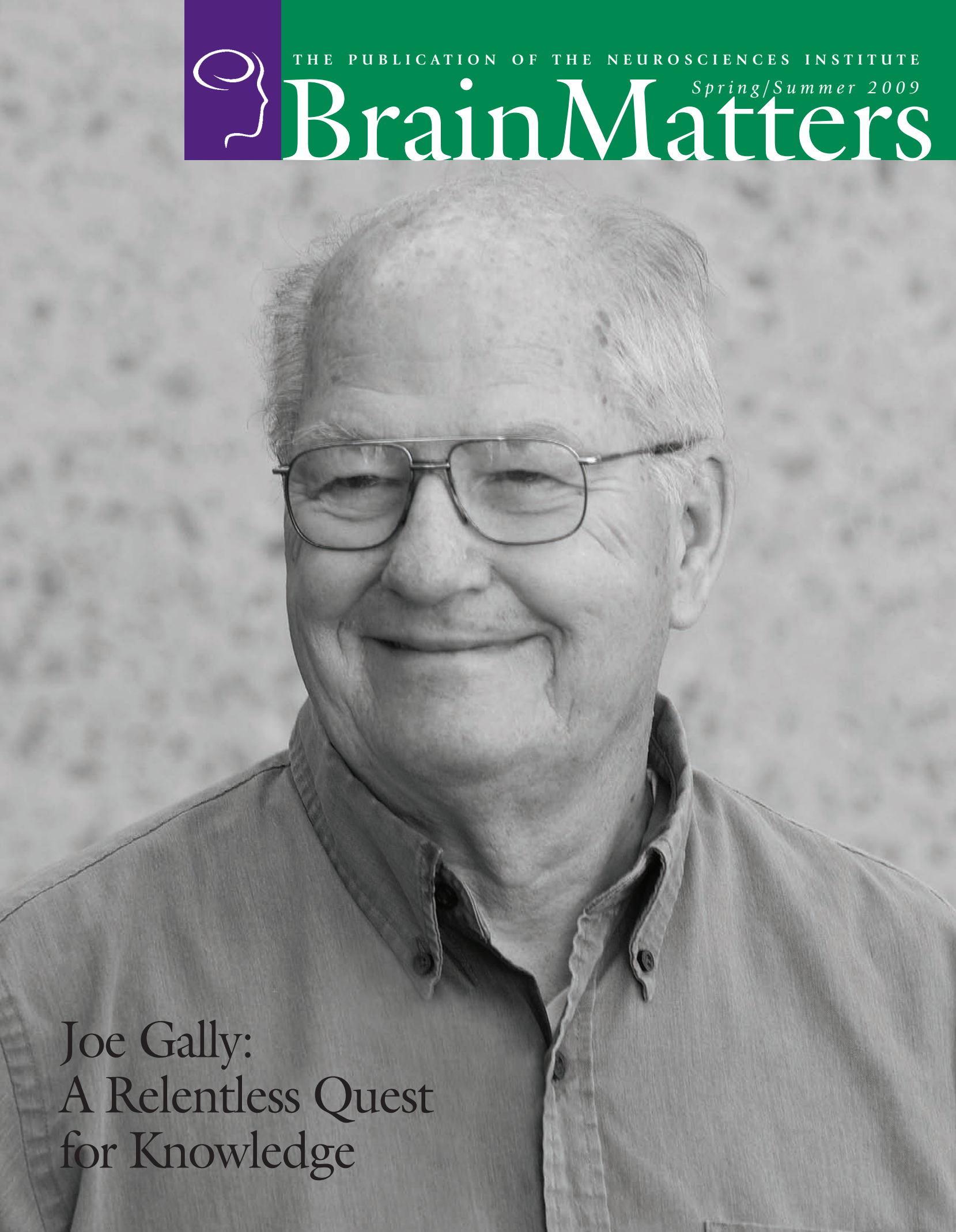
THE PUBLICATION OF THE NEUROSCIENCES INSTITUTE

Spring/Summer 2009

BrainMatters



Joe Gally: A Relentless Quest for Knowledge

Within the monastery-like environment that nurtures and inspires the groundbreaking work at The Neurosciences Institute, one scientist explores the great expanse of scientific progress around the world without ever lifting a test tube. Joseph Gally, Ph.D., could be likened to a modern-day monk who, if not a keeper of the flame, is a passionate and unmatched observer of a flame that illuminates discovery wherever it flourishes.

Gally, the Institute's Lewis B. and Dorothy Cullman Senior Fellow in Theoretical Neurobiology, has no laboratory and conducts no hands-on research. His primary scientific tool is a computer and the Internet, for Gally's lab is his mind. His significant contributions arise from his intense study, analysis, and synthesis of the massive amount of research—both in neuroscience and other scientific fields—that is being conducted inside and outside the walls of the Institute.

