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NEWS FROM THE DIVISION OF BIOLOGICAL SCIENCES VOL. 7 NO. 1

TECHNOLOGY TRANSFER

Seeking ways to promote the transfer of technology from universities to the business sector, administrators, scientists, entrepreneurs, and investors gathered in December for a day-long conference at UC Davis to share their experiences and ideas. The participants came from Davis, Stanford University, and the Sacramento Valley and San Francisco Bay Area business communities.

Jim von Rummelhoff

Scientists John and Lois Crowe have invented and patented methods to protect proteins and to preserve liposomes during freezing. One patent is among the top 20 revenue producers for the University of California.

Speakers at the conference quickly established that "technology transfer" means more than just the licensing by a business of a technology developed at a university. "Technology transfer is a whole continuum of relationships between campuses and industries," said speaker Charles Soderquist, (Ph.D., Agricultural and Environmental Sciences, 1978), president of the Technology Development Center in West Sacramento, Calif., and a former University of California regent.

For example, technology transfer occurs when information is shared between university and business communities through seminar programs and publications. It also occurs when students assume internships and graduates become employees at companies. Activities such as these, along with the licensing of university inventions, ensure that the results of research are available for public use and benefit.

NEW TECHNOLOGY TRANSFER CENTER AT UC DAVIS

Ranked eighteenth in the nation in research expenditures, with more than $195 million in contracts and grants in 1997-1998, UC Davis is a prime source of research-based inventions, according to Kevin Smith, vice chancellor for research at UC Davis and a speaker at the conference. In fact, the campus is second only to UC San Francisco in bringing revenue ($6 million in 1997–1998) to the University of California from the licensing of inventions.

Smith told conference participants that his office is establishing a Technology Transfer Center at UC Davis that will process disclosures, patents,

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RESEARCH NEWS

RESEARCHERS PROBE NEW DEPTHS IN PLANT COMMUNICATIONS

William Lucas, professor of plant biology, and his laboratory team have discovered a new component of the complicated internal communication and transportation systems of plants: a "movement protein" that carries information-bearing RNA from stems and leaves to faraway roots and flowers. The discovery is reported in the January 1 issue of the journal *Science*, which also features a cover photograph of the movement protein.

The Lucas laboratory is one of only a few worldwide that are unraveling how plants transport many important internal cargoes, including genetic messages that govern growth and flowering. The findings should provide insight into the evolutionary processes underlying complex plants and

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…Technology Transfer

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and licensing agreements. Currently, scientists on campus use a technology transfer office in Oakland, Calif., which serves the entire University of California system. Smith is currently recruiting a director for the UC Davis center and anticipates it will take from two to three years to shift responsibilities from Oakland to the campus. Having a local office, he says, will enable the campus "to establish and nurture ongoing relationships between key people in the private sector and our faculty."

Technologies developed by division scientists

During the conference, Mark McNamee, dean of the Division of Biological Sciences, joined a panel of six other UC Davis deans that described research activities and inventions in their respective division, college, or school. He says he welcomed the opportunity to address members of the business community. "We want to create a climate in which corporations feel comfortable connecting with the university," says McNamee. "We can be more pro-active, I think, in presenting our research to the public."

McNamee told participants that a number of scientists in the division have invented technologies that have led or may lead to commercial products. Professor John Crowe and Research Biologist Lois Crowe in molecular and cellular biology have jointly developed and patented a method for preserving liposomes, or artificially constructed lipid vesicles. When filled with biologically active or therapeutic agents, liposomes can offer an efficient means of delivering drugs to cells. One application of the Crowes' patented method was exclusively licensed from the University of California by NeXstar Pharmaceuticals Inc., of Boulder, Colo. The patent is now one of the top 20 revenue generators for the university.

Another likely target for technology transfer is a new type of fluorescent marker, named "phytofluors," invented by plant biochemist Clark Lagarias and former graduate student John Murphy (Ph.D., Biochemistry and Molecular Biology, 1997), now a postdoctoral fellow at The Scripps Research Institute in La Jolla, Calif. They built the new yellow-orange marker from a plant light receptor, phytochrome, and a pigment from red algae. Phytofluors have many attributes that make them a very promising alternative to the widely used marker green fluorescent protein.

