

Getting inside the brain: Neurosciences Institute researchers seek 'new knowledge'

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By Dave Schwab (daves@lajollalight.com)

Imagination rules at The Neurosciences Institute in La Jolla, which its director describes as a scientific "monastery" for unconventional brain research.

"Science is imagination in the service of a verifiable truth," said the institute's director and founder, Gerald M. Edelman, M.D., Ph.D., who shared the Nobel Prize for Physiology or Medicine in 1972 for discoveries concerning the chemical structure of antibodies.

Edelman gave an example of the institute's outside-the-lines theoretical work.

"We have a small group investigating the effect of music on the brain," he said, noting that doesn't involve orthodox psychological testing but "measuring how the brain relates to music in an actual physical way," accomplished via recording magnetism elicited by brains.

Finding the principles

Edelman said the research is valuable because "we think music is a way of understanding language."

He likened the complexity of neurologists studying the brain to astronomers attempting to grasp the universe.

"The cortex of the brain, the wrinkled structure, has 30 billion neurons, and 1 million-billion connections," he said. "If you were counting one per second, you wouldn't finish counting until 2 million years later. We can't really encompass all that. So what we have to do is find the principles, then build replicas that involve these principles."



The Neurosciences Institute Auditorium is used for community programs.

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The Neurosciences Institute's focus is mostly theoretical without much immediate practical application. Though that's true, Joseph Panetta, president/chief executive officer of BIOCOM, a regional association representing San Diego's biotech community, noted that the institute's work has significant indirect applications.

A critical component

"There is clear evidence it's contributed in terms of advancing the understanding of neuropharmacology and neurophysiology that have benefited the companies working in that field," he said. "It's played a key role in the types of drugs they are developing."

Panetta said the institute is a key component of "one of the most advanced biomedical research clusters anywhere in the world." He said that in turn contributes to attracting scientists to work at the institute and other research centers. "It's a magnet for top scientific talent."

The institute's specialized function and concentrated focus create a synergy within San Diego's biotech community.

"It serves as a nucleus for neuroscience research," Panetta said. "It's a major contributor to other advanced research institutes such as Salk and Burnham."

Sharing interaction

W. Einar Gall, Ph.D., the Neurosciences Institute's research director, said the facility's small staff of about 40 allows it to operate differently, emphasizing interaction among people in different disciplines.

"Our product is new knowledge," he said. "Our main goal is to understand how something works. History shows understanding how something works will definitely have practical application."

Gall said fellows are suggested for the institute's programs by personal contacts and through networking.

"We advertise when positions are open in science magazines and so



Photo by Einar Gall



Photo by Einar Gall

forth," he added.

A number of research "irons" are in the fire at any given time.

Gall said current areas of study include everything from sleep and appetite control in fruit flies to brain-based devices testing ideas about brain processes to studying how learning changes brain function.

Benefiting the community

The community benefits from the institute as well, by providing an array of educational programming.

"We have open houses for teenagers," Gall said. "We have a job-shadowing program where students follow scientists. We have a library roundtable lecture series several times a year where we invite somebody, say in neurobiology, to talk to the public about recent developments. We have a brown bag lunch series where people come in and one of our scientists talks about their areas of expertise."

The institute has one major community fundraiser in September, Minding the Arts, to generate revenue for the \$350,000-plus cost incurred in lending its auditorium free to performing arts and other local arts groups. Guests are treated to an afternoon of entertainment including an outdoor cocktail reception and a private concert in the auditorium featuring local arts organizations.

The institute is a tax-exempt, not-for-profit organization supported largely by nongovernmental gifts and grants. Among the donors is the San Diego Foundation, Gall said.

"The foundation has a program, Blasker-Rose-Miah, where they give several awards each year to support the research of scientists in the community," he said. "We're fortunate to have gotten those awards in the past, as well as getting support from the foundation from several donor-advised funds. We also have a very significant grant from the Mathers Charitable Foundation."

Visit the institute's Web site at www.nsi.edu.

Some areas of study

- Music and the brain
- Study of consciousness
- Brain-based devices
- Spatial navigation
- Learning, memory and cognition
- Mysteries of sleep
- Neurological diseases and disorders



Gerald M. Edelman, M.D., Ph.D.,
is director and founder of The Neurosciences Institute.
Courtesy: The Neurosciences Institute

Minding the Arts

The Neurosciences Institute hosts an array of arts and community programs, in part because "the relationship between music and human brain function represents a special focus of (its) research," according to the center's Web site.

In keeping with that goal, the institute's auditorium is available without charge to many groups for concerts and educational programs. This week, as part of the San Diego Science Festival, it hosted a panel on "The Science of Science Fiction" and the Revelle Forum appearance of physician Abraham Verghese, author of "Cutting for Stone."

Minding the Arts 2010 will be held on September 12, from 4-8 p.m.

For a complete list of upcoming events, go to

http://www.nsi.edu/index.php?page=performing_arts_community_programs.

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