UC DAVIS
BIOLOGICAL SCIENCES
NEWS FROM THE DIVISION OF BIOLOGICAL SCIENCES VOL.7 NO.3

HOPE FOR WORLD HUNGER

Although world hunger remains a staggering problem—there are currently 800 million people worldwide who are undernourished—Gordon Conway, Ph.D., Zoology, 1969, believes there is a solution. Fortunately, as president of the Rockefeller Foundation, he is in a position to do something about it.

Chris Flannigan/Axiom

Gordon Conway shared his views on world hunger during a visit to UC Davis as guest speaker at the division's commencement exercises.

Conway, an agricultural ecologist who has lived and traveled in some of the world's most impoverished areas, says the solution lies in helping farmers grow life-sustaining crops in low-potential rural lands. These lands, particularly in Africa, Asia, and Latin America, have the largest numbers of undernourished people.

"Two recent revolutions in biology offer hope," says Conway. Biotechnology tools, such as genetic engineering, now make it possible to design high-yield grain plants that grow in conditions such as poor soil and dry climate. And environmentally friendly principles, such as sustainable agriculture and integrated pest management, now enable farmers to grow crops using methods that do not adversely affect their health or land.

A third part of the solution, Conway says, is to increase the participation of farmers in solving their farming problems. "We need to recognize the wisdom of farmers," he explains. "They know their watersheds, cropping patterns, and methods of weed control better than extension service 'experts.' The farmers need to be involved in their own revolution."

Conway offered these thoughts, which he details in his 1997 book, *The Doubly Green Revolution: Food for All in the 21st Century,* during a talk in June at UC Davis. It was by no means his first trip to the campus. From 1966 to 1969 he was a graduate

(continued on page 2)

TERRENCE MURPHY RECOGNIZED FOR MENTORING UNDERGRADUATES

It's apparent that professor of plant biology Terrence Murphy enjoys mentoring undergraduates: During his 29 years at UC Davis, he has welcomed at least 65 undergraduates into his laboratory. In recognition of his dedication to undergraduate research, Murphy was awarded the 1998-99 Chancellor's Award for Faculty Mentoring of Undergraduate Research.

Although undergraduates may find the prospect of doing research in a faculty member's laboratory intimidating, Murphy's friendly demeanor and consistent helpfulness put students at ease.

"He is one of the most thoughtful and genuinely interested undergraduate mentors with whom I have dealt," says a graduate student who worked with Murphy in UC Davis' Program in College Teaching. "Regardless of the research topic, Professor Murphy has a tremendous desire to help students understand the fundamental principles of research that will help them to succeed as scientists."

Murphy personally oversees his students' research,

(continued on page 3)

Biological Sciences Alumni,

We're interested in your thoughts about your UC Davis undergraduate education. Therefore, we hope you'll take the time to complete the enclosed survey.

With appreciation,

Dean Mark McNamee
Associate Dean Thomas Rost

CONTENTS

News Briefs

1999 Commencement

Approximately 760 students donned black gowns and tasseled mortarboards for the Division of Biological Sciences commencement ceremony on June 19. **Gordon Conway,** Ph.D., Zoology, 1969, president of the Rockefeller Foundation, gave the commencement address.

Postdoctoral Career Development Program

UC Davis and San Francisco State University are establishing a cooperative career development program for postdoctoral scientists in the biological and chemical sciences. Funded by a $3,123,379 training grant from the National Institutes of Health, the program will facilitate the academic careers of postdoctoral fellows. Scientists in the program will conduct research at UC Davis and teach at San Francisco State University, one of the largest and most ethnically diverse comprehensive urban universities. Jerry Hedrick, professor of molecular and cellular biology and associate dean of graduate studies, is the principal investigator for the program.

...World Hunger

(continued from front page)

student at Davis, earning a doctorate in zoology with a focus on systems ecology.

His visit in June included a second talk as guest speaker at the Division of Biological Sciences commencement ceremony. During his speech, Conway, a native of Wales, shared his great fondness for the campus.