Jim von Rummelhoff

Stephen Kowalczykowski's patent "Spectroscopic helicase assay" has potential application in studies on viral infection, cancer, and other disease states.

Also of commercial interest is a method to produce yeast strains with improved resistance to freezing and dehydration. Microbiologist Daniel Klionsky and colleagues from Germany created and patented the method, which could increase efficiency and decrease costs of baking and brewing. In addition, Stephen Kowalczykowski, professor and chair in microbiology, has developed a new assay to study the activity of helicases, enzymes that unwind double-stranded DNA or DNA-RNA hybrids to create two single strands. The assay has potential application in studies on viral infection, cancer, and other disease states.

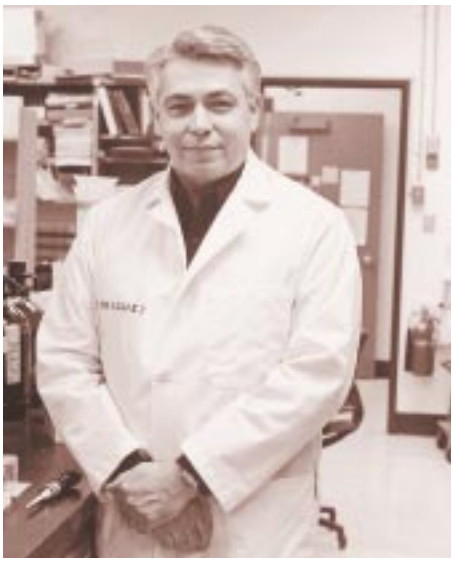
Words from a faculty entrepreneur

Geneticist Raymond Rodriguez is in the unique position of viewing technology transfer from the perspectives of both a faculty inventor and business entrepreneur. In 1993 he established a biotechnology company, Applied Phytologics Inc., of Sacramento, Calif., while remaining a full-time faculty member in the division.

Speaking at the conference, Rodriguez told attendees that the dual-role experience made him better appreciate the mission of the university. "It also gave me a better understanding of university-industry relations, the ever-present danger of conflict of interest, and the complexities of technology transfer," he said.

Rodriguez thinks that choosing the right business partners have been and will continue to be a major challenge for the university. "The reason for this is the vast difference that exists between the academic and corporate cultures," he explained. The university, he said, places a high priority on the pursuit of knowledge, basic inquiry, collaboration, individual accomplishment and communication, whereas corporate culture places importance on the pursuit of profit, application of technology, competition, teamwork, and secrecy.

"These corporate values are not bad or wrong, they are simply values that most university administrators, faculty, and students are unfamiliar or uncomfortable with," said Rodriguez. "Technology transfer, with its well-developed and time-tested policies and procedures, provides the means for bridging the gap between these disparate cultures."



Ray Rodriguez says starting a biotechnology company as a full-time faculty member was a "challenging and exhilarating experience." His company, Applied Phytologics Inc., develops proprietary varieties of rice and barley that can be used to deliver safe, low-cost, value-added proteins and metabolites to food.

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could lead to better defenses against crop diseases.

"This new study is very important," says Richard Jorgensen, an associate professor of plant sciences at the University of Arizona and also an expert in the field. "What they've identified is probably a component in a radically new system for communication between cells and between organs of the plant."

The current picture of the plant's transportation, or phloem, system looks something like a bustling subway. The tube-shaped sieve elements of the phloem are the subway lines, the companion cells of the sieve elements are the stations, and connecting tunnels called plasmodesmata allow cargoes to move from the stations into the subway lines.

In the cells of leaves and stems, the movement protein binds to a segment of genetic code transcribed from DNA called messenger RNA (mRNA). Like a subway ticket, the movement protein lets the mRNA enter the plasmodesmal tunnel to the subway line, or phloem translocation stream. Once in the subway line, the complex of movement protein and mRNA travels very rapidly to distant stations located in roots and flowers.

At its destination, the report suggests, the mRNA probably influences the level of some other protein. That level conveys information to local tissues about, for instance, the overall physical condition of the plant, the season of the year or the presence of an invading pathogen.

