NEUROSCIENCE QUARTERLY

FALL 2003

Special Election for President-Elect

The nominees running on the ballot to replace Story Landis as president-elect are:

Carol A. Barnes, PhD, University of Arizona

Pat R. Levitt, PhD, Vanderbilt University

To access the ballot, please visit the following site: https://www.directvote.net/sfn. The special election opened on October 1 and will close on October 21 at 5 p.m.

For login information, please refer to the e-mail sent to you by Survey & Ballot Systems, Inc., on October 1.

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Landis Named Director of NINDS

Story C. Landis has been named Director of the National Institute of Neurological Disorders and Stroke (NINDS). Her appointment was announced by Elias Zerhouni, Director of the National Institutes of Health (NIH). Landis took the helm of NINDS on September 1, 2003.

Story C. Landis

Because of the time required as NINDS director, Landis has resigned as SfN's president-elect, effective September 1. In accordance with the resolutions to SfN's bylaws, Anne Young, the incoming president-elect, will become president-elect as of September 1, and will become SfN president at Neuroscience 2003. A special election for president-elect will be held in October.

According to Landis, her new position is an exciting opportunity to help encourage the growth of neuroscience research. "There are wonderful opportunities for new discoveries in basic science and their rapid translation into diagnostics and therapeutics for diseases of the nervous system," she said. "The NINDS has played an important role in the past, and I look forward to helping direct the efforts of the institute and the investigators that it funds in the future."

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Message from the President

Neuroscience Databases: What We Have, What We Need, How We Might Get There

Over the last two or three years, the need for neuroscience databases has become particularly noticeable to many researchers, possibly because we have come to rely so heavily on databases in other areas such as genomics and proteomics.

For example, if we discover an alteration in the expression level of a novel gene, or an association between a gene and a behavioral trait, we can use available public databases to learn about the sequence and structural organization of that gene, its chromosomal location, the polymorphisms it contains, the protein it encodes, its presumed function, and its possible relationship to a particular disorder.

However, it is difficult to get beyond this level of analysis to uncover information about the brain-specific expression of that gene, its relation to ontological terms that make sense to a neuroscientist, or its involvement in a particular neural or behavioral role, unless it is implicated in a neural Mendelian disorder.

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Neuroscience Databases

Huda Akil,
SfN President

This lack of access to organized brain-related information is felt regardless of our starting place. So, is there a database we can use to acquire a snapshot of the connections of the bed nucleus of the stria terminalis? To identify the complement of genes expressed in a subset of neurons in the dorsal striatum? To view the electrophysiological signature of somatosensory cortical neurons in response to a given stimulus? To compare the features of the anterior cingulate between human and rodent? To examine the neural phenotype associated with a brain disorder using brain imaging?

Earlier this year, when the Society for Neuroscience Council approved an initiative to study the current status and assess the future of neurodatabases, I would have answered "no" to all the above questions. I am pleased to report that much more good work is currently under way than we might have imagined.

Also, a great deal more can and should be done by us as scientists in collaboration with the relevant institutes at the National Institutes of Health (NIH), the National Science Foundation (NSF), and other funding agencies.

As an immediate next step, I want to inform the neuroscience community about the existing efforts and available resources and suggest opportunities to participate in shaping the future of this all-important undertaking.

THE CHALLENGE

The need for a plan to organize the existing knowledge and the rich stream of information generated by neuroscience goes beyond convenience to the neuroscientist. To truly understand brain function, it is necessary to confront the very feature that makes it unique—its multidimensional complexity and the emergent properties that arise from it. And there is no way to confront this complexity without first gathering accurate and extensive data that characterize it, mining this information, and interpreting it in a biologically relevant context.

The national and international investment in neuroscience, the huge and creative efforts expended by the neuroscience community, and the devastating nature of brain disorders demand that we organize our information in a way that can be used by the entire community to answer fundamental questions about the brain. This necessitates the creation of either an overarching neuroscience database or a thoughtfully integrated federation of neuroscience databases.

Neuroscience presents unique challenges for the creation of databases, and particularly for an integrated database that subsumes and links various dimensions of neurobiology. Neural systems not only involve multiple interacting molecules within a cell, but multiple types of neurons and glia interconnecting to form higher order circuits that perform complex brain functions within an anatomical context. Moreover, neurons have distinctive and varied cellular structures and time-dependent electrical properties. They are endowed with remarkable plasticity, both age- and experience-dependent.

"To truly understand brain function, it is necessary to confront the very feature that makes it unique—its multidimensional complexity and the emergent properties that arise from it."

—Huda Akil

This intricate and dynamic network organization is the distinctive hallmark of the brain, and the associated spatial and temporal features need to be considered in any integrative schema for databases. Moreover, brain disorders are typically genetically complex and cannot be understood without reference to all the above features of brain function, from the molecular and cellular to the circuit and network levels.

Our challenge is to organize the various bodies of neuroscience information (lexical, visual, and temporal) in a conceptually sophisticated and biologically relevant manner that is robust enough to withstand the addition of future novel concepts, technologies, and data, while ensuring that the database can be navigated in a user-friendly way and interfaced with other biological databases.

THE SFN NEURODATABASES INITIATIVE AND THE BRAIN INFORMATION GROUP

During this past year, the SfN Council determined that the time was ripe to survey the status of neurodatabases and to generate a strategic plan for enhancing their creation, coordination, and active use by the neuroscience community.

This goal was discussed among the leadership of the SfN and the directors of key NIH neuroscience institutes, including the National Institute of Mental Health, the National Institute of Neurological Disorders and Stroke, the National Institute on Drug Abuse, the National Institute on Alcohol Abuse and Alcoholism, and others.

In response, the SfN Council created a special working group, the Brain Information Group (BIG), generously funded by the Wadsworth Foundation. BIG is chaired by Floyd Bloom; other members are listed in the box accompanying this column.

The charge to BIG is to:

1) survey existing neurodatabases, their goals, features, strengths, and limits;
2) identify critical components that may be missing from the existing body of databases;
3) identify the challenges intrinsic to interfacing existing databases;
4) conceptualize a framework for a well-integrated overarching neuroscience superstructure that subsumes current databases and can readily incorporate future ones; and
5) write a white paper, summarizing the findings and recommendations to Council, and share it with the Society membership.

The SfN leadership is exploring proposed short- and long-term goals as a template for neuroinformatics database development that would be discussed with the NIH and may be funded by various agencies, including appropriate NIH institutes, the NSF, international agencies and governments, foundations, and possibly the private sector.

WHERE WE ARE

To date, dozens of efforts have been supported by individual NIH institutes or by collaborations across agencies to create specific types of brain databases. For example, the Human Brain Mapping Project began a decade ago as a multi-agency NIH effort to achieve some of the above goals, with the neuroscience-related institutes playing the leadership role. Other databases have been funded by NSF, and some of the ongoing coordinating efforts are supported by the National Center for Research Resources, an institute concerned with matters of science infrastructure.

The current databases are all specialized in some manner, focusing on particular species (e.g., rat, mouse, nonhuman and human primates), on particular approaches and technologies (e.g., classical neuroanatomy, functional neuroanatomy, three-dimensional imaging of brain regions or pathways, cell biology, electrophysiology, human neuroimaging) and targeted toward the needs of particular research communities (e.g., research in olfactory systems or electrophysiological time series in somatosensory cortex).

These databases use different platforms, architectures, and data gathering strategies. Some funded efforts, within and outside the Human Brain Mapping Project, are beginning to coordinate a subset of them. However, it is evident that we need to focus on creating an integrated plan that orchestrates the various databases and specialized networks into a framework that could eventually span the entire field of neuroscience.

A helpful distinction described during the BIG meetings was the difference between curated knowledge bases and archival databases that warehouse and organize actual data from particular research communities.

Thus, a potential anatomical database may describe circuits such as those associated with dopaminergic systems and allow linkage to the accumulated literature on the role of these circuits in

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Brain Information Group Members

Floyd Bloom, BIG chair, Department of Neuropharmacology,
The Scripps Research Institute, San Diego, CA

David Van Essen, BIG liaison to SfN Council, Department of Anatomy and Neurobiology, Washington University School of Medicine, St. Louis, MO

Sarah J. Caddick, liaison to Wadsworth Foundation, Seattle, WA

Huda Akil, Mental Health Research Institute, University of Michigan, Ann Arbor, MI

Mark Boguski, Vulcan Inc., Seattle, WA

Douglas M. Bowden, University of Washington National Primate Research Center, Seattle, WA

Daniel Gardner, Cornell Medical College Department of Physiology, New York, NY

Gwen A. Jacobs, Montana State University Center for Computational Biology, Bozeman, MT

Edward G. Jones, Center for Neuroscience, University of California, Davis, CA

Luis Marenco, Center for Medical Informatics, Yale University School of Medicine, New Haven, CT

Maryann E. Martone, Department of Neuroscience, University of California-San Diego, San Diego, CA

Richard J. Mural, Celera Genomics,
Rockville, MD

Gordon M. Shepherd,
Department of Neurobiology, Yale University School of Medicine, New Haven, CT

John D. Van Horn, Center for Cognitive Neuroscience, Dartmouth College, Hanover, NH

Robert W. Williams, Department of Anatomy and Neurobiology, University of Tennessee Health Science Center, Memphis, TN

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motor behavior, reward, stress, or substance abuse. As such, it would function as a knowledge base and would need to be curated to ensure that the information is up to date and in line with current concepts.

