CHEMISTRY & BIOCHEMISTRY
California State University, Long Beach • Spring 2008

Slowinski Recognized for Molecular Electronics Research

by Anne Ambrose

In 2004, Krzysztof (Kris) Slowinski and colleagues in California and Poland saw their article titled "Wiring of α, ω – Alkaneditiols into Electrical Circuit" named a "Hot Paper" by the journal *Chemical Communications* of the Royal Society of Chemistry. Papers featured in this section of the journal are rated as "very significant" and "in the top 10 percent" of papers published in *ChemComm* by expert reviewers in the field.

"Our paper, co-authored by my postdoctoral associate Dr. Slawek Sek and Dr. Renata Bilewicz from Warsaw University, has demonstrated that the chemical nature of the electrical contact between the molecule and the electrode strongly influences the electrical properties of the molecule itself," Slowinski said.

"My research in general is concerned with molecular electronics," he explained. Slowinski joined CSULB's Department of Chemistry and Biochemistry in 2001 and received early promotion to associate professor effective in fall 2006.

See page 4, Slowinski

Lipid Transport is Weers' Interest

by Anne Ambrose

Lipids, or fats, are essential to the survival of all organisms, and Biochemistry Assistant Professor Paul Weers is focusing his research on the proteins that aid in their transport.

"Lipids do not mix with water, which presents a problem when transported through our circulatory system," Weers explained. "However, there are special proteins in our blood that pack lipids into small, water soluble particles, allowing for their transport. These special proteins are known as lipoproteins".

The nature and variety of lipids and proteins that are involved in lipid transport processes make this a "very exciting area to study. There are still major gaps in our knowledge as to how these proteins interact with lipids, the lack of structural data, and its impact on human health," he said.

Human lipoproteins share some striking similarities with certain insects, like locusts, so he uses insect lipoproteins as a model system. "These insects

See page 5, Weers

Photo by Victoria Sanchez

From left: students William Hammond, Thi Nguyen, Prof. Krzysztof Slowinski, Prof. Paul Weers, students Derek Eglit and Daisy Martinon in the lab.

Message by the Dean

Photo by Victoria Sanchez

Laura Kingsford

In 2005, a U.S. National Academies' panel issued a report entitled "Rising Above the Gathering Storm". This report provided a blueprint for sustaining economic growth in the U.S. by strengthening the research and educational systems (*Science*, 21 October 2005, p. 423). This report included 20 priorities, ranging from putting out more and better science and math teachers to increasing funding for research, especially in the physical sciences and engineering. The realization was there that we must do a great deal more in order for the U.S. to stay competitive in an international environment.

As such, Congress responded by passing the COMPETES (Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science) Act on August 2, 2007 (*Science*, 10 August 2007, pps. 736-737), which authorizes $43 billion over three years to support numerous programs. This act, for example, provides for a jump in a $10-million per year program to give scholarships to science, math, and engineering undergraduates who promise to teach. It puts NSF on a seven-year doubling track for funding. It creates grants for young scientists who have failed in their first NSF submission to help increase their chances of success the next time. All of these have very important implications for CSULB, our College of Natural Sciences and Mathematics, and the Department of Chemistry and Biochemistry. In a highly competitive funding environment, these can make a real difference for our faculty and their teaching/research programs for students.

Our role as a comprehensive master's institution is very important in the national scene to increase the number of science, technology, engineering, and mathematics (STEM) majors as well as teachers who are highly qualified to teach middle school and high school science and mathematics. The need to keep students in the pipeline for STEM careers means we have to work constantly to provide the best programs and opportunities for all of our students. Our students have to see the relevancy of what they are learning in the classroom, they have to be encouraged and nurtured, and they need hands-on opportunities to explore the process of doing science.

The faculty members in the Department of Chemistry and Biochemistry are doing an excellent job of this. As chair, Doug McAbee indicates in his article that things are in transition in the department, and the faculty are making changes in the teaching of chemistry to increase student learning and engagement in the process. Because much of the research and jobs these days requires a strong chemistry foundation and content, it is essential that we provide the very best in chemistry curriculum for all students in the college and those we serve from other colleges.

We also have to adapt to the way this generation of students learns, which is different from how their faculty members learned. More than 250 of our undergraduate students do research with the faculty along with our master's candidates each year—one of the best possible ways we know to teach and encourage young scientists to stay in their major and go on to graduate programs and careers in all areas of education, industry and government. We do an excellent job of providing experiences and support for students to keep them in the pipeline for careers in science and math. We are making significant contributions to the goals and priorities set out in the U.S. National Academies' report and look forward to the opportunities provided by the COMPETES Act.

In support of student learning and research, we have exciting news to report regarding our second new science building. We are moving ahead on the demolition of PH3 and the construction of the new building at a cost of $87 million. This building, along with the Molecular and Life Sciences Center, will give us one of the best science complexes in the CSU and elsewhere. The 164,369-square-foot building will add state-of-the-art classrooms, teaching labs, research labs, and supporting offices and work areas for four science departments and science education. We are most excited about this and will be getting more information out as we move through the process. We will be raising additional money to provide enhancements to the building, to purchase equipment for teaching and research, and to support research for faculty and students. If you have an interest in helping with this, please contact our director of development, Maryanne Horton, at 562/985-1687 or by e-mail to *mhorton@csulb.edu.*

We thank you faculty, staff, students, alumni and friends, who have supported us in the past and currently. 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.

Photos by Victoria Sanchez

Remarks by the Chair

Photo by Victoria Sanchez

Douglas McAbee

This year's issue of the newsletter focuses on the general theme of the changing nature of chemistry and contains articles that discuss ways in which chemistry as it is practiced has evolved over that past decade or so, and how those changes have affected the way chemistry is taught. I am confident you will find these articles interesting, informative and thought provoking.

Enrollments and Curriculum

Enrollments in courses for our majors increased this past year by 13 percent, which continued the trend of annual double-digit enrollment growth we have experienced in preceding years. While we are pleased that a greater fraction of university students are choosing programs in the physical and life sciences, meeting such rising demands is becoming more difficult. Our task for the foreseeable future will be to seek ways to manage our growth so that we can accommodate student needs and maintain quality of instruction within the boundaries of our limited resources.

One notable change in the department's curriculum this fall was the offering of a new organic chemistry lecture/lab sequence (CHEM 322A/B, 323A/B) geared toward students majoring in the life sciences. For many years, biology majors have comprised about three-quarters of the students taking our standard organic chemistry course for science majors (CHEM 320A/B), and conversations about development of a rigorous organic course to specifically serve this group of students began some years ago. Dr. Berryhill, with assistance from other organic chemistry faculty, designed the new eight-unit course that employs applications from the life sciences, yet remains sufficiently rigorous to pass muster of professional school admissions requirements. The first sections of the new organic chemistry course, CHEM 322A/323A were offered for the first time this fall. The second half of the course, CHEM 322B/323B, was offered for the first time in this spring. Some changes for the original CHEM 320A/B course are also planned so as to better prepare our own students for more advanced organic chemistry courses.

Faculty and Staff Changes

We have had some noteworthy changes in our department faculty this past year. After 43 years of distinguished service, Dr. Nail Senozan fully retired from the department, having taught his last semester as an emeritus professor this past fall. Dr. Peter Baine, emeritus professor who was Dr. Senozan's close colleague in the department since the 1960s, writes about Dr. Senozan's life in our department in this newsletter. Even though he is now fully retired, Dr. Senozan has indicated he is willing to teach on occasion if the need arises. We are greatly indebted to Dr. Senozan for his service to the department, and we wish him the very best in all his future travels and endeavors.

Last fall, we welcomed two new faculty members to the department, Dr. Michael Schramm (organic chemist) and Dr. Eric Sorin (computational chemist). Dr. Schramm comes to us most recently from Scripps Research Institute in La Jolla, Calif., and Dr. Sorin from Stanford University. Both bring valuable research expertise and great teaching potential to our department, and we are very pleased to have them join us. Their addition provides our students with excellent instruction and new opportunities for research. You will be pleased to read more about Dr. Schramm and Dr. Sorin in a separate article in the newsletter. The department initiated two faculty searches this past year, one for a biochemist and one for an inorganic chemist. Due to the state's anticipated revenue shortfall for 2008-09, we were forced to postpone the inorganic search indefinitely. We hope to conclude the biochemist search successfully by late spring.

Dr. Margaret Merryfield has assumed the position of senior director for Academic Human Resources in the Chancellor's Office. Certainly, our loss is CSU's gain as Dr. Merryfield undoubtedly brings her insight, creativity, integrity and enormous competence to the Chancellor's Office. We wish her well in this new assignment and hope to see her occasionally at department seminars and other functions on our campus.

