Scholars Program, which serves underrepresented neuroscience researchers, will be submitted to NINDS in January 2014, and Council reviewed the new program design, which will preserve the program's historic strengths while introducing new online strategies to engage more scientists. A new Latin American training program, supported by the Grass Foundation, will similarly expand the reach of program. To support these and other future online activities, Council approved funding for a new online member program strategy and platform. Set to launch as early as late 2014, it will centralize training resources, expand networking opportunities, and support new programs that can engage members worldwide. Council also approved efforts to compile and share best practices in neuroscience training among departments and programs, as well as new chapters in Nigeria, Tennessee, and Florida.

In the Public Outreach Cluster, Council approved a major media campaign to support biomedical research, a new young advocates program, and funding for Canadian advocacy. Leadership discussed the success and growth of *BrainFacts.org*, which surpassed 2 million page views worldwide, and reviewed SfN's contribution to new U.S. science teaching standards, which for the first time include neuroscience.

Council also discussed progress on the development of an online, multimedia history of SfN's first 25 years. ■

Get Involved in SfN

CALL FOR **NOMINATIONS**

DEADLINE: **FEBRUARY 24**

Shape the future of neuroscience by nominating yourself or a colleague for SfN's volunteer leadership — to serve as an officer, councilor, or committee member. Elections will follow in the spring.

SfN.org/committeenominations

Exploring Creativity and Advances in the Field at Neuroscience 2013

More than 30,000 neuroscientists from around the world met in San Diego this November to discuss their research, attend scientific presentations and workshops, and share great science. One of several discussions at the annual meeting provided insight into how creativity works in the brain, and how creative individuals interact within society. Pixar and Walt Disney Animation Studios President Ed Catmull discussed how he creates a culture of creativity at Pixar, highlighting issues he says are central to uncovering genius, including removing hidden barriers to creativity and candor, particularly in the workplace. "Many people fail because it is too hard to let go of a project that isn't working," Catmull said, in remarks at the "Dialogues Between Neuroscience and Society" lecture at Neuroscience 2013. "In a research environment, we have the desire to always get it right. In a creative context, 'zero error' doesn't work."

At another panel, Bruce Adolphe from National Public Radio's Piano Puzzler discussed the possibility of studying the brain as it imagines sounds, to learn about where such functions live. He was joined by several guests at the Fred Kavli Public Symposium on Creativity, which focused on how the visual arts, music composition, and other forms of creativity are manifest in the human brain. Psychologist and author Kay Redfield Jamison began her remarks by naming creative historical figures with mood disorders. After discussing the disproportionate number of bipolar disorders those in creative professions statistically have, Jamison asked the audience, "If you medicate a disorder, does that mean you then medicate away creativity?"

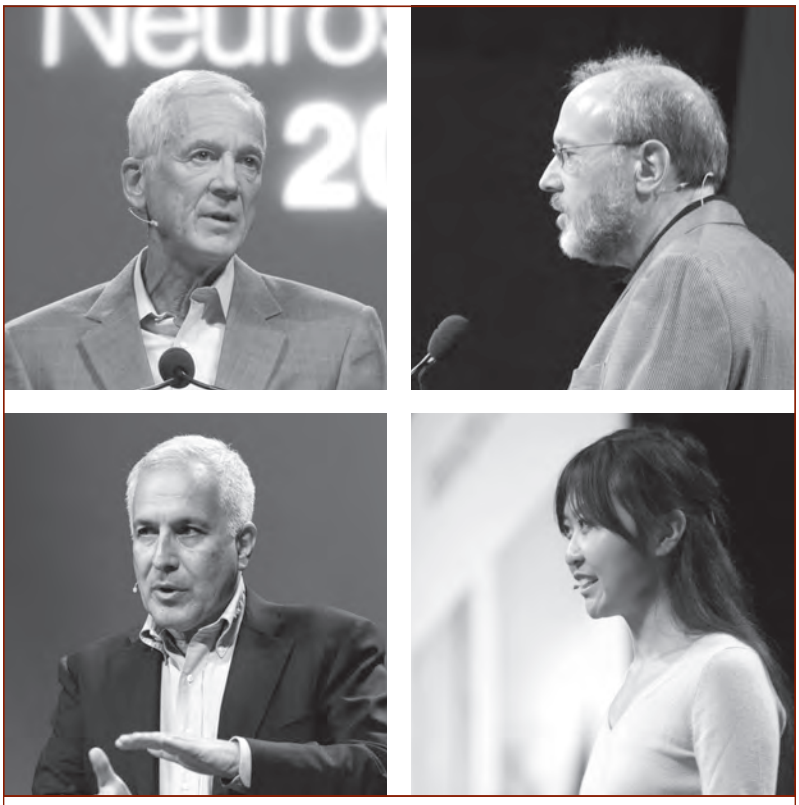
Advocating for the Future of the Field

In addition to discussions on creativity, the meeting featured a number of sessions on how advances and innovations in neuroscience have accelerated fundamental understanding of the brain, and why it is important to communicate with legislators and the public about neuroscience research that is leading to better treatment of brain diseases and disorders for millions of people worldwide. At the Global Advocacy Symposium, SfN, IBRO, and FENS came together for the first time to share ideas and strategies. The event focused on how to help communities of all sizes and in any country to design locally tailored advocacy and outreach programs. Outgoing SfN President Larry Swanson kicked off the symposium by encouraging SfN members to promote strong international ties because, he said, "That's what science is – an international community."

As the world's largest meeting focused on scientific discovery related to the brain and nervous system, the event brought to life more than 15,000 scientific presentations showing innovative advances in techniques, and valuable new research about brain structure, health, disease, and treatments. In addition to posters and scientific lectures, the meeting featured 34 professional development workshops and networking functions, and 600 exhibitors. ■

Guests at the SfN Diversity Reception included (L to R): Carole Parent, Rep. Chaka Fattah (D-Pa.), Erich Jarvis, and Michelle Jones-London.

NEUROSCIENCE QUARTERLY



Presidential Special Lectures at Neuroscience 2013 focused on the functional connectome (Clockwise from top left: Scott Emmons, Gerald Rubin, Doris Tsao, and Jeff Lichtman).

Five key leaders from the BRAIN Initiative and the Human Brain Project participated in a panel to discuss emerging neuroscience initiatives in the U.S. and Europe. From left to right: Story Landis, director, National Institute for Neurological Disorders and Stroke, NIH; Thomas Insel, director, National Institute of Mental Health, NIH; SfN President Larry Swanson; Cora Marrett, acting director, National Science Foundation; Geoffrey Ling, deputy director, Defense Sciences Office, DARPA; and Daniel Pasini, Policy and Programme Officer, European Commission.

Published quarterly by the Society for Neuroscience

Circulation: 44,300

Neuroscience Quarterly is printed on New Leaf Reincarnation Matte made from 100% recycled fiber and 40% post-consumer waste, printed with vegetable inks, and processed chlorine free. By using this environmental paper, SfN saved the following resources:

43	trees
19,489	gallons of water
1,235	pounds of solid waste
4,322	pounds of hazardous effluent

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