Equipped with this knowledge and his deep understanding of the Institute's research efforts, Gally serves as a unique sounding board for Institute Founder and Director Gerald M. Edelman, M.D., Ph.D., and also connects with all of the scientists. He keeps them informed of advances relevant to their fields and often suggests new avenues of inquiry they otherwise might not have pursued.

As one of the most self-effacing scientists you will ever meet, Gally is too modest to acknowledge the key role he plays. However, Edelman is more than willing to share his view of Gally's importance to the Institute.

"Joe is first and foremost a superb, gifted biologist, steeped in Darwin. His remarkable passion and relentless curiosity have influenced and aided his colleagues at the Institute for more than two decades," Edelman says.

"I know of no other scientific organization that has someone serving in the type of special niche he holds here. Joe's powerful mind enables him to navigate the breadth of emerging scientific knowledge and then share his insights with his fellow researchers in a way that enlightens and invigorates, leading them not only to a deeper understanding of the brain and neuroscience in general, but suggesting new paths for their own research. Joe's work forms one of the essential and invaluable foundations of our achievements here at The Neurosciences Institute."

That deep curiosity has been a part of Gally's personality as long as the 71-year-old scientist can remember.

"I've always been fascinated by how things work and how science attempts to provide a coherent picture of the world in which we live and how things function in it." Gally says. "I remember back in the 50s my high school biology teacher telling us he had heard that the chemical nature of the gene had just been discovered. I went right up to him after class and said, 'Well, what is it?' I just had to know."

Born in Boulder City, Nevada, Gally moved to the San Fernando Valley when he was 11. He majored in chemistry at Pomona College and received a graduate fellowship from The Rockefeller University in New York, where he first met Edelman and assisted with the research that led to the latter's Nobel Prize for discovering the chemical structure of antibodies. After receiving his Ph.D., Gally returned to Pomona to teach in the chemistry department for several years. Seeking new challenges and hoping to see more of the world, Gally accepted a brief teaching fellowship in Egypt, returning to Rockefeller to a temporary position with Edelman while he looked for a permanent teaching job.

Joe leading teens on tour during Teen Discovery Day

In 1968 he accepted a unique position teaching immunology and molecular biology at Nashville's Meharry Medical College, then the nation's only predominantly black private medical school. Gally's two decades as a professor at Meharry were among the most rewarding years of his career. One highlight was leading a special program in which disadvantaged black students whose college education had not been strong enough to otherwise gain medical school acceptance would receive an extra year of instruction at Meharry to bring them up to speed.

"This was in the midst of the civil rights era and our program was really one of the earliest affirmative action programs," Gally recalls. "I enjoyed working with these students every day to increase their knowledge to the level where they could succeed in

medical school. To watch these young people who came from such challenging backgrounds work hard and become practicing physicians was one of the most satisfying things I've ever been a part of."

As someone who had always kept abreast of scientific literature, mostly for his own enjoyment, Gally began to read even more voraciously, in part because he became intrigued by Edelman's transition from immunology to developmental biology and neurobiology, forming The Neurosciences Institute at Rockefeller. Gally soon realized he had found his calling and joined the Institute in 1987, relocating to La Jolla when it moved west in 1993 and becoming an integral part of the organization.

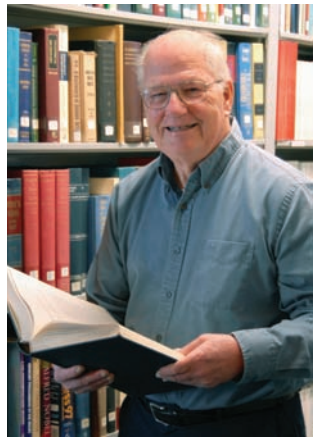
"From my standpoint, it was a fairly easy decision," Gally recalls. "At that time, the foundations of basic biology had already been pretty well established. We had a handle on how every part of the body from the neck down worked, but it was almost like an insult to human intelligence that we didn't seem to have a clue about how the brain functions. There was a huge mysterious gap in understanding this incredibly complex and intricate organ, and joining the effort to explore this last frontier really interested me."

Although in those days Gally had to rely on hard copies of scientific journals and papers to glean what was happening in the research community, it wasn't hard to keep up because the amount of neuroscience research conducted was a fraction of what it is today.

"There has been an exponential increase in the amount of research on the brain and related biology in the 21st Century and with that comes an avalanche of information. I'm fortunate that I have one of the most powerful tools ever invented—the Internet—to delve into this mass. By using online abstracts and summaries, I'm able to focus on the research most relevant to the work we do here at the Institute."

