College of Science San José State University

THE SCIENTIST

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Inside this issue:

MESSAGE FROM THE DEAN

DR. J. MICHAEL PARRISH

After an extra-long Indian Summer, fall has finally arrived on the SJSU campus, and it is time for me to fill you in on what has transpired in the College of Science in the last few months. The college continues to attract more than our share of students, with 15% growth in Science enrollments since Fall of 2006. In the meantime, our budget has remained flat-funded at the 2006 level, although we are now looking at a mid-year rescission and the likelihood of future cuts remains high.

Our college continues its commitment towards student success, and in particular in improving both graduation and retention rates for our students. Last spring we opened the College of Science Advising Center (COSAC) which is designed as a one-stop shop for advising questions within the college. We are cooperating with both departmental advisors and the advisors in Student Services to ensure that students have a user-friendly pathway to whatever type of advising they might require. Since its opening in April, the center has averaged over 150 visitors per month.

In July, we welcomed our new president, Jon Whitmore, to the SJSU campus. President Whitmore comes to us from Texas Tech University in Lubbock, where he served as president for five years, and where he had an excellent record of obtaining external support, including the establishment of 27 endowed chairs. We are excited about working with President Whitmore, and look forward to seeing what he has in store for the campus.

We have also had some changes in the Dean's office. After serving first as interim and then permanent Associate Dean, Dr. Steve Branz has accepted a position as Associate Dean in Undergraduate Studies, where he is also in charge of General Education programs, a part of the curriculum about which he is extremely passionate and knowledgeable. Taking Dr. Branz's position in an interim capacity is Dr. Maureen Scharberg, who was already a part-time Associate Dean in addition to serving as Director of the Science Education program for the College (a role that has been assumed by Dr. Ellen Metzger) and supervising the new college advising center. We have also brought Dr. Herb Silber into the College Office as Associate Dean for Research. Dr. Silber is charged with working with faculty to identify opportunities for collaborative research and helping them to secure external funding.

We had a very successful recruiting effort last year, filling all of the advertised positions with creative and energetic new faculty. Joining us this fall were Professors John Abatzoglou and Menglin Jin (Meteorology), Nishanta Rajakaruna and Miri Van Hoven (Biological Sciences), Thomas Young (Chemistry), Jon Hendricks (Geology) and Plamen Koev and Jared Maruskin (Mathematics).

The College received a very generous gift from former Science Education Director and Emeritus Professor of Biological Sciences

(Continued on page 2)

MESSAGE FROM THE DEAN

(Continued from page 1)

Jean Beard, whose bequest established PERSIST (Professional Education Regional Services in Science Teaching), which is an endowment to support the Science Education Program's interactions with regional school districts. We are very grateful to Dr. Beard for her generosity and continued support of a program that she has worked hard to nurture and expand during her years at SJSU.

Professor Julio Soto spearheaded a Department of Biological Sciences effort to secure a coveted Howard Hughes Medical Institute award, the first one that the campus has received. The grant will be utilized to revise the core biology curriculum, provide research opportunities for undergraduate students, and provide research and pedagogical support for Biological Sciences Faculty.

This fall, we initiated a new Professional Science Master's program for Medical Product Development Management. This program is designed to provide students with a combination of project management, statistical analysis, and biomedical background that will allow them to assume leadership positions in project management and clinical trials in the biomedical industry. We are grateful to Abbott Vascular for a $100K donation that provides startup support and student scholarships for the new program.

As you can see, the College of Science is moving ahead on multiple fronts, despite the downturn in the economy. We have extraordinary faculty and students, and this newsletter will provide a more detailed look at what they have been doing lately. As always, I invite you to return and visit the campus when time permits, and we are always appreciative of your support.

Dr. J. Michael Parrish

CHEMISTRY DEPARTMENT NEWS

Animations of Chemical Reactions

By Dr. Resa Kelly

Resa Kelly
Assistant Professor

The goal of my research is to develop animations of chemical reactions that meet the teaching specifications of instructors and the learning needs of students. In order to develop animations, I have investigated how experts (chemistry professors and teaching assistants) explain specific chemical reactions through drawn and oral explanations to learn features that should be incorporated into the design of animations. Studies by Newtson and Engquist (1976) and Zacks, Tversky, and Lyer (2001) indicate that when people examine an ever changing world they segment the "continuous flux" into meaningful events or "changes in space and time that are perceived as bounded units with beginnings, middles, and ends" (as cited by Martin and Tversky, 2003). Thus, how experts segment their explanations of chemical reactions is being used as a tool for developing an animation that contains segments.