"I arrived at UC Davis after working in Borneo for five years," he recalls. "Coming from the rain forest to a land of shopping malls and highways was a great culture shock. But the people here were just wonderful, and I eventually managed to overcome it."

In the 30 years since he left Davis, Conway has worked and traveled throughout Asia and Africa. In Thailand, he developed methods to analyze agricultural ecosystems. In Pakistan and Ethiopia, he worked side-by-side with villagers to analyze, define, and implement solutions to their farming problems. And in the Sudan, Indonesia, the Philippines, and Thailand he developed interdisciplinary centers of environmental education. He has also kept strong ties with the United Kingdom, holding academic positions at Imperial College and the vice chancellorship at the University of Sussex.

Conway's broad international experience, distinguished scholarship, and genuine concern for people made him a likely pick in 1998 for the presidency of the Rockefeller Foundation. Based in New York City, the foundation is dedicated to improving the well being of people throughout the world. It is the oldest and, with $2.8 billion in assets, largest organization of its kind.

Conway takes pleasure in knowing that he is the first ecologist to serve as the foundation's president. "Like most biologists, I'm an optimist," he remarks. "I believe that achievements in biological research hold the promise of considerable benefits for the people of developing countries."

The Rockefeller Foundation has funded more than $100 million of plant biotechnology research in the past 10 years. Highlights of this research include:

- In Mexico, scientists have added genes to rice and maize to increase tolerance to aluminum, which presents a soil toxicity problem that blights vast areas of the tropics.
- In India, researchers have added two genes to rice that appear to help the plant survive being submerged for long periods of time, a common problem in Asia.
- Scientists have developed a strain of rice with added beta-carotene, which is turned into Vitamin A in humans. In developing countries, 180 million children suffer from Vitamin A deficiency and each year two million die from it.
- Other efforts to add genes to rice could boost its iron content by three-fold. Some two billion people worldwide suffer from anemia, a condition caused by iron deficiency.

Research News

Marine Reserves Net Sustainable Fish Catch

Setting aside areas of coastal waters where fishing is prohibited—creating "no-take" marine reserves—can help preserve biodiversity and at the same time produce a sustainable harvest for fishers, say Alan Hastings and Louis Botsford, faculty members in the Center for Population Biology.

In a paper published in the May 28, 1999, issue of the journal *Science*, authors Hastings and Botsford use simple mathematical models to show that the yield from coastal waters incorporating "no-take" zones would equal the harvest fishers get under current practice, which allows the industry to take a fixed percentage of the available fishery stock.

Fearing reduced harvests, fishing industry groups have been wary of proposed marine reserves as a remedy for overfishing and as a way to preserve marine biodiversity, according to Botsford and Hastings.

But the scientists say that reserves can work as well as traditional fisheries management, particularly for populations composed of sedentary adults and widely

Research News *continued on page 3*

...Murphy

(continued from front page)

and at weekly laboratory meetings he listens as the students discuss their progress. However, Murphy's guidance is never intrusive; he lets students work independently, making himself available for questions or assistance with problems.

Jim von Rummelhoff

Murphy (left) with undergraduate biotechnology student Desmond Bautista. Murphy says, "I enjoy mentoring students, and undergraduates do good research. Several of my students have been co-authors of published research papers and at least one has been a first author."

"Professor Murphy gives me a great deal of autonomy in deciding which experiments to run," attests one of his students, "and he is always open to helping me perform new types of experiments, even if they're not anything the lab has been doing."

Charles Gasser was an undergraduate in Murphy's laboratory and is now a faculty member in the Section of Molecular and Cellular Biology. He recalls, "Dr. Murphy's lab was my first experience with academic research. He gave me my own project to work on with a clear set of goals and showed me that you can't believe everything that is published in the scientific literature. Probably the most inspirational aspect of the experience was the fact that, in contrast to laboratory courses, I was doing work that could provide new information—information *no one* had ever known before! This experience increased my interest in a research career and was an important factor in my eventual decision to go to graduate school. I'm grateful to Dr. Murphy for providing the supportive environment and relative freedom that made my work in his lab such an enjoyable and educational experience."

