CHEMISTRY & BIOCHEMISTRY

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

The Value of CSULB Research

by CSULB President F. King Alexander

F. King Alexander

Photo courtesy of CSU Chancellor's Office

The selection of three California academic researchers among this year's Nobel Prize winners again demonstrates the state's preeminent position as a cornerstone of America's global influence, particularly in the fields of science, health care and high technology.

For example, the National Science Foundation (NSF) reported that in each year since 1996, high-technology industries in the United States generated more domestic manufacturing activity than the 15 nations in the European Union (EU) or any other single country. A sizable portion of a company's investments into new product ideas is focused upon research and development, with the expectation that its R&D results will lead to profitable returns from sales of these new products and processes.

Public universities like Cal State Long Beach are major contributors to the nation's workforce, and CSULB embraces its responsibility to nurture aspiring research professionals across a range of fields, from the liberal arts and education to science and technology. We encourage our students to participate alongside faculty in projects across the curriculum and to present their findings at academic conferences and as co-authors of journal articles. Conversely, among major research universities, undergraduate students may encounter limited opportunities to engage in their own investigative studies, particularly with full-time professors.

As a result of our focus as a teaching-intensive, research-driven university, approximately 55 percent of graduates in the Department of Chemistry and Biochemistry continue on to advanced degrees, and the

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Research on the Upswing

by Shayne Schroeder

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 Bauer, who came to the university in 1959 and retired after 35 years, the last 14 as dean for the College of Natural Sciences and Mathematics. "When I came, I thought university professors did research.

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CSULB researchers (l-r) John Jung, Dean Laura Kingsford, Roger Bauer and Beth Ambos.

Photo by Victoria Sanchez

Message by the Dean

Photo by Victoria Sanchez

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 not included in these totals.

The university submitted a total of 350 proposals during the 2005-06 fiscal year, up from 307 from the previous year. I'm pleased that 40 faculty members in the college submitted 58 proposals to various external funding agencies this year. Additionally, a proposed supplement to the SCORE grant included 12 individual P.I. research projects, although it is listed as only one submission in the university totals. Twelve of the proposal submissions (including individual SCORE projects) came from seven faculty members in the Department of Chemistry and Biochemistry.

The Department of Chemistry and Biochemistry has been fortunate to hire a number of outstanding faculty members over the past several years. This is increasing the research base in the department and making a real difference in the quality of educational experiences for students, particularly in opportunities for undergraduates and graduates to do research with faculty members. External funding in the way of the CSULB Beckman Scholars Program from the Mabel and Arnold Beckman Foundation and the NIH RISE and BRIDGES programs has provided scholarships and stipends to undergraduate students to do research. The Boeing/CNSM Scholarships have supported four graduate students per year in their final semester of preparing their theses. These awards, along with ongoing prior awards and individual grants, are helping to establish a strong research environment in the department and college.

The campus and the college continue to be an exciting place to work. With increasing enrollments (up 2.5 percent this year, with projections of 2.5 percent for each of the next four years), we are challenged to meet those demands with faculty and classroom space. All of the departments continue to do a great job of adjusting schedules to make classes available for students that need to progress through their majors and graduate.

We have six new faculty members joining us this year in the Departments of Biological Sciences (Dr. Kevin Sinchak), Chemistry and Biochemistry (Dr. Young Shon), Mathematics and Statistics (Drs. Babette Benken, Yu Ding, and John Brevick), and Physics and Astronomy (Dr. Christian Bracher). We also have two new full-time lecturers: Dr. Priscilla Zia in Chemistry and Biochemistry and Dr. David Nickels in Science Education. We extend a warm welcome to all of them and wish them a rewarding career at CSULB.

Last year I reported that we were well into the design phase of a second new building, a replacement of the PH3 facilities, which currently houses Physics, Geological Sciences, and Chemistry. The new building would also house part of Biological Sciences and Science Education, along with all the college offices and support areas. We are ready to move forward on this project, which is dependent upon a bond (Proposition 1D) being approved in the November ballot. To properly train students for the workforce in science and math, it is really important that we have adequate facilities with state-of-the-art equipment. We encourage your support of this proposition, which will help provide the physical infrastructure for a quality education for our students.

As always, we thank you—faculty staff, students, alumni and friends—who have contributed in some way to the teaching and research programs for our students. State funding only covers part of the cost of educating our students, and it is support from all of you who help make it possible to provide the high-quality programs for our students who leave CSULB with highly valued degrees.

Photo by David J. Nelson

Remarks by the Chair

Photo by Victoria Sanchez

If one word could be used to describe the 2005-06 academic year for the department, it might be *growth*. For the last few years, the department has enjoyed a steady increase in course enrollments and the number of students choosing our programs of study, and this trend continued unabated this past year. At present, we have about 450 students in our undergraduate and M.S. programs, an increase of about 50 percent over the last four years. Enrollments in our larger service courses such as general chemistry, organic chemistry, and nursing chemistry, as well as courses throughout our curriculum, have also increased by similar levels.

Such growth has brought increased opportunities for our faculty and students for learning and research, but at the same time it has stretched the department's capacity to provide the number of lecture and lab sections sufficient to meet the increased enrollment demands. The university and college has responded to our needs by providing additional funds to hire more teaching associates and part-time instructors, as well as to acquire additional instrumentation to adequately equip teaching labs. The college has also provided funds to offer additional supplemental instruction sections, which have proven to significantly increase student success in several of our courses.

The most fundamental factors engendering student success in our programs are the quality of instruction and advising provided by our department, and some notable changes have occurred this past year in the makeup of our faculty. Dr. Peter Baine completed his fifth and last year in the Faculty Early Retirement Program (FERP) at the end of the spring 2006 semester. His absence from the classroom will be sorely felt by students, as he has been one of the most popular faculty members in our department for many years. Students will also miss Dr. Robert Loeschen and Dr. Tom Maricich, both of whom will be entering FERP this fall. While Dr. Loeschen will restrict his activities to associate dean duties, Dr. Maricich will be teaching organic chemistry during the fall semesters. Near the end of the academic year, Dr. Margaret Merryfield assumed the position of interim associate vice president of academic personnel for the 2006-07 year, and we will miss her presence as a first-rate teacher and student advisor this next year.

We are very pleased to have two new faculty members join our ranks this year. Dr. Young Shon is our newest organic chemist, coming to us from Western Kentucky University as an experienced and successful faculty member. Dr. Shon will be teaching in our CHEM 320A/B organic chemistry course, and his funded research program will provide new research opportunities for our students. Dr. Priscilla Zia, who has been an adjunct faculty member in our department for a few years, joins us now as a full-time lecturer. While her original research focus was in inorganic chemistry, Dr. Zia brings with her a wealth of academic and industrial experience in many aspects of chemistry and biochemistry, and we are pleased to have her teaching in our CHEM 111A/B general chemistry course.

The key challenge the department faces this next year will be to keep pace with program demands and faculty needs. Over the last few years, increases in department course enrollments and faculty retirements have outstripped new faculty hiring, and we expect to hire three to four new faculty members over the next two years to help address this imbalance. Searches for two new tenure-track faculty positions are underway: one for an organic chemist and the other for a computational physical chemist. The large majority of our faculty members are research-active, so providing adequate research space for our faculty and students has also become a challenge. As of now, the MLSC building is full, and funding for the construction of a new science building to replace Peterson Hall 3 will require passage of a state bond measure in November. The improvement of the state's financial health has helped us to recover some of the large cuts in our base budgets during 2002-04. Nonetheless, many important programs in the department, such as our seminar and Distinguished Lecturer series, as well as student awards and scholarships, rely solely on private gifts and donations from department alumni and friends. We greatly appreciate the financial support that many of you have provided us this past year.

This issue of the newsletter emphasizes the research activities of our faculty, the growing research "culture" of our university, and the central importance research plays in providing our students with a first-rate education. Research has been a significant part of the growth our department has experienced this past year. This positive trajectory should continue, but it will require the CSU to broaden and strengthen its commitment to its faculty and students to ensure that a healthy scholarly environment becomes embedded within the structure and culture of the university.

I am certain that you will find this year's newsletter to be informative and enlightening. As always, we welcome your continued participation in the life of our department through news about your personal and professional endeavors. To paraphrase former Dean Glenn Nagel, our success is defined by our students' success.

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Value of Research

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 16 percent increase in research grants, now totaling $44 million.

Where research once was narrowly focused on specific topics, the new paradigm is interdisciplinary studies. CSULB is a leading institution in encouraging collaborative efforts not only within the campus, but with other institutions as well. These collaborations include the Institute for Integrated Research in Materials, Environments and Society; the Center for International Trade and Transportation; and the new Environmental Science and Policy bachelor's degree.
The rewards for engaging in research are of immense value both to the individual as well as to society. It is an essential part of our university's mission to ensure that our faculty can conduct studies that make a meaningful difference and to guide our students in becoming the research leaders of tomorrow.

F. King Alexander is president of California State University, Long Beach.

Research Upswing

When I got here, I found out some people didn't believe that."

Jung had much the same experience. "When I first came here in 1962, there wasn't a lot of research going on," said Jung, who then went to Canada from 1965-68 to teach. He returned to CSULB, where he became a full professor and department chair in psychology in the early 1970s. "It was individuals in various departments who did research, but they were self-motivated people. Overall, though, there wasn't a big push to do research."

As Bauer indicated, and Jung concurred, the mindset of then-senior faculty at CSULB was not exactly against research, it was just that, up to that point, it hadn't really been done on campus and not many knew really how to go about it.

"The people who were senior when I came, they were the ones who kind of built our department," said Jung. "They had some sort of vision in terms of wanting to hire faculty who would be interested in doing research, but they themselves were not doing a lot of research. It kind of made it difficult because they didn't really know what they were doing in trying to get us to do research. I won't say there was friction, but the senior faculty was pushing research and then the junior faculty would turn around and see that they weren't doing any research. At that time, for the most part, the senior faculty didn't really understand what it took to do research."