Additional goals of the project are to develop animations that have layers of detailed complexity that can be added to the most simplistic model which contains the essential features of a concept. The layers will allow the instructor to gradually introduce details that more accurately portray a chemical concept, but if introduced initially might overload the students' working memory. The animations will also be designed to address novice chemistry students' misconceptions of reactions. Finally, the animations will be tested by both instructors and students to learn how well the animations meet the instructors' needs for teaching the concepts and the students' needs for understanding the concepts.

2008 Early Career Investigator Award Recipient — Dr. Daryl Eggers

The SJSU Research Foundation has awarded Dr. Daryl Eggers the Early Career Investigator Award for 2008.

Dr. Eggers has excelled in areas of research, scholarship or creative activity by securing funds for his research. His former and current students working in his laboratory have made 23 presentations based on research projects completed under his supervision with four more planned for the Fall semester. The Eggers laboratory concentrates on understanding the dominant forces in *protein folding* and has observed that *misfolding* of proteins may contribute to the pathology of certain human diseases.

CHEMISTRY DEPARTMENT NEWS

Self-Assembly and Paramagnetism

By Dr. David Brook

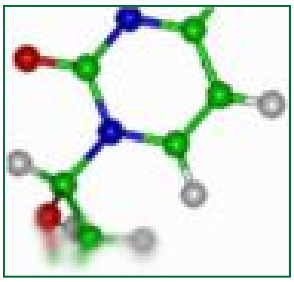
Research in the David Brook lab involves two main concepts *self-assembly* and *paramagnetism*. Self-assembly is the ability of certain molecules or systems of molecules to recognize each other and combine to form larger ordered structures. The premier natural self-assembling/molecular recognition system is DNA but many other natural and unnatural systems are possible. Our focus is on molecules that bind metal ions, and the ions act in turn as a kind of glue that assembles multiple molecules together to form ordered structures. Such molecules have been known for quite a while; however, our goal is to incorporate into these ordered structures *paramagnetic* units that can add some kind of molecular level function. *Paramagnetic* molecules have a magnetic moment that means they are weakly attracted to a magnetic field. When paramagnetic units interact they can reinforce each other giving a stronger effect that ultimately leads to what we typically think of as a magnet (ferromagnetism). Alternatively they can interact and cancel each other out (antiferromagnetism). By controlling the interaction of paramagnetic molecules with self-assembly, we hope to control the nature of the interaction between them, and use the interaction for applications such as information storage or molecular computing.

The particular paramagnetic molecules that we focus are attention on are known as verdazyls. They are free radicals (they have an odd number of electrons) and the odd electron provides the paramagnetism we need. Unlike most organic free radicals they are quite stable, and are especially suitable for our purposes because they can bind metal ions. Currently most of our attention is on the synthesis of verdazyls and understanding their basic properties. This has yielded some interesting results already; one of the free radicals we have made crystallizes in two forms that are different colors (Right). We are working to understand these phenomena, and anticipate more exciting and unusual results.

Biology and Medicine Research

By Dr. Marc d'Alarcao

Our group's research interests focus on the use of synthetic and mechanistic organic chemistry to shed light on questions in biology and medicine.



For example, one area of current interest is the mechanism by which the hormone insulin exerts its effect on target cells. It has been demonstrated that binding of insulin to the cell-surface insulin receptor results in (among other things) the release into the cytosol of a small inositol-containing phosphorylated oligosaccharide that serves to activate the cell. Such a substance, known as a second messenger of insulin action since it carries the insulin message from the surface of the cell into the interior, is of tremendous interest in the treatment of diabetes mellitus. However, the precise structure of this material and its chemical target(s) in the cell have not yet been elucidated. Therefore, we are engaged in a program of chemical synthesis of inositol-containing oligosaccharides with the goal of preparing compounds with insulin-like activities. We are also engaged in the design and synthesis of molecules that can be used to probe the biochemical mechanism of these second messengers within the insulin-sensitive cell.

Another area of interest is the design of chemotherapeutic agents for cancer. Our approach is to design small carbohydrates that interfere specifically with intra- or extracellular signaling pathways that are requires for tumor growth, evasion of apoptosis, and/or metastasis. We expect that by interfering with these pathways, our designed carbohydrates can interrupt the growth an/or progression of tumors.

A third area of current research involves the design of polymers that can be degraded by the application of an electric current. Such new materials could have applications in drug delivery and microfluidics.