By contrast, the substance abuse research community may choose to create a database to share primary data, be it electrophysiological recordings, alterations in gene expression, or activation of neuronal ensembles associated with drug administration under specified conditions. This would be a dynamic community database where data are archived along with metadata that specify the exact conditions used for collecting the empirical information. Clearly, however, one should at least be able to navigate bi-directionally between these two types of databases and laterally between various knowledge bases or community databases.

". . . it is evident that we need to focus on creating an integrated plan that orchestrates the various databases and specialized networks into a framework that could eventually span the entire field of neuroscience."

—Huda Akil

WHERE WE HOPE TO GO

The white paper to be issued growing out of the BIG deliberations will outline immediate and longer term strategies for achieving some of the above goals.

It will likely propose the elaboration of a lexical system for a shared but evolving language to be used in neuroscience databases. A central requirement of such a language would be that it be flexible and not demand an exclusive use of certain terms at the expense of others.

This language property is critical not only because existing databases already use their own terminologies, but because such rigidity would not be compatible with the idea of an evolving system that can adapt to alterations in our conceptual framework. The proposed use of the National Library of Medicine-Uniform Medical Language System can accommodate these needs and help ensure the fluidity of this lexical framework.

An equally important consideration is the creation of a flexible *spatial reference framework* that can be interfaced with the lexical system to provide the neuroanatomical scaffolding for our databases.

Once established, the lexical system and spatial framework would serve as the organizational layers that could be used for connecting and translating information between specialized databases, while allowing them to maintain their own inter-

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Q & A with Floyd Bloom

Floyd Bloom

Floyd Bloom chairs the Brain Information Group and is chairman of the Department of Neuropharmacology at The Scripps Research Institute in San Diego, Calif. He is also founding CEO and chairman of Neurome, Inc.

NQ: What is the overall purpose of the Brain Information Group (BIG)?

Bloom: The purpose of the group is to discuss what the Society might do to help our members by developing strategies for creation of integrated neuroscience databases. It is a short-term effort to develop some strategic thinking that can be presented to the directors of the relevant NIH institutes and other funding groups. It is also one of the first efforts that I know of in which the Society has reached out beyond the annual meeting and *The Journal of Neuroscience* in order to do something on behalf of the membership.

NQ: How would this project integrate with what has already been done by the various National Institutes of Health?

Bloom: The BIG initiative integrates with what has already been done in the Human Brain Mapping Project, but it also allows us to go beyond this project and look at other agencies that might be interested in participating. The Department of Energy, for example, was a very big player in the early days of the genome mapping project, and the National Science Foundation has not been a major participant in this so far, but could be.

NQ: What kind of impact would you like the BIG initiative to have five years from now?

Bloom: The field of neuroscience will produce more and more data of a higher degree of detail that will integrate genetic information with biochemical, physiological, and anatomical data. Finding ways to gain control of the literature and analyze it is part of the dream of every scientist.

NQ: What are some of the hurdles to accomplishing these objectives?

Bloom: Very few people think about integrating databases. Some of the participants in the BIG initiative are among the world's leaders in integration of databases, but efforts to integrate neuroscience databases are still very limited and highly incomplete. Unless we can come up with a method by which people can enter their data into a database that doesn't take them more time than they're spending on doing their research, we won't be able to get people to buy in. We need the community to buy in to the idea of data sharing and data organization. Individuals currently submit information to

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New Academy Will Look at How Neuroscience Can Improve Architectural Environments

The neuroscience and architectural communities have teamed up to explore how knowledge of neuroscience can assist architects in their design of environments that allow people to function at their fullest.

The Academy of Neuroscience for Architecture (ANFA), formed in May, is the product of a 20-year working relationship between a group of neuroscientists and architects who believe that scientific data on how the brain responds to cues from different environments will eventually provide better informed tools for the design process.

The academy will support research in areas such as the way in which architectural environments can be designed to enrich learning in classrooms, increase office productivity, and facilitate healing of patients in health-care facilities.

Formation of the academy, which is located in San Diego, Calif., was announced at the American Institute of Architects (AIA) National Convention this year. Fred H. Gage, SfN past president and a neuroscientist at the Salk Institute in La Jolla, Calif., gave a keynote address at the convention, joining with architects and meeting organizers to announce the formal collaboration between the two groups.

"We now know that the mature brain is more structurally plastic than was previously thought, and we also know that experience can influence that plasticity," said Gage. "The design of the environments in which we live, work, and play will affect the underlying structure of our brains as we navigate through those environments, but we do not know how this design affects our brain and behavior. ANFA has been established to develop and test hypotheses so that a knowledge base at the interface between architecture and neuroscience can be developed."

John P. Eberhard, AIA national director of research planning, has long argued for a working relationship between neuroscientists and architects.

"We have long known of the power of architecture to elevate and enrich the human experience," Eberhard said. "As neuroscientists and architects continue to work together, we will know not only that people's experiences are enriched by architecture, but also how and why."

NEUROSCIENCE AND HEALTH-CARE FACILITIES

One successful example of neuroscientists and architects beginning to work together is in the design of health-care facilities. A National Academy of Sciences workshop on neuroscience and health-care facilities took place last year in Woods Hole, Mass. Sponsored by the AIA and the Vinyl Institute, the workshop explored how neuroscience methods that help explore how the human brain reacts to different experiences can be used to investigate the experiences of patients, doctors, and visitors in health-care facilities.

The workshop explored the use of various techniques to make moment-by-moment charts of an individual's brain activity when they are in, for example, a well-designed versus a poorly designed hospital room. Some of the techniques discussed were functional magnetic resonance imaging, electroencephalograms, and magnetoencephalograms.

A follow-up workshop on neuroscience and health-care facilities will take place in Woods Hole, Mass., in August 2004.

WORKPLACE PRODUCTIVITY

The AIA is also collaborating with the National Institutes of Health (NIH) and the Public Building Service of the General Services Administration to study workplace productivity. A team of NIH neuroscientists will test office workers to study how cognitive functions are affected by architectural settings.

One of the most effective collaborations between architect and scientist that enhances scientists' work environments is the Salk Institute for Biological Studies, said Gage. The Salk Institute differs from other laboratory environments because of its large amount of unimpeded lab space made possible as a result of the trusses being concealed.

The unimpeded space—with electricity and water supplied from interstitial spaces—allows scientists to be flexible in their design of experiments. "If we as Salk Institute scientists change our ideas about how we want to do an experiment, we can pull the wires and water up, redesign the rooms, drop everything down and begin the newly designed experiment within weeks," said Gage. "Such flexibility may allow for a more effective research environment."

SfN members who are part of the ANFA organizing committee and advisory board include Gage, Tom Albright, and Terrance Sejnowski, all of the Salk Institute; Eduardo Macagno, Division of Biological Sciences, University of California-San Diego; Larry Squire, VA Medical Center, San Diego; and Einar Gall, the Neurosciences Institute, San Diego.

Also on the organizing committee and advisory board are prominent architects and others interested in the interface between architecture and human experience such as Robert Schuller of the Crystal Cathedral Ministries in Garden Grove, Calif. ■

An Architect and a Neuroscientist Discuss How Neuroscience Can Influence Architectural Design

A roundtable with John P. Eberhard, director of research planning at the American Institute of Architects, and Fred H. Gage, SfN past president

John P. Eberhard

Fred H. Gage

NQ: Why are architects and neuroscientists beginning to work together?

Eberhard: Architecture has the most impact when the ideas used in building design reflect our understanding of how the brain reacts in different environments. Neuroscientists can help architects understand scientifically what have historically been intuitive observations.

Gage: Neuroscience has reached a point in its understanding of the brain and how it is influenced by the environment that neuroscientists can work with architects in their designs for environments that enable people to function at their fullest within those environments.

NQ: How can one transform the intuition of the architect regarding what makes for good design into scientific study?