"The large, structurally complex plants we see today evolved an elaborate vascular system to carry water and the products of photosynthesis all over the organism," says Lucas. "A parallel communication system also had to evolve to permit such large plants to integrate events happening in distant organs, such as sugar production in leaves, reproduction in flowers, and nutrient acquisition in roots. Our finding supports the hypothesis that a critical element of this communication system is the transport of RNA molecules through the plant's vascular system to those distant tissues."

The new protein is named CmPP16 because it was first found in the Halloween pumpkin, *Cucurbita maxima*, is a phloem protein, and is 16 kilodaltons in size. Another interesting feature of CmPP16 is that its genetic sequence and its behavior are very much like those of a movement protein used by viruses.

"Plant viruses appear to have acquired the ability to use plant communication pathways to infect an entire plant," Lucas says. "The parallels between viral movement proteins and CmPP16 provide the first strong evidence that viruses may have acquired that ability by stealing it from plant genes."

The lead authors of the *Science* paper are three postdoctoral researchers in the Lucas lab in the Section of Plant Biology: Beatriz Xoconostle-Cázares, Yu Xiang, and Roberto Ruiz-Medrano. Their co-authors are three other UC Davis postdoctoral researchers—Hong-Li Wang, Jan Monzer and Byung-Chun Yoo—Lucas and former staff research associate K.C. McFarland. Vincent R. Franceschi, professor of plant biology at Washington State University, is also an author.

Reference: Xoconostle-Cázares B, Y Xiang, R Ruiz-Medrano, H-L Wang, J Monzer, B-C Yoo, KC McFarland, VR Franceschi, and WJ Lucas. 1998. *Science* 283: 94-98.

FRUIT-FLY MATING PRODUCES A GAME OF EVOLUTIONARY LEAPFROG

Male and female fruit flies have a common interest in reproduction, but they're at odds on one key point: Every male wants his sperm to fertilize the female's eggs, but the female wants only certain males to succeed.

A new study co-authored by Professor Emeritus Timothy Prout in the Section of Molecular and Cellular Biology suggests this conflict provokes continual tit-for-tat changes in the flies' genes—a male-female game of leapfrog that could have important evolutionary consequences.

In the study, which appears in the January 8 issue of the journal *Science*, Prout and two collaborators arranged 6,200 fruit-fly matings and charted the paternity of the 125,000 subsequent offspring. The results revealed a new factor controlling sperm success: The male's genes had to match in certain ways with the female's genes.

In theory, under those conditions, males with the most successful genetic makeups would soon evolve to dominate the population. The researchers suggest that to forestall that happening, females frequently change their genetic profiles to alter the males' competitive odds.

"This sort of interaction could be an important factor for maintaining variation among the successful males," says Prout. "There's a lot of scientific interest in these issues of sexual selection, which occur not just in many insects, but also in some birds and mammals."

Prout's co-authors are Andrew Clark, professor of biology, Pennsylvania State University, and David Begun, a former postdoctoral fellow in UC Davis Professor Charles Langley's laboratory who is now an assistant professor of zoology with the University of Texas, Austin.

Reference: Clark AG, D J Begun, and T Prout. 1998. *Science* 283: 217-220.

NEUROSCIENTISTS UNRAVEL MYSTERY OF "PHANTOM-LIMB" EFFECTS

For some amputees, the pain and disability of losing an arm or leg are followed by a lifetime of other disturbing effects. For them, a touch on the face feels like a touch on the lost limb; the missing fingers or toes seem to be moving toward the remaining stump; and pain can persist in the limb that is long gone.

Many people are at risk for these phantom-limb effects; about 100,000 amputations occur each year in the United States alone. In the November 6, 1998, issue of *Science*, Edward Jones, director of the UC Davis Center for Neuroscience, and co-author Tim Pons, professor of neurosurgery at Wake Forest University School of Medicine, paint a new picture of the changes that occur deep in the brain after amputation.

Their findings could point to new means of preventing or treating post-amputation problems. And, coming on the heels of other news that adults, even people in

Research news (continued on page 7)

FEATURE

An Interview With Edward Jones

Distinguished neuroscientist Edward "Ted" Jones, M.D., Ph.D., is the new director of the UC Davis Center for Neuroscience and president of the Society for Neuroscience. I recently met with him to discuss his views on the burgeoning field of neuroscience and on the campus's neuroscience center.