While some institutions have one or more persons assigned to staying abreast of outside research, few have Gally's special genius to assimilate, analyze, synthesize, and disseminate that information in such a logical and intuitive fashion that the work almost rises to the level of a scientific process of its own.

"It's why I also read widely outside of neuroscience so I can keep up on the latest research in molecular biology, genetics, and biochemistry," Gally says. "You never know when you'll come across a discovery in another field that if you just stop and think, it could well have implications for the brain. Just one example was our discovery years ago of the role of nitric oxide in regulating brain function. There are just some things you're never going to learn by only studying the anatomy or electrophysiology of the brain—you have to keep your mind open to all aspects and the potential implications of advances in all the sciences."



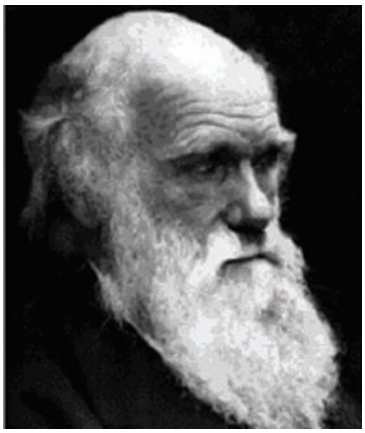
Joe in the Institute's library

So eager is Gally to be on hand for future breakthroughs, he has no immediate plans for retirement. In fact, he's doing even more, having put on his educator's hat again after Edelman asked him to teach the Institute's computer programmers how the brain works to assist them in their work in synthetic neural modeling.

"I've been extremely fortunate in my life, and my association with the Institute is a great example. I'm paid for a job that I would do anyway. I get to investigate the most interesting scientific breakthroughs and share them with my colleagues. I'll never run out of areas to probe because I'm in a remarkable field where the more you learn about the brain the more you discover you don't know. It's amazing to me that when I move my finger, we know how the muscles accomplish the physical act, but we still don't know how the brain creates that movement. Or how consciousness—the Holy Grail of neuroscience—is connected to brain function."

Gally adds, "I'm also honored to work at one of the most groundbreaking scientific institutions anywhere, with some of the best minds in the world. Because of how much I read, I have a unique perspective on just how phenomenal the work being done here is. I'm not exaggerating when I say most of the neurosciences community is several steps behind where we are today.

"That's why I want more people to appreciate the wonderful things that are happening here at the Institute, and if they are so inclined, increase their involvement and support of the tremendous work being done here. People should know that the outstanding research at The Neurosciences Institute only happens because of the dedication of these great scientists and the resources and freedom they are given to pursue their research."



The Unbroken Circle of Natural Selection

Charles Darwin was a keen and patient observer, talented experimenter, and original thinker. He was also uniquely well situated geographically and historically to formulate, publicize, and defend the theory that has come to be accepted as the unifying account that underlies all biological science. Central to Darwin's theory was the concept that all living things now on the planet are descendants of a common ancestor, so that each species of plant, animal, or microbe now alive can be considered a terminal twig on a particular branch of a vast tree of life having a single trunk.

This appreciation of the unity of all life on earth is not only aesthetically and philosophically pleasing, it has incontrovertible scientific support and enormous practical applicability. Here at the Institute, for example, researchers study such neurally based phenomena as sleep, drug addiction, sexual behavior, learning, and memory by investigating these properties in laboratory-grown fruit flies. This is done in the confident expectation that what is learned observing insects will contribute to our understanding of these and other phenomena in our fellow *Homo sapiens*.

Dr. Cynthia Hughes observing fruit fly behavior

On what foundation is this confidence grounded? It is based in part on the years of labor of multitudes of laboratory investigators. Their painstaking analyses of the composition and organization of a wide range of biologic specimens have found common patterns of anatomical, developmental, physiological, and chemical properties. These empirical discoveries that illustrate both the vast diversity and close kinship of all life forms are only made comprehensible through the Darwinian perspective of a long, slow, evolutionary history.

But Darwin did more than argue for an evolutionary history of living things, he proposed a novel mechanism to drive this process—natural selection. Until he, and Alfred Russel Wallace, had formulated their theories, it was nearly universally held that the intricate design evident in any living organism was sufficient in itself to require the existence and functioning of a designer of some sort, a designer with intended goals in mind and some control of the means to achieve these goals.

Darwin's genius was to observe and describe a process of organic change that was plainly evident but overlooked by almost all before him. This process was the unavoidable consequence of three biological facts: (1) Offspring tend to resemble their parents, i.e., traits are inherited; (2) Rarely are two individuals absolutely identical, i.e., the ubiquity of biological variation; and (3) The number of descendants an individual has depends, to some degree, on its inherited traits. Darwin recognized that from these principles alone the distribution of different traits in a population would change over time, even in the absence of any planned goal.

