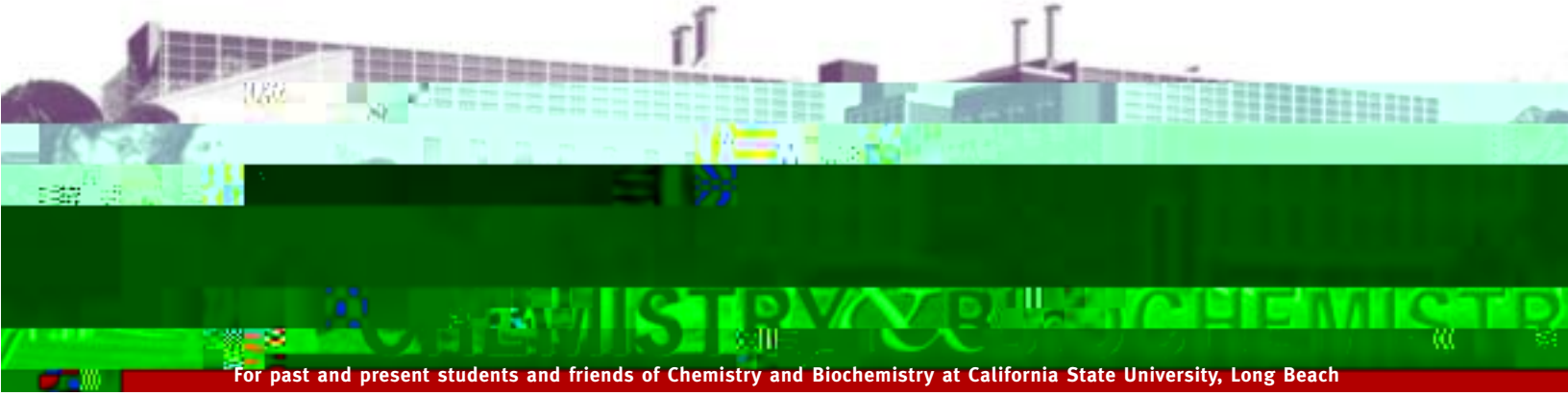


For past and present students and friends of Chemistry and Biochemistry at California State University, Long Beach

Research? What's that? Back in the 1950s and '60s, that response or ones similar, with rare exception, came from new academic hires at CSULB. Known primarily as a teaching institution in its early years, the university and its faculty did not put any true emphasis on research.

A couple of individuals at the university in those early years—Roger Bauer and John Jung, who continue to be heavily involved at CSULB—can easily recall what it was like when the word "research" was even brought up.

"In the early days here, there was a philosophy that was rather pervasive that said 'we're here to teach, not to do research. I didn't come here to do research; I came here to teach and that's it,'" said