—Karen Guin

Neuroscience is one of the most rapidly expanding areas of biology and medicine. Where have the greatest strides been made?

There have been enormous strides in neuroscience overall. In the last five years there have been more publications in neuroscience than in the whole prior history of biological sciences. That's an indication of a number of things, I think. One is the development of an enormous variety of new techniques within the subject which have led to an explosion of studies, particularly at the molecular level. These molecular studies offer greater opportunity than we ever anticipated for uncovering the basis and ultimately, we hope, strategies for treating neurological and psychiatric diseases.

Another reason for this explosion of activity is the recruitment of individuals, especially young individuals, from other disciplines. This is the nature of neuroscience. It imbibes technologies and intellectual ideas from other disciplines. Twenty-five years ago there was no neuroscience. There was neuroanatomy, neurophysiology, and the beginning of neurochemistry, but certainly no molecular neurobiology. Even the word "neurobiology" was limited to use by insect physiologists.

Jim von Rummelhoff

Also propelling the development of neuroscience has been the recognition by society that there is an enormous amount to be gained from understanding neurological disease. It's been helped by the fact many important figures in our society, in the entertainment industry, in government, have themselves suffered from or have had a relative affected by a neurological disease.

Do you think there has been a change in society's attitude toward mental illness?

There's certainly been major transformations of attitude. They stem in large part from the conversion of psychiatry from being totally analytical to now being essentially biological. We now know that virtually all neuropsychiatric diseases have an underlying biological basis and probably a large genetic component. In some cases, especially schizophrenia, we're on the verge of a breakthrough.

The public has recognized that you don't hide these things any more. One percent of the human population suffers from schizophrenia, but you would not have realized that until recently. Now when I mention that I am engaged in schizophrenia research, it's not uncommon for someone to say to me, "Oh yes, I have a schizophrenic relative." You would not have heard that before. So this is good and it's good because it now promotes the drive toward understanding and the drive toward funding for research.

There has also been a tremendous alliance forged between scientists and patient advocacy groups, who really used to be at loggerheads because they were competing for attention with the funding agencies. Now it is recognized that there are enormous benefits from linking activities in this field. Also coming into this are the directors of the NIH (National Institutes of Health) Institutes. They are now part of the alliance involving both of these groups and even Congress itself.

Your recent report in *Science* (see summary, p. 3) and recent reports by others, indicate that the brain can undergo structural changes over time. Can you speculate how knowledge about the brain's plasticity may lead to new types of treatments for neurological disorders?

I think this has been one of the very exciting developments in neuroscience. Beginning in the

middle '80s, studies have revealed that the sensory perceptive parts of the brain are much more plastic and adaptable than we originally thought. For a time, we adopted a sort of gee-whiz approach to that. Recently, it's become evident that if we can harness the mechanisms associated with brain plasticity there may be an opportunity to improve function in cases where people have suffered a loss of function, such as after strokes or cerebral trauma. It also might be possible to force adaptive changes in an undamaged brain that is in some way compromised, such as in the case of learning disabilities, autism, and attention disorders.

Now I wouldn't want to suggest to a parent who had an autistic child that an effective treatment for autism is just around the corner. But certainly many scientists feel there is hope that a brain that is compromised in some way or another may be forced to adapt positively by using some of the kinds of stimulus parameters used in studies of plasticity in monkeys.

You assumed the position of director of the Center for Neuroscience in July 1998. What attracted you to the center?

There were several things. One is Davis itself, which I believe is poised to become a major player in the field of neuroscience in particular and in biological sciences in general. Davis has effective leadership with vision. It also has the available resources, primarily resources of people. I think Davis has been very effective in husbanding those people resources.

Another component was that the center already had a very established reputation. Not one that was particularly old because the majority of the faculty in the center are still very young. They are just rising to their full productive years. But it was clear that it was an entity that already had the basic framework of very good science, and I was given the opportunity to build on that. I also permitted myself to be taken out of the routine sort of administration that a departmental chairman is normally expected to do. This is a different kind of administration. It's the administration of science. That's a privilege that's given to few scientists.