Natural selection depends not upon the ability to identify or seek a desirable goal, but rather upon the vast numbers and kinds of variations arising by

chance, and some of these performing better than others in a process of trial and error.

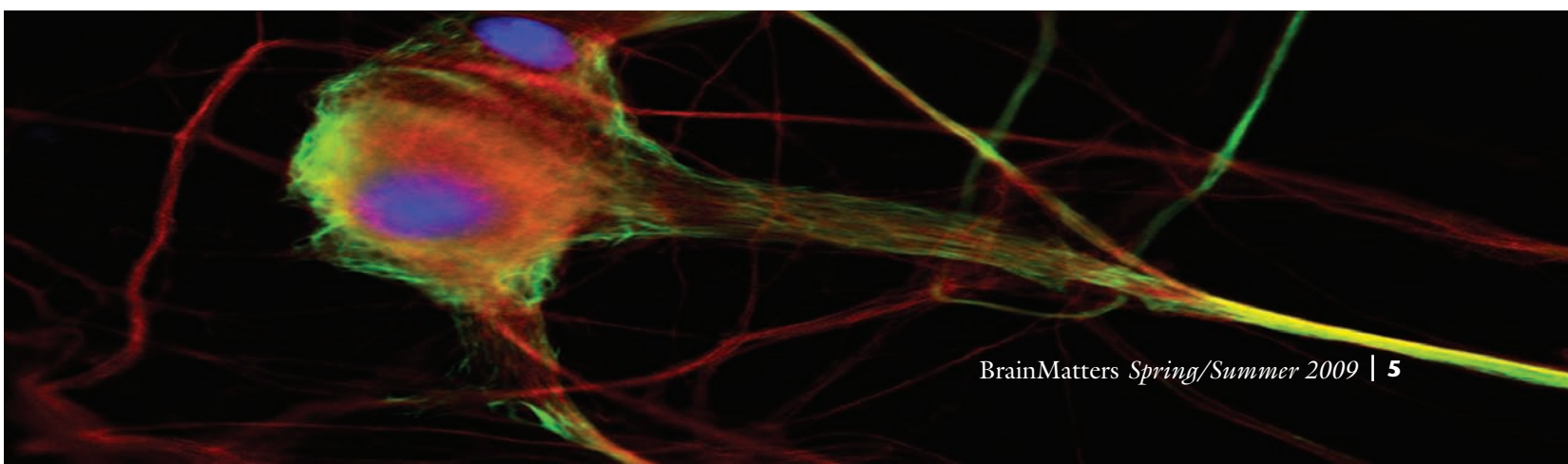
This is, of course, an inherently slow, gradual, and wasteful process, since only a minute fraction of the variable population is selected for. It is also inherently unpredictable, since many different kinds of advantageous variants may appear and be selected for different reasons. Fortunately for our understanding, natural selection is also a process that leaves many traces of its past operation in the creatures that evolve. Darwin was an expert in detecting these clues in the morphology, behavior, and other visible manifestations of the species that he examined. Nowadays evidence for the workings of natural selection throughout all of biology is most convincing at the molecular level, e.g., in the sequence of subunits in genetic material.

For the last 150 years, the work and insights of Charles Darwin have served as an inspiration and model for many outstanding scientists. This is particularly evident, for example, in the work of Macfarlane Burnet, who published his influential book *The Clonal Selection Theory of Acquired Immunity* exactly fifty years ago. Burnet proposed that a process resembling natural selection operates within the body of individual vertebrate animals. He hypothesized that during the development of an animal's immune system, each immune cell randomly acquires the ability to synthesize its own unique protein which was then distributed on its surface. Each protein had the potential of binding a different subset of molecular components foreign to that animal. The size of this population of different proteins would be so huge that any foreign substance (antigen) entering the body would likely encounter a cell having a protein with the complementary binding ability, an antibody. Stimulated by this encounter, the cell would start to proliferate, synthesize, and secrete that specific antibody. Thus, the theory accounts for our ability to combat any infectious agent by making protective antibodies.

Just as a species must evolve to survive and prosper in an unknown and unanticipated future, so must each individual member of that species. To assist them in this challenge, vertebrates have evolved large, hugely complex brains. But how can the enormous population of brain cells arise and organize themselves during the development of an animal's body? Is it plausible, or even possible, that such an intricate and elaborate structure guided only by biological processes was shaped by Darwinian natural selection? Are there even enough genes within human chromosomes to specify the astronomical number of specific connections that must be in place for a person to perform even a simple mental act? Although Darwin clearly felt the human brain had evolved by a process similar to that which gave rise to other organs, the state of neuroscience in his time precluded any confident response.