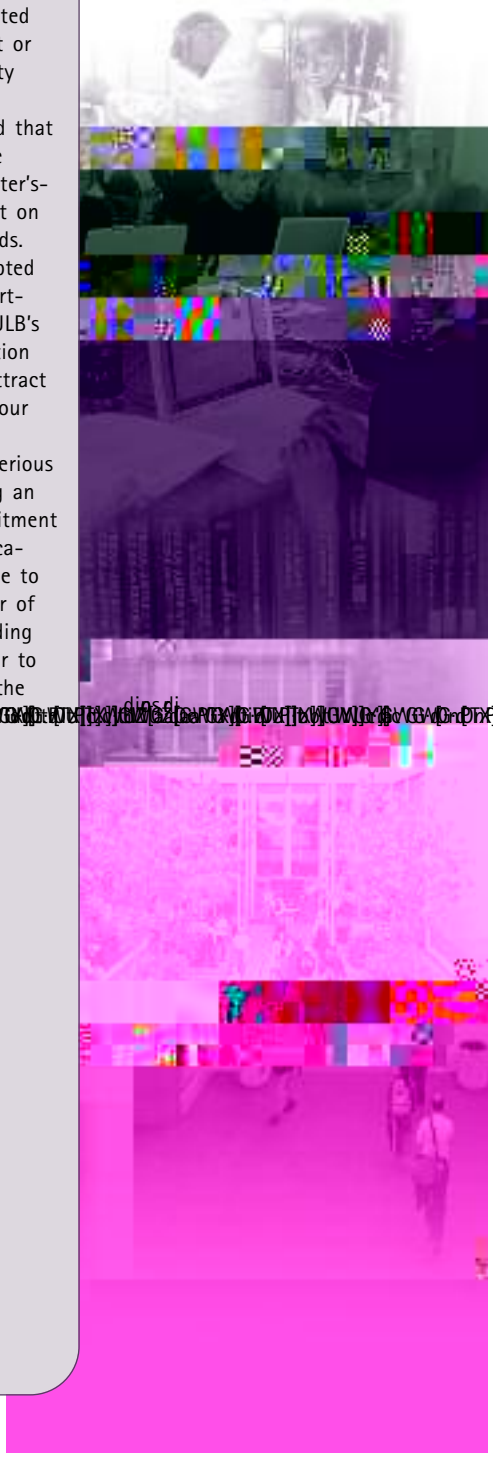
The Office of University Research at California State University, Long Beach reported the second highest year (fiscal year 2005-06) in grant and contract totals in the history of the university. A total of $44 million in new grants and contracts was received, up from $30.5 million the previous year. The effective indirect cost return on these awarded grants and contracts is about 16 percent, possibly the top in the CSU system. Twenty-seven of these awards were from the College of Natural Sciences and Mathematics (CNSM) with a total of $9,317,348, up from the $4,456,841 of the prior fiscal year. A National Institutes of Health (NIH) SCORE grant, consisting of nine major individual research grants, is listed as one award of $6,566,211. Congratulations go to Drs. Eric Marinez, Lijuan Li, Paul Weers, Xianhui Bu and Stephen Mezyk in the Department of Chemistry and Biochemistry, who received new grants for research during this past year. We also have many faculty members in the department and the college with prior grant awards, who are conducting externally funded research that is

If one word could be used to describe the

Department of Biological Sciences reports that 40 percent of its master's graduates enter doctoral degree programs, including medical school, while 60 percent go into science-oriented positions in industry, government or private agencies, or as community college science faculty.

Moreover, a recent NSF study found that between 1995 and 2004, CSULB had the largest number of graduates among master's-level universities in the nation who went on to earn doctoral degrees in research fields. Many of these students have been accepted to institutions such as Harvard, Yale, Dartmouth, Johns Hopkins and Stanford. CSULB's maturity as a respected research institution also is demonstrated by our ability to attract post-doctoral researchers to study with our faculty.

Building a research culture is a serious undertaking for any institution, requiring an immense infrastructure and fiscal commitment to provide students with a superior educational experience. CSULB faculty continue to successfully demonstrate the high caliber of their research to public and private funding organizations and private donors in order to improve laboratories and to underwrite the cost of experiments, resulting in a (v



M.S. Theses

Chemistry & Biochemistry

2005-06

Jennifer Aral

Ludilyn Fernandez Cayas

Lan Chen

Kristin K. Clark

Gianpaola Gacho

Tzu-Chi Hsu

Chad MacArthur

Dan-Tam Hoang Nguyen

Robert Loeschen, associate dean of facilities for the College of Natural Sciences and Mathematics (CNSM) and professor of chemistry and biochemistry, is a man who wears many hats, including one often found at construction sites. Loeschen is responsible for overseeing space configuration and usage of the buildings used by CNSM: Peterson Halls (PH) 1, 2 and 3, Microbiology, Faculty Offices 3 and 5, and the new Molecular and Life Sciences Center (MLSC).