Eberhard: This is very tough, but we are in the process of doing that. The research we are undertaking during the initial stages of development of the Academy of Neuroscience for Architecture (ANFA) will explore ways in which links might be made between the intuitive understanding of architects and the rapidly growing knowledge base of neuroscience. For example, we believe that providing windows for children in a classroom is a good idea, but we don't know why. We hope that neuroscientists can answer questions such as this in terms of what happens in children's brains when they are in an environment with windows. About one year from now, we hope to have specific hypotheses to test.

Gage: Part of what we are trying to do in bringing the knowledge of neuroscience into architecture is to establish a systematic way of gathering information for architects to use when they make decisions about design. The underlying premise of this initiative is that the brain is significantly more structurally plastic than was thought in the past. And more evidence is accumulating that activity-dependent experiences influence the underlying structure of the brain. If this is true, then the buildings that we spend all of our time in—living, working, and playing—can influence the underlying structure of our brain, and therefore affect our behavior.

However, we have absolutely no clue about how the design or the shape of a building affects our behavior. What we do have are the architects' intuitions about what makes for good design. We would like to add some empirical evidence that could substantiate some of these intuitions.

NQ: Are there good examples of how neuroscience has influenced architecture?

Eberhard: The work of Stanley Graven on understanding how neonatal care units should be designed to better provide for the developing brains of premature infants is one of the only examples currently available. Graven has shown that both visual and auditory development may be impaired in premature infants exposed to inappropriate lighting and noise levels in neonatal intensive care units (NICUs). Architectural designs that allow focused lighting and dimmer controls could help individualize light levels for infants according to their stage of development. Likewise, NICUs could be designed with silent alarms (such as blinking lights), paging systems with vibrators rather than beeping sounds, and other substitutions to soften the noise level common in these units.

"Neuroscience has reached a point in its understanding of the brain . . . that neuroscientists can work with architects in their designs for [architectural] environments."

—Fred H. Gage

Gage: Very few examples exist. There may be those that came about through serendipity, but very few have come about systematically.

NQ: Are there some architectural parameters that universally induce certain emotional states and responses?

Eberhard: Again, this is a hypothesis we hope to test over the next few years. There are intuitive observations by architects about such responses. For example, everyone who visits the Lincoln Memorial in Washington, D.C., especially at night, has an emotional experience that they long remember. We don't know why, but those who make such a visit universally report it.

Gage: Yes, that is one of the underlying hypotheses we'd like to test: Are there elements of design that evoke universal responses?

NQ: Can anecdotal architectural success stories lead to the development of robust hypotheses that can be tested?

Eberhard: Case studies are not the correct way to think of what we want to do. That is a social science approach. I want to find people who are already undertaking neuroscience research, find out what problem they are looking at, and try to restate that research as an architectural question.

Gage: You can think of intuition or anecdotal pieces of information as leading to a hypothesis. Then an experiment can be designed around that hypothesis. The anecdotal information provides the baseline data, or historical data, that are part of any good experiment in which a scientist reads the literature, finds out what is known about a particular topic, from that knowledge generates a hypothesis, and from that hypothesis designs an experiment that controls for the appropriate factors.

NQ: How do you think the findings of neuroscience will influence how architects work in the future?

Eberhard: Much as the practice of medicine was changed by the identification of the germ theory of disease, the invention of the microscope, and the creation of a pharmaceutical industry, so it is likely that in 10 to 20 years the practice of architecture will be greatly changed by the findings of neuroscience.

For example, by understanding the biological basis for workplace stress, we can design environments that help induce wellness, rather than illness.

Gage: Rather than thinking of scientific evidence as constraining architects in their work, our view is that this empirical evidence will be freeing for architects, because they can use it to bolster their own creativity. An empirical approach to architecture can provide a rationale for making design choices about a building that can then be put forward to other decision-makers.

For example, for architects to say to a state legislature that they think it is true that having windows in the classroom is good for children's cognitive activity does not make for a convincing argument. Scientific evidence to back up the statement can influence decision-makers to follow the design choices of architects.

NQ: What do you consider to be some of the major challenges in fusing the work of neuroscientists and architects?

Eberhard: We must identify basic concepts important to understanding human experiences in buildings that can be linked to research of interest to neuroscientists.

Gage: There are skeptics to this sort of work among both neuroscientists and architects. Scientists may believe it is too difficult to control for all the factors that may influence an individual's behavior in a particular architectural setting. I would answer that there is a range of levels of analysis in neurobiology. We need to be clear that this research will be on the level of systems neurobiology; as in, for example, evaluating a patient's response to a drug in a hospital setting. The better we design an experiment, the better the results will be.

To the architects who believe that imposing scientific empiricism on architecture will rob it of its artistic element, I would answer that scientific evidence can bolster creativity by providing some validation for architects' intuitions.

"Much as the practice of medicine was changed by the identification of the germ theory of disease . . . so the practice of architecture will be greatly changed by the findings of neuroscience."

—John P. Eberhard

NQ: How do you envision partnerships between organizations like the American Institute of Architects and SfN?

Eberhard: We hope to build intellectual bridges between architecture and neuroscience by jointly sponsoring meetings and workshops. For example, SfN and ANFA are currently considering co-sponsoring an event to help the public learn more about the connection between neuroscience and architecture.

ANFA is also planning to co-sponsor with other organizations a slate of workshops for 2004 that will address topics likely to be among the first to be studied by neuroscientists and architects. A follow-up to the 2002 workshop on neuroscience and healthcare facilities will be held in August 2004 in Woods Hole, Mass. A workshop on sacred places will be held in Columbus, Ind., in April 2004, and a workshop on neuroscience and the design of elementary schools will be held in late 2004 or early 2005.

Gage: I can image in the future that architecture schools will have courses in basic neuroscience, and that graduate schools in neuroscience, in collaboration with schools of architecture, could provide teaching assistance. There will likely then be students from each program who may conduct research at the interface of these two disciplines. SFN in conjunction with AIA could provide a fellowship program to foster this type of work and help train the first generation of neuroarchitects and architectural neuroscientists. ■

To find out more about the connection between neuroscience and architecture, see the following resources:

Academy of Architecture for Health, www.aia.org/pia/gateway/PIA_Home_pages/aah.asp

ANFA, www.neuroscienceforarchitecture.org

Architecture and the Mind, www.architecture-mind.com

Coalition for Health Research Environments, www.cheresearch.org

The SCAN, an architecture and neuroscience electronic newsletter; for more information, contact Margaret Tarampi at mtarampi@aia.org).

NIDA Director Discusses Successes and New Directions in Drug Addiction Research

Nora Volkow

Nora Volkow is the Director of the National Institute on Drug Abuse (NIDA). She will be giving the Public Lecture at the Society for Neuroscience Annual Meeting in November, where she will speak about the addicted human brain.

NQ: What new initiatives are planned for drug addiction research funded by your institute?

Volkow: We want to emphasize research on prevention. To that end, we are targeting topics like the interaction of the environment with genetics and the relationship between genetics and behavior. We are also working on research to optimize intervention in childhood and adolescence, which will involve the educational system and also primary care physicians. Another initiative is the expansion of research on treatment development, emphasizing new molecular targets.

NQ: What do you mean by "new molecular targets"?

Volkow: Extensive work has been done over the past few years to develop molecules that target the dopamine system because this neurotransmitter has been shown to play an important role in the reinforcing effects of drugs of abuse and in addiction. Now research studies have shown that manipulations of neurotransmitters other than dopamine (e.g., GABA, glutamate, and CRF) can lead to changes in the patterns of drug self-administration. For example, some very interesting compounds target the cannabinoid-1 receptor because these compounds markedly modify the reinforcing effects of several drugs of abuse.

NQ: What areas will have the greatest significance for the public and neuroscientists?

Volkow: For the public, areas related to prevention research will have a significant impact by helping to reduce the burden of drug addiction. Basic research related to prevention will also have a big impact for neuroscience. Research will explain how environmental risk factors change the molecular biology in the brain to make an individual more vulnerable to drug abuse. The research will provide us with information on how environmental stimuli shape the neurochemistry and function of the human brain. Research into proteomics will also be beneficial for the neuroscience community because it will help identify the molecular machineries underlying the function of cells in the brain.

NQ: What are the greatest opportunities for understanding drug addiction and developing better treatments?

Volkow: The genome project has identified a series of genes that encode proteins that we did not know existed and that can now be manipulated to see their effects on drug self-administration, on addictive behaviors, and on relapse. This will also help identify potential new therapeutic targets.

Another area where the genome project will be very beneficial is in the investigation of the mechanisms underlying vulnerability to drug abuse and addiction. As we investigate the functional significance of gene polymorphisms in behavior and their differential expression in addicted versus non-addicted individuals, we will start to understand which genes are involved in vulnerability for drug abuse or addiction and how these genes interact with environmental risk or protective factors.