What is the current thrust of research at the center?

The center is currently recognized for its strength in what we call systems and cognitive neuroscience, the aspects of nervous function which involve integrative higher-order function—perception, attention, and cognition, generally. There's a range of research going on here in that field, from studies of single nerve cells in behaving animals to studies of human patients who have had strokes or other forms of cerebral damage. That's where the current strength of the center lies and I think it's recognized as one of the best in that area. That's a tribute to the first director, Michael Gazzaniga.

What plans do you anticipate for the future of the center?

I intend to make Davis the major recruiter in neuroscience in the United States, and probably in the world, over the next five years. There are a large number of positions to fill, currently 12. All of the recruits will be members of the center and have appointments in university departments.

My mandate here is to add to the center the dimension of cellular and molecular neurobiology. So all of my recruitments will probably be in that field. This will have the effect of making the center, I don't want to say "diverse," I would say "more broad." There will probably be parallel streams of neuroscience research going on but these will intersect at many different levels.

This is going to be one of the top neuroscience campuses in the country. There's no doubt about that because we have the resources to do it and the leadership which is inspired enough to do it.

About Edward Jones

Edward G. Jones was born in New Zealand, where he received his M.D. in 1962 from the University of Otago. He earned his Ph.D. from the University of Oxford in England in 1968. Jones held teaching positions at both universities before joining the faculty at Washington University School of Medicine in St. Louis, Mo., in 1972. He became a U.S. citizen in 1978. In 1984 Jones joined the faculty at UC Irvine as chair of the Department of Anatomy and Neurobiology. He assumed his current position as professor of psychiatry and director of the Center for Neuroscience at UC Davis in July 1998. In November, he became the president of the Society for Neuroscience, a worldwide organization of more than 26,000 scientists and physicians. Jones is an authority on brain anatomy and recognized as a leading researcher of the central nervous system. In recent years, he has introduced molecular biology methodology to systems neuroscience to provide an integrated way of studying the nervous system. He has done groundbreaking work on schizophrenia, focusing on how changes at the molecular and cellular level give rise to the disorder. Jones also belongs to a group of scientists who are working on the nation's Human Brain Project, which supports the development of databases on the brain and of technologies to manage and share neuroscience information.

People

Alumni

Jill Shore Auburn, Ph.D., Zoology, 1985, is associate director of the UC Davis-based Sustainable Agriculture Research and Education Program and has been named national program leader for sustainable agriculture by the U.S. Department of Agriculture.

Jack Kelly Clark, B.S., Zoology, 1967, is a principal photographer for UC Davis Communication Services, Division of Agriculture and Natural Resources. He specializes in capturing images of minute agricultural pests that affect crops and is internationally known for his "macrophotography." Clark's work has appeared in a range of contexts from college textbooks to children's books. The February 20, 1998, cover of *Science* is Clark's photograph of a green peach aphid. More of his work can be seen in the *Natural Enemies Handbook*, a field guide on biological control recently published by the UC Statewide Integrated Pest Management Project.

Above: Jack Kelly Clark specializes in taking photos of minute agricultural pests. Right: Clark's photo of a predatory mite, *Anystis agilis*, attacking a grape leafhopper nymph, from *The Natural Enemies Handbook*.

Melissa Duede, B.S., Biological Sciences, 1997, is a special events planner with UC Davis Alumni Relations. As an undergraduate Duede enjoyed serving on the Picnic Day Board. After graduating she worked in laboratory-client relations at Analytical ChemTech International Inc., Sacramento, Calif., before joining Alumni Relations.

The UC Davis Registrar's Office selected **Keitha Hunter,** B.S., Zoology, 1981; M.A., English, 1983, to implement a new degree-auditing system, that will enable students to track their academic progress using the World Wide Web. Hunter, a staff member for nine years, was editor of the general catalog for the past eight years.

Robert McLandress, M.S., Ecology, 1979; Ph.D., Ecology, 1983, has been named president of the California Waterfowl Association, a statewide organization that conserves California's wetlands, waterfowl, and outdoor heritage. McLandress has been with the California Waterfowl Association since 1985 and has 30 years' experience in waterfowl and wetlands conservation. He led the association's scientific staff as they conducted landmark research on the biology and habitat use of mallards that nest in California.