To describe Loeschen as a multi-tasker is somewhat of an understatement. Each year, starting in the summer, while the rest of the campus moves at a slower pace, Loeschen works with Facilities Management personnel and the CNSM shops staff to prepare teaching and research labs to meet the needs of fac[illegible]

component amino acids. Today, a typical biochemical or molecular biology research group would concentrate on learning how the proteins function in the body, how changes in the protein affect metabolic process and how to design proteins to attack cells that cause disease. Far different types of equipment are required for these types of investigations. The equipment used routinely in chemistry and biology was not even invented in the '50s."

[illegible] requires a far different type of infrastructure. For a new building at a state university like CSULB, it takes 10 or more years before designs and plans are approved, yet time and scientific equipment upgrades move on. "All the new equipment these days needs dust-free environments, so you have to have air-conditioned rooms and sealed windows," Loeschen continued.

One shining example of a modern science infrastructure is the Molecular and Life Sciences Center (MLSC), opened in fall 2004 and funded by the passage of Proposition 1A in 1998. The 80,000-square-foot facility provides space for lab-intensive student instruction. There are a total of 43 laboratories: 19 teaching laboratories for general and organic chemistry, anatomy and physiology, and general biology sequences; and 24 directed studies laboratories used by inorganic, organic, analytical, biochemical and molecular biology

2005–06

Zeynep Oztug

Jasmine Shaw

The phrase, “being of two minds,” takes on a special meaning for Department of Chemistry and Biochemistry alumni Jennifer Guzzo and Jasmine Shaw. During their undergraduate years at CSULB, each pursued double majors in the sciences and the arts.

Guzzo graduated in 2004 with a bachelor of science in biochemistry, a bachelor of arts in chemistry and a bachelor of music in percussion performance. “From the time I could walk and talk, I was already playing doctor. It was all I ever wanted to do,” Guzzo recalled. “I also grew up playing the piano. It was my main instrument, but I was always fascinated by percussion. When I came to CSULB in 1997, I met Dr. (Michael) Carney and told him how much I wanted to be a part of the band’s percussion section. He was the first to introduce me to steel pan in the steel drum orchestra, which has become one of my passions. By my third year of college, I had begun music classes and later became a part of the percussion program.”

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Distinguished
Visiting Lecturer

This past year, the College of Natural Sciences and Mathematics selected Dr. Reid Bowman as its recipient of the Distinguished Alumnus award.

Dr. Bowman received his B.S. degree in chemistry from CSULB in 1969. He went on to advanced study in chemistry, receiving an M.S. degree from Princeton University and a Ph.D. from the University of California, Santa Barbara. He did post-doctoral work at the University of California, Berkeley prior to his joining the Dow Chemical Corporation.

Dr. Bowman has over 20 years of experience as a scientist and chemist in developing innovative products for major corporations. He holds 10 patents in process development chemistry and has the prestigious honor of being the youngest person ever in Dow Chemical history to attain the elite status of Associate Scientist.

Currently, he is the vice president of product development and chief technical officer at Applied Process Technology (Applied) and also a co-founder of the company. A leading research scientist, featured speaker and expert in his field, Bowman has made more than 25 presentations at national conferences about the HiPOx technology, Applied's cornerstone water treatment product, which he co-invented. He has published numerous technical articles in well known trade journals, including . *& Wastewater Products Magazine*, . . and the U.S. Environmental Protection Agency's / g – , &/ , newsletter.e

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Dr. Young-Seok Shon is a new organic chemistry professor in the Department of Chemistry and Biochemistry at California St

IANHUI U

This has been a busy and productive year for

The research group now has three M.S. candidates: Bryan Fiamengo, a full-time degree candidate; Crystal Jenkins, a faculty member at Santa Ana College; and Jim Brady, a program officer at the Keck Foundation. Margaret Brown has graduated, and will be attending the M.S. program at CSU Northridge in the fall. Joe Badillo continues in the group with support from the RISE program. All of us continue our methods development work related to the synthesis of chiral dihydropyridazinones.

My wife, Sarah, has been helping out in the lab and teaching laboratory sections in the department. We continue to enjoy our home, where it has been a good year in the gardens. We outwitted the possums so far this year and may see apples, plums, grapes and blueberries, in addition to our lemons. Of course the presence of a hive of honeybees, estimated by a beekeeper at over a million bees, making a home on our back fence may have helped the productivity. I will be testing the effect of productivity on my research students this year.