NQ: What are the major challenges in drug addiction research over the next decade?

Volkow: Our portfolio on clinical research has been eroding, and so one of the challenges is to expand the training of clinical researchers. Another challenge is the translation of the basic research into applications for clinical or community intervention in drug addiction. The findings from basic research have been tremendously accelerated by the knowledge and the technology that resulted from the human genome project. The challenge is how to take advantage of these findings to affect drug addiction and the problems that arise from the use of recreational drugs in humans (e.g., accidents and sexually risky behaviors, with consequent risk for HIV infection).

NQ: What are the keys to uncovering the underlying causes of addiction disorders?

Volkow: One of the keys is to realize that these are complex disorders. If we are to understand them, a systems analysis approach is required to evaluate the effects of drugs on genes, proteins, cells, neuronal circuits, behavior, and social networks. This will require the integration of the findings of the effects of drugs at the molecular level with those that relate to the contribution of social and environmental variables in the abuse of drugs and the impact of the latter on genes, brain neurochemistry, and function.

NQ: Where do you see the most progress toward addressing addiction being made in the near future? In which disorders are scientists close to developing effective treatments, and what makes this possible?

Volkow: Where there has been the most success is with heroin treatment, where we have had several substitute medications that have been effective in protecting individuals against risky behaviors associated with heroin addiction. For example, methadone treatment has been shown to have a dramatic effect in preventing HIV infection in heroin abusers, because methadone is given orally, minimizing the risks of HIV infection secondary to injection of heroin.

NQ: What makes these new medications possible?

Volkow: We know that the speed at which drugs exert their effects in the brain determines how addictive they are. The faster a drug acts, the more addictive it is. Heroin acts very rapidly in the

brain and it is perceived as highly reinforcing. In addition, heroin induces physical dependence, which is responsible for the severe physical withdrawal that ensues after its discontinuation. You can provide medications that target the opiate system but with different properties to those of heroin. One property of these medications is that they enter and leave the brain much more slowly than does heroin. These slower pharmacokinetics interfere with the "high" and minimize the occurrence of withdrawal symptoms.

"Research will explain how environmental risk factors change the molecular biology in the brain to make an individual more vulnerable to drug abuse."

—Nora Volkow

NQ: Which other disorders will be more difficult to overcome, and why?

Volkow: One of the main challenges in the drug abuse field is that of drug use in adolescents, who tend to be more vulnerable to experimentation with drugs and to pressure from peers to use drugs than adults. Although the campaign against smoking has been very successful in adults, this has not been the case with teens and adolescents, where the consumption of cigarettes is quite high. This problem is compounded by drug availability in the community, which facilitates access to the drug and early experimentation.

NQ: One of the big reasons for the success of campaigns to educate the public about the dangers of cigarettes is that smoking causes lung cancer. Are there similar themes that could be promoted in an educational campaign about drugs like heroin or cocaine?

Volkow: There are, and some of them are scarier, but in order to convey this information it is useful to look at the results of the cigarette smoking campaign. It is very different to put a scary statement to an adult than it is to an adolescent. Telling adolescents that they are going to get lung cancer 40 to 50 years from now is unlikely to make much of an impact on them because that is too far into the future. Telling a person in their 30s or 40s that they are increasing their risk of cancer, when they've likely seen people close to them die of cancer, is likely to be much more effective.

One of the reasons I think anti-drug education hasn't been effective in adolescents is that the campaigns tend to be molded through the eyes of adults and do not necessarily focus on the concerns of adolescents.

For example, "club drugs" such as ecstasy or methamphetamines are very toxic to the brain and can damage brain cells involved with motor control. If you take these drugs, you are damaging the system that allows you to have fast motor reflexes. For an adolescent, knowing this could be an effective deterrent to drug use, because one of the things many adolescents value is how good they are at sports. These designer drugs mimic what happens to the brain's motor control system when it grows old. You could say to a 20-year-old, "You're taking this drug and perhaps enjoying it, but one or two years from now, if you continue to do this, some of your brain will function like that of someone who is 60 years of age or older. This will affect your ability to be or become one of the top players on the team." Information about drugs that is presented to adolescents should address the impact drug use will have on activities that could affect the quality of their lives now, not 40 to 50 years in the future.

NQ: What effect will deciphering the human genome have on understanding drug addiction?

Volkow: We have decoded the human genome and although we do not yet understand the functions of most of the proteins that the human genome encodes, the genome has already served to identify a wide array of molecules involved in brain physiology that we did not know existed. The manipulation of some of these proteins has been shown to affect drug self-administration, drug toxicity, and relapse in animal models of addiction. This has been very valuable, helping map the multiple neuronal and cellular pathways involved in drug reinforcement and addiction and providing targets for development of medications.

The human genome has also allowed us to start identifying polymorphisms on genes that may be more frequently expressed in addicted individuals, which may help identify genetic factors involved in vulnerability to drug addiction.

NQ: How important is early experience, maternal care, and genetics in the development of addiction disorders?

Volkow: We know that, by manipulating genes, we can engineer animals that either will self-administer drugs promptly and compulsively or will be extremely reluctant to self-administer drugs. That demonstrates the relevance of genetics on vulnerability for drug abuse and addiction. We know from epidemiological data that if you have a family history of drug addiction, you have a higher vulnerability to taking drugs. This has been most clearly documented in the case of alcoholism. However, complicating the interpretation of findings from studies of children whose parents abuse drugs is that these families tend to be very dysfunctional. The question that arises is whether the vulnerability is the result of the gene or a stressful environment that likely includes improper early rearing and nurturing of the child.

We know from the alcohol literature that rearing practices and early family nurturing and support are very important. The work of Marku Linnoila and collaborators at the National Institute of Alcohol Abuse and Alcoholism in primates showed that even if an individual has the biochemical markers for vulnerability to alcohol abuse, the development of alcohol abuse is dependent on whether the young is reared by peers, as opposed to parents. When reared by peers, an individual is much more likely to take alcohol than if he is reared by parents.

The interaction of genetics and environment is what ultimately determines whether abuse and addiction will occur. For example, at one extreme an individual can have all of the genetic predisposition factors for drug use, yet if never exposed to the drug, he or she will never become addicted. Past history is another factor that we know about from animal studies. Early

Continued on page 10 . . .

. . . Volkow, continued from page 9
exposure to drugs such as nicotine increases the likelihood of drug self-administration later in life.

A current area of concern for the public is the impact that the use of stimulants for the treatment of attention deficit hyperactivity disorder (ADHD) during childhood will have on vulnerability for future drug use. Most studies tend to show that if a child or adolescent with ADHD is treated with stimulants, the risk of future drug abuse is decreased. However, the question remains about the use of stimulants in children who are misdiagnosed with ADHD.

NQ: What treatment and research technologies hold the most hope for overcoming addiction disorders?

Volkow: I don't think it's going to be one treatment or technology but rather our ability to create multidisciplinary teams that take advantage of the multiple advances in technology and the various scientific disciplines that will allow us to make major breakthroughs in our understanding of addiction.

NQ: How can NIDA and SfN attract a greater number of presentations on addiction research to the Society's Annual Meeting?

Volkow: By making young investigators aware of how powerful and productive investigation into the effects of drugs on the brain can be, as a model to understand basic processes in the brain. For example, the way in which drugs of abuse affect neuronal circuits in the brain is directly relevant to the neuroscience of learning and memory, motivation and salience, attention and concentration, perception, motor coordination, and pain, among other areas.

It is also important to convey to clinical drug abuse researchers the importance of neuroscience in uncovering the problems of drug addiction. By bringing clinical researchers and neuroscientists together, we can encourage more collaboration between both fields.

NQ: How do you propose that your institute partner with organizations like the Society for Neuroscience to urge continued funding for neuroscience research and other science advocacy efforts?

Volkow: Drug abuse and addiction researchers are investigating areas of interest to neuroscientists, so the partnership with SfN is very important. This partnership will help identify areas of research for which funds are needed, as well as educate advocacy groups from other disciplines on the relevance of drug abuse for the diseases they represent. For example, more than 80 percent of people who suffer from mental illness also suffer from an addictive disorder. Investigation of the mechanisms underlying this co-morbidity is likely to help improve the understanding of the disorders and help in the development of better therapeutic interventions.

Another very important area where the SfN could help NIDA is in promoting awareness of the need to train more researchers in the neuroscience of drug addiction.