This past year, we said farewell to Gina Van Essen, who had served as the department's administrative assistant for several years. Gina and her husband moved to Maui last summer, which is actually a journey home for Gina, as she grew up in Hawaii. We wish her and her family all our best. George Saxon has now taken over Gina's former position as lead office administrative coordinator, ably assisted by Irma Sanchez.

Department in Transition

As amplified elsewhere in this newsletter, the onset of construction of the new PH3 replacement building has been delayed

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CONTENTS

SLOWINSKI

"We are interested in the electrical properties of either single molecules or two dimensional monomolecular assemblies—monolayers of molecules immobilized on various surfaces."

During his first four years at CSULB, "we constructed a new type of macroscopic tunnel junction that allowed us to perform experiments in water. Our paper, co-authored by two undergraduate students, Roger York and Phuong Nguyen, describing this electrochemically controlled junction, was published in the prestigious *Journal of the American Chemical Society*."

Slowinski later received a National Institutes of Health Support of Continuous Research Excellence (SCORE) grant that enabled him to purchase a scanning tunneling microscope, which allows imaging of single atoms and molecules.

Based on his earlier work, "we used our electrochemical approach for single molecule measurements. We were able to monitor the influence of the formation of a single chemical bond on the conductivity of a molecule," said Slowinski, who with visiting Ph.D. student Emil Wierzbinski published the results in 2006 in *Langmuir*, a leading physical chemistry journal. "Then, we further expanded this research into biologically related molecules. We were interested in the conductivity of single DNA molecules in an aqueous environment. We have found that the conductivity of DNA strongly depends on the orientation of the molecule within the tunnel junction." That study, co-authored with undergraduates Bill Hammond and Justin Arndt, also appeared in *Langmuir* in 2006.

"There is a pretty well established notion that the presence of a mutation in DNA decreases electrical conductivity of the DNA molecule," he continued. "For this reason, if you develop a reliable method to measure the electrical properties of DNA, then you can think about constructing a sensor that will use the electrical conductivity of a molecule to actually detect the presence of a mutation within the DNA. Of course, we are far from developing anything like that, but the fundamental research that we do is going in this direction."

His lab is one of the few in the world conducting electrical characterization of single molecules in water. He hopes to expand the use of this method to other biologically relevant molecules, for example, redox proteins. "The ability to change the redox state of proteins in conjunction with the possible catalytic functions of proteins makes them desirable candidates for nano-molecular analytical devices. Furthermore, the intermolecular recognition characteristics of proteins may facilitate 'programmed' assembly of the future bio-nano-circuits as well as allow development of novel analytical approaches."

With four grants from Research Corporation, American Chemical Society's Petroleum Research Fund, NIH and NATO received since 2001, Slowinski and his students are engaged in several other projects. By using a different device—a scanning electrochemical microscope—"we characterize DNA monolayers modified with redox intercalators. This collaborative project with Professor Michael Hill from Occidental College might result in the development of a new method of microscopic imaging of single nucleotide polymorphisms."

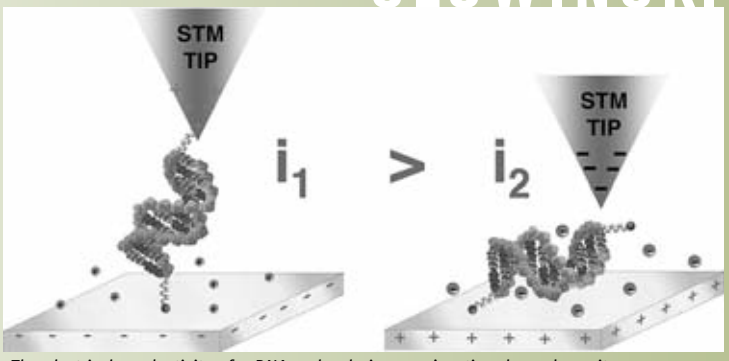
Other projects in his laboratory include the use of a line electrode voltammetry to study Langmuir monolayers of conducting polymers and the use of mercury based junctions to characterize multicomponent molecular assemblies.

Slowinski earned his master's and Ph.D. in chemistry from Warsaw University, Poland, and was a postdoctoral associate to Dr. Marcin Majda at the University of California, Berkeley before joining CSULB. His wife, Kasha, is an assistant professor in CSULB's Chemistry and Biochemistry Department.

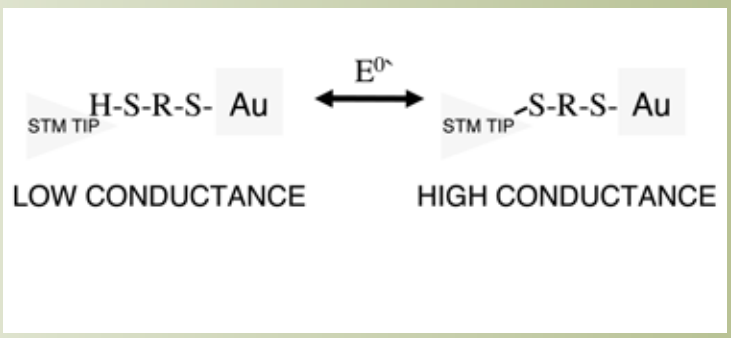
WEERS

The electrical conductivity of a DNA molecule in nano-junction depends on its geometric orientation.

SLOWINSKI



The electrical conductivity of a DNA molecule in nano-junction depends on its geometric orientation.



The intrinsic electrical conductivity of a single molecule of alkanedithiol increases if both ends of the molecule are covalently bonded to metallic contacts.

WEERS

are able to migrate over long distances, and what better fuel is there than fat, "Weers said. "But, that's the problem—how to transport all this fat. Thanks to the presence of a small protein called apolipophorin III, insects are able to do this very efficiently. That's one of the reasons why locusts are superb long-distance flyers. We have used apolipophorin III as a model for the study of the function of apolipoproteins for many years.

"There are significant advantages for using this protein," he continued. "For example, the high resolution structure of apolipophorin III has been elucidated, providing great insight into the protein, in addition to the fact that we can produce large amounts of protein in a bacterial expression system. Our research group is particularly interested in the structural features of apolipoproteins that facilitate the interaction with lipids."

Weers came to CSULB in January 2003 after completing his Ph.D. at the University of Utrecht, The Netherlands, and postdoctoral research at the Biochemistry Department of the University of Alberta in Edmonton, Canada. Weers was an assistant research scientist with the Children's Hospital Oakland Research Institute prior to joining CSULB.

Engaging in research and teaching appeals to him. His work with recombinant protein technology presents an opportunity for students to get exposed to biochemistry, molecular biology and biophysics. "By providing students with research opportunities, we are able to raise their level of competitiveness, which improves their candidacy for graduate or professional schools. The research experience gives them the edge."

In 2004, he obtained a three-year National Institutes of Health area grant for the study of "Lipid-induced Conformational Switch of Apolipophorin III". He is among a group of CSULB professors who received an NIH Support of Continuous Research Excellence (SCORE) grant.

His SCORE grant enables his lab to study another aspect of apolipoproteins. "These proteins bind to lipopolysaccharides, which are found in the outer membrane layer of bacteria, and they're extremely toxic when they are released in our circulation," Weers commented. "We think that apolipoproteins are able to neutralize lipopolysaccharides, providing protection against bacterial infections and thus play an important role in innate immunity.

"External grant support allows me to spend many hours in the lab with my students, and that's crucial to our success. I am directly involved in research training of students—to design experiments to answer key questions in relation to our research goals, think about potential problems, collect, present and discuss data, and finally to publish our results." During the past three years, Weers and his students have had six research papers published in major research journals.

CHAIR'S REMARKS

for some months. Nonetheless, in anticipation of the demolition, the department will relocate all of the teaching labs from PH3 (including introductory and general chemistry) to previously dormant labs in PH2 for classes this next year. This relocation, while necessary, will reduce the total number of labs we can offer during construction and will also require the department to re-open the chemistry stockroom in PH2 to serve teaching and research labs in that building. In addition, several faculty have relocated their research labs to spaces in PH2 to vacate space in PH3 and make way for new faculty members in MLSC.

As part of this process, the college has been very busy renovating much of the lab space in PH1 and PH2, including converting the "Henderson" organic chemistry teaching labs into usable research space for several faculty. Of course, occupation of office and research spaces in PH2 are temporary until completion of the PH3 replacement building project, at which point all department faculty will be housed in either the new building or MLSC. Research and teaching in this transition time will be challenging for the entire department community, but I am confident that our faculty, staff, and students will rise to the occasion and meet this challenge with resourceful and creative solutions.