Jeff Cohl erg

We have continued our research on the aggregation of the enzyme superoxide dismutase (SOD) and its relation to amyotrophic lateral sclerosis (Lou Gehrig's disease). One new tool that is now available is dynamic light scattering, thanks to the acquisition of a Malvern NanoS instrument this winter. Furkan Senal, a new graduate student, is focusing his research efforts on the use of DLS to detect oligomeric aggregates of SOD. Another grad student, Yoko Nakano, has gotten some encouraging results on identifying aggregated forms of mutant SODs that are toxic to cultured cells. One undergraduate, James Tan, has left the lab and is now in dental school, but Chris Bowman is continuing his studies on the monomer-dimer equilibrium of mutant SODs, and Phong Dinh is investigating the properties of mutant SODs lacking free cysteines.

Our new proteomics facility, including the MALDI-TOF mass spectrometer, is now up and running, under the supervision of our new technician, Ashraf Elamin. I am starting to work with Ashraf to develop a proteomics experiment for the Chem 443 lab, and I am looking both to learning state-of-the-art techniq

"My work has been directly on the mechanism of cell division. Defects in this process are implicated in many types of cancers. My work is primarily focused on how cells divide and how cells use proteins in a particular region called the kinetochore, which is responsible for connecting chromosomes to microtubules in the division apparatus. These microtubule binding proteins synchronize a balance that results in disassembly of the microtubules scaffolds at the correct time after the chromosomes are duplicated, separating two copies of each chromosome to the two resulting cells. We're probing the biochemistry and structural biology of that. Using electron microscopy and X-ray protein crystallography, this work tries to understand how these proteins work by obtaining the three-dimensional structure of these proteins caught in the act of binding the microtubule. The structures will be invaluable in designing drugs to restore normal function in cancer cells," he explained.

"I've been at Harvard about two and a half years now," he said. "My ambition is to continue my work, which is progressing quite well, and to hopefully apply for a faculty position in biology and biochemistry, likely in an environment that is more research oriented." Al-Bassam was a CSULB President's Scholar through a privately funded campus program that provides full scholarships to selected California high school valedictorians and National Merit scholars.

He studied with Professor Jeff Cohlberg, whom he called "a great undergraduate research mentor because he had the perfect mix of being a teacher and giving me enough freedom to learn and to fail. Research is a series of failures followed by an extensive series of successes.

"It has to be a perfect mix of guidance and independence, and I think Dr. Cohlberg had a very important role in that when I was an undergraduate," he added. Furthermore, "The Long Beach biochemistry and biology departments are very personal and provided a lot of personal attention. That is really impor-

Michael Myers

My lab group continues the study of ion channel structure and function in the differentiation of stem cells from human umbilical matrix cells (HUMCs). We perform this collaborative work with the lab of Kathy Mitchell from Kansas University. Our MTA continues with KU through this year. We continue to look at the effects of nitric oxide on these primordial cells in collaboration with Dr. Li's lab in the department. We are also continuing our basic study of potassium channel structure with collaboration from the lab of Kathy Giangiacomo of Temple University. In this work, we are probing large conductance potassium channels (Maxi-K) with scorpion toxins (both native and recombinant). It is of great interest to my lab to study these molecules because we have recently shown that application of the toxins indeed blocks Maxi-K channels in HUMCs, providing pharmacological proof that Maxi-K channels exist in these cells after they differentiate. Blocking these channels during differentiation halts their progress into developing into neurons. This result is significant in that it represents a first step in directing the differentiation of HUMCs. Halting their default pathway into neurons may direct them to turn into other types of cells (cardiac, pancreatic, etc.).

We teamed this year with Dr. Martin Jadus at the V.A. center in Long Beach to study the role of Maxi-K channels in the killing of human U251 glioma cells ex

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