In 1972 Dr. Gerald Edelman, the Director of The Neurosciences Institute, was awarded a Nobel Prize for Physiology or Medicine for work that, among other things, corroborated Burnet's Clonal Selection Theory. In 1987 Dr. Edelman addressed questions about the evolution, development, and functioning of the brain in his book *Neural Darwinism: The Theory of Neuronal Group Selection.* In his theory, processes of variation and selection among patterns of connectivity among neurons of the brain are guided by interactions of the behaving animal with the real world and play a central role in brain formation. It is through this process, similar in principle to natural selection, that the mind develops. To that end, only the fittest neurons and synapses are selected to form the pathways and patterns that remain and thrive.

Subsequent research at the Institute and elsewhere has provided much convincing evidence that this theory is correct. It demonstrates the wide applicability of the Darwinian perspective and the unbroken circle of natural selection.



The Neurosciences Institute Hosts the 75th Meeting of the Neurosciences Research Program Associates

During the first week of March, the Institute brought together the 36 Associates of the Neurosciences Research Program (NRP). This unique meeting assembles a small yet varied group of renowned neuroscientists from around the world for discussions that range from language and the neural basis of decision making to emotion and time perception. Arising from the recognition that traditional barriers between practitioners of different scientific disciplines had to be broken if the complexity of the brain was ever to be breached, the NRP meeting brings together a diverse group to share their latest research.

The 75th meeting's presentations were diverse in both topic and scope. Irene Pepperberg recounted the astonishing cognitive capacities of Alex, the grey parrot—observations that have forced many to re-evaluate what cognitive capacities are uniquely human. In another domain, Eberhard Fetz described his efforts to build electronic neural implants that enable paralyzed patients to control their limbs by retraining their motor cortex.

Perhaps the most exhilarating are the informal discussions that break out among the Associates on far-flung topics. Observing, even participating, are the Fellows at the Institute who are thrilled to rub shoulders with the elite of the scientific research community. Following are the observations of one of the Institute's newest Fellows, Stephen Cowen.

Dr. Stephen Cowen

As a scientist at The Neurosciences Institute and first-time attendee of the meeting, I was particularly impressed by how directly the talks and subsequent discussions impacted my own research. For instance, the lecture by Trevor Robbins described the contributions of the frontal cortex and various neuromodulators to the decision-making process. His talk inspired me to investigate further how dopamine alters the activity of neurons during decision making in healthy and autistic subjects. Furthermore, Gyorgi Buzsaki's fascinating talk on the neural representation of time and space motivated a number of Institute scientists, including myself, to renew our efforts to understand the neural basis of timing.

On the second day of the meeting, Harvey Karten elegantly dismantled the previously sacrosanct belief that bird and mammalian brains were fundamentally different through his careful comparative studies of the bird and mammalian anatomy. Before describing his research, however, Dr. Karten recalled a conversation he had with a colleague over forty years ago. To paraphrase, the colleague told him that "you need to learn something every day and write it down. When you can no longer do that, it's time to pack it in." That colleague, Robert Galambos, the co-discoverer of how bats use echolocation for night flight (1939), happened to be in the audience and replied, "Oh, then I am in trouble!" Fortunately, neither Dr. Galambos nor the audience had anything to worry about. The talks that preceded and followed Dr. Karten's lecture were filled with lifetimes of experience, and all participants left the conference mentally exhausted, but content and excited about the many ideas that emerged.

In the COMMUNITY

LIBRARY ROUNDTABLE

The Neurosciences Institute's Library Roundtable lecture series is offered several times each year at no charge to the public. With lectures delivered by leading figures in brain science and related fields, the series provides San Diegans with an opportunity to learn first-hand about the latest advances in brain science. The lectures are followed by a question-and-answer discussion session moderated by Dr. Edelman. Following the discussion, guests enjoy the opportunity to engage in stimulating conversation over drinks and hors d'oeuvres.

On November 11, John Searle, D. Phil., presented "How the Human Brain Creates Human Society," a fascinating lecture on the necessity to think of culture as a part of nature, specifically as an extension of biology. Dr. Searle's work ranges broadly over philosophical problems of mind and language, two key areas of 20th century philosophy. He has written extensively in this area, authoring over a dozen books on language, mind, and consciousness. In 2004 Dr. Searle received the National Humanities Medal for shaping modern thought about the nature of the human mind.

Dr. John Searle

At the reception following the lecture, several Institute fellows described their research projects to invited guests.

Cauleen and Michael Glass and Sharrie Woods

For more information about our next Library Roundtable presentation, visit our website at www.nsi.edu.