In addition to laboratory techniques, students learn other skills under Murphy's tutelage: he encourages them to apply for undergraduate research grants and participate in the annual UC Davis Undergraduate Research Conference. "Professor Murphy helped me to face my fear of public speaking by having me participate in the campus's undergraduate research conference," affirms an undergraduate in Murphy's laboratory.

...Research News

(continued from page 2)

dispersed larvae—for example, sea urchins, Dungeness crab, and lobsters—that might not have a chance to reproduce otherwise.

If an equal harvest can be collected under the reserve system, this plan could counter industry pressure to increase the allowable catch and thus avert more rapid depletion of the fish population. No-take zones would also be easier to monitor and enforce than quota and size limits. In addition, fisheries management through reserves would eliminate the need to assess stock constantly.

Citing examples in Chile and South Africa, Hastings and Botsford say that at present few no-take marine reserves exist. In California, nine no-take marine reserves exist, comprising 7,000 acres, just 0.2 percent of the state's waters.

"There's been an inertia to this idea. People thought there would be less efficient management with reserves. But this way, you just divide up the coast, with fishing allowed here, but not there," Botsford says.

"With the reserves, there's less uncertainty in predictions of what you can catch," Hastings adds.

The research was supported by a National Science Foundation grant, and conducted at the National Center for Ecological Analysis and Synthesis at UC Santa Barbara.

Reference: Hastings A and LW Botsford. 1999. *Science* 284: 1537-1538.

News Briefs

Center for Genetics and Development

Provost and Executive Vice Chancellor Robert Grey recently approved a proposal to establish an interdisciplinary Center for Genetics and Development. The center is part of a remolding of biological sciences programs to reflect rapid advances in molecular genetics and developmental biology. "Genetics is a profoundly important way of looking at biology, and development represents one of the most interesting problems in biology," says Division of Biological Sciences Dean Mark McNamee. "Processes at the molecular level are not understood very well. The center enables the division and related groups to recruit faculty members interested in molecular aspects of genetics and development." Over the next five years, the division will hire 10 new faculty members, two per year, for the center. In addition to helping the campus stay on the forefront of molecular biology, the center will serve to link biological sciences with programs such as the UC Davis Cancer Center. The campus has allocated $850,000 per year for laboratory renovation and equipment costs associated with creating the center, and $200,000 per year for administrative support. The division also secured a $409,000 grant from the National Institutes of Health for remodeling costs.

FEATURE

UNNATURAL CAUSES:

BIOLOGICAL WEAPONS AND BIOTERRORISM

UC Davis microbiologist Mark Wheelis, an infectious disease and biological weapons expert who is frequently consulted by the news media, shares his thoughts on the threat of biological warfare.

By Debra C. Cleveland

In 1980, the World Health Organization announced that the smallpox virus had been eradicated. The world's only known stores of the smallpox virus, variola, remain in high-security laboratories at the Centers for Disease Control and Prevention in Atlanta, Ga., and at Vector in Novosibirsk Region, Russia.

Both of these smallpox stores were to be destroyed in June 1999, theoretically eliminating the fearful virus forever. Despite protests from scientists and health care agencies who claim the virus is too dangerous to keep, President Clinton decided to preserve the United States' store.

Mark Wheelis agrees with Clinton's decision—not too long ago, he wouldn't have.

Wheelis, a senior lecturer in microbiology, says that until six months ago he was a proponent of destroying the smallpox stores. "I strongly supported destruction because the virus has inflicted enormous suffering on humanity. No cure exists and no storage facility is absolutely secure. In addition, scientists have sequenced the genomes of several strains of the virus." However, Wheelis changed his mind after recent disclosures that the Soviet Union had an extensive, covert biological weapons program, which included manufacturing variola, and may have passed the virus to North Korea.