Even if most around him were set, some dead set, against conducting research, Bauer wasn't dissuaded. He was determined to incorporate that element into professorial duties.

"I spent my first year getting a research grant. I always thought that was part of our responsibility," he said. "I tried to adhere to that philosophy when I was department chairman, and when I became dean, I was even more adamant about it."

Laura Kingsford, now the dean of the College of Natural Sciences and Mathematics, arrived on campus in 1980. She was not a stranger to conducting research, probably something that set extremely well with the person who hired her.

"Roger Bauer is the one who hired me when he was dean, and in our conversation during the interview, he said I was being hired to upgrade research on this campus," said Kingsford, who was happy to hear that. "I came in during a time of transition when research was going to be supported; otherwise, I don't know if I would have come here. I mean, I love to teach, but research was a high priority for me then. I feel that I came in at a time when research was really starting to be emphasized and began to be readily accepted as part of the responsibilities."

That seems to be the sentiment more and more on campus, and gladly so, if you ask Bauer. "Nowadays I look at the young people and they seem to be all gung-ho to do research," he said. "From my perspective it has been a marvelous transition of attitude. Young people come in now knowing that university professors are supposed to do research."

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Research Upswing

"We'll never be a UC campus," added Jung, "but we still want to develop the faculty so they will be more knowledgeable and up to date in their fields, and the only way you can do it is by research. The younger faculty are really eager to do research, and I think that makes them better teachers.

"When I am on a hiring committee and we look at a person's résumé, we look to see what their research interests are and see how active they want to be. If they want to get promoted, there are some expectations that they publish. They are not going to get tenure or get promoted if they never publish, and publishing comes as a result of doing research."

Even with the stipulation certain faculty need to conduct research, according to Bauer, there has to be a true desire to do research if it is to be successful. "It has to be inner driven because it takes too much time and energy and it's such a long-term commitment," he said. "If you don't come in with an interest in doing this, then you're probably never going to do it. You've got to get started on it right away and that is why it's important to have requirements for getting tenure and being promoted.

"We are now truly a teaching-intensive, research-driven university," stated Ambos, a faculty member and administrator since 1989. "Faculty, staff and students are partners in the research and creative activities enterprise at CSULB. What most faculty do in terms of their own intellectual creativity naturally leads to grant applications and often to innovations and enrichments in teaching. Grants can provide faculty support, employment for students, laboratory supplies, outreach to area schools; all the activities we want and need to do to make a CSULB education the best it possibly can be.

Photo by David J. Nelson

Photo by David J. Nelson

Photos by Victoria Sanchez

Student Research Symposium

More than 50 students from CSULB, as well as area community college participants in the Bridges to the Baccalaureate program, discussed their findings at the College of Natural Sciences and Mathematics' annual Student Research Symposium on Sept. 8. The event included poster and oral presentations.

M.S. Theses

Chemistry & Biochemistry

2005-06

Jennifer Aral
B.S., California State University, Long Beach
"Synthesis and Electrochemical Investigation of Iron-Dinitrosyl Complexes Bridged by Bis-Phosphine Ligands"
Advisor: Lijuan Li

Ludilyn Fernandez Cayas
B.S., Saint Mary's College of California
"Electrical Pproperties of Polyaniline Monolayers at the Air-Water Interface"
Advisor: Kryzsztof Slowinski

Lan Chen
B.S., Jinan University, Guangzhou, People's Republic of China
"Synthesis and Crystal Structure Determination of Novel Zinc Phosphites"
Advisor: Xianhui Bu

Kristin K. Clark
B.S., California State University, Long Beach
"The Free Radical-Induced Destruction of Pesticides in Water: Kinetics of Hydroxyl Radical and Hydrated Electron Reaction"
Advisor: Steven Mezyk

Gianpaola Gacho
B.S., University of the Philippines
"Synthesis, Characterization, and Electrochemical Studies of Nitrile-containing and Phosphine-bridged Dinitrosyl Iron Complexes"
Advisor: Lijuan Li

Tzu-Chi Hsu
B.S., California State University, Long Beach
"Correlation of Protein Stability of Apolipophorin III with Lipid Binding"
Advisor: Paul Weers

Chad MacArthur
B.S., California Polytechnic State University, San Luis Obispo
"Characterization and Application of an Enzyme Inhibitor to Investigate the Role of Butyrylcholinesterase in Developing Neurons"
Advisor: Roger Acey

Dan-Tam Hoang Nguyen
B.S., Ho Chi Minh City University of Technology, Vietnam
"Synthesis and Structural Characterization of Novel Open-framework Materials"
Advisor: Xianhui Bu

Hard-Hatted by Design

by Teresa Hagen

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 faculty for the upcoming academic year. This work may involve the removal or remodeling of casework, the addition of electrical and plumbing capacity, the repair and installation of exhaust hoods, and other room changes such as removal of the asbestos floor tile and the painting of the rooms—and all of this in a dizzying array of combinations.

"Our biggest challenge right now is trying to deal with existing labs, the ones that were built in the 1950s," commented Loeschen. "They were designed for the type of science that was done back then: bench top work using relatively simple equipment. In biochemistry, for example, a research problem back then might involve the isolation of a small protein and the identification of its

Photo by David J. Nelson

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."

Today's teaching environment also 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

See page 7, Loeschen

Loeschen

faculty and students. The laboratory space is accompanied by 42 faculty/student offices.

Ironically, the new building was made possible by a failed renovation of the existing Peterson Hall 3. "In the early 1990s, a contractor was hired to renovate much of the ventilation systems in PH3, while we occupied the space," Loeschen explained. "It was chaos. We lived for two years with light bulbs hanging down in the hallways as they tore out the ceilings and tried to put in new ventilation ducts. We had no heat, and the building leaked badly during the winter rains. Finally, state funding agencies recognized that it is next to impossible to renovate buildings for use by sciences that require extensive hoods and room air changes, because one doesn't have the floor-to-ceiling heights to put in all the exhaust ducts in old buildings. That was when funds for MLSC were made available."

But new buildings do not solve all of the problems--more space is needed for directed studies. "There's a real difficulty with space allowed for sciences at the CSUs because the State of California space standards formulas were instituted 50 years ago for a different kind of university," Loeschen said. "These formulas are concerned primarily with space for instructional labs for large groups and do not include any space for faculty members to set up their research labs. The formulas do not provide much space for the one-on-one type of research directed studies that are so important these days in the sciences.

"In order to meet the needs of the rest of the physical and biological departments in our college, the Chancellor's Office decided to support the construction of a second new building rather than attempt renovation of PH2 and 3. The PH3 replacement building will contain more space than is presently available in PH3, but not as much room as the old PH2 and 3 combined. The construction funds for this replacement building were included in the propositions on the November '06 ballot. By the time you read this article, we are hoping that the propositions will have passed, the drawing of the construction documents will be well underway and that demolition of PH3 can occur during the summer of 2007."

Loeschen, who retired this past May and is serving the college for another five years through the FERP program, jokes that the dean has said he may not leave until a new building is finished. "Part of my job this year is to prepare PH2 and PH1 to accommodate physics, geology and the rest of biology and chemistry, which are all moving out of PH3," Loeschen added. "When the PH3 replacement building is finished, my successor will have an easier time accommodating faculty needs because he or she will not have to attempt mini-renovations of 60-year-old space every time a new faculty member is hired."

Photos by Victoria Sanchez

M.S. Theses

Chemistry & Biochemistry

2005-06

Zeynep Oztug
B.S., Bogazici University, Istanbul, Turkey
"Formation of Amyloid from Human Copper-Zinc Superoxide Dismutase"
Advisor: Jeffrey Cohlberg

Cynthia Christine Pratt
B.S., California Polytechnic State University, San Luis Obispo
"Lipopolysaccharide Binding of Apolipoprotein III"
Advisor: Paul Weers

Srividya Raman
B.S., University of Delhi, India
"Isolation and Characterization of RNA Polymerase II from Developing Artemia"
Advisor: Roger Acey

Behnaz Razavi
B.S., University of British Columbia, Canada
"Free Radical-initiated Destruction of Carcinogenic Nitramines in Water"
Advisor: Steven Mezyk

Sidharth Kumar Seth
B.S., University of California, Santa Barbara
"Lactoferrin Receptor Binding Properties of Recombinant Human Lactoferrin-Transferrin Hybrid Proteins"
Advisor: Douglas McAbee

Rosmery Tajiboy
B.S., University of California, Santa Barbara
"Coordination of Tetrakis (Diphenylphosphino) Tetrathiafulvalene, [(PPh2)4TTF], with Dinitrosyl Iron Centers: Synthesis, Spectroscopy and Electrochemical Investigations"
Advisor: Lijuan Li

Vincent Yee
B.S., California State University, Long Beach
"Rat Asialoglycoprotein Receptor Expression and Activity Following in Vivo Hepatic Iron Overload."
Advisor: Douglas McAbee

Photos by Victoria Sanchez

Jennifer Guzzo

Photo by David J. Nelson

Jasmine Shaw

GUZZO & SHAW
Fusing Science and Art

by Teresa Hagen

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."

"My freshman year in college, I wanted to major in everything," said Shaw, who graduated in 2006 with a B.S. degree in chemistry and a B.A. in art history. "I guess I really liked having seven different subjects in high school, and I wanted to continue with that. Since my interests are so varied, I really could have gone in several different directions, but as the years went by, I narrowed it down because I didn't want to remain an undergrad forever."

So how did the sciences and the arts interrelate for these two President's Scholars? "I think some of the analytical skills required for the sciences transcend to music," Guzzo replied. "I'm kind of a perfectionist. I really need to have order and structure and to know what steps are next because of my background in science. In music, you're looking at this free world you can explore and be expressive—be an artist. It was quite challenging at first because I felt like my musical thinking wasn't developed. I find that the two fields are on different levels in terms of thinking processes, but there are some similarities. The math definitely influences music."