Besides the undertaking of a major building project, the department has also begun redeveloping and articulating its mission in a fresh way. In 2005-06, the department completed a scheduled self-study initiated in 2003, and a variety of department strengths and weaknesses were revealed by this review. In response, the department has contracted the services of an external consultant, Elaine McClanahan, to assist us in the development of a strategic plan that will provide a framework for department direction over the next 10 years. The initial phase of this process, which will be completed over a period of about 12 months, began in February 2007, and will include three faculty retreats, two of which were held in June and October 2007. Ms. McClanahan came to us highly recommended by our chemistry colleagues at CSU Fullerton, and her work with us thus far has been strong and positively received by the department faculty.

2007-08

As outlined above and detailed elsewhere in the newsletter, the department community is very active and engaged in its educational mission, and we look forward to the opportunities and challenges during this academic year. As always, it is our great pleasure to hear from our alumni and friends about their professional and personal activities and accomplishments. We are also most grateful for the financial support that many of you have provided us this past year, donations that may seem small but collectively accomplish so much and benefit so many.

Photos by Victoria Sanchez

by Anne Ambrose

Stephen **Mezyk** Awarded Distinguished **Faculty Teaching Award**

STEPHEN P. MEZYK, associate professor of chemistry and biochemistry, was honored with a 2007 Distinguished Faculty Teaching Award, given to selected CSULB faculty in recognition of sustained excellence in teaching. Mezyk is originally from "Down Under" (he is a native of Australia with a Ph.D. from the University of Melbourne in 1990), but he has made himself at home at CSULB.

"My teaching philosophy is that I don't teach; I help the students learn the material and make sure they are ready for the next courses in their degrees," he noted. "I don't believe in memorization at all, to the point where I always allow students to bring their own sheet of paper into exams with whatever material they want written on that sheet. My exam questions are based on application and understanding of the material, not memorizing facts out of the textbook."

Provost Karen Gould (l), Stephen Mezyk and Chemistry and Biochemistry Chair Douglas D. McAbee.

This approach ensures that students understand the material, which makes them retain it better. His current research is based in the chemistry of kinetics, of how things change with time, and includes investigating the free-radical chemistry of carcinogenic nitrosamines in water; understanding the toxicity of platinum-based anti-cancer drugs; measuring the kinetics and mechanisms of the removal of trace amounts of pesticides and their residues from drinking water using free-radical chemistry; and the destruction of chemical warfare agents in water using externally generated oxidizing and reducing radicals.

by Teresa Hagen

Gary **Shankweiler** Receives 2007 **Mayfield Award**

At the Commencement ceremonies this past May, Professor **GARY SHANKWEILER**, a lecturer in the Department of Chemistry and Biochemistry, was presented with the 2007 Mayfield Award for Outstanding Teaching in the College of Natural Sciences and Mathematics (CNSM). This annual award is sponsored by the college's student council and was established 18 years ago at the suggestion of members of the council to honor Darwin Mayfield, professor emeritus of chemistry and biochemistry who retired that year at the age of 70. It was designated the Mayfield Award to recognize its first recipient.

Shankweiler teaches organic chemistry for the science majors, where the average class size is 80 to 100 students, and helps coordinate the labs. He also teaches the lab for advanced organic chemistry (Chem 420).

"Organic chemistry is a very hard course," Shankweiler commented. "It's one of the hardest ones in the university. A lot of the students that we have are taking it because they're told to by their majors. They're not really interested in it. They learn it and immediately forget it.

"It's important that you make the students comfortable and put forth the effort to learn their names as much as possible, so they know they've got purpose," Shankweiler continued, when asked about his teaching style. "I try to keep things interesting by asking students questions, telling them jokes. Of course, I have to tell the students when to laugh. I just try to keep them paying attention. When there's down time in the lecture and they're copying things down off the board, I'll walk around and talk to the students individually as I can. I try to personalize this as much as possible."

Shankweiler received both his undergraduate and graduate degrees at New Mexico State University. After completing his Ph.D. in biochemistry, he studied as a post doctoral candidate for five years with Dr. James Lake at the UCLA Molecular Biology Institute. Before CSULB, he taught

Photo by David J. Nelson

at El Camino College and then Mount St. Mary's College.

When asked about his decision to become a teacher, Shankweiler admitted that he originally planned on pursuing a medical career. "Somewhere in my senior year, I figured out that's not really what I wanted to do," he said. "My grandfather was actually a professor. He kind of inspired me. A couple of my professors from my undergraduate degree also inspired me to go into education, teaching science."

In turn, Shankweiler has inspired his own students to go into teaching. "My wife is dean at El Camino College," he said. "She was telling me that one of my students when I was at Mount St. Mary's is now teaching full time at El Camino College, and that person said that I was one of her inspirations. She got a degree in medicine and decided to come back and teach. I have a couple of other students that I've influenced into going into research. It really makes you feel good when you run into those situations."

Shankweiler says he was totally surprised when his name was called at Commencement. "I'm very pleased," he commented. "I know I've actually touched several students' lives. It's nice to know that the students appreciate what you do for them."

Since the Mayfield Award's inception, the selection process has been managed entirely by CNSM students through a nomination process for outstanding teachers. The student council conducts balloting, and more than 300 students cast ballots for their favorite professor. The award consists of a plaque given to the recipient, whose name is then added to a commemorative plaque displayed in the James Jensen Student Access to Science and Mathematics Center.

by Anne Ambrose

Advisory Board Profile

Stephen L. **Pentoney, Jr.**

Among **Steve Pentoney's** proudest professional achievements is his 1997 induction into Beckman Coulter's Inventors Hall of Fame for patents he has received in the areas of laser chemical analysis, DNA sequencing and capillary electrophoresis.

Pentoney is director of advanced systems chemistry for Beckman Coulter's Advanced Technology Center in Fullerton, Calif. Over the years, he received 17 United States patents, published 30 scientific journal articles and earned 2003 Distinguished Alumnus honors from CSULB's College of Natural Sciences and Mathematics.

The Chemistry/Biochemistry Department Advisory Board member earned his B.S. in chemistry at CSULB in 1983, and with the encouragement of late Emeritus Professor Kenneth Marsi and current Professor Stuart Berryhill, went on to earn a Ph.D. in chemistry at UC Riverside in 1987.

"I was then offered a postdoctoral research position in the Zarelab at Stanford University, working in the area of laser-based biochemical analysis," he recalled. "My research at Stanford was funded by a company then called Beckman Instruments, and upon completion of my postdoc two years later, Beckman offered me a position as a staff scientist in their R&D group in Palo Alto. I thought a great deal about becoming a professor and staying in academia, but I ultimately decided to accept the Beckman offer and go into industry."

Fullerton-based Beckman Coulter has offices in 130 nations and is a leading manufacturer of instrument systems, chemistries and supplies for automated laboratory processes. In addition to his research and management responsibilities, he participates in science educational activities for K-12 students and teachers and is a member of the Beckman Young Investigator's Grants Advisory Committee that provides research grants to outstanding new university professors. Moreover, he recently earned his Lean Six Sigma Black Belt certification from San Diego State University.

"I cannot say enough about how right CSULB was for me," Pentoney remarked. "CSULB faculty members played an important role in both my education and in key career decisions I made. I am confident that CSULB remains an excellent choice for a large number of students who will benefit from a university environment where teaching and quality instructors are a priority."

He and his wife, Terry, have three children, two of whom are in college. "My son, Chris, and I co-authored a publication that appeared in *Analytical Chemistry* earlier this year and was based on work he did while working as a summer intern in one of my labs."

Outside the lab, "I have all but traded in my surfboard for a boat," Pentoney added. In addition to coaching youth sports, he earned his 50-ton captain's license from the United States Coast Guard, which enables him to run fishing charter boats.

SAACS

Photos by David J. Nelson

Heather Hopkins (r) and Eddie Duran are demonstrating the proper safety technique to make liquid nitrogen ice cream.

Back row from left: Christopher Slay, Dr. Brian McClain, Whitney Graves, Manu Singh, Dr. Paul Weers, Christopher Bruner. Front row from left: Heather Hopkins, Casandra Cox, Eddie Duran, Miles Brookman, Alexandria Brooks.

by Brian L. McClain

The CSULB Chemistry Club is Back!