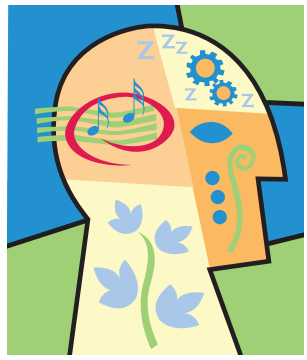
CASA DE MAÑANA

As a community service, Institute scientists deliver quarterly presentations about their latest research to the residents of Casa de Mañana in La Jolla. This series, called "Discussing the Mind and Its Complexities," has become very popular with residents and the Institute's members, who are also invited. Attendees enjoy interacting with Institute scientists in an intimate setting and having the opportunity to ask them questions on a variety of topics. Recent speakers, including Drs. Ralph Greenspan, Geoffrey Owens, Stephen Cowen, Jason Fleischer, and Cynthia Hughes, have presented engaging talks on topics ranging from the role of the fruit fly in medical discovery to how our brains store personal experiences, from aging and disease to appetite and sleep.

SAN DIEGO SCIENCE FESTIVAL

The month of March 2009 marked the first San Diego Science Festival which aimed to unite the San Diego community to showcase the science and innovation that makes San Diego unique! The month-long event celebrated the science and technology all around us with events, lectures, and activities countywide to engage all audiences and inspire our youth to consider science-related careers. As part of the festival, Institute scientist Dr. Aniruddh Patel gave a lecture entitled "The Evolution of Music," and the Institute's founder, Dr. Gerald Edelman, participated in the festival's "Lunch with a Laureate" series to give middle and high school students the rare opportunity to engage in an informal conversation with a Nobel Prize winning scientist over lunch.

News & Events



Minding the Brain

ON SATURDAY, MARCH 14 we opened our doors to give our valued donors, members, and friends a first-hand look at the exciting research being conducted by the Institute's scientists at our annual *Minding the Brain* event. The afternoon began with a presentation by Dr. Aniruddh Patel entitled "Music and Biological Evolution." Guests were then able to select two presentations to attend for an in-depth look at a variety of topics ranging from "The Neuroscience of Decision Making" to "Switching on Genes that Energize the Brain" to "How Our Noisy Environment Affects Our Brain and Hearing." After a final wrap-up session moderated by Dr. Gerald Edelman, guests enjoyed a reception on the laboratory rooftop overlooking the Institute.

Dr. Aniruddh Patel opens the afternoon event

Wrap up with Dr. Edelman and the Institute scientists

Reception on laboratory rooftop

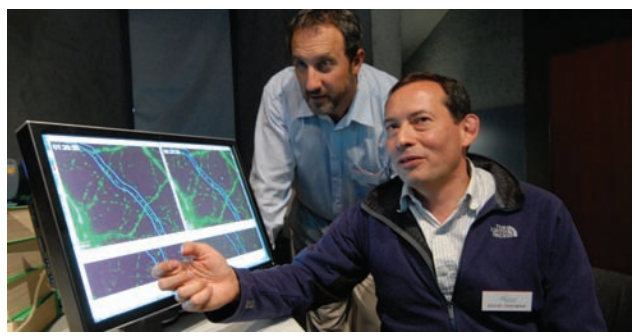
Dr. Jason Fleischer – Of Time & Memory: Using Robots to Understand How the Brain Stores Personal Experiences

The Neurosciences Institute's Educational Outreach Program was established in 2009 to increase enthusiasm for the sciences among local youth. In addition to the many hours volunteered by Institute staff members to local students, schools, and clubs, three formal components make up the program. These are the Brain Bee, Teen Discovery Day, and Job Shadowing.

BRAIN BEE On Saturday January 31st, the Institute hosted the first regional *Brain Bee* competition for San Diego County high school students. Sponsored by Life Technologies, Mike and Jean Collins, the San Diego Chapter of the Society for Neuroscience, the UCSD Temporal Dynamics of Learning Center, and the Institute, the event engaged 31 local high school students from 10 schools in a friendly, one-day question and answer competition about the brain and how it relates to intelligence, memory, emotions, sensations, movement, stress, aging, sleep, and neurological disorders. Students shared lunch with scientists from local research institutes, met college and graduate science students, and had the chance to advance to the national competition in March. Congratulations to all the students who participated and to Prabhav Jain, a junior from Torrey Pines High School, who placed first.

Dr. Nicholas Spitzer, UCSD Professor and Event Emcee congratulates winner Prabhav Jain

TEEN DISCOVERY DAY & OPEN HOUSE was developed as a natural complement to the Institute's *Minding the Brain* Open House for donors and friends. Junior high and high school students were invited, along with their parents and teachers, for a look at the exciting science happening behind our walls on Sunday, March 15th. Over 75 young people heard short talks from Institute scientists about the kind of research they conduct, followed by tours of the laboratory facilities with opportunities for hands-on experiences with the experiments. The common reaction from teens to the first ever event at the Institute was that the event was "off the hook." *(slang for "cool", "fresh", "happening" and "appealing to one's mind")*



Drs. Fred Jones & David Edelman – Mitochondria really move!