"The disciplines are demanding in different ways such that their difficulties are not really comparable, and that is exactly why I chose to major in both," Shaw added. "If I tell people I majored in chemistry their eyes widen, but art history was rigorous too; it's not just looking at pictures. Karen Kleinfelder, the art history professor of modern/contemporary art, completely changed how I feel about the role of art historians/artists in society.

"Contemporary art is always questioning itself from within, whereas certain things in science are just taken to be, you know, FACTS," Shaw continued. "But I took a history of science class through the Honors Department with Dr. Jacob Hamlin my junior year that made me begin to think about the idea of the relativistic nature of paradigm shifts within science, and made me realize that the facts in science constantly shift as well, just perhaps not as conspicuously."

Majoring in the arts and the sciences held some challenges for the two women, particularly for Guzzo, whose music degree included concerts and performances, many of them during the school year. "Going on tour with the music department would conflict with exams," Guzzo said with a rueful grimace. "There were always conflicts. Classes in science were only offered at certain times, and it was the same for music. I was constantly having to shift the order of courses. When I would be absent from class (for a tour or concert) and miss an exam, the Chemistry/Biochemistry Department didn't understand why they needed to let me make it up. I would have to explain that I was getting a degree in both majors."

"Surprisingly I only ever had one class overlap, which is amazing, because otherwise it could have taken a lot longer to graduate," Shaw said. "I think though, that the most difficult thing was the 'balancing act.' Especially when you get into your upper division classes you have this whole other life that none of the other students in your classes really have, and yet you are expected to be able to per-

See page 9, Guzzo and Shaw

Dr. Baine Retires

Photo by David J. Nelson

by Dr. Nail Senozan

In May of this year, Dr. Peter Baine completed his 38th year at Cal State Long Beach and entered into retirement. When Dr. Baine started in 1968, the department had 14 full-time faculty and no part-timers. The chair was Roger Bauer. The College (or School) of Natural Sciences did not exist. Only two colleagues of Dr. Baine from 1968 are still in the department: Dr. Dorothy Goldish and myself.

Dr. Baine has been the sole instructor of the physical chemistry laboratory for the last 20 years. Since p-chem lab is a requirement for all chemistry majors (B.S.), all graduates must have been Dr. Baine's student at least one semester and experienced firsthand his kindness and cheerful demeanor.

Besides the p-chem lab, Peter regularly taught general and physical chemistry. His courses were known for their thoroughness; he scrupulously avoided dumbing down his courses. While challenging the best of his students he has also kept those with lesser interest in chemistry engaged and inspired. In 2000 he was voted by the students of the College of Natural Sciences and Mathematics as the outstanding teacher of the year and received the Mayfield Award.

Peter's research was primarily focused on nuclear magnetic resonance spectroscopy. His work on proton exchange, which was published in the *Journal of American Chemical Society*, is regarded as one of the seminal papers in this field. Several other papers from his work have appeared in the *Magnetic Resonance in Chemistry.*

Peter has been an active member of the American Chemical Society. He has served continuously for over 30 years on the Executive Committee of the Southern California Section, and was the secretary of this committee in the late '70s and its chair in 1993. He has twice served as the general chair of the Western Regional Meeting of the ACS. In recognition of his services to the American Chemical Society, Peter was recognized as the recipient of the Agnes Ann Green Award of ACS in 1999.

Peter, along with his wife Barbara, continues to live near the campus. His son, Michael, who has a Ph.D. in physics, works for NASA in Texas. His daughter, Christina, who has recently become a mother, lives in San Diego and practices law. Peter rides his bicycles three times a week to Laguna Beach and back, and still takes his sailboat out around the Long Beach harbor, often with friends and colleagues aboard.

Guzzo and Shaw

form at the same level (at the very least) as the rest of the group."

Despite their dual educational lifestyles, Guzzo and Shaw left their mark on the Department of Chemistry and Biochemistry. Guzzo served as president of the Student Affiliates of the American Chemical Society (SAACS) from 2000-01. She also received the Toni Horalek Award for Departmental Service and gave research presentations, titled "In Vitro Angiogenesis of Gastric Microvascular Endothelial Cells Requires the Mitogen-Activated Protein Kinase, P38, and Protease Activity," at both CSULB and the 2001 American Chemical Society convention in San Francisco.

Shaw's awards included Chemistry Departmental honors, the Robert B. Rhodes Award, AIC Baccalaureate Award in Chemistry, Merck Award in Organic Chemistry, Inorganic Chemistry Award, American Chemical Society Polymer Chemistry Award and the Spyros Pathos Award (general chemistry). She also served as secretary in 2004 and president in 2005 of SAACS.

Guzzo, who left for Trinidad in September as a year-long Fulbright scholar to study the women's role in the steel pan era (she plays the tenor/melody pan), recalls her chemistry/biochemistry professors with much fondness. "There were a couple of professors that were really instrumental, like Dr. (Kenneth) Marsi who taught organic chemistry," Guzzo commented. "When he passed away, I was heartbroken. What I liked about him was that he would just reach out and help you until you figured it out. When I first began organic chemistry, I would go to his office almost every day to receive his guidance. He was instrumental in giving me the confidence to really understand the concepts versus memorizing reactions. During my first two years at the university, I was still kind of shy, and Dr. (Nail) Senozan would encourage me to keep trying the experiments. If it didn't work, try it again. I worked with Dr. (Peter) Baine, who had a bubbly personality, for the many years I was involved with SAACS, especially when I was president. Whenever you're around people that are happy, you just stay motivated. These three professors understood my mixture of science and music and played the biggest role in my development during that time."

"The main source of my joy was the fantastic professors," added Shaw. "The very first person I met at CSULB was Dr. Senozan, and he has been instrumental throughout my college career, not only as a professor and a guidance counselor, but also as a dear friend. The experience I gained from working two years in Dr. Lijuan Li's inorganic chemistry lab was invaluable. Dr. Li is so encouraging and inspiring and an excellent role model. There are so many others I want to name, but I fear I would leave somebody out."

Both women have chosen to continue on in their arts-related fields. Guzzo, who is pursuing a master's degree in percussion performance and a multiple subject teaching credential (which includes teaching science), plans on pursuing a Ph.D. in ethnomusicology and performing orchestral music. Shaw is considering a master's degree in art conservation due to the interdisciplinary study of studio art, art history, archaeology, anthropology, chemistry and foreign languages. Presently, she is working at an art gallery and interning with the Natural History Museum of Los Angeles County in the paleontology and conservation labs. She has also lined up two short-term restoration projects/archaeological digs. However, there is no doubt that these two talented women will continue to be influenced by their degrees in chemistry and biochemistry throughout their careers.

Distinguished Visiting Lecturers

1980—2005

1980 Takeru Higuchi (Pharmaceutical Chemistry), Univ. of Kansas
1981 Charles Casey (Organometallic Chemistry), Univ. of Wisconsin
1982 Albert Lehninger (Biochemistry), Johns Hopkins University
1983 Kenneth Raymond (Bio-inorganic Chemistry), UC Berkeley
1984 Ephraim Racker (Biochemistry), Cornell University
1985 Harold Weintraub (Biochemistry), Fred Hutchinson Cancer Research Center (Seattle)
1986 Paul Saltman (Biochemistry), UC San Diego
1987 Joan Valentine (Bio-inorganic Chemistry), UCLA
1988 Donald Cram (Organic Chemistry, Nobel Laureate), UCLA
1989 Harry Gray (Inorganic Chemistry), Caltech
1990 Ignacio Tinoco (Physical Chemistry), UC Berkeley
1991 Bruce Ames (Biochemistry), UC Berkeley
1992 Jerrold Meinwald (Organic Chemistry), Cornell University
1993 Ralph Adams (Analytical Chemistry), Univ. of Kansas
1994 Jacqueline Barton (Bio-inorganic Chemistry), Caltech
1995 Nelson Leonard (Bio-inorganic Chemistry), Univ. of Illinois, Caltech
1996 F. Sherwood Rowland (Physical Chemistry, Nobel Laureate), UC Irvine
1997 Leslie Orgel (Physical-inorganic Chemistry), Salk Institute (San Diego)
1998 Ahmed Zewail (Physical Chemistry, Nobel Laureate), Caltech
1999 C. Grant Wilson (Physical Organic Chemistry), Univ. of Texas
2000 Dudley Herschbach (Physical Chemistry, Nobel Laureate), Harvard University
2001 Catherine Fenselau (Analytical Chemistry), Univ. of Maryland
2002 Marc Kirschner (Biochemistry), Harvard University
2003 Barry M. Trost (Organic Chemistry), Stanford University
2004 Peter C. Ford (Bio-inorganic Chemistry), UC Santa Barbara
2005 Andrew G. Ewing (Bio-analytical Chemistry), Penn State University

2005 Allergan Distinguished Visiting Lecturer

by Dr. Douglas McAbee

Photo courtesy of Chemistry Dept.

Dr. Andrew G. Ewing

On Oct. 27, 2005, the department was very pleased to host Dr. Andrew G. Ewing as our Distinguished Visiting Lecturer. 2005 marked the 26th consecutive year the department has offered this event, which was again sponsored by the very generous support of Allergan Corporation. In this regard, we are indebted to Dr. Stephen Ruckmick of Allergan, who is a member of our advisory board and has been instrumental in obtaining funding for this seminar series.

Dr. Ewing is professor of chemistry, professor of neural and behavioral sciences, and holder of the J. Lloyd Huck Chair in Natural Sciences at Penn State University. His research efforts emphasize the development and application of bio-analytical chemistry techniques to small-volume and single cell neurochemistry, biology and biophysics. This work is important to the scientific community because it defines the limits for measurements in small biological environments and it provides a means to examine molecular mechanisms of neuronal function and dysfunction (illness) at a level difficult except with molecular biology techniques and with fluorescent chelating agents.