Officially Named the

"Student Affiliates of the American Chemical Society"

The club is better known to Peterson Hall and MLSC dwellers as SAACS. Dwindling membership over the past few years has lead to the club's presence on campus as being more incognito. However, this past spring semester was a springboard for the revival of SAACS. The first meeting started with a bang reminiscent of an ammonium tri-iodide reaction; a highly sought after CSULB parking pass was raffled off, which drew over 100 interested students (a tradition that will continue indefinitely). Students were introduced to a club that promotes student-faculty interaction as well as bridges students with local industries. And just as the meeting was really heating up, the student affiliates cooled things down with an edible experiment by making liquid nitrogen ice cream.

The rest of the semester's meetings proved a time for experimenting with chemistry in everyday life, including a quantitative test of carbonated beverages and Mentos under varying conditions (see Diet Coke and Mentos videos on YouTube). A St. Patrick's Day social was held at the home of Dr. Nail Senozan, who was generous enough to lend us his house for the day (so sorry about the garbage disposal, Nail!). Students who were lured to the SAACS sponsored Coffee and Donut Hour on Friday mornings found much more companionship and academic support than they ever expected. The event soon became a regular meeting place for students and faculty, and will continue into the upcoming school year with a few improvements. Finally, the SAACS officers took on a new role as academic advisors for first- and second-year students pursuing science-based majors.

And much more is going on for SAACS! The beginning of fall semester 2007 kicked off with a student-faculty social at Dr. Baine's house. The club actively recruited new members to step into leadership roles, providing a great opportunity for students to become more involved in the campus and department community. The fall semester also brought our first SAACS field trip as well as more exciting experiments. To find out more about what next semester brings, look for flyers posted around campus.

And last, but not least, special thanks go out to Jennifer Casey, Casandra Cox, Derek Eglit, Whitney Graves, Marianne Guirguis, Thomas Neubauer, Manu Singh and Lesley Vasquez, the original executive members. On them hinged the success of the club. Thank you, all!

The current officers are: Heather Hopkins (chairperson), Edward Duran (vice chairperson), Christopher Slay (treasurer) and Christine Bradford (secretary). SAACS is advised by Dr. Brian L. McClain and Dr. Paul Weers, and yet you are expected to be able to perform at the same level (at the very least) as the rest of the group.

Dr. Senozen Retires

by Dr. Peter Baine

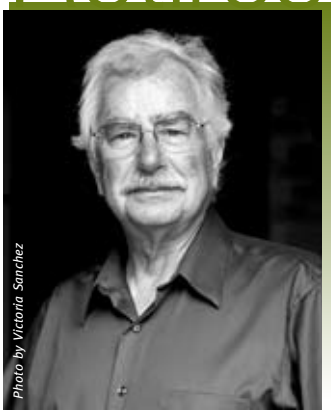


Photo by Victoria Sanchez

Nail Senozan started at California State College, as it was called then, in 1964. In the summer of that year Nail went on vacation to Turkey and was drafted into the Turkish army. As part of the NATO Alliance, Nail spent the next two years protecting us from the "red menace." As a first-year junior faculty member, I first met Nail on his return from that two-year sojourn, and we quickly formed a strong friendship. It wasn't long before we managed to share the same office.

Nail's research interest at that time was low-temperature calorimetry, but that changed when he encountered the alkaline earth's ammoniates. Nail spent many a long night carefully measuring the equilibrium vapor pressure of calcium and barium ammoniates. The long nights paid off with publications in the *Journal of Chemical Physics* and the *Journal of Inorganic and Nuclear Chemistry*. Later Nail became interested in the blood of marine animals that have the ability to concentrate copper and vanadium from the environment. These studies led to his friendship with Dr. Harry Gray at Caltech, who, it turned out, was also interested in these mollusks. Nail's other research interests involve theoretical investigations of carbon monoxide binding to hemoglobin. Dr. Jerald Devore collaborated with him in some of these studies. Nail has published over 25 articles in peer reviewed journals.

Nail has taught many courses in his tenure in the department, but the one from which he received the most satisfaction was Chemistry 111B. Many a student struggled with Nail's midterms, but they were great learning experiences as I can testify. His interest in general chemistry did not preclude him from teaching other courses. One of his passions was thermodynamics, He saw deeply into this subject, as the discussions I had with him revealed. He also taught a course on blood chemistry under the auspices of the College of Natural Sciences, as it was known then. Towards the end of his career, he turned his attention to students who were not prepared to enter the general chemistry sequence, and his work with those students is legendary. Nail received the Phi Beta Kappa University Scholar award for the year 1978-79, and in 1993, he was honored with the University Out-standing Professor Award, a tribute to his dedication to the university, the department and to his students.

By an odd coincidence, Nail and I live on the same street, albeit, several miles apart. Nail is famous for the faculty/student parties he has held at his home. He was always the perfect host, together with his charming wife, Diane. Diane teaches physical education in the Lynwood Unified School District. They have two children, Erin and Sean. Erin started medical school this fall at Creighton University on a USAF scholarship. Who says brains don't run in the family! Sean is a junior in high school.

Photo by David J. Nelson

Dr. Nail Senozan leads the march for the 2007 graduation commencement ceremony.

New Faces


Horton


Schramm


Sorin

Maryanne Horton

by Anne Ambrose

Helping the six departments and four institutes and centers within CSULB's College of Natural Sciences and Mathematics to thrive financially is the responsibility of Maryanne Horton, the college's new director of development.

"I am responsible for cultivating major gift support for the college and all of its programs, with a focus on specific college priorities," she explained. "Those include scholarship support and both student and faculty research support, as well as to help with capital equipment when that's needed. But, it's truly to develop relationships with alumni and help them do wonderful things with their philanthropic dollars.

"We're really trying to bring alumni back to the college and get them involved and let them know what kind of value their degree holds because it has continued to grow over the years. There is a so much for them to be proud of."

With one recent new science building completed and another on the way, "It's a very exciting time," she noted. "As I talk with alumni, it seems to me that the quality of education has always been very good, here. So many of our alumni credit their college experience with their success and have wonderful things to say about the faculty and the atmosphere in our college, being very welcoming and supportive. They felt that the college had a vested interest in their success and that made them feel very good about being here."

Horton received her B.A. in history from UC Berkeley, which included a year of physics and chemistry study as a personal interest, and an MBA in arts management from UCLA. The veteran fundraiser has worked for the Los Angeles Opera, KUSC-FM Classical Radio, Cal State L.A.'s High School for the Arts, and most recently for Cal State Fullerton's Engineering and Computer Science program. But, the 16-year Long Beach resident was enthusiastic about joining CSULB.

The ability of Cal State Long Beach students to conduct research and be co-authors on articles in major research journals "is really a hallmark of our program, here. In a UC situation, an undergraduate would not have that opportunity. That's the purview of graduate students," she remarked. "We hear from industry quite a bit that our students graduate bench-ready and in some ways are better prepared, coming with an undergraduate degree than perhaps someone out of a UC who hasn't spent that much time in a lab. It's definitely a distinction for this university and for our college, in particular."

To learn more about support opportunities for the Department of Chemistry and Biochemistry, contact Horton at 562/985-1687 or mhorton@csulb.edu.

Michael Schramm

by Dr. Paul Buonora

Michael Schramm was born in upstate New York, where he graduated magna cum laude with a B.S. degree in environmental chemistry from the State University of New York College of Environmental Science and Forestry. He then pursued graduate studies at the University of Chicago as Professor Sergey Kozmin's first doctoral student. While at Chicago, his research significantly expanded the role of siloxyalkynes as building blocks in organic chemistry. Two initial reports focused on the ring closing metathesis of siloxyalkyne-alkenes and the [2+2] cycloaddition reaction of siloxyalkynes. These reports formed the foundation for subsequent exploration in the group. His Ph.D. dissertation applied siloxyalkyne chemistry towards the preparation of a 1,200-member structurally diverse small molecule library.

Subsequent biological screening was supported by an NIH predoctoral training grant that afforded Dr. Schramm the opportunity to test the library in the lab of Professor Geoffrey Greene at the Ben May Cancer Research Institute. One compound was discovered to behave as a modest estradiol mimic in both in vitro and cell-based assays.

After graduation, Dr. Schramm moved to the Scripps Research Institute in La Jolla as a post-doctoral research associate in Professor Julius Rebek, Jr.'s group. While at Scripps, his work focused on the encapsulation of small molecules in surpamolecular assemblies; the encapsulation environment drastically increases the time scale on which molecular interactions occur, thus allowing the measurement of phenomena that would otherwise be unobservable. His efforts realized a synthetic receptor that functions as a host for small molecule guests while embedded in aqueous micelles. This receptor was shown to be selective for "anchors" functionalized with short peptides and fluorophores.