Cynthia Mojica, B.S., Biological Sciences, 1993, received a master's degree from the UCLA School of Public Health in 1995 and is now a project director with the Cancer Prevention and Control Research group at the school. A graduate of the Biology Undergraduate Scholars Program (BUSP) for underrepresented students, she recently visited UC Davis to talk with current BUSP students about her research and careers in public health. Mojica currently researches how telephone counseling affects a woman's quality of life, and adherence to a doctor's recommendations, after a breast abnormality is discovered. In a second project, she is studying the attitudes, beliefs, and screening practices of colon cancer patients' family members because close relatives are two-to-three times more likely to develop colon cancer.

Jim von Rummelhoff

Mojica received a master's degree from the UCLA School of Public Health in 1995 and recently visited the campus to talk with BUSP students about careers in public health.

Melani Paquin, B.S., Zoology, 1994, is a researcher with the U.S. Geological Survey, Biological Resources Division. She is stationed at the Dixon Field Station, one of 20 field stations that compose the Western Ecological Research Center.

Paquin participates in research that focuses on habitat use and life history characteristics of the giant garter snake (*Thamnophis gigas*), a species endemic to California's Central Valley wetlands that the federal government designated as threatened.

Ray Sauvajot, Ph.D., Ecology, 1997, is an ecologist and science advisor for the National Park Service, Santa Monica Mountains National Recreation Area. His research focuses on the effects of urban encroachment and habitat fragmentation on wildlife in Southern California.

Gail Yokote, B.A., Biological Sciences, 1971, is the new assistant university librarian for the sciences at UC Davis. Yokote was previously an associate biomedical librarian at UCLA's Louise M. Darling Biomedical Library. She earned her master's degree in library science from the University of Illinois in 1972.

Students

Adam Gemoets, an undergraduate double-majoring in avian science and evolution and ecology, is the creator and owner of a new Davis pet store, Animal Kingdom. His desire to open a pet store stemmed from his frustration with the ways in which many pet stores are managed. Gemoets stresses to new pet owners that "having a pet is a lifelong commitment." He tries to find pets through local breeders and

supports the 4-H and SPCA as suppliers of animals. Each member of Animal Kingdom's staff is a UC Davis student who specializes in a particular animal and offers significant knowledge about that animal's nutrition and care.

Dan Leroy, a student in the Graduate Group in Ecology, is coordinating the restoration of the Putah Creek Riparian Reserve, located on the southern edge of campus, as his master's degree project. In December, approximately 60 people planted more than 1,200 native plants donated by the California State Department of Fish and Game and the Yolo Basin Foundation. Leroy will continue working to restore the site with the help of community groups.

Staff

Elizabeth Bishay, formerly the director of external relations and development for the Division of Biological Sciences, is now the director of major gifts for the campus's Center for the Arts fund-raising campaign.

Ellen Tani has been promoted from student affairs officer to assistant dean for undergraduate academic programs in the Division of Biological Sciences. Her responsibilities include management of the undergraduate academic program office, which oversees student affairs for approximately 3,500 biology students. Tani earned bachelor's and master's degrees in zoology from UC Davis in 1975 and 1976, respectively. She was employed by the zoology department, first as a student and later as a student counselor, for 18 years. In 1992, she became a student affairs officer in the division's dean's office.

Faculty

James Clegg was awarded a Fulbright Scholar Award for 1998-1999. Clegg is currently at the University of Ghent in Belgium studying the encysted embryos of brine shrimp from geologic cores many thousands of years old for clues to the long-term stability of preserved DNA. Clegg was director of the Bodega Marine Laboratory from 1986 to December 1998. Ernest Chang, professor of animal science and of neurobiology, physiology, and behavior, is interim director of the laboratory while the campus searches for a new director.

…Research news

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their 60s and 70s, grow new brain cells, the report adds to the growing awareness that the adult brain is far more responsive and adaptable than had been believed.