Although the analytical chemists in the department were his official hosts, Dr. Ewing's research is highly interdisciplinary between analytical chemistry, biochemistry, molecular biology, cell biology and neurobiology. Dr. Ewing gave two presentations. In the noontime general talk, he discussed electrochemistry in small environments. His afternoon research seminar focused on his work using mass spectroscopy to study lipid domains in single cells. Both presentations were very well received by students and faculty. Since visiting our campus, Dr. Ewing has received two notable awards in recognition of his outstanding contributions to the field of analytical chemistry: the 2006 Analytical Division Award in Chemical Instrumentation for the American Chemical Society; and the 2006 EAS Award for Outstanding Achievements in Analytical Chemistry from the Eastern Analytical Symposium.

The Distinguished Visiting Lecturer series was instituted in 1980 with lectures by Dr. Terkeru Higuchi of Kansas University. Since then, the series has continued without interruption and has included many outstanding scientists representing all areas of chemistry and biochemistry. Lecturers from the last few years have included Dr. Peter Ford (bio-inorganic chemistry, UC Santa Barbara), Dr. Barry Trost (organic chemistry, Stanford University) and Dr. Marc Kirschner (biochemistry and systems biology, Harvard University). We are pleased to announce that the 2006 Distinguished Visiting Lecturer will be Dr. Alex Pines from the University of California, Berkeley. Dr. Pines' work focuses on the general area of theoretical and experimental magnetic resonance spectroscopy and imaging. He was scheduled to be on campus on Oct. 5 but had to postpone his visit due to health problems. We hope to host Dr. Pines later this year.

Alumni Profile

Reid Bowman

by Dr. Douglas McAbee

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 *Water & Wastewater Products Magazine*, *Journal AWWA* and the U.S. Environmental Protection Agency's *Technology News & Trends* newsletter.

Since graduating from CSULB, he has been a regular donor to the university, and while at Dow, he mentored a CSULB chemistry student in Dow's summer intern program. He has also returned twice to CSULB to give seminars to the Chemistry Department. His most meaningful and valued experience at CSULB was meeting and knowing the late Dr. Kenneth Marsi. In his public acceptance of the award at the annual Alumni Awards Banquet in May, Dr. Bowman specifically stressed how important his relationship with Dr. and Mrs. Marsi was during his time as an undergraduate and Mrs. Marsi was his honored guest at the awards banquet.

Dr. Bowman and his wife, Clair, enjoy tennis and living on their ranch in Ojai, Calif. He has two daughters, Jessica and Shawne; as well as three stepchildren, Jesse, Jake and Julie Gwin; and two grandchildren, Avery and Zachery.

Jawdat Al-Bassam

by Anne Ambrose

Jawdat Al-Bassam took only three years to complete his B.S. degree in biochemistry from CSULB, and since that time, the 1998 alumnus is enjoying a successful research career. He went on to earn his Ph.D. in cell biology at the Scripps Research Institute in La Jolla and now is doing postdoctoral research at Harvard Medical School.

"Scripps was a wonderful experience," he recalled. "It was a research institute that had a very small but highly ranked graduate program. My research was with Dr. Ron Milligan, who is an expert in the field of imaging of macromolecular assemblies, called microtubules, using high-resolution electron microscopy.

"The first part of my work as a graduate student was to determine the first three-dimensional structure of a group of proteins called MAP2 and tau, which binds to microtubules and stabilizes their structure. We discovered that these proteins hold microtubules together like bolts would hold metal scaffolding," he continued. "These bolt-like molecules make it possible for neurons to extend long distances within the human body."

These vast distances for a single cell require transport synaptic vesicles to their far outposts. "The transport of the vesicles is necessary for any organism's survival because they contain neurotransmitters, which are required for communication between neurons," he said. "It's very important to understand how these cells mediate the transport. My work was focused directly on how a group of proteins called kinesin motor proteins work on a molecular level. These molecular motors haul the vesicles along the microtubules like trucks hauling cargo along a freeway. I published four major publications in my Ph.D. and many of them have been very highly cited."

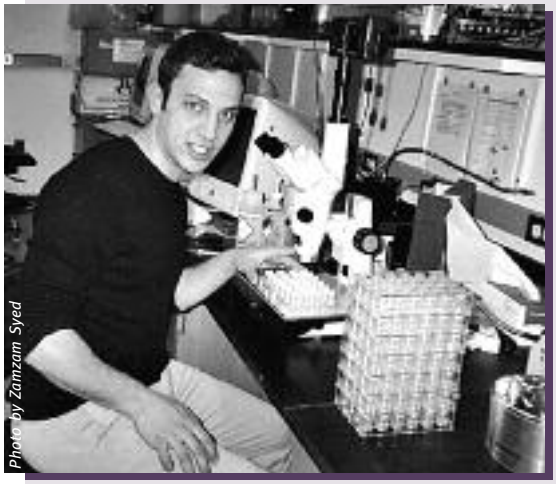

Photo by Zamzam Syed

His work at Scripps earned him a postdoctoral research position in the Harvard laboratory of Stephen C. Harrison. "Steve Harrison is one of the leading scientists in the structural biology of viruses such as HIV, as well as other viruses which are direct causes of diseases like hepatitis, but our lab has a wide range of interests in other areas such as the biology of cancer," Al-Bassam said.

See page 15, Alumni Profile

New Face Joins the Faculty

by Dr. Paul Buonora

Photos by Victoria Sanchez

Young Seok Shon

Dr. Young-Seok Shon is a new organic chemistry professor in the Department of Chemistry and Biochemistry at California State University, Long Beach. He is joining our department as an associate professor. Prior to this position, he served for five years as an assistant professor at Western Kentucky University, where he taught organic chemistry, organic chemistry lab, advanced organic chemistry, polymer chemistry and general chemistry lab. He also earned a reputation as a nanomaterial researcher who studied the synthesis and characterization of various monolayer-protected nanoparticles and nanostructured films.

Dr. Shon was born on Feb, 21, 1969, in Seoul, South Korea. He received a bachelor's degree and master's degree in chemistry from Sogang University in Seoul in 1991 and 1993, respectively. He then served as a research assistant in the Korea Institute of Science and Technology before he came to the United States for graduate studies at the University of Houston in 1994. Dr. Shon received his Ph.D. degree from the University of Houston in 1999 under the guidance of Professor T. Randall Lee. Following graduation, he moved to Chapel Hill, N.C., and began post-doctoral training in the Department of Chemistry at the University of North Carolina, Chapel Hill, under the guidance of Professor Royce W. Murray, who is currently an editor of *Analytical Chemistry*, a prestigious journal from the American Chemical Society. After working on nanomaterial research at the University of North Carolina, he joined the faculty in the Department of Chemistry at Western Kentucky University and began his academic career in 2001.

Since becoming a faculty member at Western Kentucky University in 2001, Dr. Shon has worked with undergraduate students, graduate students and visiting scholars to improve synthetic strategies for hybrid nanostructures and to develop technological applications of nanomaterials. Dr. Shon's research focuses on two general areas: organic-metal nanoparticle composite materials and self-assembly of nanomaterials. The new synthetic methods for the hybrid nanoparticles and nanostructures expand the available diversity of the nanomaterials as functionalized chemical platforms. His research seeks to find an improved method to control the composition of nanoparticles (organic surfaces, core metals and core sizes) and build new nanoparticle assemblies with interesting properties and applications.

His research group at Western Kentucky University studied the facile synthesis of new C60-conjugated gold nanoparticles and C60 (or C70)-nanoparticle hybrid films. Chemical, thermal and ultrasonic stability of hybrid nanoparticles and nanoparticle-multilayer films were also investigated. Nanoparticle-cored dendrimers (NCDs) and nanoparticle megamers were synthesized from monolayer-protected gold nanoparticles using either single- (convergent approach) or multi-step (divergent approach) reactions. His research group also performed systematic studies on the synthesis of functionalized monolayer-protected clusters (MPCs) from mixtures of alkanethiols and one-pot synthesis of monolayer-protected Ag nanoparticles from sodium S-dodecylthiosulfate (bunte salt) in aqueous solution. The various synthetic methods of monolayer-protected Au, Ag, Cu, Pt, and Pd nanoparticles and organic reactions of monolayer-protected nanoparticles were investigated. In addition, electronic structure of ensembles and sulfur surface-enrichment of monolayer-protected gold nanoparticles were explored.

His work at California State University, Long Beach will include the synthesis and application of ionic monolayer-protected clusters (IMPCs) and electroactive/photoresponsive nanoparticle-cored dendrimers (NCDs). His research seeks to develop IMPCs as a special class of stable, ionic molecular nanoparticles, and to expand the scope and architectural control of their synthesis. Using a simple and straightforward research plan, which greatly enhances the probability for successful results, he proposes convenient and practical synthetic routes to various ionic nanoparticles suitable for sensing and catalysis applications. He will also elucidate the relationship between primary structural elements in functionalized NCDs and their optical and electronic properties. The availability of effective methods for the preparation of various functional NCDs will allow him to exploit these nanomaterials in a variety of ways, including energy storage, optics, sensors, drug delivery and electronics.

In the classroom, Dr. Shon will emphasize the central role that chemistry plays in the fields of materials, medicine and energy. It is his hope that undergraduates who specialize in fields other than chemistry will learn to respect and appreciate chemistry for its important role in these diverse areas. For undergraduates who major in chemistry, he hopes that this approach will deepen their interest and encourage them to consider graduate studies in chemistry. He will encourage the participation of highly motivated undergraduate students to take part in research. He will work closely with each of these students to help them develop a clear understanding of the immediate and far-reaching goals of their particular project. He will also stress the importance of thorough referencing of scientific literature, because the future success of our chemical "offspring" will depend on their ability to integrate ideas and techniques developed by research in other scientific disciplines. This philosophy dictates the interdisciplinary nature of his research program and positively impacts the students who conduct research under his supervision. In addition to mastering a wide variety of experimental techniques, students who emerge from his group will have a solid foundation of knowledge in a wide variety of fields.