Photos by Victoria Sanchez

A second successful project revealed that distant chiral centers can be "felt" by co-guests in supramolecular capsules. Finally, he made contributions to the development of hybrid synthetic capsules, which only form in response to appropriately sized and shaped guests, standing in contrast to the dominant theme of self-sorting observed in supramolecular assemblies.

Dr. Schramm joined the Department of Chemistry and Biochemistry in fall 2007 as an assistant professor. Dr. Schramm's interest in teaching organic chemistry and supramolecular recognition stem from inspiring instruction he received as a student, which continues to influence his approach to teaching. His independent research interests include utilizing synthetic receptors to facilitate membrane transport, the development of modular a-helical peptidomimetics, and new approaches to enhancing catalytic asymmetric output though careful substrate design. He will be looking for highly motivated and creative students to join him in these pursuits.

Eric J. Sorin

by Dr. Paul Buonora

Eric J. Sorin is a Southern California native who is married with two teenage children, and enjoys music, outdoor activities, good fantasy novels and nights alone with his wife, Suzy. He completed his undergraduate work at UC Riverside, majoring in chemistry/chemical physics, and recently completed his Ph.D. in the Department of Chemistry at Stanford University. While his academic training was in physical chemistry, his graduate research focused on a highly interdisciplinary combination of physics, chemistry, biology and computer science, a mix Eric is eager to cultivate as a CNSM faculty member.

As one of the first members to join the Folding@Home distributed computing project, Eric studied biopolymer folding using computer simulation and published several seminal papers describing ensemble folding simulations of proteins and RNAs. As a graduate student, he co-authored two reviews and one book chapter on protein folding, and he continues to be an active member of the Folding@Home team while maintaining the ffAMBER package of force field ports.

Dr. Sorin is currently in the process of developing a research program in the MLSC-300 computational science lab. The lab will include a research-oriented computing cluster, a college-wide scientific software server, and servers to conduct research using the worldwide Folding@Home network. His research will continue to focus on modeling and simulating biomolecular systems, with strong interests in understanding protein and RNA folding, studying environmental effects on biopolymer systems, and improving current molecular simulation models. As a computational scientist, Dr. Sorin was impressed with the quantity of interesting collaborations offered by faculty members within the Department of Chemistry and Biochemistry at CSULB.

The focus on teaching at CSULB, however, was the dominant factor in Eric's decision to join the department, and he began his teaching duties this fall with CHEM 377A. He is looking forward to continuing with CHEM 377B this semester and has developed curriculum in computational chemistry, biology and biophysics to be offered this next fall. His teaching interests extend to assessing the factors that influence student success in the sciences and integrating computation and technology into classic science curriculums.

HRAMM HORTON New Faces

Photo by David J. Nelson

Reports from Faculty

Faculty standing, back row from 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 sitting, from left: Dr. Robert Loeschen, Dr. Paul Weers, Dr. Tom Maricich, Dr. Jeffrey Cohlberg, Dr. Douglas McAbee, Dr. Nail Senozan and Dr. Brian McClain.

Xianhui Bu

During the past year, there has been a significant change in the makeup of my group. Dan-Tam Nguyen, one of my M.S. students, left the group after finding a position with Terumo Cardiovascular Systems. Tam spent three years with me working on open-framework materials based on metal sulfites and published three papers in *Inorganic Chemistry*. Currently, my lab has two M.S. students, Emily Chu and Matthew Wong. Emily also did some work on metal sulfites and contributed to two publications. Her current work, however, is on chiral materials based on D-camphoric acid. I am also very pleased that Matthew joined my group as a graduate student. He started his research with me in the spring of 2007. One of the biggest changes is the addition of a new post-doctor, Dr. Jian Zhang, who joined my group in October 2006. Since his arrival, the research activity and productivity in my group have reached a new level. Particularly noteworthy is the active involvement of both undergraduate and graduate students in research and publications.

Paul Buonora

This has been a year of change in the Buonora group. I ended my tenure as the chemistry undergraduate advisor and became coordinator of the starter students in the RISE program. This gives me the opportunity to work with incoming students in the sciences, setting them on a path toward becoming RISE Fellows and ultimately to graduate study in the sciences.

This was also my last year teaching the advanced organic chemistry laboratory course. In the last three years, we have modernized the equipment and training received in this course, which is taken by all our majors. I will miss the six-hour labs.

In the laboratory, we have entered the closing phases of our longstanding work in the synthesis of dihydropyridazinones (DHPs) from bicyclic lactams. This work is designed to provide potential inhibitors of phosphodiesterase (PDE) isozymes. We have discovered some interesting examples of dynamic kinetic resolution, which should help resolve some lingering challenges in the project.

Part of the reason to phase out the project is that most of the students currently on aspects of the project will graduate this year. Bryan Fiamengo is studying pericyclic ring forming reactions and conversions to bicyclic dihydropyridazinones. Crystal Jenkins is completing work on the synthesis of 5-substituted DHPs, and Jim Brady is studying the coupling of aza species, which are important to the activity of the DHPs toward PDE.

Joe Badillo will complete his B.S. in the coming year and, as a RISE Fellow, will be applying to graduate programs. His work on the synthesis of 1,2-aminoalcohols is coming together nicely, and he should present his work at the spring ACS national meeting.

With all the students leaving, this will be a recruiting year in the group. Susanne Cyrus has already joined the group, looking at some interesting NMR effects seen in the bicyclic lactams.

The new project we will be phasing in focuses on a new reagent for the synthesis of carbohydrates and pseudocarbohydrates. With the help of a Scholarly and Creative Activity Committee award from the university we began work on this project last spring. A business major, Angela Bustamante also got a good start on this project last spring.

Jeff Cohlberg

I taught Chemistry 544, the graduate course in physical biochemistry, once again this past spring. It's always a pleasure to teach this class, learn some new things and update my knowledge along with the students, a small but very able group this time around.

Our research continues on the aggregation of superoxide dismutase and its role in amyotrophic lateral sclerosis (Lou Gehrig's Disease). I used a sabbatical leave this fall to stay at CSULB, work in the lab and write up some of our results for publication. Chris Bowman obtained some very interesting results using fluorescence polarization on the role of metals, disulfide bonds and ALS-related mutations on the monomer-dimer equilibrium of SOD. I am finishing up Chris' studies while he begins an M.D.-Ph.D. program at New York University. Phong Dinh is taking a year off and working after graduation, but he will be working part time to characterize some of the mutant SOD proteins that he worked so hard to express and purify. Yoko Nakano, a grad student, is studying the effect of various forms of SOD on cultured neuronal cells and also using attentuated total reflectance infrared spectroscopy to study the secondary structure of SOD aggregates. Furkan Senal, another grad student, is using a combination of probes to investigate intermediates in SOD aggregation.

A special guest in our lab this past summer was Patrick Guan, a high school student from Belmont, Mass. Patrick's parents, Rong Guan and Min-Ping Liu, received their M.S. degrees from our department in 1992, Rong working with me and Min-Ping with Balwant Khatra in biology. Rong and Min-Ping are both physicians working with the Chinese community in Boston. I was 43 when Rong started in my lab; now Rong is 43 and Patrick is getting his feet wet in biochemistry.

Tom Maricich

This past year, I shared the coordination of the department seminar program with Paul Buonora. I arranged the fall and Paul did the spring. If any of our alumni would like to volunteer for future seminars, please contact me at tmaricic@csulb.edu or Paul at pbuonora@csulb.edu.

There are three undergraduate students and three graduate students in my research group. Also, Andrea Chen and Thach Ho help to mentor my students and work on projects when they are not teaching. Undergraduates Nai-Chia Kuan and Jeremy Wood, Provost Scholars this past summer, are studying the HBF4–OMe2 catalyzed sulfonimidate alkylation reactions of alcohols. They have observed rapid (minutes) room temperature ethylation of alcohols without rearrangements in high yields. Likewise, Christine Bradford, President Scholar and Women and Philanthropy Research Scholar, has been successful in ethylating phenols. Renata (Fan-Chun) Meng, a graduate student, has successfully O-ethylated amides to give imidates. Igor Izotov, a new graduate student, is studying the sulfonimidate alkylation reactions of phosphoric and phosphonic acids. First-year graduate student, Michael Fimbres, is working on the alkylation reactions of thiols.

This past summer, we (Suzanne, two sons, daughter, six grandkids and I) flew to the Maricich family reunion (celebrated for the 100+ times) in Anacortes, Wash. (in Puget Sound), and to my 50th high school reunion. We even got in some salmon fishing.