"If North Korea has a smallpox stock, then the United States needs its smallpox stores to develop both a new vaccine, because the classic vaccine is not entirely satisfactory, and an anti-viral drug. The latter needs to be tested directly on the smallpox virus rather than on something closely related in the hope that smallpox would respond the same way," says Wheelis.

Smallpox would be a sinister biological weapon: virtually everyone is susceptible, worldwide vaccination having stopped 20 or more years ago, and it has a 30 percent mortality rate. But other organisms are likely biological warfare agents, the bacterium anthrax for instance.

Biological attacks difficult to mount

Whether smallpox, anthrax, or another organism is used, it seems it's only a matter of time before a biological attack occurs. Wheelis agrees with this predominant view. "I think a biological attack against a major American city within the next few years is probable, but it's also probable the results won't be the Armageddon newspapers describe. Instead of thousands of anthrax cases there will be a few dozen." To support his statement, Wheelis describes the difficulties bioterrorists must overcome to mount a successful attack.

> **"It's not easy these days to get lethal microbial agents and it takes a certain level of microbiological expertise to grow a substantial supply and keep it uncontaminated. Viral agents are especially difficult."**
>
> **— Mark Wheelis**

"First, the terrorists are in danger themselves. They would need to be immunized or live with the hazard of infection. Second, they would have to acquire the biological agent and be able to grow it in sufficient amounts for an effective attack. Third, they would have to disperse the agent in a way that would get to the target population."

None of these are insurmountable obstacles, but they're not inconsiderable either. Wheelis remarks, "It's not easy these days to get lethal microbial agents and it takes a certain level of microbiological expertise to grow a substantial supply and keep it uncontaminated. Viral agents are especially difficult. Also, if the terrorists are planning to release the agent as an aerosol, they can't just buy a paint sprayer and have it emit particles in the right size range. If anthrax particles are too big they can't enter the lungs where infection begins."

Electron microscopic image of smallpox virus

Wheelis admits a bioterrorist attack could be devastating if properly designed, but points out that "Since WW II there have been only two confirmed unnatural outbreaks of disease. One was an outbreak of salmonella, the bacteria that causes food poisoning, in The Dalles, Ore., about 10 years ago. Cult members deliberately instigated the attack to test whether it would keep voters home and thus disrupt local elections."

The second incident was an outbreak of anthrax in Sverdlovsk, now Ekaterinburg, Russia, in 1979 that U.S. intelligence alleged was an accidental release from a Soviet microbiology facility. The Soviet Union denied this allegation for years. With glasnost, Western scientists were allowed into Sverdlovsk to perform an epidemiological survey. Their findings built a compelling case for the anthrax outbreak being an accidental release of spores.

Public's fear excessive

The paucity of substantiated intentional biological attacks may be reassuring, but the United States has "created a monster by our public agonizing over the country's vulnerability," Wheelis maintains. "We've publicized our vulnerability to such an extent that every terrorist in the world must have taken notice. Essentially we've invited a biological attack. Regrettably, this is one of the costs of a free press."

Revealing the country's vulnerability has had a second consequence according to Wheelis. "The public is scared beyond what is reasonable. It's not that a biological attack couldn't have apocalyptic results, it's just very unlikely. Furthermore, if it does happen we can't do anything about it."