For additional information, please visit our web site at: http://www.chemistry.sjsu.edu/mdalarcao/index.html

Geology Department: Managing Post-Fire Erosion Hazards in a Warmer World

Of the 20 largest wildfires in California in the last century, five have occurred since 2006. Whether this is primarily due to global warming or years of fire suppression, the trend is worrisome and it has driven a rapid increase in the cost of fighting fires in California. Indeed, the annual bill for fighting fires in the Golden State has tripled since the 1990's from $50 million to $150 million. With greater sums of money being spent on fighting fires, there will be fewer dollars for mitigating problems that develop after the flames have been extinguished. In mountainous terrain, fires deliver a 1-2 punch. Fire radically and nearly instantaneously alters the physical characteristics of a landscape, making it much more vulnerable to erosion, including catastrophic debris flows. Government entities and private contractors have typically tried to contain the post-fire erosional damage through a 'kitchen-sink' approach in which the entire range of mitigation measures are used. Since the erosional response of burnt resources are allocated to addressing post-fire erosion, a more targeted approach will be necessary. This will not be possible until the erosional mechanisms are better understood.

Fires from space

Debris Flow Gully

Manny Gabet, in the Geology Department, has been investigating post-fire erosion in California for the past decade. This work began as part of his PhD thesis, a comparison of the different erosional processes in grasslands and chaparral. One of the conclusions from that research was that fires in the chaparral prime the landscape for much larger pulses of erosion than in the grasslands. Presently, he is working from a $410K grant from the USDA to examine the role of vegetative ash in post-fire erosion.

Burnt Chaparral

One of the by-products of a fire is a layer of ash that can blanket an entire landscape to depths of 5—10 cm. Through a set of careful flume experiments, Manny has documented that this layer of ash can increase the erosive capacity of runoff by increasing the effective viscosity of the flow. Furthermore, this change in the flow's rheology may drive a positive feedback process that ultimately leads to the development of catastrophic debris flows.

Manny at Flume

Manny is keen to continue investigating the relationship between fire, the biota, and erosion. He is collaborating with a colleague from San Francisco State on an NSF_SGER proposal to study the fate of black carbon in Santa Cruz watersheds burned earlier this year. He is also preparing an NSF proposal to examine the role of fire in reducing the ability of soils to resist being carried off by the wind.

Erosion Deposits

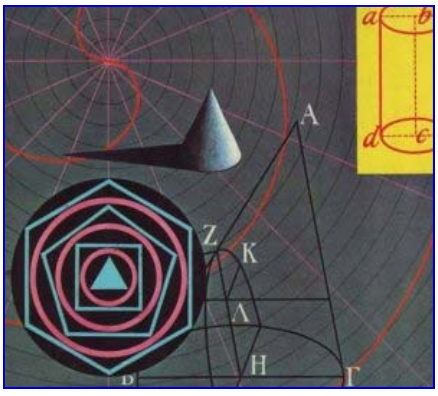
Department of Mathematics News

Developmental Math Course Redesign Project

Susan McClory participated in the CSU Transforming Course Design in Developmental Math project that began in February and resulted in a final report being submitted in September. Ms. McClory was chosen as one of the five CSU faculty members to serve on the design team for this project.

The full report and a glimpse into the redesign process can be found on the team workspace at: http://groups.googlee.com/group/csu-transform-dev-math-teams. During the upcoming year, the team will continue to work with the Chancellor's Office to pilot and evaluate strategies that were identified during the process as well as development of more comprehensive course redesigns.

Ms. McClory was also elected to another term as the Associate Vice Chair of the Academic Senate at San José State University. She also serves as the Chair of the National Association for Developmental Education Math SPIN (Special Professional Interest Network).



Mathematical Patterns of Structure

SJSU Master's Student in Mathematics Wins Outstanding Thesis Award

By Dr. Tim Hsu

Each year, two San Jose State master's theses are chosen to receive university-wide Outstanding Thesis Awards. The SJSU Math Department is proud to announce that in May 2008, our own **Katherine Shelley Nolan** (MS Mathematics, August 2007) received a Outstanding Thesis Award for her thesis, entitled "Matchwebs". In Katherine's thesis, supervised by Dr. Tim Hsu, she proved new theoretical results in the subject of graph theory, with potential applications to the study of networks and traffic flow. She has presented her work at sectional meetings of the Mathematical Association of America and the American Mathematical Society, and she plans to publish her results professionally in a joint paper with Dr. Hsu and their co-authors Rae Fredrich and Dr. Mark Logan of the University of Minnesota, Morris.