Eric Marinez

I have witnessed the graduation of several key members of my research group: Sherry Kim, Keith Glover, Amber Valencia, Christopher Wostenberg, and Yizhe (Judy) Wang. All of them have been stellar students, graduating with GPAs above 3.8. I am extremely proud of all of them, all that they have accomplished at CSULB, and I am confident that they all will succeed in their professional aspirations. Sherry will attend pharmacy school at UC, San Diego. Keith, a NIH-RISE scholar, will start a master's in chemistry under my direction. Amber and Chris will start graduate school in chemistry at the University of Southern California and Penn State University, respectively, while Judy will seek employment in the chemical industry. Chris, Amber and Keith all wrote undergraduate theses of their research. Judy defended her master's thesis entitled "Carbamate Triserine Lactone Receptors for Anion Recognition." Amber and Chris have both graduated with honors in the department and have been HHMI scholars. In addition, Amber has been a RISE and ACS Minority Scholar. During her time at CSULB, Amber earned a Kenneth L. Marsi Scholarship, Organic Chemistry Award, Merck Award in Organic Chemistry and membership into Phi Beta Kappa. Chris has been awarded the Spyros Pathos IV Award, Hypercube Award, Michael Monahan Fellowship, Khalil Salem Award and membership into Phi Beta Kappa.

My current research group consists of Kimberly Brown, Reina Chu, Eddie Duran, Ryan Kemp, Greer McMichael, Andrew Newman and my graduate student David Nacionales. Each one of them is exceptional and should graduate with high marks. Kimberly and Eddie are funded by RISE. Kim also received an ACS Minority Scholarship. This past year, Greer was funded by HHMI and earned a Women and Philanthropy Scholarship and a Kenneth L. Marsi Scholarship.

I am in the process of writing two manuscripts from this excellent group of scholars. One will be in the area of superacid chemistry and the other in molecular recognition. I commend and thank my students for their efforts and thank their parents for understanding their children's dedication towards my long and arduous research efforts. As my students know, each one of them is dear to my heart, and I cherish every moment I have spent with them.

This past spring, the college received NIH-Minority Access to Research Careers (MARC) U*STAR Program for honors students interested in graduate school in the biomedical sciences. This grant provides participating students with a stipend, tuition reimbursement, and a summer research opportunity between their junior and senior years at a major university or government-sponsored laboratory. Working with Dr. Henry Fung (program director) and Dr. Roger Bauer (P.C.), I am the new program coordinator for the grant and look forward to working with all the future scholars.

MARINEZ

Photo by Victoria Sanchez

From left: Andrew Newman, Sherry Kim, Amber Valencia, Prof. Eric Marinez, Reina Chu, Kimberly Brown and Hector Medoza, Jr. Back row, from left: Christopher Wostenberg, Edward Duran and David Nacionales.

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Steve Mezyk

It was another productive and fun year in the Mezyk RadKEM laboratory at CSULB. Research success was plentiful; my master's student, 10 undergraduate research students and I were able to get 11 refereed papers accepted or published, as well as provide 18 conference contributions. Our year was highlighted by presentations at conferences such as the ACS meeting in Chicago in March 2007, the First Egypt-US Workshop on Water in Cairo, May, 2007, and the International Congress for Radiation Research, San Francisco, June 2007.

Last year my master's student Behnaz Razavi graduated and started her Ph.D. in environmental engineering at the University of California, Irvine. Kristin Clark, my first master's student, won the Outstanding Thesis of the Year award in our college for her CSULB research on the radical-based remediation of pesticide-contaminated waters. She is very happy continuing her Ph.D. at the University of California, Santa Barbara.

This year was also extremely successful for my undergraduate researchers. Casandra Cox is finishing up her Beckman Scholars Program scholarship research on the free-radical chemistry involved in nitrosamine carcinogenicity. Katy Swancutt also received this prestigious scholarship this past May, for her research on reduction/oxidation of anti-cancer platinum drugs under physiological conditions over the next 18 months. Devin Doud and Thomas Neubauer received scholarships from CSULB Women and Philanthropy, while Edsel Abud and Trent Foust were awarded CSULB Provost Summer Research Fund scholarships. These scholarships supported their research efforts over summer/fall 2007, and provided travel funds for them to conduct free-radical kinetics experiments at the University of Notre Dame Radiation Laboratory.

Personally, my one other highlight was receiving the 2007 CSULB University Distinguished Teaching Award. With my sabbatical for fall 2007, as well as my ongoing teaching release time, I am concentrating on writing grants and papers, and so anticipate another outstanding year to come!

Doug McAbee

We were very pleased that Sid Seth completed his M.S. thesis this past year, which focused on characterizing the receptor-binding properties of various lactoferrin-transferrin recombinant hybrid proteins. Sid's project, begun originally by Grace Jung, is part of a collaboration the lab has with Dr. Tony Schryver's group (Univ. Alberta), focused on identifying structure-function relationships of the iron-binding proteins lactoferrin and transferrin. Sid expressed two lactoferrin-transferrin hybrid cDNAs as bacmids in a baculovirus expression system in which different sub-domains of lactoferrin were replaced with the corresponding sub-domains of transferrin. After purifying the recombinant proteins, Sid analyzed their ability to bind to immobilized asialoglycoprotein receptors (the Ca2+-dependent lactoferrin receptor on hepatocytes) using surface plasmon resonance analysis (employing a Biacore instrument at UCLA medical school). Sid's results demonstrated that swapping the C1 or C2 sub-domains of lactoferrin with transferrin elements did not abolish protein binding to immobilized receptors, though it did significantly alter the binding affinities. Sid's results now provide a springboard for generation and analysis of other lactoferrin-transferrin hybrids. Sid recently took a position with Kirin-Pharma USA (San Diego). We wish him all the best.

Ms. Aynur Bakirci has continued to work on her M.S. project of understanding the iron-dependent changes in the liver proteome following in vivo iron-overloading. Much of her work this past year has involved the hard task of developing purification and analytical protocols for electrophoretic separation of hepatocyte membrane and cytosolic proteins for subsequent high-throughput analysis by MALDI-TOF/TOF mass spectrometry. We are indebted to Dr. Ashraf Elamin, a research fellow who oversees the proteomic facility here at CSU Long Beach. Aynur's work is now poised to begin comparing protein profiles of hepatocyte proteins isolated from the livers of control and iron-loaded rats, though those experiments were unexpectedly delayed due to staffing and logistical problems in the Animal Care Facility this past summer. We look forward to resuming this work by summer.

Casey Curran, an undergraduate research student in the lab, was also busy with his

Photo by David J. Nelson

project, focusing on generating a complete proteomic profile of lactoferrin-binding proteins from human serum. Much of Casey's time this past year was spent stockpiling lactoferrin-binding proteins isolated by affinity chromatography on lactoferrin-agarose columns, as well as initial electrophoretic analysis of these proteins. This next year should prove fruitful as Casey begins to identify these protein isolates by mass spectroscopy. This will be Casey's last year in the lab, as he plans to enter medical school the following year.

My teaching activities this past year included re-entering the instructional rotation of undergraduate biochemistry (CHEM 441A/B), which was most enjoyable. This will be my last year as department chair, after which I plan to get back into teaching and research full time.

Michael Meyers

This year has been an exciting and productive year for my research group. We published one paper in *Laboratory Investigation* and have a second paper in submission at the time of this writing. I have had tremendous successes in grant writing this year, with three external grants funded while finishing my Research Corporation Award in June. These grants have allowed me to continue productive research collaborations and foster new ones for my lab group to participate in. In addition, I received funding to join the library in improving the University 100 course for our entering freshmen.

I am very happy to report that our NSF (National Science Foundation) MRI (Major Research Instrumentation) grant, entitled "MRI: Acquisition of a Confocal Laser Scanning Microscope for Research and Training in the Natural Sciences at California State University, Long Beach," was funded on July 25 for our requested amount of $343,723. The project began on Sept. 1 and continued through Aug. 31, 2010. These funds will also be used to purchase a confocal laser scanning microscope (Olympus Fluoview 1000) to support the research programs of 12 CSULB faculty. Bruno Pernet is the P.I., and I am a co-P.I. along with Editte Gharakhanian and Diane Lee. In addition to all the standard capabilities of a confocal microscope (e.g., collection of Z-series, 4D rendering, etc.), the system will be capable of excitation in a variety of wavelengths to facilitate multiple labeling, optical sectioning through thick specimens, high numerical aperture objectives, rapid scanning for high temporal resolution in time-dependent studies of living material (e.g., shifts in cell pH or calcium concentrations, or molecular interactions), near-simultaneous confocal and brightfield (DIC) imaging, and lambda scanning and spectral manipulation to optimize fluorophore differentiation in multiple-labeling experiments. Acquisition of such a system is particularly timely now, as we can support the developing research programs of recently hired faculty. In addition, we can train our diverse research students in confocal microscopy to fully prepare them for the best graduate programs or entry into other science-related careers.