Dr. Shon is married to Dr. Hosun Choo, also a chemist, and they have two lovely daughters, Dayeon (Judy) and Hayeon (Rachel).

Photo by David J. Nelson

Reports from Faculty

Faculty standing from back row, left: Dr. Xianhui Bu, Dr. Christopher Brazier, Dr. Eric Marinez, Dr. Margaret Merryfield, Dr. Stephen Mezyk, Dr. Dorothy Goldish, Dr. Marco Lopez, Dr. Paul Buonora, Dr. Peter Baine, Dr. Kasha Slowinska, Dr. Krzysztof Slowinski, Dr. Dennis Anjo and Dr. Ken Nakayama. Front row, left: Dr. Robert Loeschen, Dr. Paul Weers, Dr. Tom Maricich, Dr. Jeffrey Cohlberg, Dr. Douglas McAbee, Dr. Nail Senozan and Dr. Brian McClain.

Roger Acey

It's been a very interesting year for the group. We are especially excited about our patents being published and the possibility of attracting industrial funding to support development of our ideas. Sri Raman completed her master's degree and is now gainfully employed by one of our alumni, Dr. Richard Kanner, at Newport Scientific. Wafa Manna and Chad McArthur have been working hard on their research projects and should be graduating in the fall. Chad is working with a class of dialkyl phenyl phosphates (synthesized by Dr. Nakayama's group), trying to evaluate their potential as a therapeutic for neurodegenerative diseases. We are using umbilical cord stem cells as a model biological system to determine the toxicity of these compounds. Wafa has been looking at the effects of di-n-butyl phthalate, a plasticizer found in PVC and other malleable plastics, on differentiating neurons.

Jim Yano's project is to carry on from Brian Baker's work. Jim is trying to localize the down-regulated protein Brian had described in developing macrophages. We're very intrigued about getting a handle on the potential biological function of this protein. Gwen Jordaan has been working diligently, trying to clone the promoter for our metallothionein gene. Amanda Binns, a HHMI Scholar, has enhanced our metallothionein expression system to the point where we are now getting a five-fold greater level of expression.

The newest members of the lab are Shelia Soroushian, an HHMI Scholar, and Karen Ho, a senior at Whitney High School. I have begun collaborating with Dr. John Rainer at the University of Utah. Dr. Rainer is a former master's student of Ken Nakayama. Shelia is involved in testing a series of compounds generated by Dr. Rainer's students as potential cholinesterase inhibitors. Karen is working with Amanda, learning how to express metallothionein.

Xianhui Bu

This has been a busy and productive year for my lab and me. My teaching activities this year included advanced inorganic chemistry (CHEM 431). We were fortunate to receive a Research Corporation grant to help fund my project entitled, "Synthesis and Characterization of Cysteine-Peptide Capped CdS Nanoclusters and Crystalline Superlattices." An instrumentation grant to the NSF-MRI program to acquire a physical measurement system, on which I was a co-P.I., was also funded. Our work resulted in nine manuscripts either published or in press this year, three of which have my graduate student Lan Chen as an author or co-author. Lan defended her M.S. thesis, entitled "Synthesis and Crystal Structure Determination of Novel Zincophosphites." She is currently in the Ph.D. program in chemistry at UC Irvine.

My first post-doctor, Dr. Lei Han, worked in my group from March to June 2006 and had to go back to China because he found a faculty position at Ningbo University. During his short stay, he discovered a very interesting compound in which ZnI2 is joined by an organic ligand into DNA-like double helical chains. A student, Alice Choi, from Wellesley College, did research in my group from June to August 2006. Dan-Tam Nguyen, one of my M.S. students, has been quite successful at growing crystals. Recently, she has developed a new synthetic system based on metal sulfites. It is anticipated that dozens of new interesting compounds will come out of this novel system.

Paul Buonora

In the 2005-06 academic year, I continued as undergraduate advisor and chaired the department's search for a new organic faculty member, with Drs. Lopez and Berryhill as committee members. In an effort to make sure that the best candidates were not lost to other institutions, we organized and ran the search to complete the process before the end of the fall semester. We were fortunate to have a strong applicant pool and Dr. Young Shon, whom you can read about elsewhere in the issue, was ultimately hired.

Photo by David J. Nelson

From left: Jim Brady, Susanne Cyrus, Bryan Fiamengo, Crystal Jenkins, Joseph Badillo and Dr. Paul Buonora.

This was my second year teaching the advanced organic laboratory chemistry course. I was fortunate to take over this course as we moved into the new MLSC building last year. To help prepare students for careers in research, the students are now keeping patent style notebooks, which are witnessed after each lab period. In keeping with the course goal of teaching modern organic lab techniques we have been able to add a 300 MHz NMR, attenuated reflectance IR, flash chromatography, radial chromatography, a new GC-MS with sample changer, two inert atmosphere /vacuum lines and more rotary evaporators to the suite of teaching labs. This equipment is also utilized by research groups when the class in not in session.

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 Cohlberg

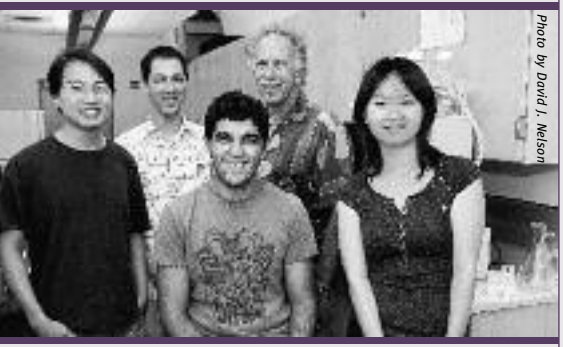

Photo by David J. Nelson

Front row from left: Phong Dinh, Chris Bowman and Yoko Nakano. Back row from left: Ihsan F. Senal and Dr. Jeffrey Cohlberg.

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 techniques in protein identification and to sharing this with our students.

Lijuan Li

I am pleased to report that my NIH-SCORE grant was renewed for another four years. I am also pleased to report that I have three graduate students who have successfully completed their M.S. theses this year. John Liarakos, who co-authored two peer-reviewed publications with me, has completed his M.S. thesis in fall 2005 and is now working for Varian Inc. as a field engineer. Gian Gacho, who co-authored two papers with me so far, defended her thesis in September 2005. She is studying her Ph.D. at USC. Jennifer Aral defended her M.S. thesis in November, and is currently working as a chemist for Amgen Pharmaceutical Company in Thousand Oaks. Also, three of my undergraduate students graduated. Chaitali Sheth, a Beckman scholar and HHMI Scholar, completed her honors thesis and is preparing for optometry school. Jasmine Shaw, a President's Scholar and also in the HHMI program, is in France and will be back in the summer to complete her honors thesis with me. Nathan Claydon, a B.S. student, just graduated in spring 2006.

Currently, there are 12 people in my group: five graduate students, four undergraduate students, two community college students and one technician. Rosmery Tajiboy (graduate student), who received the Boeing Concluding Semester Award last semester, is completing her M.S. thesis on the synthesis and characterization of new molecular wires of the type $(NO)_2$ Fe-P4-Fe$(NO)_2$ and P4-Fe$(NO)_2$. She is interested in a community college teaching position. Miguel Camacho (graduate student from Spain), who joined my group in 2004, made the Dean's Honors List (top 1 percent) this year. He is working on theoretical calculations using density functional theory in the modeling of structure of non-heme iron dinitrosyl complexes. He plans to go on to the Ph.D. program next year. Alex Shabban (Moe, for those who knew him before) has been working as a laboratory analyst for the Orange County Sanitation District in Fountain Valley and will come back to complete his M.S. thesis. Heather Sanchez (undergraduate) is a President's Scholar and is also in the RISE program. She has been working with me for two years on the interactions of dinitrosyl iron with nucleotides of DNA. There are several new people who joined my group this year. Ting (Nico) Hu (graduate student) joined us in fall 2005 from the Beijing Institute of Petrochemical Technology in China, and is working on isolating thiol coordinated non-heme iron nitrosyls. Sandra Hernandez (undergraduate) started research on making new phosphine ligands in fall 2005 and has been admitted to the RISE program. People who started fresh in the summer are Richard Hua (undergraduate), Lawrence McKnight (undergraduate), Nathalie Fernando (Bridges student), Rosalie Reynoso (Bridges student), Dr. Priscilla Zia and Van Buzzo (graduate student) from Cal. State Fullerton.

This is my third year to serve the department as a graduate advisor for chemistry. I am pleased to report that our chemistry graduate student enrollment has increased to about 30. I am also actively involved in the Partners for Success Program. I have mentored 16 first-generation college students. Some of them have gone to medical schools and some have gone into Ph.D. programs.

Tom Maricich

This past year, I continued to coordinate the department seminar program. Three of our alumni, Reid Bowman, Eugene Rozumov and Chip Cullman, presented seminars. If any of our other alumni would like to volunteer for future seminars, please contact me at tmaricic@csulb.edu.

My research students continue to make progress on their projects. Andrea Chen presented a talk on our research work at the 40th Western Regional ACS Meeting in Anaheim in January. Melissa Garza, a RISE fellow, is comparing the HBF4 and BF3 promoted sulfonimidate alkylation reactivity of alcohols and phenols. Renata (Fan-Chun) Meng, a graduate student, is studying the sulfonimidate alkylations of amides and imides. Igor Izotov, a new graduate student, is studying the sulfonimidate alkylation reactions of phosphoric and phosphonic acids. Andrew Roberts, a visiting summer research student from UC San Diego, Long Beach resident and grandson of Charles Roberts, an emeritus physics professor from CSULB, is working on the alkylation reactions of enols.