This marks the second time in the last five years that a master's student from the math department has won an Outstanding Thesis Award, as **James Kittock** also won for his thesis "The Isoperimetric Problem in Finitely Presented Groups" in May 2004. Says department chair Brad Jackson, "We're proud of the great work that all of our master's students and their thesis supervisors have done, and we're looking forward to continuing success in the years to come. I also want to acknowledge Prof. Hsu and Prof. Cayco for their hard work in encouraging many of our best students to pursue PhD degrees."

The SJSU Math Colloquium

By Dr. Tim Hsu

The Math Colloquium is a speaker series devoted to educating and entertaining everyone in the SJSU Math community. Talks are on Wednesdays, from 3-4pm, in MacQuarrie Hall 320; snacks are served at 2:30pm in MH 331B.

Why should you go to the Math Colloquium?

* We are committed to making colloquium talks as accessible as possible. All speakers have been told to aim their talks at junior year math majors, or if possible, first-year calculus students.
* We are also committed to having diverse speakers and topics, from pure and applied math, math education, universities, and industry.
* For students and others, this is your chance to see the big picture: How can math be both beautiful and useful? What are the frontiers of math research today? How can you put an education in mathematics to work in the real world?

For more information, see our schedule at: http://www.math.sjsu.edu/~hsu/colloq/ OR contact Tim Hsu at 924-5071 or email at hsu@math.sjsu.edu.

Math Symbols

More Mathematics News……..

More Department of Mathematics News

San Jose Math Circle (SJMC) and Bay Area Mathematical Adventures (BAMA)

By Dr. Tatiana Shubin

The Mathematics Department of SJSU has been instrumental in establishing a very successful outreach program for South Bay/Peninsula middle and high school students and math teachers. This comprehensive program consists of three components which enhance and support one another – the San Jose Math Circle (SJMC), the Bay Area Mathematical Adventures (BAMA), and the Math Teachers' Circle (MTC).

SJMC is one of the growing number of math circles for middle and high school students. It is one of three oldest math circles in the US – the first one started in Boston about 14 years ago; it was joined by the Berkeley Math Circle and the San Jose Math Circle ten years ago. Both of these Bay Area math circles started in November of 1998 and they have been running ever since.

A math circle is broadly defined as an informal or semi-formal educational enrichment experience that complements the pre-collegiate mathematical instruction by bringing mathematicians and mathematical scientists in direct contact with pre-college students and/or their teachers in order to explore over an extended period of time mathematical themes, problems, and topics beyond the typical K-12 curriculum. Although the styles of math circles vary considerably, the goal of any math circle is to foster passion and excitement for mathematics.

SJMC meets every Wednesday from 7:00 – 9:00 pm; every meeting is usually attended by 25-30 students. Most our students are 7- or 8-graders, but there are some younger and older students, as well. There is no screening - every student is welcome. Attendance is free of charge. SJMC's schedule, handouts, and other materials can be found on our web site at:
http://www.sanjosemathcircle.org/.

About once a month, a regular meeting of the SJMC is replaced by a talk organized by the BAMA (http://mathematicaladventures.org/). BAMA is a series of talks whose main goal is to encourage an interest in mathematics among bright secondary school students, as well as their teachers, parents, and the general public. Six talks per school year alternate between the campuses of Santa Clara University and San Jose State University. The series is sponsored by the Department of Mathematics and College of Science, SJSU, and the Department of Mathematics and Computer Science, Santa Clara University, with support also provided by the American Institute of Mathematics (AIM), and the Mathematical Sciences Research Institute (MSRI). The presentations include a broad variety of topics, and are given by outstanding mathematicians. BAMA talks have been very successful, with enthusiastic audiences that consist mainly of students, ranging from sixth and seventh grades through high school. On the average, BAMA talks draw 100 – 120 students and others. Among BAMA speakers there have been members of the National Academy of Sciences, the American Academy of Arts and Sciences, Presidents and Vice Presidents of both the Mathematical Association of America (MAA), and the American Mathematical Society (AMS), invited speakers of the International Congress of Mathematicians. In 2004, a book consisting of BAMA talks was published by the MAA in its Spectrum series; the second volume is now in preparation.

While math circles empower students, Math Teachers' Circles (MTCs) empower teachers, each of whom can influence thousand of students over the course of a career. By fostering a confidence to tackle open-ended math problems, middle school teachers become better equipped to initiate more student-centered, inquiry-based pedagogies in their classrooms. The two primary goals of the program are 1) to engage middle school math teachers in mathematical problem-solving and involve them in an ongoing dialogue about math with students, colleagues, and professional mathematicians; and 2) to provide guidance, materials, and resources to middle school math teachers that will enable them to promote open-ended problem-solving as a way of learning, thinking about, and practicing mathematics in their classrooms.