JOB SHADOWING is a program at the Institute in which students who are interested in learning more about a career in science are able to shadow a scientist for a day. On April 8, nine students from grades 8-12 were able to see firsthand what a scientist at the Institute does, from planning experiments and interpreting results to running rats in mazes and dissecting fruit flies. Students had the opportunity to dine with the scientists as part of the daily Fellows Symposium lunches that are an integral part of the life of a scientist at the Institute. Another job shadowing day is scheduled for Wednesday, July 15, 2009.

Dr. Weimin Zheng invites middle-schoolers to participate

The Perks of MEMBERSHIP

MEMBERSHIP LEVELS

FRIENDS
$250 - $999

PATRONS
$1,000 - $4,999

FOUNDER'S CIRCLE
$5,000 & more

If you are eager to get involved and learn more about the brain, becoming a member of The Neurosciences Institute is a great place to start. Membership in The Neurosciences Institute has many benefits beyond the personal satisfaction of being part of the greatest quest for knowledge in human history…the pursuit of understanding the human brain.

Because the Institute chooses not to pursue the typical NIH grants that fund the majority of scientific projects in this country, we rely on our base of members to provide individual support for this ambitious research that is pushing the boundaries of scientific knowledge every day. We are so grateful for this support that we do our best to make Membership a truly extraordinary experience for those who choose to join.

We offer our members access to small, intimate presentations by our scientists on topics about the brain that are relevant to their lives. Several times each year we hold lecture-discussions with some of the great neuroscientists around the world, geared for a public audience. We open our doors for members annually to share the latest projects and experiments that our own scientists are conducting, and to share the progress they are continually making toward gaining knowledge that will help create tools that will make our lives better.

And every year we have at least a few unique members-only events that may range from a magic show to an intimate lecture by Dr. Gerald Edelman, the Institute's Founder and Director.

We hope you will consider joining today and becoming part of the Institute's family!

Rachel A. Jonte
Vice President for Institute Relations


Members Jim and Barbara Hartung


Members Chris and Pat Weil with guest Edith Rodriguez


Members Tom and Berit Durler


Members Betty Joan Maly and John Meyers

JOIN US AUGUST 30, 2009 FOR MINDING THE ARTS!

Minding the Arts 2009, chaired by Joani Nelson with Nuvi Mehta returning as Master of Ceremonies, will be held on August 30, 2009. This lovely afternoon affair will begin with a tempting array of food and beverages from San Diego's finest caterers and restaurants amidst the stunning architecture of the Institute's campus. The evening will then continue with a private concert in the auditorium featuring performances by The Hutchins Consort, The NOTEables, and the RB Swingtet.

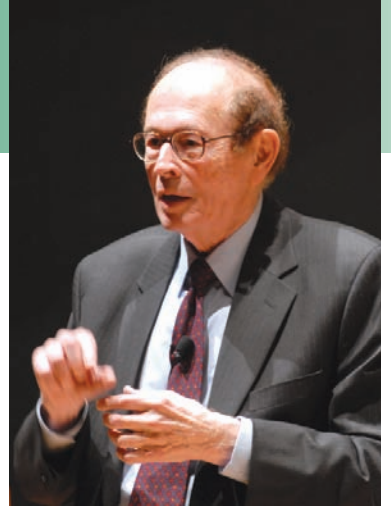
This event raises critical funds for our Performing Arts Program, through which we donate the use of our acclaimed auditorium to non-profit arts and educational organizations for the benefit of the San Diego community. This superb performance space comes at a high cost to the Institute, whose main goal is scientific research to better understand how our brains work. Your support of this event allows us to keep the doors open and to continue providing our auditorium free-of-charge to your favorite arts organizations!

Call Jessica Colby at (858) 626-2022 to buy your tickets today!

Minding the Arts

From the Director

The EVOLUTION OF BRAIN *and Mind*



This year marks the 200th anniversary of the birth of Charles Darwin and the 150th anniversary of the publication of his seminal work, *On the Origin of Species by Means of Natural Selection*. The thoughts of this greatest biological theorist continue to prompt debate. A good part of that controversy turns to the matter of the mind. How can it be that the operations of our mind that create thoughts and theories like Darwin's overarching idea actually emerged as a result of natural selection? To address this question, consider the fundamental Darwinian Two-Step: variation in the inheritable properties of members of a species together with selection under competition act to favor the survival of the progeny of those individuals that are, on the average, more adapted to the environment. This process leads to gradual change over long periods of time, change that can give rise even to "organs of extreme perfection" as Darwin called the eye. The eye is one thing, but the assertion that the brain and mind of man evolved in this manner has prompted controversy from the very beginnings of Darwin's proposal. One of the most striking illustrations of the resistance to this assertion was proposed by Alfred Russel Wallace, Darwin's contemporary who independently proposed the seminal idea of natural selection.