Commenting on emeritus professors, I have decided to join them as a Faculty Early Retirement Professor [FERP], teaching full-time in the fall semesters and doing research and whatever in the spring and summer. My wife, Suzanne, says that she will join me in retirement in January.

Reports from Faculty

Doublas McAbee

This past year was hallmarked by some notable events and activities. In July 2005, we received $500,000 from the W.M. Keck Foundation to help establish the Center of Education in Proteomic Analysis (CEPA), which is part of the Institute for Integrated Research on Materials, Environments, and Society (IIRMES) at CSULB. As P.I. on this project, I spent considerable time this past year to equip and staff our facility. Some of the state-of-the-art instrumentation we acquired includes an Applied Biosystems 4800 MALDI-TOF/TOF mass spectrometer, a ProPic-II gel imager/spot cutter

Photo by David J. Nelson

Front row from left: Aynur Bakirci and Sidharth Seth. Back row from left: Dr. Doug McAbee and Casey Curran.

from Genomic Solutions and the Janus robotic liquid handling system from PerkinElmer. We also acquired a full array of electrophoresis equipment to provide users with two-dimensional gel electrophoresis capabilities. This past spring, we conducted a national search for a highly qualified proteomics technician for the facility and were very fortunate to hire Dr. Ashraf Elamin, who had been a research associate at the University of Pittsburgh Medical Center proteomics facility. Dr. Elamin brings much proteomic and mass spectroscopic analytical expertise to our facility. At present, the proteomics facility is temporarily housed in the prep rooms for the old Henderson organic labs in PH2 and has been operational since July.

Renovation of the new IIRMES facility in the microbiology building is underway, and we expect to relocate the proteomics facility into this space sometime in the fall. I am glad to acknowledge co-P.I. Dr. Zed Mason, professor in the Department of Biological Sciences and IIRMES director, for all his efforts in the CEPA project, which would not have happened without his involvement. We are also indebted to Dean Laura Kingsford for her strong support of the project, as the college has provided more than $500,000 to help establish the facility. With CEPA, our college can now provide CSU faculty and students with first-rate proteomic analyses for research and teaching.

This past year, Sid Seth, a graduate student in my lab, made some important observations as part of his thesis project on the receptor-binding activity of lactoferrin-transferrin recombinant hybrid proteins. Sid overcame many obstacles to express and purify quantities of recombinant proteins sufficient for biochemical analysis. Using the Biacore 3000 surface plasma resonance spectrometer at UCLA Medical School, Sid examined the interaction of immobilized purified asialoglycoprotein receptors with native and recombinant lactoferrins. Most notably, he found that recombinant hybrid lactoferrins containing either the C1 or C2 sub-domain of transferrin bound to the receptor as well as non-hybrid recombinant and native lactoferrins.

This is an important advance in understanding the molecular basis for the novel interaction between lactoferrin and the hepatic asialoglycoprotein receptor as it indicates that the receptor-binding elements of lactoferrin are not restricted to the two major sub-domains of protein's C-lobe. Sid is now writing his thesis and should defend sometime this fall. It is fitting that Grace Jung, former student in the lab who began the recombinant hybrid lactoferrins project for her thesis, is the technician at the UCLA Biacore facility and assisted Sid in generating the surface plasmon resonance data. Grace is still in the process of completing her thesis, which should be finished sometime this year. Vincent Yee, another former student, is working at a pharmaceutical company in the area, and he is also nearing completion of his thesis writing for his work focused on iron-induced changes in asialoglycoprotein receptor activity and expression.

Two new students joined the lab this spring. Aynur Bakirci, a graduate student, is expanding the project started by Vince to examine the proteomic changes in hepatocyte membrane protein expression that accompany in vivo iron overloading. Casey Curran, a B.S. biochemistry major, began work this summer to perform a complete proteomic analysis of human serum lactoferrin-binding proteins. This is a continuation and expansion of the project begun and continued by former students Pat Pierce and Jennifer Laprise. Both Aynur and Casey will be using instrumentation in our new proteomics facility for their work. I feel very fortunate to have these two quality students join the lab.

My major goals for the coming year include writing and publication of manuscripts describing work completed by Grace, Sid, Vince, Pat and Jennifer. Results from Aynur's and Casey's projects will provide additional important data to supplement these manuscripts. The results contained in these publications will provide important preliminary data for new grant proposals. After almost a two-year hiatus, I look forward to teaching CHEM 441B this fall. I also look forward to my fifth year as department chair, expecting new challenges and opportunities.

Alumni Profile

Jawdat Al-Bassam

"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 important because that is what fosters the feeling that you're an individual rather than a number."

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

Front row from left: Dr. Linda Callahan, Queen Uchekwe, Alice Jessup. Back row from left: Dr. Michael Myers, Jimmy Pham, Portia Bediako, Nirav Bhakta, Qwente Bryant and Victoria Tran

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 expressing membrane macrophage colony stimulating factor (mM-CSF) via a swelling/vacuolization process called paraptosis. This is a viral therapy for a very aggressive brain cancer (and stem cells share many qualities with cancer cells!). Our study showed that osmotic disruption of the glioma cells by activated Maxi-K channels not only induced paraptosis but helped explain why immunity towards mM-CSF expressing tumor cells is elicited after the cells are killed. We presented this work at an international meeting (Biophysical Society annual meeting in Salt Lake City) and have a paper in submission to Laboratory Investigation at the time of this report. This collaboration began with a casual conversation with Dr. Jadus at the Chemistry Department's advisory council breakfast meeting several months ago.

This past year, I began to serve as the CSULB representative to the CSU Stem Cell Task Force of the California State University Program for Education and Research in Biotechnology (CSUPERB). I participate in regular conference call meetings of the task force as we position the CSU to be at the center of the Prop 71, the Stem Cell Initiative for California. Along with others on the task force, I gave a talk about my stem cell work at the 18th Annual CSU Biotechnology Symposium in San Jose in January, to raise awareness about stem cell research advances going on in the CSU.

Thanks go to all my undergraduate students working on these projects this year: Max Mendez, Nirav Bhakta, Alice Jessup, Tam Pham, Gerald Vandeusen, LaQwente Bryant, Victoria Tran and Queen Uchekwe. Thanks also go to Dr. Linda Callahan of the Nursing Department who continues to work in my group. Funding for these projects is made possible from the Research Corporation, the HHMI grant to Gerald Vandeusen and the RISE grant to LaQwente Bryant.

In addition to my bench research, I continue to work with Nancy Gardner and others in the department to do research in chemistry education. Nancy and I were able to get two abstracts published again at the 4th Annual International Conference on Education held earlier this year in Honolulu, Hawaii. I began to work this year as the faculty e-learning consultant liaison to Dr. Tom Carey (visiting senior scholar, MERLOT Project, Chancellor's Office, California State University). The work we are doing involves assessing a pilot study with Dr Ken Nakayama in the department to increase student learning in organic chemistry through technology using MERLOT and the ELIXR project. Ken and I are currently working to publish the data from this project. Post baccalaureate student Maiphuong Vo has been helping us with the assessments for this important project.

Stephen Mezyk

It was another fun and productive year in our laboratory, with many noteworthy accomplishments for both my students and myself. Building on the successes of the last few years, my three master's students, eight undergraduates and I were able to publish seven papers in this period, as well as having nine conference contributions.

One major highlight for our laboratory was the graduation of my first master's student at CSULB, Kristin Clark, whose thesis explored the chemistry behind the advanced oxidation process of free-radical-induced degradation of pesticides in water systems. Kristin has now started her Ph.D. program at the Donald Bren School of Environmental Science and Management at the University of California, Santa Barbara, where she continues her research on the analysis and removal of pesticides in soils. Two of my master's students, Kristin Clark and Behnaz Razavi, also presented their work at the Pacifichem Conference in Oahu, Hawaii, in the Free Radical Chemistry in the Environment session in December 2005. Kristin gave a poster on the efficiency of degradation of pesticide analogues in water, while Behnaz reported on her kinetic and mechanistic studies of the radicals formed in the oxidation and reduction of nitramines in water. Both students enjoyed the conference and the beach as much as possible.

This past semester, my senior undergraduate student, Nicholas Landsman, graduated with honors in biochemistry. He has started his one-year internship at the National Institutes of Health's Bethesda facilities, using analytical techniques to search for naturally-derived chemopreventive agents. While at CSULB, Nicholas elucidated the kinetics and reaction mechanisms of the reactions of the oxidizing hydroxyl radical and reducing hydrated electron with a series of alkyl nitrosamines in water for his Howard Hughes Medical Institute project. Two other undergraduate students who worked in my laboratory, Ricardo Encinas and Lisette Fernandez, also graduated this last spring. Ricardo is currently finishing off his chemical engineering degree, while Lisette has started her teaching credential, both here at CSULB.

This last year was also a very successful one for my other undergraduate researchers. Casandra Cox was awarded one of the Beckman Scholars Program scholarships, which will support her research activities over the next 18 months. She is studying the free-radical chemistry behind the carcinogenicity of nitrosamines. This work is aimed at establishing structure-reactivity relationships for simple nitrosamines, and to assist in understanding the mechanisms of reaction of more complex tobacco-specific nitrosamines. Casandra was also accepted into the Research Initiative for Science Enhancement (RISE) program at CSULB, which supported her attendance at the ACS Great Lakes regional meeting in Milwaukee, where she gave her first research talk. In addition, Casandra, and another undergraduate, Katy Swancutt, were also awarded Women in Philanthropy Undergraduate Research scholarships to further support their research efforts. Katy's research involves the investigation of the reduction/oxidation of anti-cancer

platinum drugs under physiological conditions as this chemistry is implicated in the toxicity of these chemicals, thus limiting their usefulness. These scholarships will support both students' research efforts over the fall 2006/spring 2007 semesters, as well as providing travel funds for them to visit the University of Notre Dame Radiation Laboratory, where they will conduct some of their free-radical kinetics experiments.