The partnership with SfN could also help identify and attract neuroscientists who have been studying systems involved with drug abuse and addiction (e.g., learning and memory, habit formation, reward, inhibitory control) into the drug abuse research field. ■

Neuroscience 2003 Featured Lectures

Public Lecture
The Addicted Human Brain
Speaker: Nora D. Volkow, MD,
Saturday, November 8, 8:00 pm – 9:00 pm
Convention Center, La Nouvelle Orleans Ballroom

Pfizer Lecture
Neural Mass Actions Studied with Electrophysiology and Functional Magnetic Resonance Imaging
Speaker: Nikos K. Logothetis, PhD,
Sunday, November 9, 11:15 am – 12:15 pm
Convention Center, La Nouvelle Orleans Ballroom

Presidential Special Lecture
A World of Tiny RNAs
Speaker: Gary Ruvkun, PhD,
Sunday, November 9, 4:15 pm – 5:15 pm
Convention Center, La Nouvelle Orleans Ballroom

Presidential Symposium
Sunday, November 9, 7:30 pm – 10:00 pm
Convention Center, La Nouvelle Orleans Ballroom
In Memorium: A Tribute to Patricia Goldman-Rakic, past president of the Society for Neuroscience
Cortical Development and the Neuropathology of Schizophrenia
Raquel Gur, MD, PhD
Edward G. Jones, MD, PhD
John L. R. Rubenstein, MD, PhD

Dana Alliance Lecture on Neuroethics
Neuroethics: An Uncertain Future
Speaker: Donald Kennedy, PhD,
Monday, November 10, 10:00 am – 11:00 am
Convention Center, La Nouvelle Orleans Ballroom

Presidential Special Lecture
Human Genetic Variation and Complex Human Traits
Speaker: David Cox, MD, PhD,
Monday, November 10, 2:30 pm – 3:30 pm
Convention Center, La Nouvelle Orleans Ballroom

The Grass Foundation Lecture
Decision-Making and the Neural Representation of 'Experienced Value'
Speaker: William T. Newsome, III, PhD,
Monday, November 10, 4:15 pm – 6:15 pm
Convention Center, La Nouvelle Orleans Ballroom

History of Neuroscience Lecture
Mapping Memory in the Brain: Two Centuries of Exploration
Speaker: James L. McGaugh, PhD,
Tuesday, November 11, 1:00 pm – 2:00 pm
Convention Center, La Nouvelle Orleans Ballroom

Presidential Special Lecture
Drugs, Neuroplasticity and the Transition to Addiction
Speaker: Terry E. Robinson, PhD,
Tuesday, November 11, 4:15 pm – 5:15 pm
Convention Center, La Nouvelle Orleans Ballroom

SfN Identifies Translational Animal Research Accomplishments

The SfN Ad Hoc Translational Neuroscience Committee has developed a collection of positive examples that illustrate the benefits of responsible animal models in research. The examples are for members to use in a proactive way, if their research is challenged. They can also be used in public discussions. The examples are scheduled to be posted on the SfN Web site this fall.

The Society maintains that "knowledge generated by neuroscience research on animals has led to . . . the development of better treatments that reduce suffering in humans and animals." The examples highlight the ways in which even complex computer models cannot effectively simulate a living organism, making animal models necessary to develop effective treatments for patients suffering from neurological disorders.

The material, collectively known as *Translational Neuroscience Accomplishments*, may also be developed into another series, tentatively called *Research Success Stories*, which will be used by SfN members and others to advocate for increased biomedical research funding. The first group of *Research Success Stories* is tentatively scheduled to debut in January 2004.

A KEY RESOURCE

The idea for Translational Neuroscience Accomplishments was first conceived at the 2002 Annual Meeting by the Committee on Animals in Research (CAR). CAR believes that this document will help scientists effectively counter arguments against the use of animals in research by giving scientists a resource to consult when discussing their research with policymakers, the press, members of the public, and in schools.

Translational Neuroscience Accomplishments will provide information on animal research that has had a significant clinical impact and will be organized by the area of accomplishment. Originally, the organizers had visualized a "top ten" list highlighting just a handful of important areas, but so many positive contributions in translational neuroscience were suggested that the list is being expanded to include 12 targeted areas.

The sections cover subjects as varied as polio, retinal degeneration, depression, the critical period for brain development, drug addiction, Parkinson's disease, and prions.

For each topic, there will be a short version, geared toward a lay audience, and a longer version, including more in-depth scientific detail about how animal research has had a direct, clinical impact on humans.

Translational Neuroscience Accomplishments is currently undergoing an extensive review process by Council and other SfN committees to polish a final version and to ensure that each translational neuroscience accomplishment is accurately represented.

"I am very pleased with how the project has developed," said John Morrison, chair of the Ad Hoc Translational Research Committee (TRC). "Initially, I envisioned a list that would serve as a convenient guide that SfN members could refer to as examples of translational neuroscience accomplishments."

Clearly it has evolved beyond that, and I now see it as a project that we will add to and expand as the science progresses and as our membership has an opportunity to contribute their thoughts and insights with respect to the clinical relevance of basic neuroscience," Morrison continued. "The clinical issues with respect to brain disorders are huge, both in human cost and financial burden, so we need to do everything possible to translate our science into clinical applications."

EVOLUTION OF AN IDEA

The list of topics for *Translational Neuroscience Accomplishments* was drafted by the TRC, which was established earlier this year, drawing its membership from the Committee on Animals in Research and other interested scientists. In addition to chair John Morrison of the Mount Sinai School of Medicine, the other members of the TRC are Amy Arnsten, Flint Beal, Floyd Bloom, Dennis Choi, Linda Cork, John Dowling, Suzanne Haber, Mort Mishkin, and Adrian Morrison.

To compile *Translational Neuroscience Accomplishments*, members of the TRC corresponded by e-mail to identify leading examples of cases in which animal research was crucial to developing an important clinical application for humans. The TRC's goal was to compile a comprehensive group of accomplishments in neuroscience, based on animal research, that have been translated into clinical benefits for both humans and animals.

Once the most pertinent sections were chosen for inclusion in the final project, members of the TRC wrote about accomplishments in their area of expertise. All of these write-ups were consolidated into a single document for review by the entire TRC and CAR. They were also edited to make them uniform and "user-friendly" for anyone accessing *Translational Neuroscience Accomplishments*.

COUNTERING ANIMAL RIGHTS

Animal rights activists have been targeting scientists who conduct research on animals, with scientists reacting defensively to their attacks. By using the Translational Neuroscience Accomplishments to discuss the positive impact of animal research in a public forum, scientists can begin to proactively counter the animal rights movement.

The TRC is confident that *Translational Neuroscience Accomplishments* will be well received by the SfN membership and that it will be used to promote the importance of animals in neuroscience research. Along with the *Guidelines for Crisis Management*, an updated version of a previous SfN publication, *Translational Neuroscience Accomplishments* will be a valuable tool in a proactive approach to countering animal rights activists. ■

New Mexico Chapter Pursues Public Outreach

The New Mexico Chapter is pursuing outreach activities, including an annual Neuroscience Day and Brain Awareness Week (BAW), both of which help bring neuroscience to the public.

NEUROSCIENCE DAY

Our annual Neuroscience Day is an important opportunity to take advantage of funding provided by the Grass Foundation to invite well known neuroscientists to spend the day with our chapter. Our guest neuroscientists join us for a day that includes a public talk, posters, a reception, and opportunities for informal discussion. We have had well-known neuroscientists like Herbert Jasper, Mortimer Mishkin, Larry Squire, William Catterall, Dennis Choi, Oswald Steward, Ron McKay, and Theo Palmer as our invited guests. Neuroscience Day has become an invaluable opportunity for students, faculty, and the general public in New Mexico to hear about and discuss exciting and sometimes controversial issues in neuroscience research.

Since 1996, we have used the occasion of Neuroscience Day to bestow the A. Earl Walker Neuroscience Research Award, which recognizes the outstanding achievement in neuroscience research of a University of New Mexico faculty member. We take the name of this award from Walker, an accomplished neurologist, neurosurgeon, and neuropathologist who was active in teaching and research at the University of New Mexico from 1972 until his death in 1995. It has been gratifying to be able to recognize the neuroscientists in our midst whose research has risen to international acclaim.

Although Neuroscience Day coincides with BAW, it is treated as a separate event and predates BAW.

BRAIN AWARENESS WEEK

The other area of focus for the chapter is BAW. We have focused our outreach activities on the Northwest New Mexico Regional Science Fair. Faculty and graduate students judge neuroscience-related projects and give two prizes each for the top project in the junior and senior divisions. In addition, we sponsor a very popular booth at the science fair open house. At the booth, faculty and graduate students coordinate a variety of activities.