A prototypical local MTC has two components: a) a residential summer immersion week for 20 to 25 teachers that launches the program, and b) monthly follow-up meetings held throughout the following academic year and indefinitely thereafter. During the immersion component, teachers engage in various open-ended problem-solving activities throughout the day and evening, guided by professional mathema-

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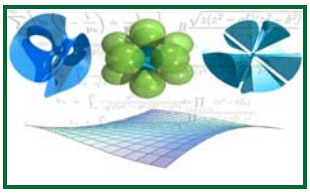
(Continued from page 6) **SJMC and BAMA**

ticians and experienced facilitators. The monthly meetings continue to provide a content-based enrichment outlet for teachers but also have a more pedagogical focus intended to help teachers bring problem-solving techniques into their classrooms. This local MTC started in the summer of 2006 when the immersion summer program was held at AIM, and it continues to meet.

Because of the success of this original circle, AIM has initiated a national MTC program. To this end, AIM has sponsored three workshops designed to inform teams (of middle school math teachers, school .administrators, and research mathematicians) from diverse geographical regions about the program and equip them to begin MTCs of their own. The 2007 summer workshop produced six successful MTCs (from a total of seven teams who attended the workshop), and the two workshops held in Summer 2008 are expected to produce an additional twelve MTCs. Together with the original MTC, this will bring the total number of MTCs to 19 nationwide.



Statistics Solutions

Information about the national MTC Network as well as about the original MTC (also known as AIM MTC) can be found at: http://mathteacherscircle.org.

Mathematics - New Faculty

Two new applied mathematicians Dr. Plamen Koev and Dr. Jared Maruskin are joining the Mathematics Department as assistant professors this fall. We are looking forward to their help in supervising CAMCOS (Center for Applied Math, Computation, and Statistics) student research projects and in helping us in the development of our applied math and statistics programs including professional science masters degrees in applied math and statistics.

Dr. **Plamen Koev** is an applied mathematician with a variety of research interests including numerical linear algebra, matrix theory, applied multivariate statistical analysis, random matrix theory, accurate and efficient algorithms, and computational mathematics. Plamen demonstrated his mathematical abilities as a problem solver at an early age. In 1990 finished in 3rd place in the Bulgarian Mathematical Olympiad, he received a first prize in the Balkan Mathematical Olympiad, and a second prize in the International Mathematical Olympiad. Dr. Koev received his B.S. Mathematics and M.S. Mathematics from the University of Sofia in 1997, and a Ph.D. in Mathematics from the University of California, Berkeley in 2002. His thesis entitled "Accurate and Efficient Computations with Structured Matrices" received honorable mention for the Householder Award as the Best Dissertation in Numerical Linear Algebra for the Period 2002-2004. At UC, Berkeley, Dr. Koev also received an award as the Outstanding Graduate Student Instructor in 1999.

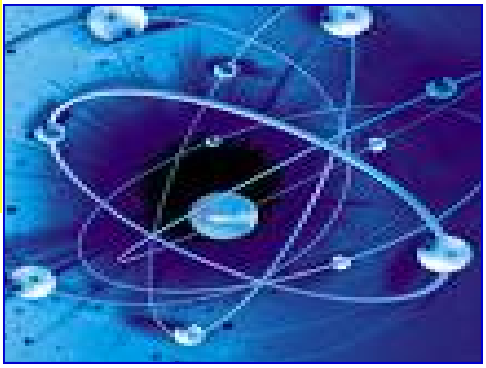
Since 2000, Dr. Koev has published 19 articles on his research and his research has been supported by two NSF grants. Dr. Koev was at the Massachusetts Institute of Technology from 2002-2007 as an instructor of applied mathematics and a postdoctoral research associate. In 2007 Dr. Koev was an assistant professor at North Carolina State University. This fall we are pleased to welcome Dr. Plamen Koev back to the Bay Area as an assistant professor in the mathematics department at San Jose State.