The 12 faculty involved in this proposal are in three departments (Biological Sciences, Chemistry and Biochemistry, and Psychology). The study topics include cell and molecular biology, immunology, plant and animal developmental biology, neurobiology, microbial ecology and life history evolution. Seven are well-established researchers (Flora Banuett, Judy Brusslan, Elizabeth Eldon, Editte Gharakhanian, Diane Lee, Kay Lee-Fruman and me), and five were hired in the past three years and are in the process of building their laboratories and research programs (Jesse Dillon, Simon Malcomber, Bruno Pernet, Bryan Rourke and Kevin Sinchak). Most of the faculty involved are from Biology, Diane Lee is from the Department of Psychology, and I am the only member from Chemistry and Biochemistry. As the grant progresses, I hope to involve more Chemistry and Biochemistry faculty and students in the use of the instrument.

Confocal microscopy is important in two of my lab's projects. The first involves the mechanism by which glioma cancer cells are killed by macrophages expressing membrane macrophage colony stimulating factor (mM-CSF). This project is a continuation of my collaboration with Dr. Martin Jadus at the V.A. center in Long Beach. The cancer cells expressing mM-CSF undergo paraptosis, a form of programmed cell death. We have shown that large conductance calcium sensitive potassium channels (Maxi-K or BK channels) are responsible for paraptosis in these cells. We are studying how these channels control paraptosis as an essential first step

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in eventual clinical use of this process. We have labeled antibodies to the Maxi-K channel and have begun to localize the channels in cancer cells across species.

A confocal microscope is essential for these studies because we need to be able to locate proteins by cellular compartment (e.g., endoplasmic reticulum, Golgi), using a second label for the compartment of interest. With the purchase of our own instrument, we can now analyze the cells "in-house" instead of constantly relying on the facilities at the V.A. center.

The second project involves understanding the role of potassium channels in differentiating stem cells isolated from the umbilical cord. It is known that potassium channels contribute to the differentiation of stem cells into neurons. These cells have electrical excitability even as neural progenitors and before they send out axons and dendrites. In preliminary studies, we have used potassium channel blockers to halt neural differentiation. This may shunt the cells down another pathway (e.g., inducing differentiation as pancreatic or cardiac cells) that could be beneficial in treating other diseases (e.g., diabetes, heart disease). We are able to record the channels using electrophysiology, but confocal microscopy is essential for localizing the channels to specific cellular compartments, as described above. Training students in my lab on the confocal microscope will give them a great opportunity to relate functional studies of ion channels with their localization in the cell.

I am also delighted to report that in January, I was awarded a CSUPERB (California State University Program for Education and Research in Biotechnology) Faculty-Student Collaborative Research Seed Grant. The project is entitled "The Role of Maxi-K Channels in a Viral Therapy for Glioma Cell Cancer," and the funds will be used to support my research collaboration with Dr. Jadus. Even though my award was reduced to $13,500, I must note that I was very pleased to win the CSUPERB award this year as only 20 percent of the submitted grants were funded. This support from the CSU will allow me to continue to involve undergraduate and graduate students in my research by giving summer stipends to students and purchasing needed supplies through May 2008. I presented the preliminary data of this work at this year's Annual Biophysical Society meeting in Baltimore. I won a travel award from CSUPERB to attend this East Coast meeting (along with department and college funds). We are very fortunate to have this funding support from this state program as well as from our campus.

Thanks go to all my undergraduate students working on these projects this year: Nirav Bhakta, Alice Jessup, Jimmy Pham, Gerald Vandeusen, LaQwente Bryant and Victoria Tran. Thanks also go to Dr. Linda Callahan of the Nursing Department, who continues to work in my group.

In addition to my bench research, I continue to do research in chemistry education. I was able to get another abstract published at the fifth Annual International Conference on Education earlier this year in Honolulu, Hawaii, on my work with Dr. Ken Nakayama in the department. The work we are doing involves assessing a study 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 ongoing project.

In January of this year, I was awarded funds as a consultant on an Information Competence Grant from the CSU Chancellor's Office. The Commission on Learning Resources and Instructional Technology was charged with developing and recommending policy guidelines to the chancellor that facilitate the effective uses of learning resources and instructional technology throughout the CSU. Tiffini Travis from the library is the P.I. on this $14,000 external grant. The grant is entitled "Calibrated Peer Review and the First Year Experience: Problem Based Learning and Demonstrated Information Literacy Skills."

This proposal will allow the library, in conjunction with the university's first-year experience program, University 100 (U100), to redesign the library's online component of the U100 course to integrate information literacy tenets, student learning outcomes, and incorporate active learning assignments using a new theoretical framework (case-based problem-based learning and innovative technologies (Calibrated Peer Review (CPR) and the ETS Information and Communication Technology Literacy ICT Assessment). As an expert on CPR, my role will be to write the HTML code and assignments for the peer review components being added to the course. I use some of the same peer review assignments in the teaching of my biochemistry classes.

I look forward to a busy year of more biochemistry teaching, grant writing, manuscript preparation, and continuing to work with students as the new undergraduate advisor for the department. We will continue to raise the bar on teaching and research here at The Beach!

Ken Nakayama

Our group has continued with the work involving inhibition studies of the cholinesterases, in collaboration with Professor Roger Acey's research group. Our first paper on our collaboration was published in *Biochemical and Biophysical Research Communications* earlier this year. During the spring and summer of 2007, graduate students Eunice Cheung and Astor Suriano contributed significantly towards expanding the library of organophosphorus compounds to be assayed. Undergraduates Chris Bruner, Connie Cajavilca and Joel Ancheta also assisted in the compound library expansion efforts. Chris and Connie received scholarships for their summer 2007 work. Chris was also the recipient of the organic chemistry department award for the academic year 2006. Meanwhile, graduate student Ricardo Gallardo has been working on building a stockpile of precursors for a chiral auxiliary needed in the synthesis of chiral phosphates. Long Nguyen also joined our group as a graduate student during the spring 2007 semester.

I have continued to apply the active and group learning strategies developed by Professor Don Paulson (retired) of CSULA in the organic curriculum. The results of applying Don's strategies continue to be very encouraging in terms of student response and depth of understanding gained by those who follow though with the process. I applied them in the advanced organic lab course for the first time in fall 2007.

On a personal note, our daughter, Karissa (eight years old), is now a very articulate child with command of both English and Japanese. From her current interests, her future goals seem to vacillate between

NAKAYAMA

From left: Joel Ancheta, Chris Bruner, Connie Cajavilca, Astor Suriano, Prof. Nakayama and Ricardo Gallardo-Macias. Not pictured are Long Nguyen and Eunice Cheung.

becoming either a philosopher or an entomologist. Our son, Kendall (five years old), is getting very adept at word pronunciations and working with numbers. They continue to be sources of both joy and life's lessons for my wife and me.

Young Seok Shon

This has been a wonderful first year here in Southern California and at CSULB. I thoroughly enjoyed teaching several quality students in organic chemistry classes. I was also fortunate to work with motivated undergraduates students on my research projects related to the synthesis of nanoparticle-hybrid materials. David Kroman, Jonathan Dare and Tuong Dinh have synthesized nanoparticle-cored dendrimers with different generations (layers of branched monomers).

Caroline Lam, Shaleen Chuc and Parfait Voundi have studied device assembly, anion exchange and spectroscopic response of ionic monolayer-protected clusers (IMPCs). Hyung (Nicole) Choi and Tieng (Julie) Luong were involved in the preparation of nanoporous metal thin films from nanoparticle-hybrid multilayer assemblies. Hyun Lim, Bryant Dineros, Dibbs Mejia and Rachel Salazar have also spent some quality time in my lab. In the future, we will elucidate the relationship between primary structural elements in these nanomaterials and their optical and electronic properties. This will allow us to exploit these nanomaterials in a variety of ways, including energy storage, sensors, drug delivery and electronics.

I was invited to write a review article on "Dendritic Functionalization of Metal Nanoparticles for Nanoparticle-Cored Dendrimers," which is one of my current research projects, from *Current Nanoscience*. The review paper is currently in press. The collaborative researches on "Spontaneous Adsorption and Electrochemically Induced Release of Thiolate-Capped Gold Nanoparticles on Graphite" and "Preparation of Ultrathin Thiolate-Covered Bimetallic Systems: From Extended Planar to Nanoparticle Surfaces" with research groups in Universidad Nacional de La Plata in Argentina have generated successful results and are published in the *Journal of Physical Chemistry* C. The Collaboration with the Argentina groups is being continued for the research involving AuAg and AuPd alloy nanoparticles. I also presented my research on "Ionic Monolayer-Protected Metal Clusters (IMPCs): Effects of Counter Anions" at the American Chemical Society Meetings in Chicago.