Attendees can take a "brain test," use human brains to discover important anatomical landmarks, challenge hand-eye coordination with a bean bag toss using displacing prism goggles, and chat about the importance of neuroscience research. Our logo, projected on the wall of the science fair and given out on buttons, has become a familiar sight with students, teachers, parents, and the general public who attend the science fair. Each year, our booth is easily the most popular event at the open house.

The chapter was formed in 1983 as a loose confederation of students and faculty from around New Mexico with a basic interest in neuroscience. Originally, the major focus of the group was a weekly seminar series. In 1997, the Department of Neurosciences at the University of New Mexico was formed, in part from associations developed through the SfN chapter. ■

SfN Recognizes Minorities in Neuroscience Training

The Society for Neuroscience is committed to strengthening diversity in the field of neuroscience and offers two programs to accomplish this.

The Society's Minority Neuroscience Fellowship Program (MNFP) increases diversity in neuroscience with a special focus on increasing the number of traditionally underrepresented racial and ethnic minorities engaged in neuroscience research in preeminent laboratories. The program trains individuals from traditionally underrepresented racial and ethnic backgrounds and gives training stipends for pre-doctoral and postdoctoral fellowships.

FELLOWSHIP PROGRAM

MNFP provides resources such as travel assistance and registration to attend the SfN Annual Meeting, enrichment programs including funds to participate in activities outside of the fellow's home laboratory, an opportunity to be matched with an SfN mentor, and complimentary SfN membership with an online subscription to *The Journal of Neuroscience*.

The SfN Minority Conference Fellowship Program (MCFP) is a three-year program for underrepresented minorities. With oversight by the Society's Minority Education, Training and Professional Advancement Committee (METPAC), MCFP offers travel assistance to the Society's annual meeting along with mentoring, enrichment opportunities, and SfN membership benefits. MCFP enhances professional development by enabling fellows to develop a network of professional contacts, acquire the necessary skills to present their work, and advance their scientific careers.

SfN has recently submitted a competitive grant application to the National Institute of Neurological Disorders and Stroke (NINDS) that, if approved, will replace the current MCFP program. This grant will provide increased funding for

outside training activities, increase the number of fellows supported by the program, and enable a scientific conference to be organized by the fellows.

More information on diversity in neuroscience and these programs can be found at www.sfn.org/fellowships.

NEUROSCIENCE 2003

Minorities will be recognized during several events at Neuroscience 2003. The Minority Poster Session, organized by the Minority Neuroscience Fellowship Program Coalition, will be held Saturday, November 8. The purpose of this session is to recognize the accomplishments of minority fellows who have received aid in their pre- and postdoctoral fellowships from SfN, the American Psychological Association, the Meharry/Vanderbilt Alliance for Training in Neuroscience, and the Texas Consortium in Behavioral Neuroscience. Fellows will present their posters or give brief presentations on their research.

SfN will also host a Mentor/Fellow breakfast in which fellows who have been matched with senior SfN members can meet with their mentors and network with other fellows. The Mentor/Fellow program provides fellows with an opportunity to receive guidance from mentors in areas like career development, grant writing, and job searches. SfN hopes the program will produce a lasting professional relationship beneficial to both parties.

Another event will be the Annual Minority Reception on Monday, November 10, which will recognize all minority neuroscience fellowship program coalition recipients. This event will celebrate minority accomplishments in neuroscience.

SfN will also sponsor "How to Better Prepare Minorities in Neuroscience Research" on Wednesday, November 12. The goal of this professional development workshop is to help shape the careers of undergraduates, graduate students, and postdoctoral fellows by providing a forum where minority role models in neuroscience research discuss career issues. Prominent neuroscientists from minority backgrounds will cover issues such as career paths, approaches to improving the pool of minority scientists in neuroscience, and funding opportunities for minorities. The purpose of the event, organized by MCFP fellow Gonzalo Torres, is to motivate and encourage young minority scientists to make a commitment to neuroscience research and will take place November 12, from 9 to 11 am at the Career Resources Center.

More information on this workshop can be found at www.sfn.org/prepare. ■

Neuroscience 2003 Offers Improved Services

The Society for Neuroscience this year will offer several new services to annual meeting attendees. These include a general information booth, a multipurpose society booth, remote access to the message center, a revamped Career Resources Center and Job Placement Service, and free wireless access to the Internet for use with your own laptop or PDA in the convention center.

To help make the annual meeting more manageable for all attendees, a general information booth will be located in Lobby I of the Morial Convention Center. Here attendees can get their questions answered on a variety of subjects, including directions to events, helpful explanations of the poster floor, and information on exhibits. The general information booth will be open during registration hours.

In addition, this year the Society for Neuroscience will be able to serve members better with a large, multipurpose booth (Booth 1528) in the center of the exhibit hall. Meeting attendees can speak with a membership representative, learn more about exciting new education initiatives, speak with members of the editorial board and staff of *The Journal of Neuroscience*, or meet for a discussion of career initiatives with women mentors. The Society booth will be open Sunday, November 9, to Wednesday, November 12, from 9:30 am to 5:00 pm each day.

This year's meeting begins on Saturday, November 8, at 1:00 pm and ends on Wednesday, November 12, at 5:00 pm. The program committee hopes this arrangement will allow a greater number of participants to present their work to a wider audience.

Dates and Deadlines

On-site online registration opens October 8, and on-site registration opens November 7.

ANNUAL MEETING REGISTRATION

On-site online annual meeting registration opens and continues through annual meeting . . . . . Oct. 8
Last day to apply for membership prior to annual meeting registration . . . . . Oct. 10
Last day to cancel annual meeting registration and receive refund . . . . . Oct. 24
On-site registration opens at the convention center . . . Nov. 7

HOTEL

Last day to cancel hotel reservations and receive deposit refund . . . . . Oct. 24

Registration Fees	ON-SITE ONLINE Opens Oct. 8.	ON-SITE Opens Nov. 7.
Member	$240	$250
Student Member	$75	$80
Nonmember	$400	$410
Student Nonmember	$90	$100
Guest	$25	$30
CME Accreditation	$40	$40

More than 15, 000 scientific abstracts were submitted this year. The scientific abstracts have been organized into various groups. There are 19 posters on the history of neuroscience and 82 posters on the teaching of neuroscience. There are 1,455 slides being presented, along with 13,761 posters. Posters and slide presentations have been further divided into 965 volunteer paper sessions. With such exceptional submission numbers, this year's meeting promises to deliver an excellent look at the cutting edge of neuroscience research today.

In addition to retrieving and sending messages from the SfN Message Center on-site during the hours of registration, attendees will now be able to access the Message Center remotely, via the SfN Annual Meeting Web site (www.sfn.org/am2003). Remote access will be available beginning Friday, November 7, and ends on Wednesday, November 12, at 5:00 pm. To log in, please click on the Message Center link on the lower righthand side of the Web page. This will bring up the log-in screen, where you must enter your last name and badge number. Once you have logged in, the Message Center functions in the same way as it does when you are logged in from within the convention center.

Wireless Internet (Wi-Fi) service will be available for attendees to use with their own laptops and PDAs at no charge, in Lobby F-J, and in the second and third floor meeting rooms and lobbies of the Morial Convention Center. Please check the Annual Meeting Web site before you come to New Orleans for more details on this service.

Undergraduates, graduate students, postdocs, and neuroscience professionals are all invited to use the FASEB Career Resources Center and Job Placement Service. Registration for the FASEB Job Placement Service is free to all applicants who are registered annual meeting attendees. This service offers an informal and confidential setting for job applicants and employers to meet, conduct interviews, and post job openings. Job opportunities include private practice, academic, government agency, nonprofit agency, and industry positions, including sabbatical positions worldwide. Candidates at all levels are encouraged to apply.

TIPS AND REMINDERS FOR ATTENDEES

To help make Neuroscience 2003 a pleasant and easily navigable meeting, here are a few tips and suggestions:

November Weather in New Orleans

Light clothing is most comfortable, although a raincoat and umbrella should always be close at hand. The maximum temperature for November is 71° F, and the minimum is 51.8° F (source: the National Oceanic and Atmospheric Administration).

Bring a Sweater

Despite the mild temperatures outside, meeting rooms can often be quite chilly, and the temperature is difficult to adjust. With this in mind, please be sure to bring a light sweater to the convention center to ensure the greatest comfort throughout the day.

Comfortable Shoes Are a Must

The convention center is large, and to get the most out of Neuroscience 2003, a lot of walking will be necessary. To make walking between meetings and conferences and browsing the poster floor and exhibits as enjoyable as possible, be sure to wear comfortable shoes.

Visit the Exhibits

Exhibits are an integral part of the Society's annual meeting. They provide an opportunity for attendees to learn about the latest products, publications, and services available in neuroscience. The final program includes a tentative list of exhibitors and booth numbers.