In a letter to Darwin sent on 24 March, 1869, Wallace, who admired Darwin greatly, said: "In my forthcoming article in the 'Quarterly' I venture for the first time on some limitation to the power of natural selection." Wallace contended that certain physical characteristics as well as the intellectual and moral faculties of man depended not on natural selection but on a "Higher Intelligence." Clearly, Darwin was vexed. He sent a reply with the statement "I hope you have not murdered too completely your own and my child," meaning, of course, the theory of natural selection.

Wallace's reasoning was tied to the observation that savages had brains almost the same size as those of civilized man. Positing that both powerful intellect and moral refinement were not needed by such individuals, he concluded that natural selection could not have led to the emergence of such brains.

From the historical record, we know Wallace was a Spiritualist with a belief in supernatural causes. Unlike Wallace, Darwin recognized that not all mental abilities had to have evolved by natural selection and that some could have arisen as by-products of human development. In his book *The Descent of Man* he paid savages their due, noting that powers of mind could have arisen, for example, as a result of the continued use of language. Unlike Wallace, Darwin saw no need to invoke natural selection to account for all mental traits. But neither did he invoke supernatural causes to account for these traits. Subsequent studies have reinforced Darwin's conclusion. Vexed though he was, he maintained a cordial attitude personally toward Wallace who reciprocated. Mutual gentlemanliness continued to be sustained even if not as a direct result of natural selection.

At The Neurosciences Institute, our work is premised on the notion that the brain evolved by natural selection. But in accord with Darwin's views, we need not account for all aspects of human behavior as direct consequences of natural selection. Our task nevertheless is guided by the assurance that any satisfactory explanation of brain function will be consistent with the Darwinian heritage.

Gerald M. Edelman, M.D., Ph.D.
Director

THE PUBLICATION OF THE NEUROSCIENCES INSTITUTE

BrainMatters

Spring/Summer 2009

Neurosciences Research Foundation, Inc.
10640 John Jay Hopkins Drive
San Diego, CA 92121

ADDRESS SERVICE REQUESTED

Non-Profit Org
U.S.Postage
PAID
Permit 3373
San Diego, CA

MEMBER PROFILE

Jean & Mike Collins

A fascination with science and a strong belief in education have drawn Jean and Mike Collins to support The Neurosciences Institute for nearly a decade. You need only look at the multiple ways they're involved with the Institute to realize this philanthropic couple really enjoys their relationship with the organization.

In addition to being longtime donors, Mike served on the Institute's Board of Trustees for seven years and Jean has volunteered on the Minding the Arts gala committee, offering her professional interior design skills to help guide the event's décor. Earlier this year they were key sponsors of the inaugural San Diego Brain Bee, held at the Institute, in which high school students competed to advance to the national competition.

"Watching these super intelligent kids answer some very tough and complex questions about the brain was impressive and a lot of fun," Mike says. Adds Jean, "We're big believers in science education and education in general, and we're concerned about the decline in quality education in the U.S., especially compared with other countries. We saw the Brain Bee as a chance to contribute to a program that is encouraging young people to pursue careers in science and hopefully help us keep up."

The Neurosciences Institute is just one of the many organizations the Collins have supported since moving to San Diego from North Carolina in the early 1960s. Mike, one of the city's top investment advisors, has served as board member and chair of Sharp Health Care and the San Diego Natural History Museum, and as board member for the Thomas C. Ackerman Foundation. Jean, who recently retired from her interior design business to paint artistically, has been involved with Junior League, ARCS (Achievement Rewards for College Scientists), and ARTS (A Reason to Survive) which uses the arts to help children in challenging situations.

"Education is not the filling of a pail, but the lighting of a fire."

– William Butler Yeats

The Institute is a special place, especially for someone who is as interested in science as Mike has been all his life.

"Interacting with the Institute's world-class scientists has been intellectually stimulating for me," Mike says. "I've learned they are doing important, groundbreaking work—delving into the mystery of consciousness. Understanding more about the mechanisms of consciousness and how we perceive reality may lead to improvements in education and human relations around the world."

EDITORIAL CREDITS:
Jeanna Adams
Jessica Colby
Stephen Cowen
Einar Gall
Joe Gally
Debbie Honeycutt
Rachel Jonte
Toni Nickell
Bob Ross

PHOTOGRAPHY:
Michael Hanna
Debbie Honeycutt
Geoffrey Owens
Bob Ross

DESIGN:
Melissa Marquardt Design

PRINTING:
In to Ink Fine Printing