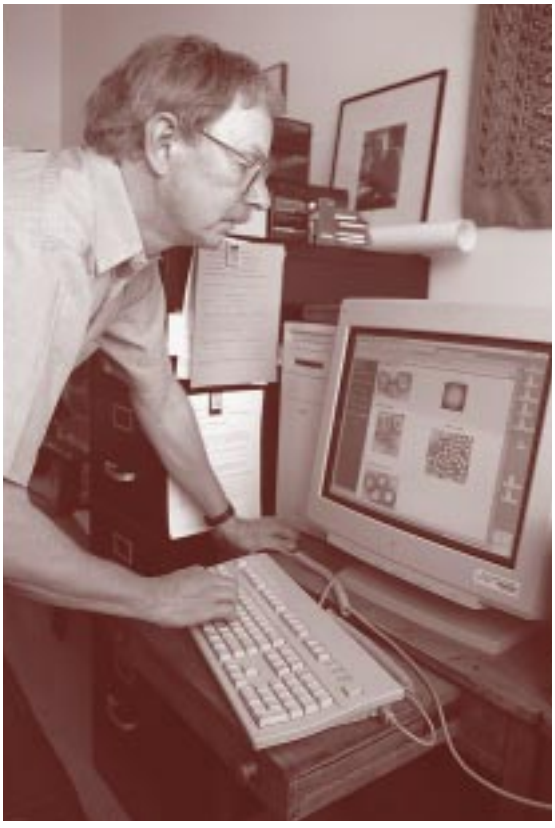
While Wheelis' statement sounds fatalistic, he means that people need to understand the reality of preparing for an attack. He explains, "There's no way we can quickly ramp up our public health and emergency systems to respond to a thousand cases of anthrax in Washington, D.C., or 100 cases of smallpox. We're currently trying to prepare for a public health disaster far beyond our capacity. We should focus instead on preparing for small- or medium-scale events for which it's possible to develop attainable plans."

Obviously, preventing an attack would be preferable, and the United States has increased its surveillance of countries likely to stage a biological attack. Unfortunately, discovery of Iraq's biological weapons program provided a sobering lesson.

"The United States had no idea how advanced Iraq's program was," comments Wheelis. "Intelligence agencies completely missed many of the facilities Iraq used for large-scale biological production. The U.S. State Department now estimates that a dozen, or as many as two dozen, countries may be actively pursuing the production of biological weapons. It's a fairly tense time with regard to proliferation."

New treaty on biological weapons

A treaty currently being negotiated in Geneva, Switzerland, would strengthen the 1972 Biological and Toxin Weapons Convention, which called for the termination of all research on offensive bioweapons and the destruction of existing stocks of agents, but contained no mechanism for verifying compliance. In part, the new treaty would allow teams of international inspectors to visit facilities, such as vaccine plants, to ensure they're not a cover for biological weapons production. This July, Wheelis is traveling to Geneva to help organize a Federation of American Scientists panel, which will give a presentation to diplomats negotiating the treaty. The presentation will address peaceful uses of microbiology.



Jim von Rummelhoff

Wheelis is a member of the Federation of American Scientists and chairs its Biological Weapons and Toxins Verification Program's (BTW) Subgroup on Investigations. Among other activities, the BTW program explores ways to prevent further proliferation of biotechnology for military applications.

People

Alumni

This fall, **Ngoc Phan,** B.S.; Neurobiology, Physiology, and Behavior; 1998, will begin the Health Sciences and Technology M.D. program jointly offered by Harvard and MIT (Massachusetts Institute of Technology). For the past year, Phan has worked with the chair of UC Irvine's Department of Medicine, John C. Longhurst. She is studying how nitric oxide (NO), a diffusable gas that acts as a signaling molecule, affects cardiovascular responses to bradykinin, a polypeptide the heart produces when it doesn't get enough oxygen. Phan says, "My research suggests that NO may have contrasting roles in the central nervous system and peripheral tissues. Perhaps in the future we'll develop new therapies for hypertension and other cardiovascular pathologies that involve the regulation and production of NO."

This past April, Phan presented her research at the annual meeting of the Federation of American Societies for Experimental Biology in Washington, D.C.

Amy Wolf, Ph.D., Ecology, 1998, received the Sigma Xi award for her outstanding research and dissertation, titled "Population Structure and Reproductive Ecology of Serpentine Endemic Plant Species in California's North Coast Range." Susan Harrison, Wolf's major professor, comments, "Amy's work addressed a timely question in conservation biology and ecology: How does the spatial structure of landscapes shape the distribution, reproductive success, and genetic structure of species? Her study was one of the first to show that isolated plant populations suffer reduced reproductive success. Her work was remarkable for its ambitious geographic scope and its blend of observational, experimental, and genetic approaches."