The 2003 Guide to Exhibits will include the final exhibit descriptions and a cross-referenced listing of companies by type of product exhibited. The guide will be distributed on-site at each entrance to the Exhibit Hall. Your badge will double as a name badge and an exhibit inquiry card. Attendees' demographic information will be coded onto their badge. E-mail addresses will be included only if the attendee has selected the appropriate option when registering. The SfN Council encourages all annual meeting attendees to present their badge at each exhibit booth they visit. Exhibitors determine the success of their participation in the Annual Meeting by the number of leads they accumulate from attendees visiting their exhibit booths. We appreciate your cooperation—a successful exhibit program helps defray the cost of running the annual meeting and keeps registration fees to a minimum.

SfN Web Site – A Valuable Resource

While planning your trip and at the meeting, be sure to refer to the SfN Neuroscience 2003 Web site, www.sfn.org/am2003, for the most up-to-date information on all subjects relating to the meeting, including workshop times, exhibit listings, and lecture rooms.

No Badges Outside the Convention Center

While inside the convention center, your badge is a valuable tool that allows admission to the scientific sessions and poster floor, as well as providing exhibitors with important information. As in any city, once outside the convention center, your badge labels you as a tourist, so be sure to remove your badge when leaving the convention center. ■

Professional Development Resources at Neuroscience 2003

This year's annual meeting includes a wealth of resources for career development. FASEB is hosting a Career Resources Center and sponsoring a Job Placement Service. The annual meeting schedule also includes a substantial number of professional development workshops.

The FASEB Career Resources Center and Job Placement Service will be located in Hall J of the Morial Convention Center. Registration for the Job Placement Service is free to all applicants who are registered annual meeting attendees, although prospective employers are required to pay a fee.

This service offers an informal and confidential setting for job applicants and employers to meet, conduct interviews, and post job openings. Job opportunities include private practice, academic, government agency, nonprofit agency, and industry positions, including sabbatical positions worldwide. Candidates at all levels are encouraged to apply.

Online pre-registration can be done electronically at https://ns2.faseb.org/career/crc/sfncrc.htm (select Applicant or Employer services option). Registration can also be done offline by contacting FASEB Career Resources at: 9650 Rockville Pike, Bethesda, MD 20814-3998; phone, (301) 530-7021; fax, (301) 571-1889.

FASEB's services feature computer-assisted registration and interview scheduling, "self-service" search-and-referral computer terminals, on-site interview facilities, and a "position available" posting area. Also available are a message center and employer photocopying services, career development seminars, cover letter and resume critiquing, and yearlong listing in CAREERS OnLine database.

In addition to the Career Resources Center and Job Placement Service, several professional development workshops are available to attendees at Neuroscience 2003:

- Your Job Search: A Sequential Process with Different Goal at Each Step of the Way
- Resumexercise: Tone and Sculpt a Powerful Resume/CV
- Interviewing 101
- So You Don't Want to Work at the Bench Anymore? Planning Your Career Transition in the Sciences
- The First Hundred Days: How to Keep your Dream Job from Turning into a Nightmare!
- The Truth About References and Reference Checking
- Writing, Editing, and Publishing in Science
- Nonacademic Careers in Neuroscience: Opportunities and Benefits, Struggles and Risks
- Obtaining Funding from the Foundation World
- How to Better Prepare Minorities in Neuroscience Research
- NIH and NSF Funding for Your Research Training and Career Development
- WIN Career Development Workshop: Mentoring to Excellence

Advance registration may be required for these workshops. For more information, please go to www.sfn.org/professional. ■

President of FENS Speaks About Growing Neuroscience Community in Europe

Pierre Magistretti

Pierre Magistretti is the president of the Federation of European Neuroscience Societies (FENS). He is also a vice chairman of the European Dana Alliance for the Brain. Magistretti is currently a faculty member of the Institut de Physiologie at the Université de Lausanne in Lausanne, Switzerland.

NQ: Given the growth of the FENS forums since 1998, how do you envision the organization growing over the next few years?

Magistretti: There is still room for expansion for FENS in terms of membership through the increase in the membership of national societies. Even more importantly for us, we can work toward an increase in the participation of scientists who attend the FENS forums.

> *"Our organizations can work together by keeping each other informed, increasing the exchange, and taking common positions when necessary."*
>
> —Pierre Magistretti

NQ: How do you expect to extend the scientific content of the next forum, which is to be held in Lisbon, Portugal? What are you doing to encourage student and foreign participation?

Magistretti: We have a program committee, which is being chaired by Professor Wolf Singer, from Germany. He is an outstanding scientist, as are the other members of the program committee, and we've come up with a very attractive program. I think the scientific quality will be very good.

There are fellowships from FENS and the national societies to support student participation. The International Brain Research Organization (IBRO) is providing fellowships, mostly for Central European participants. We were very pleased to learn that SfN will offer some fellowships for North American graduate students to attend. These fellowships will go a long way toward increasing the participation of students.

NQ: What sort of impact is FENS seeking to have on the European neuroscience communities?

Magistretti: FENS represents 31 national societies and 18,000 neuroscientists and is the most visible and most representative partner to advise the European Union on neuroscience developments and support for research through European Community grants.

The forum is an important activity and we really look forward to developing it even further. FENS also organizes schools that take place every second year, alternating with the years in which the forums take place. Several of the FENS schools are organized in collaboration with IBRO. These have a substantial impact on our community.

NQ: What are the biggest challenges for FENS, and what steps are you taking to address them?

Magistretti: Our biggest challenge is to manage our growth. We are managing the growth by distributing certain functions across specific European countries; this has the advantage of maintaining the internationally representative nature of FENS. Among others, we have an office in Berlin, through the auspices of the German Society for Neuroscience, which is responsible for administrative tasks like membership. The editorial office for the FENS journal is in Cambridge, England. An office in Bordeaux, France, under the auspices of the French Society for Neuroscience, ensures the logistics of the forums.

NQ: How can FENS and the Society for Neuroscience work together?

Magistretti: We have already begun collaborating by having regular meetings between the presidents and the executive committee members at events like the Society for Neuroscience meeting or at the FENS forum.

There can be an exchange of information through the newsletters, and, together, we can also work to increase trans-Atlantic participation in the forums and meetings; we encourage the participation of American scientists at the FENS forum. Of course, the participation of European scientists is already quite significant at the SfN annual meeting. In this sense, SfN has been encouraging participation by providing slots to FENS for abstract submissions. Clearly, the idea is to foster exchanges and participation in the respective meetings.

When necessary, our organizations can take a common stand on important issues, such as last year, when then-SfN President Fred H. Gage and I signed a common letter to support the establishment of a primate research facility in Cambridge, England.

Our organizations can work together by keeping each other informed, increasing the exchange, and taking common positions when necessary.

NQ: The Society for Neuroscience has established a regional chapter structure that has now expanded abroad. How does FENS envision the best way for local or regional SfN chapters within the European region to organize themselves?

Magistretti: Officially, the FENS council has not discussed this matter yet. It will be brought up to the Council at its next meeting in the fall. For the moment, our position is that we should be open to anything that expands opportunities and provides access for neuroscientists to a number of very interesting benefits.

FENS does not think that it would be ideal for SfN chapters in Europe to cover single nations. That would duplicate part of the function of the national societies. We would discourage establishing national chapters, but other geographic distributions could be helpful. There are, for example, transnational regions that have historical ties and regions that share a common culture even though they belong to different nations, because of history over the last centuries. These transnational regions could be a chapter. Large cities might also be good candidates for chapter representation.

NQ: The Society has a number of benefits for SfN chapter members, such as the Grass Traveling Scientific Lecture Series, capacity building grants for chapters from SfN, and some travel award programs. What other benefits does SfN chapter participation bring to its members?

Magistretti: Among topics that we discussed recently with Gage and SfN Executive Director Marty Saggese are the public awareness activities—for example, Brain Awareness Week—that have been very popular in the United States. If a chapter existed abroad, there would be an infrastructure in place that would help coordinate those kinds of activities locally in Europe, and I think that would be another potential benefit of establishing local chapters.

NQ: Given that FENS is a coalition of European neuroscience societies, and that some of those member nations may have varying legislative and policy issues, how do you envision your organization facilitating public advocacy and addressing legislative issues?

Magistretti: There is a growing impact on the funding of science research in Europe being made by the European Union in Brussels. Grants from the European Union are usually designed for multi-group, transnational applications. FENS will undoubtedly work with other European organizations to sensitize the European Community to the importance of funding neuroscience research throughout Europe.