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M.S. Theses
Chemistry & Biochemistry

2006-07

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

Shail Yadav
B.S., Pt Ravishankar Shukla University
"Synthesis and Characterization of Gold Clusters with Aldehyde Surface Groups as a Novel Crosslinking Agent for Collagen Based Materials"

Sidharth Kumar Seth
B.S., University of California, Santa Barbara
"Analysis of Lactoferrin-Transferrin C-Lobe Hybrid Proteins for Binding to the Asialoglycoprotein Receptor"

Bernard F. Brady
B.S., University of California, Irvine
"Pathway Optimization in the Synthesis of Dihydropyridazonones"

Emily Huey-Hsia Chew
B.S., University of Texas Arlington
"Synthesis and Characterization of Homochiral Framework Materials"

Chad MacArthur
B.S., California Polytechnic University, San Luis Obispo
"Chlorinated Organophosphates as Novel Inhibitors of Butyrylcholinesterase"

Wafa Mana
B.S., California State University, Long Beach
"The Effect of Di-n-Butyl Phthalate on Butyrylcholinesterase in Differentiating Stem Cells"

2006-07 Research Publications

for Department Faculty

Roger Acey

- Law, K.S., R.A. Acey, C.R. Smith, D.A. Benton, S. Soroushian, B. Eckenrod, R. Stedman, K.A Kantardjieff, K. Nakayama. 2007. Dialkyl Phenyl Phosphates as Novel Selective Inhibitors of Butyrylcholinesterase. *Biochem. Biophys. Res. Commun.* 355, 371-378.

Patents

- U.S. Patent Serial Number 7,135,605. Metal Binding Proteins & Associated Methods (*Issued November 14, 2006*). (Application is a continuation of our original claiming the use of membrane bound MT as a method for removing toxic metal from solutions.)

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Paul Weers

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Paul Weers

Thanks to the support of NIH-AREA and SCORE grants our group was able to continue our research efforts to gain insight into structural and functional aspects of apolipophorin III, a model exchangeable apolipoprotein. Apolipoproteins play a role in lipid transport processes, are involved in several lipid related diseases, and may also play an important role in innate immunity. During the last year, the following people were part of our research group: Lesley Vasquez, Derek Eglit, Le Nuyen, Arti Patel and Sean Lee, (undergraduate students); Leon Wan, Merve Oztug, Xinping Wu and Daisy Martinon (graduate students); and Gizman Abdullahi (research technician).

Photo by Victoria Sanchez

From left: Arti Patel, Prof. Paul Weers, Gizman Abdullahi (research assistant), Derek Eglit and Daisy Martinon.

A combined effort from Leonardo Leon, Leon Wan and Hasitha Idangodage led to the discovery that the apoLp-III helix bundle opens upon lipopolysaccharide (LPS) binding. This implies that apoLp-III is able to associate strongly with LPS, thereby neutralizing this toxic bacterial component (circulating LPS causes septic shock, which has a high mortality rate). The results were published in the October 2006 issue of *Biochemistry and Biophysical Research Communications*. Leonardo Leon was a former student and research assistant, and left our group in September 2006; he is currently enrolled in the UC Davis pharmacology program. Leon Wan participated in a collaborative effort from the Children's Hospital Oakland Research Institute (Calif.), UC Berkeley, Wake Forrest University (N.C.) and CSULB to identify the lipid binding domain of a recently discovered human apolipoprotein, apoA-V. The results were published in the May 2007 issue of the *Journal of Biological Chemistry*.

Leslie Vasquez graduated and started at the baccalaureate program of CSU San Francisco. During her last semester, she participated at the CSULB annual research competition, was awarded the first prize and was the runner up at the state-wide competition at CSU Dominquez Hills. She investigated structural and functional properties of apoLp-III after chemical modification.

The following students received awards: Merve Oztug, Louis Perglut Scholarship; Xinping Wu, Michael Monohan Memorial Summer Research Fellowship; Derek Eglit, departmental service award; Arti Patel, Provost's Undergraduate Student Summer Stipend Program for Research, Scholarly & Creative Activity.

Awards & Scholarships

Chemistry and Biochemistry Students 2007

Endowed Awards

Robert B. Henderson Award

Dr. Henderson was a member of the Department of Chemistry and Biochemistry from 1955-82 and a distinguished scientist and teacher of organic and general chemistry. He was one of the founding faculty of the department, served as chairman of Physical Sciences, an associate dean of the college, and was a thesis advisor for several M.S. students. This award is given to a student best exemplifying Henderson's scholarship and commitment to the profession of chemistry. This year, we were pleased to present this award of $1,000 to each of three outstanding students: **Jennifer Casey**, **Amber Valencia** and **Christopher Wostenberg.**

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. 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 **Casey Curran**, who is a B.S. biochemistry major working with Dr. McAbee.

Michael Monahan Fellowship

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 11th year this $2,500 award has been given, and the recipient is **Xinping Wu**, an M.S. biochemistry student working with Dr. Weers.

Jennifer Casey

Amber Valencia

Christopher Wostenberg

Casey Curran

Xinping Wu

Gerene Garcia

Heather Sanchez

Sheila Soroushian

Bach Truong

Spyros Pathos IV Award

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 recipient is **Gerene Garcia,** a B.S. biology-zoology 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 scholars this year are **Heather Sanchez** and **Sheila Soroushian,** who are both pursuing professional degrees in medicine.

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. **Bach Truong**, a B.S. chemistry student, was named the recipient of the Stern Award for 2007.

Photos by David J. Nelson

awards & scholarships

Subject Area Awards

Freshmen Chemistry Award:
Jason Alvarez

American Chemical Society, Polymer Chemistry Award:
Andrew Newman

American Chemical Society, Analytical Chemistry Award:
Christopher Wostenberg

Organic Chemistry Award:
Greer McMichael

Merck Award in Organic Chemistry:
Amber Valencia

Biochemistry Award:
Yoolim Hong


Andrew Newman


Greer McMichael

Departmental Awards

Toni Horalek Award for Departmental Service:
Derek Eglit

Hypercube Award:
Miguel Camacho Fernandez

Departmental Undergraduates Honors:
Jennifer Casey, Yoolim Hong and **Amber Valencia**

Departmental Graduate Honors:
Miguel Camacho Fernandez and **Chad MacArthur**

American Institute of Chemists Baccalaureate Award:
Jennifer Casey and **Christopher Bowman**

American Institute of Chemists Graduate Award:
Dan-Tam Nguyen and **Chad MacArthur**


Derek Eglit


Miguel Camacho Fernandez


Dan-Tam Nguyen

College & University Awards

Graduate Dean's List of University Scholars and Artists:
Jonathan Kleinman

Robert B. Rhodes Award:
Christopher Bowman

Khalil Salem Award:
Christopher Wostenberg

Initiated into Phi Beta Kappa:
Casey Curran, Amber Valencia and **Christopher Wostenberg**

Photos by David J. Nelson

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Faculty

LI

From left: Sandra Hernandez, Wei Xu, Ting (Nico) Hu, Carlos Peinado, Van Buzzo, Dr. Rongming Wang, Thomas Combahee, Steven Bolivar, Peter Thuy-Boun and Dr. Lijuan Li.

Students

ACEY

Photo by David J. Nelson

Front row, from left: Chad MacArthur, Mary Han and James Yano.
Middle row, from left: Rebecca Graziano, Wafa Mana and Simon Moon
Back row, from left: Dr. Roger Acey and Gwen Jordaan.

Lab Groups

BRAZIER

Photo by David J. Nelson

Front from left: Prof. Chris Brazier, Michelle Tandoc and Marwa Rifai.

Gifts by Individuals

During the 2006-07 fiscal year, the department received gifts totaling **$10,751**. The faculty, staff and students of our department are very grateful for your generosity.

Cash gifts are used for scholarships, awards, the seminar program, and purchase of supplies and equipment for which there is not adequate state funding. Also, the costs of publishing the Chemistry and Biochemistry newsletter are met with private giving. You may give an income tax-deductible gift directly to the department by sending a check to:

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Thank you!

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Total value of cash and in-kind gifts to the department during the fiscal year ending June 30, 2007 was **$6,250**.

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Matching gifts totaling **$1,250** were received from the following companies (employees whose gifts were matched are given in parentheses):

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

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Members of the 2006-07 graduating class with several members of the Chemistry and Biochemistry Department faculty.

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