Lisa Puryear, B.S., Evolution and Ecology, 1997, is a first-year student in the UC Davis School of Veterinary Medicine. Lisa says, "I came to Davis with

Lisa Puryear with UC Davis alumnus Brent Weeth. Puryear says her undergraduate education "was more than the courses required for my major and included studying for a quarter in Costa Rica, working as a peer counselor, and conducting research for three years."

great dreams of becoming a veterinarian, but once here I discovered that Davis offered more than just solid pre-vet preparation. I took advantage of every department on campus, from textiles to viticulture to English literature. I feel it's just as important to find out what you don't like as well as what you do, so in vet school I'm taking every learning opportunity that crosses my path from dairy cow management to llama shearing, and having a great time doing it."

Gina M. Delucca, B.S., Biological Sciences, 1995, graduated this past June from UC San Francisco (UCSF), with a

Gina M. Delucca

Doctor of Pharmacy degree. She will enter a general practice pharmacy residency at the Veterans Affairs Medical Center in San Diego. Gina was selected as one of five nominees for the Bowl of Hygeia award, sponsored by the UCSF Pharmacy Alumni Association. The award is given to a senior student who, in the estimation of classmates and instructors, best demonstrate the qualities of the ideal pharmacist in action, thought, and attitude. In the future Gina hopes to practice in an ambulatory care setting.

Heather Vermazen, B.S., Biochemistry, 1989, has turned her hobby of designing and sewing clothes for her daughters into a business, "Mama's Stitches," that

Heather Vermazen, née Young, and daughter Sarah, who is wearing a christening gown designed and sewn by her mother.

specializes in English smocking and French heirloom stitching. French heirloom stitching is a method of attaching lace to fabric to achieve certain shapes. English smocking, the process of embroidering on pleated material, often makes up the front breast piece of dresses for little girls. Vermazen sees her work not only as a business venture, but also as an important American craft in danger of dying out. Previous to having her own business, Vermazen worked as a laboratory technician in the UC Davis School of Medicine, Department of Microbiology and Immunology, where she studied HIV.

Michael DeAnda, B.S., Biological Sciences, 1981, attended dental school at UC San Francisco and has a general

practice in Sacramento, Calif. DeAnda's wife, Marilyn, is a dental hygienist who works one day a week at the practice. The couple's two children, Christian and Andrew, four and seven years old respectively, have, not surprisingly, perfect teeth.

Mike Mahan, B.S., Biochemistry, 1978; M.S., Genetics, 1982, is an associate professor of molecular, cellular, and development biology at UC Santa Barbara. In his research, Mahan uses *Salmonella*, which causes diseases ranging from food and blood poisoning to typhoid fever, to study how bacteria cause disease. Utilizing a special technique, Mahan's laboratory isolated bacterial genes that are *on* in a mouse and *off* out of a mouse. The laboratory subsequently identified the master switch that controls the *on* and *off* states: bacterial enzyme DNA adenine methylase, or DAM. Mice immunized with DAM mutants were completely protected against a subsequent *Salmonella* infection. Because DAM is present in many pathogens that cause serious health problems worldwide, including cholera, dysentery, meningitis, typhoid fever, and the plague, Mahan's studies could lead to the development of a new generation of vaccines and antibiotics that combat these infectious diseases.

"My wife, Kelly, who graduated in psychology from Davis, and I are quite happy in Santa Barbara." says Mahan. "We have two children: our son, Scott, is three years old and our daughter, Erin, is four months old. Scott loves the beach, and I ride my bike to work, just like in Davis."

Students

Ph.D. recipient **Anurag Agrawal** received the 1999 Merton Love Award, which honors a graduate student completing an outstanding doctoral dissertation in ecology or evolutionary biology. Agrawal studied three wild mustards to investigate the evolutionary ecology of facultative resistance to herbivores, *i.e.*, resistance induced after exposure to a cue of the herbivore's.