At the national level, FENS can provide a very strong, unified position on certain issues, based on specific panels of FENS neuroscientists, the FENS Council, or the executive committee. FENS could provide initiative and highly qualified advice to national societies or support the initiatives of a member society for specifically national issues.

NQ: What are some ways that FENS can partner with other international organizations?

Magistretti: IBRO has been reorganizing into regional councils. FENS is working with two of those, the Western European Regional Council and the Central European Regional Council, to engage in common activities.

One example is the schools mentioned earlier. Another project is to establish an inventory of graduate programs in neuroscience throughout Europe. We would also like to establish some fellowships to support, in particular, young students from developing countries, facilitating their attendance at these graduate programs in neuroscience in Western and Central Europe. Support of neuroscience in developing countries is one of the major tasks of IBRO, and it blends well with the FENS concept of supporting educational programs. This is one area where we collaborate. In fact, we just established the fellowship program to help further this mission.

Public awareness is another area in which IBRO and FENS will collaborate, along with the European Dana Alliance for the Brain (EDAB) initiatives. There will be a shared effort by FENS, IBRO, and EDAB to promote public awareness in Europe and to distribute material in several languages outside Europe.

"When it first started, the [FENS] forum was like a bicycle with training wheels. I think that we have taken off the training wheels and now we just have the two big ones; the forum can go on its own."

—Pierre Magistretti

NQ: What do individuals need to do if they want to participate in FENS programs?

Magistretti: The FENS schools are widely advertised, and scientists are encouraged to submit proposals, which are then evaluated by the school committee of FENS. Scientists are also encouraged to submit proposals for schools and panels planned in collaboration with IBRO. Once the schools are formally accepted and advertised, then applications by students are welcome. Proposal submission and applications to attend the schools can be done through the FENS Web site (www.fens.org), and they will be processed regularly. Participation in the FENS forum is another way for individual scientists to get involved. For the Lisbon forum, the deadline for application of abstract submissions is in early February, and can be done on the Web.

NQ: What programs does FENS have in place to support the professional development of neuroscientists?

Magistretti: The Web site has advertisements of positions available. When universities or departments have openings, they can advertise on the site. Another way in which FENS encourages the development of neuroscience is the *European Journal of Neuroscience*. I should stress that American scientists are welcome to submit to this journal and SfN members now have free access to the Journal through SfN's Web site.

NQ: Do you foresee any changes or additions to your organization's current programs?

Magistretti: I think we really want to consolidate those that we have just started. The forum is now well in place. When it first started, the forum was like a bicycle with training wheels. I think that we have taken off the training wheels and now we just have the two big ones; the forum can go on its own. The school program can expand even more. We should develop more fellowships and collaborations. I really think that FENS is still in its youth. ■

. . . Bloom, continued from page 4

individual databases, but only to varying degrees and sometimes not at all. The biggest database we have now is PubMed, to which individuals submit their abstract after a paper has been submitted and peer reviewed. That's about as much as most people currently share.

NQ: Why are you interested in the BIG Initiative?

Bloom: It has long been my goal to recapture the kind of control I thought I had over the literature when I was a young scientist and knew almost everybody in the Society by name. When I look at the annual meeting abstract book now, I am extremely frustrated because there is far more there than I could ever read, and I know that by the time the meeting rolls around the data will have proliferated even more. It has been my long-term goal to help fellow scientists get organized and be able to understand what is in the data that we have already collected.

NQ: Do you see this as meshing with your experience as both a scientist and an editor?

Bloom: Yes, much of what we did when I was editor-in-chief at *Science* was designed to organize information in unique ways for new scientists, such as the *Science* signal transduction knowledge environment and the aging knowledge environment.

NQ: How does the BIG initiative compare with the Human Genome Project in complexity?

Bloom: The brain is dimensionally much more complex than any genome, so the attempt to integrate databases that deal with the brain is more difficult than the human genome project. The genome is essentially a two-dimensional analysis of four bases. It does the analysis over a huge span of those bases, but it is basically just in one linear dimension. With the brain, we must consider brains of different species that vary tremendously in their scale and complexity, all the way down to invertebrate nervous systems. Each of those nervous systems is interesting to somebody in the Society and so data on them would be useful. We should also include information on development and time, neither of which is intrinsic to the human genome database. And there are far more technologies used in producing the kinds of data that we envision will be in the ultimate brain database than there were in deciphering the human genome.

NQ: What incentives will researchers have to contribute their data to such a centralized database? Or do you perceive this as individuals submitting data to standardized specialty databases that would then feed into a centralized database?

Bloom: We don't know the answers to those questions yet. We do know that we don't want to create something so big that just opening it is time consuming. The database needs to be organized in a way that a person can penetrate right to the level where they feel most comfortable and where their questions are to be aimed, but at the same allowing them to pursue links into other nervous systems, other parts of the same nervous system, and other times or developmental periods. The ultimate brain database should be capable of being mined in multiple dimensions.

NQ: What expertise do you feel that the members of the committee bring to the project?

Bloom: Many of them have created their own personal use databases, and in some cases they have helped create small community-housed databases. The people who have agreed to participate in the BIG initiative are among the most knowledgeable in creating, implementing, and maintaining such databases.

NQ: Will a centralized brain database include only published data, or some unpublished data as well?

Bloom: The databases will certainly have an opportunity for peer-reviewed information to be included. Whether people want to have unpublished observations of others or their own listed in the database is something that community standards will determine.

NQ: What is the timeline for the committee to accomplish its goals?

Bloom: We hope to have a white paper available at Neuroscience 2003 to present to SfN President Huda Akil and the Council. Then we hope to be able to present it to NIH directors for their review in early 2004. ■

. . . Landis, continued from page 1

Landis joined NINDS in 1995 as the scientific director of the intramural program. In her new position, Landis will oversee an annual budget of around $1.5 billion. Her staff will include approximately 900 scientists, physician scientists, and administrators.

The new director started her academic career at Wellesley College. After graduating from Wellesley, she obtained her master's degree and her PhD at Harvard University. After postdoctoral work at Harvard, she was invited to join the faculty of the medical school's department of neurobiology. In 1985, Landis joined the faculty of Case Western Reserve University's School of Medicine.

Special election nominations for a new president-elect were submitted via the SfN Web site. The nomination period opened on August 18 and closed on September 5. Two candidates were nominated. The nominees are Pat R. Levitt, PhD, Vanderbilt University, and Carol A. Barnes, PhD, University of Arizona.

The voting process is taking place through electronic balloting. Voting opened on October 1 and is continuing through October 21. Please be on the lookout for an e-mail from the independent election company, Survey & Ballot Systems, Inc., with information on how to cast your ballot. ■

. . . Message, continued from page 4

nal architecture, operating systems, and hardware. These frameworks would help new databases be structured in a way that would ensure their ready interface with already existing databases. The committee has summarized the strategy for interfacing neurodatabases as "evolvable
interoperability."

GET INVOLVED

In order to acquaint the neuroscience community with currently ongoing efforts, BIG has recommended the creation of an SfN Web page that will include a listing of all currently existing neurodatabases and serve as a portal for accessing them—a so-called Database of Neurodatabases. Part of this effort will simply be an organized listing of the databases.

Another slightly more ambitious component would provide examples of how a given database can be linked to another and accessed through it. The intention would be to have neuroscientists visit the page, become acquainted with some of the existing resources, and provide feedback. Such input would be extremely valuable to BIG in finalizing its recommendations to Council.

QUESTIONS AND FUTURE DIRECTIONS

The BIG report will represent just the beginning of a long road ahead in terms of neuroinformatics needs. It will likely recommend for Council's consideration strategies for continued involvement of the SfN in this undertaking.

The challenges ahead are significant. We need to continually ascertain the needs of our community as knowledge evolves and amounts of data increase. We need to attract talented computer scientists and informaticians to create a sophisticated and yet user-friendly informatics superstructure that is intrinsically, systematically, mutable. We need to ensure that our project interfaces seamlessly with the planned NIH Human Genome Database.

We need to ensure quality controls at every level. We need to encourage various scientific communities to populate these databases with high quality data. We need to train a new generation of neuroinformaticians. And all of this requires significant funding, during times of multi-billion-dollar federal budget deficits.

Above all, we need to vigorously advocate for the vital importance of this undertaking and its support from both governmental and private agencies, within and outside the United States. ■

NQ welcomes reader responses to articles that appear in the newsletter. To provide a forum for comment, NQ is introducing a new Letters to the Editor feature, starting with the winter issue. If you would like to respond to an article or idea appearing in NQ, please send an e-mail to nqletters@sfn.org. The editors of NQ reserve the right to select letters for publication and will edit them for style, length, and content.

— The Editors

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