Katy Swancutt and Christine Bradford were recipients of Howard Hughes Medical Institute summer scholarships for research in my laboratory this past summer. Christine spent the summer synthesizing low molecular weight mixed alkyl-aryl nitrosamines, to be used as model compounds for investigation of the aqueous free-radical chemistry of tobacco-specific moieties. She also worked on the synthesis of thionitrosamines and iodine-containing carboxylic acid compounds in conjunction with Dr. Paul Buonora.

As always, several new students joined our laboratory. Devon Doud is a biology major who is starting work on investigating the free-radical chemistry of oxidation and reduction of a new class of chemical warfare agent simulants, based upon simple low-molecular-weight diethoxyphosphate derivatives. Trent Foust has just started with us, working on the oxidation chemistry of chloramine in drinking water, specifically whether this added disinfectant can oxidize nitrosamines to nitramines under typical water purification conditions. Several other students are just starting and are contributing by performing the hundreds of extractions we require for destruction efficiency measurements, as well as establishing their interests and projects.

For myself, it was an excellent year, with the major highlight of being awarded tenure and promotion to associate professor at CSULB. I have now completed my rotation of teaching CHEM 111B for a while, and so I am back teaching physical chemistry, starting with the graduate class this fall. My summer research was very productive, as I spent one month at the Radiation Laboratory, University of Notre Dame, collecting kinetic and mechanistic data on a variety of water-contaminant systems; and then two months in my new appointment at the Idaho National Laboratory in Idaho Falls, working on steady-state irradiation of organic solvent systems that are going to be used for extracting specific elements (Sr and Cs) from used submarine nuclear fuel. Of course, I continue to write grant applications; even with our prior success with Research Corporation and our new Water Reuse Foundation grant, more funding is always welcome. However, while I still have teaching release time, my new goal is to write up all the other outstanding data on my desk accumulated over the past five years. It should be another outstanding year to come!

Ken Nakayama

I was on sabbatical leave during the fall of 2005 to focus on some laboratory work with my undergraduate research students. Our department is steadily doing better over the past several years in the acquisition of higher-end instrumentation such as GC/MSs, high-field NMRs and a combiflash system. However, at the same time, this continues to increase stress on faculty workload as more of their time is devoted towards instrument maintenance and troubleshooting. Gaining infrastructure support by hiring a full-time instrumentation technician and maintaining service contracts is a must to keep research progress at a reasonable level.

This past spring, I taught CHEM 320A (organic I) during the spring semester. I utilized the support I received from the on-campus 3E (Enhancing Educational Effectiveness) Award to apply active and group learning strategies in my course. The results of pre-test and exit exams seemed to show that, in general, these teaching formats are beneficial towards student learning, and I was also encouraged by the overall positive student comments on the approach.

This past academic year, graduate students Eunice Cheung and Astor Suriano joined our research group. Although neither had any organic research experience as undergraduates, they are both progressing very nicely over the past six months or so in gaining experience and confidence in the lab. Undergraduates Connie Cajavilca, Jennifer Casey and Aimee Deconinck all worked very hard during the academic year to prepare cholinesterase inhibitors and key synthetic intermediates. Connie and Aimee are continuing with their projects during the summer.

Henry Po

I finished my third year in FERP, and it was productive. This past spring, I taught two new courses: CHEM 331, an introductory lecture course in inorganic chemistry; and CHEM 332, a one-unit lab course that accompanies CHEM 331 and was offered for the first time this last spring. I spent much time developing the experiments used in CHEM 332. For instance, students synthesize seven inorganic compounds and characterize them using various techniques such as IR to identify binding atoms; UV-vis to differentiate geometrical isomers and to determine ligand field splitting energy and legend's position in the spectrochemical series; magnetic susceptibility to determine number of unpaired electrons and M-M multiple bonding; and chiral separation of î optical isomer from racemic mixture and determine the degrees of optical rotation of the isolated î complex. I will be continuing to develop and refine these lab experiments in the coming year. I was also able to publish a manuscript of work that's been in progress recently (F. Freeman and H. N. Po, 2006, "Dimers of and Tautomerism Between 2-Pyrimidinethiol and 2(1H)-Pyrimidinethione: A Density Functional Theory Study." *J. Phys. Chem.* A 110(26), in press). This work was initially presented in November 2005 at the 14th Conference on Current Trends in Computational Chemistry, in Jackson Miss. The published manuscript should be available online in the near future.

My former students have been professionally active. Dr. Kenneth Huang has accepted an assistant professor position at Mount San Antonio College (Mount SAC). Dr. Janet Hunting received her Ph.D. from Cornell University (June 2006) and is teaching at Franklin and Marshall College in Lancaster, Penn. Kathleen Chou is presently director of the Office of Technology Transfer at Thomas Jefferson University School of Medicine.

Krzysztof Slowinska

My laboratory, supported by grants from NIH, Research Corporation and SCAC, is focused on research in molecular electronics. Two undergraduate students from my group, Bill Hammond and Justin Arndt, and a research associate, Emil Wierzbinski, co-authored a paper describing novel measurements of the conductivity of single DNA molecules attached to gold electrodes ("In Situ Electrochemical Distance Tunneling Spectroscopy of ds-DNA Molecules," *Langmuir 2006*, 22, 2426). Another paper co-authored by Mr. Wierzbinski reports electrochemical tunneling spectroscopy measurements for single alkenthiol and alkanedithiol molecules in aqueous environment ("In Situ Wiring of Single Molecules Into Electrical Circuit via Electrochemical Distance Tunneling Spectroscopy," *Langmuir 2006*, 22, 5205). I am particularly proud of these two papers because it was my first "research venture" into scanning tunneling microscopy technique. With the help from the college and my SCORE grant, we have purchased and set up our scanning tunneling microscope in the fall of 2005. Our STM has some unique capabilities, including imaging of single molecules on the surfaces in aqueous environment, and I am sure that it will provide outstanding opportunities for undergraduate research at CSULB.

There are two other research projects going on in my lab. Schuyler Smith, an undergraduate student majoring in chemical engineering, is working on electrical properties of n-alkanethiol and

n-alkaneselenol molecules on mercury electrodes. We are trying to resolve a long-standing question on whether the exchange of the "H-S-" with "H-Se-" group at the end of the alkyl chain influences the electrical properties of a molecule attached to the metal electrode. We plan on submitting a manuscript describing Schuyler's work later this year.

Ludilyn Cayas, a graduate student in chemistry, is working on a unique method of measuring the lateral conductivity of a monolayer of polyaniline at the air-water interface. In her approach, a monolayer of polyaniline is prepared on the water surface using the Langmuir-Blodgett method, and a lithographically microfabricated "line electrode" is used to determine the electrical properties of this two-dimensional polymeric system. Ludilyn already obtained some interesting data that we hope to prepare for publication this fall.

Front row from left: William Hammond and Audria Sarmiento. Back row from left: Justin Arndt, Michael Heeb, Schuyler Smith and Dr. Kris Slowinski.

During the last academic year, I was also quite busy at national and international conferences, presenting at American Chemical Society meetings in San Diego (spring 2005), Atlanta (fall 2005), Pacifichem in Honolulu (December 2005) and at the Gordon Research Conference on Electrochemistry (February 2006).

My teaching duties last year were mostly in our preparatory course, Chem 101. I am honored to teach this course together with our former chair Dr. Nail Senozan, whom I personally consider the most gifted teacher I've met in my professional career. It is a privilege to learn from him.

In the spring of 2006, I was appointed to serve on the University Think Tank for Technology Transfer and Intellectual Property. This committee is charged with developing new policies concerning intellectual property invented by our faculty. We have already presented our initial findings to the executive committee of the Academic Senate and to the Senior Management Council, and we plan to continue our work during the next academic year.

Last, but not least, I was promoted (two years early) to the rank of associate professor, effective August 2006.

Paul Weers

The 2005-06 semester was a successful year. As part of my main teaching responsibility as a biochemist, I taught another sequence of biological chemistry for a full class of 60 students each semester. This year I switched to the Lehninger textbook, which has plenty of supplemental information. My research project made significant progress, and I was invited to write a review about our "pet protein," insect apolipophorin III. This protein is a prototypic apolipoprotein, and used for structure-function studies. Apolipoproteins play a key role in lipid transport processes as well as innate immunity. Our goal is to study the structural aspects of apolipoprotein function to understand their role in health and disease, using a multidisciplinary approach of biophysics, molecular biology and biochemistry. More good news came from NIH, as the NIH-SCORE grant application to investigate the role of apoLp-III in innate immunity was awarded. As a result, my research program will receive financial support for the next four years to carry out our research objectives.

Vital contributions to the research program were made by several undergraduate and graduate students. Hasitha Idangodage (undergraduate, supported by HHMI) was able to engineer cysteine mutants by site-directed mutagenesis. He left in the fall of 2005 and started medical school last January. Leonardo Leon graduated in the fall of 2005 (MSC biochemistry). He continued to work as a lab technician and expressed and characterized the mutant proteins Hasitha prepared. Leon Wan (graduate student) analyzed the interaction of apoLp-III with model phospholipid bilayer vesicles. He was able to present and discuss his data at the American Society for Biochemistry and Molecular Biology meeting in San Francisco, April 2006. Other participants at the meeting were Thanuki Idangodage (undergraduate, supported by HHMI, recently accepted for medical school) and Cindy Pratt. Cindy is a graduate student, and after three years of research she is in the process of writing her thesis. Tzu-Chi Hsu is another graduate student, and he was in the last phase of his thesis writing and was expected to graduate in the summer of 2006. We were happy to learn that he recently was accepted for pharmacy school. Tom Wingert (biochemistry undergraduate) learned how to express recombinant protein just before graduating in the spring of 2006. Leslie Vasquez made a valuable contribution with lipopolysaccharide dephosphorylation studies and received well-deserved support from HHMI and RISE. She spent the summer at the research summer program at UC Davis and will return to Cal State Long Beach to finish her degree. Thanks to the good lab performance of the students, our lab was able to publish our recent progress towards the understanding of apolipophorin interaction with toxic lipopolysaccharides in *Archives of Biochemistry and Biophysics*, with Leonardo, Cindy, Leslie and me as authors.