The campus's Loren D. Carlson Physiology Prize for 1999 was awarded to **Sean Wilson,** doctoral candidate in physiology. The award, established in 1972 in honor of Carlson, professor emeritus of physiology, is given for scholarly achievement and promise for teaching and research. Wilson's work showed that some previously uncharacterized signals passed between fat cells and neighboring cells affect the number of mature fat-storing cells formed from precursor cells. This novel pathway is a potential target for drugs that could manipulate the proliferation of fat cells and their ability to accumulate fat stores.

Adrienne Williams of San Jose, Calif., received the University Medal, UC Davis' highest academic honor, at the Division of Biological Sciences commencement on June 19. Williams graduated with a B.S. in Neurobiology, Physiology, and Behavior. As a student, Williams kept goal for the women's soccer team, volunteered as a teaching assistant at North Davis Elementary School, and became certified as an emergency medical technician while earning a 4.0 grade-point average. She will be attending Dartmouth Medical School, Hanover, N.H.

At the division's commencement ceremony, **Larisa Sandler,** who graduated with a degree in genetics, was presented with the Mary Regan Meyer Prize, given to a student who demonstrates exceptional motivation. Maintaining a 3.85 grade-point average, Sandler, who is from San Francisco, Calif., served as a volunteer at two hospitals, a nursing home, a medical clinic, and a facility for troubled boys. Sandler plans to work for a biotechnology company and then attend medical school in 2000.

Biochemistry majors **Davinder Grover** and **Jeff Murray**, both juniors, were among the 304 winners of Barry M. Goldwater Scholarships, worth up to $7,500 each. The recipients were selected on academic merit from 1,181 applicants studying mathematics, science, or engineering at universities and colleges across the country.

Staff

Jacqueline Schad

Jacqueline Schad joined the Division of Biological Sciences as the director of development and external relations. Formerly the regional development director for the Office of Major Gifts at

People *continued on page 8*

In Memoriam

Professor of biological sciences Joel Keizer died on May 16, after a five-month battle with lung cancer. He was 56. Keizer joined the UC Davis faculty in 1971 as an assistant professor of chemistry. During the 1990s, Keizer's research interest turned to mathematical modeling of biological processes. In 1993 he became a professor of biology. His modeling was greatly appreciated by experimental biologists. "People who do theoretical work often come up with models that are interesting mathematically, but have nothing to do with real life," says Division of Biological Sciences Dean Mark McNamee. "Joel was very good at bridging the gap between theory and things you could measure." Keizer established the UC Davis Institute of Theoretical Dynamics in 1986 and was its director until his death. A multidisciplinary symposium, "Nonlinear Dynamics in Chemistry and Biology," is being held at UC Davis in September to honor Keizer.

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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...People

(continued from page 7)

UC Berkeley, Schad has 11 years of experience in development, including three years as the executive director of a large agency. She has a bachelor's degree in English from the University of South Dakota.

Faculty

Associate Professor **Peter Wainwright** joined the Section of Evolution and Ecology in January 1999. He studies the vertebrate skull to understand how complex muscle-skeletal systems evolve. Wainwright focuses primarily on the fish skull, a system he says "exhibits a stunning diversity of form and function." According to Wainwright, his research aims "to identify major unifying themes in how this complex system of muscles and bones is modified during evolution to produce diversity in design, prey-capture ability, and feeding ecology." Wainwright came to UC Davis from Florida State University where he had been since 1991. The courses Wainwright taught at Florida State included cadaver-based anatomy for first-year medical students. In 1994, he received the George Bartholomew Award for excellence in comparative physiology from the American Society of Zoologists. Wainwright received his bachelor's degree in zoology in 1980 from Duke University, N.C., and his Ph.D. in anatomy from the University of Chicago in 1988.

Peter Wainwright

Alan Stemler, professor of plant biology, received a 1998-99 UC Davis Outstanding Faculty Adviser award. Students nominate faculty members for the award, which is given to one faculty member from each college or division.

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