Jones and Pons studied the brains from eight monkeys in which, 12 to 20 years before their deaths, the nerves in one arm had been surgically severed at the spinal column. All the animals were from a group called the Silver Spring monkeys, the subjects of an intense debate in 1985 about animal experimentation.

The research showed that the marooned nerve cells in the brain that no longer received information from the arm shrank by almost half. The resulting space was filled by neighboring nerve cells that normally carried information from the face. In this new organization, sensory messages from the face were carried to the part of the cerebral cortex that normally receives sensations from the arm. There was also increased activity in adjacent brain cells that normally carry painful messages.

"These findings show that the effects on the brain are progressive over time, which had not been thought before," Jones says. "If we could harness these effects therapeutically, we would be able to plan strategies for preventing post-amputation pain and for recovery of function after nerve damage."

For most of the study, Edward Jones was on the faculty of UC Irvine. He joined the UC Davis faculty on July 1, 1998.

Reference: Jones EG and TP Pons. 1998. *Science* 282: 1121-1125.

The Di Fiori family, including UC Davis alumni Russell Di Fiori (front row, left), B.S. Zoology, 1990; brother Mike Di Fiori (front row, second from left), B.S. Biological Sciences, 1990; and Mike's wife Jamie Di Fiori (neé Thurman) (top row, far right), Biological Sciences, 1990. Russell sent an e-mail message letting us know that they all live in Pasadena, Calif. and comments, "Just thought you might be interested in a UC Davis family that has done well because of our fine start at the university." Russell Di Fiori is a biology professor at Pasadena City College (PCC) and directs the biotechnology program at PCC as well as the Los Angeles and Orange County Biological Technology Center. He received an economic development award from the City of Pasadena while working on the South Fair Oaks Biomedical/Biotechnology Corridor project. He also runs an expedition company, Xantus Outfitters Inc., that offers educational and research expeditions to Baja, Mexico. Mike Di Fiori is a biology teacher and head football coach at Temple City High School, Temple City, Calif. He has also coached at Saint Mary's College in Moraga, Calif., and Bishop Amat High School, La Puente, Calif. He was a defensive lineman for the Aggies from 1986 to 1990. Jamie Di Fiori attended medical school at the University of Southern California and is now finishing her final residency in radiology.

DIVISION OF BIOLOGICAL SCIENCES

Undergraduate majors

Biochemistry
Biological Sciences
Cell Biology
Evolution and Ecology
Genetics
Microbiology
Neurobiology, Physiology, and Behavior
Plant Biology
(Former names of some majors: Bacteriology, Botany, Physiology, Zoology)

Graduate programs

Animal Behavior
Biochemistry and Molecular Biology
Biophysics
Cell and Developmental Biology
Genetics
Microbiology
Neuroscience
Physiology
Plant Biology
Population Biology

Sections

Evolution and Ecology
Microbiology
Molecular and Cellular Biology
Neurobiology, Physiology, and Behavior
Plant Biology

Campuswide programs and centers

Biotechnology Program
Center for Animal Behavior
Center for Neuroscience
Center for Population Biology

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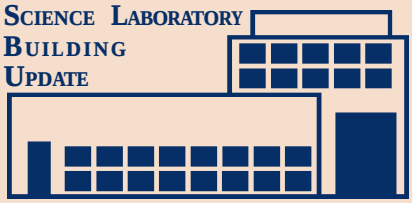
Science Laboratory Building Update



The campus's proposed science laboratory building is one step closer to being built since California voters approved in November a bond issue, Proposition 1A, that supplies funds for the state's public higher-education facilities. The bond will partially cover construction costs for the new building, scheduled for completion in 2004. Once constructed, the state-of-the-art, 34-laboratory teaching facility will bring biological sciences programs together within a core campus area and provide a learning environment that emphasizes the interdisciplinary nature of biological sciences. Courses now taught in laboratories throughout Briggs, Storer, Hutchison, and Robbins Halls will move to the new facility, making way for new programs in renovated laboratories. In addition to teaching laboratories for biology and chemistry, facility plans include space for academic support programs, the plant biology teaching greenhouse, the Biotechnology Program, and a 500-seat lecture hall. Under consideration are plans for a museum-style annex that would house the Botanical Conservatory and the Herbarium.

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