Department Staff

Clockwise from left: Irma Sanchez, Ray Grace, George Saxon, Bertha Macias, Bob Soukup and Joyce Kunishima.

Any success an organization has is due in great measure to the quality of its people. Our department is no exception. Over the years, we have been blessed with highly competent staff who are responsible for much of the day-to-day operations in the department that enable our faculty to teach and do research and for our students to have success in their academic programs.

At present, our department has six staff personnel. **Joyce Kunishima** has been our director of laboratories for many years. Joyce coordinates ordering and acquisition of all teaching lab supplies and chemicals, and helps plan scheduling of teaching labs. Given the number of lab sections the department offers and the number of students flowing through these courses, this is a big job, one that Joyce does with great skill. **Bob Soukup** has served as our in-house equipment technician and oversees installation and maintenance of almost all computers in the department. Bob also maintains the department's website and assists faculty, staff and students when they have computer problems. **Ray Grace** and **Bertha Macias** serve in the chemistry issue room. They ensure that chemicals, reagents, and a myriad of small instruments and lab equipment are ready and available for use by students in teaching labs. This is a daunting task, which they perform with great competence. **George Saxon** and **Irma Sanchez** are our department office staff. Besides completing standard paperwork and other administrative assignments for the department, George and Irma meet and personally assist many students who come to the department seeking help with a wide variety of problems and procedures.

Earlier this summer, **Gina Van Essen** and her husband moved to Hawaii. Gina had been office assistant, then office manager, in the department for several years. Because Gina is technically on leave from the university for this year, George has assumed the role of office manager. We wish Gina all the best in this new adventure.

Emeriti Professor

Emeriti Professor

Dr. Dorothy Goldish
Dr. Goldish is starting her fourth year in the Faculty Early Retirement Program. She has been working each semester with Dr. Cecile Lindsay's office as well as the College of Natural Sciences and Mathematics on special projects. Dr. Goldish will also be helping with undergraduate advising in the department for the 2006-07 academic year.

Dr. Nail Senozan
Dr. Senozan is finishing his last semester this fall in the Faculty Early Retirement Program. He is teaching lecture and laboratory in our "Introduction to General Chemistry" course (CHEM 101) and teaching the first semester physical chemistry course (CHEM 371A). During the spring and summer semesters, Dr. Senozan has traveled regularly to visit family and friends in Turkey.

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Awards & Scholarships

Chemistry and Biochemistry Students 2006

Endowed Awards

Robert B. Henderson Award

Teresa Gerrity

The Robert B. Henderson Award was established by Dr. Henderson's family, colleagues and friends to honor his memory. Henderson was a member of the Department of Chemistry and Biochemistry from 1955-83 and a distinguished scientist and teacher of organic and general chemistry. Recipients for this award are chosen from among bachelor's and master's graduates as those best exemplifying Henderson's scholarship and commitment to the profession of chemistry. This year's award of $1,000 was presented to **Teresa Gerrity**, who is entering a Ph.D. program in biochemistry.

Kenneth L. Marsi Scholarship

The Kenneth L. Marsi Scholarship was established by faculty, staff, family, friends and former students of Dr. Marsi on the occasion of his retirement in 1996. Marsi was a distinguished scientist, teacher of organic chemistry, and served superbly as department chair for 21 years. Dr. Marsi passed away in 2005. This $1,500 scholarship is used to defray registration fees of outstanding junior and senior chemistry or biochemistry majors. This year's scholar is **Greer McMicheal**, who is a B.S. biochemistry major working in the lab of Dr. Eric Marinez in organic chemistry.

Greer McMichael

Michael Monahan Fellowship

Christopher Wostenberg

The Monahan Award was established through a generous bequest from Dr. Michael Monahan, an alumnus of our department who received his B.S. in chemistry in 1963 and his Ph.D. in 1968 at UC San Diego in physical organic chemistry. While an undergraduate, he was a research student of Dr. Robert Henderson. He was a distinguished scientist and member of the faculty at the Salk Institute and subsequently a senior research scientist at Beckman Instruments. Monahan was also the founder and president of California Medicinal Chemistry Corporation. In 1985-87, following his retirement, he served as an adjunct faculty member in our department. According to his will, the income from his bequest is to be used to support student research in our department. This is the 10th year this $2,500 award has been given, and the recipient is **Christopher Wostenberg**, who is a dual B.S. biochemistry major and B.S. mathematics major. Wostenberg is doing undergraduate research in organic chemistry in the lab of Dr. Eric Marinez.

Spyros Pathos IV Award

Jason Chiu

William Hammond

The Spyros Pathos IV Award is presented annually to a student excelling in the second semester of general chemistry, Chemistry 111B. This is the 12th year this award has been granted and is made possible by the friends of Spyros Pathos IV, who was an undergraduate chemistry major in our department at the time of his death in 1993. This year's recipients are **Jason Chiu** and **William Hammond**. Chiu is a B.S. chemistry major, and Hammond is a B.S. biology-physiology major.

David L. Scoggins Award

This award memorializes David L. Scoggins, a 1968 B.S. chemistry graduate of CSULB and a graduate student and teaching assistant in the Department of Chemistry at the time of his death in 1969. The award recognizes outstanding scholarship and promise by a graduating chemistry or biochemistry student who intends to pursue a career in one of the health-related professions. The Scoggins scholar this year is **Chaitali Sheth**, who is attending medical school this fall.

Chaitali Sheth

John H. Stern Award in Physical Chemistry

The Stern Award, consisting of a cash prize, is given in memory of Dr. John H. Sterns, internationally known for his work in solution thermodynamics and author of many publications in that field. The award was established by colleagues, former students and friends of Stern, who was a member of our faculty from 1957-87 and a distinguished teacher of physical and general chemistry. **Jennifer Casey**, a B.S. chemistry student, was named the recipient of the Stern Award for 2006.

Jennifer Casey

Photos by David J. Nelson

Subject Area Awards

Freshmen Chemistry Award:
David Kroman

American Chemical Society, Polymer Chemistry Award:
Bach truong

American Chemical Society, Analytical Chemistry Award:
Jennifer Casey

Organic Chemistry Award:
Greer McMichael

Merck Award in Organic Chemistry:
Jasmine Shaw

Biochemistry Award:
Michael Sundberg


David Kroman


Bach Truong

Photo by Victoria Sanchez


Jasmine Shaw


Michael Sundberg

Departmental Awards

Toni Horalek Award for Departmental Service:
James Tan

Hypercube Award:
Hsiao-Chu Lin

Departmental Undergraduates Honors:
Cassandra Kleve, Jasmine Shaw and **Chaitali Sheth**

Departmental Graduate Honors:
Miguel Camacho Fernandez and **Kristin Clark**

American Institute of Chemists Baccalaureate Award:
Jasmine Shaw and **Teresa Gerrity**

American Institute of Chemists Graduate Award:
Miguel Camacho Fernandez


James Tan


Hsiao-Chu Lin

Photo courtesy of Chemistry Dept.


Cassandra Kleve


Miguel Camacho Fernandez


Kristin Clark

Photo by Victoria Sanchez

College & University Awards

Graduate Dean's List of University Scholars and Artists:
Miguel Camacho Fernandez

Robert B. Rhodes Award:
Jasmine Shaw

Khalil Salem Award:
Cassandra Kleve

Initiated into Phi Beta Kappa:
Greer McMichael and
Wendy Shoemaker


Wendy Shoemaker

Photos by David J. Nelson

2005-06 Research Publications

for Department Faculty

Xianhui Bu

- Han, L., X. Bu, Q. Zhang, and P. Feng. Solvothermal in situ ligand synthesis through disulfide cleavage: 3D (3,4)-connected and 2D square grid-type coordination polymers. *P. Inorg. Chem.* In press.
- Zhang, Q., X. Bu, L. Han, and P. Feng. A two-dimensional indium sulfide framework constructed from penta-supertetrahedral P1 and superte trahedral T2 clusters. *P. Inorg. Chem.* In press.
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- Zheng, N., H. Lu, X. Bu, and P. Feng. 2006. Metal-chelate dye-controlled organization of $Cd_{32}S_{14}(SPh)_{404}$-nanoclusters into three-dimensional molecular and covalent open architecture. *J. Am. Chem. Soc.* 128, 4528-4529.
- Chen, L. and X. Bu. 2006. Histidine-controlled two-dimensional assembly of zinc phosphite four-ring units. *Chem. Mater.* 18, 1857-1860.
- Zheng, N.; Bu, X.; Lu, H.; Chen, L.; Feng, P.. One-Dimensional Assembly of Chalcogenide Nanoclusters with Bifunctional Covalent Linkers. *J. Am. Chem. Soc.* 2005, 127, 14990-14991.
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Lijuan Li

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Eric Marinez

- Prakash, G. K. S., T. Mathew, E. R. Marinez, P. M. Esteves, G. Rasul, and G. A. Olah. 2006. $BF_3{\cdot}2CF_3CH_2OH$ ($BF_3{\cdot}2TFE$), an efficient superacidic catalyst for some organic synthetic transformations. *J. Org. Chem.* 71, 3952-3958.
- Olah, G. A., T. Mathew, A. Goeppert, B. Török, I. Bucsi, X. Y., Li, Q. Wang, E. R. Marinez, P. Batamack, R. Aniszfeld, and G. K. S. Prakash. 2005. Ionic liquid and solid HF equivalent amine-poly (hydrogen fluoride) complexes effecting efficient environmentally friendly isobutane-isobutylene alkylation. *J. Am. Chem. Soc.* 127, 5964-5969.

Brian McClain

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Design, photography and editorial assistance provided by University Publications and Public Affairs, 2006