Dr. **Jared Maruskin** is an applied mathematician who conducts research in dynamical systems. His research has applications in the tracking of space debris. Dr. Maruskin received a Bachelor's degree B.S.E. in Engineering Physics, graduating Summa Cum Laude from the University of Michigan in 2003. He received an M.S. in Applied and Interdisciplinary Mathematics from the University of Michigan in 2005 and he just received a Ph.D. in Applied and Interdisciplinary Mathematics from the University of Michigan in 2008. His dissertation was entitled "On the dynamical propagation of subvolumes and on the geometry and variational principles of nonholonomic systems". In addition, Dr. Maruskin has published two papers on his research and has three additional papers which have been accepted for publication.

Dr. Maruskin is also recognized as an outstanding teacher. At the University of Michigan Jared received a 2007 Math Department Outstanding Graduate Student Instructor Award and he also received a university-wide teaching award, the 2008 Rackham Outstanding Graduate Student Instructor Award. We are pleased to welcome Dr. Jared Maruskin to the San Jose State Math Department this fall.

DEPARTMENT OF PHYSICS AND ASTRONOMY NEWS

Associate Professor **Ken Wharton** has been on a "world conference tour" promoting his introcausal interpretation of quantum mechanics. In the past 15 months he has presented talks in Sweden, Sydney, Paris, Cambridge, and is about to attend the "Clock and the Quantum" conference at the renowned Perimeter Institute in Ontario, Canada. This conference "aims to promote Quantum Foundations as a subject to be studied and researched in academia." See: http://www.perimeterinstitute.ca/Events/The_Clock_and_the_Quantum/The_Clock_and_the_Quantum:_Time_in_Quantum_Foundations/ for more information.



Quantum Mechanics

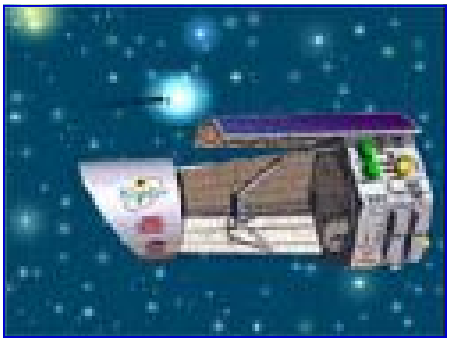
Assistant Professor **Monika Kress** was the main scientific organizer of a session at the COSPAR meeting in Montreal in July, entitled "Astromaterials and impact studies." COSPAR, the Committee on Space Research, is an international organization to promote the exchange of scientific results, information and opinions on problems related to space research, by organizing annual scientific assemblies. For more information, see http://www.cospar2008.org/index.html

Professor **Ramen Bahuguna** continued his work on optical fingerprint sensors in which he filed a utility patent in September.

Professor **Brian Holmes**, resident expert on the physics of music and an accomplished composer, completed his musical composition *Amherst Requiem*, a work for soprano solo, mixed chorus, children's chorus and orchestra. The premier performances will take place November 21 and 23 at the Stanford Memorial Church.

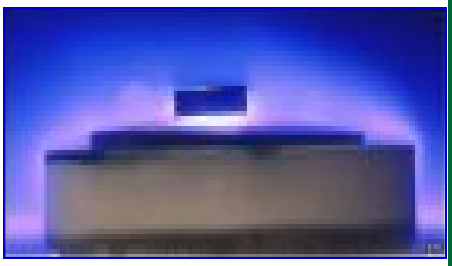
Music in Motion

Associate Professor **Natalie Batalha** is spending her sabbatical year at NASA Ames Research Center preparing for the launch of the Kepler Mission -- a space-based telescope that is designed to find earth-like planets orbiting sun-like stars in our galaxy. The objective of the mission is to learn how common or rare potentially life-supporting planets are in the Milky Way. Batalha, one of the 19 co-Investigators on the project, is responsible for selecting the 170,000 stars that will be monitored over the 3.5-year mission duration. The telescope will stare at a patch of sky about the size of two-scoops of the Big Dipper's ladle -- an area containing over 6 million stars to choose from. Selecting just the right stars that will optimize the science yield has been a 4+ year effort that will come to a close on March 4th, 2009 when the spacecraft is scheduled to launch aboard a Delta rocket at Cape Canaveral. After launch, Batalha will serve as the lead Operations Scientist as the team works to understand the data and confirm new discoveries. See http://kepler.nasa.gov/ for more information.



Keppler Mission

Professor **Carel Boekema** and his undergraduate students presented two research papers at the March 2008 American Physical Society meeting in New Orleans. Students Janice Wong and Cameron Teichgraeber were lead authors on presentations of maximum entropy analyses of cuprate superconductivity. Both participated under Boekema's direction in the Department's NSF-funded Research Experiences for Undergraduates (REU) program. Students Teera Songatikamas (Electrical Engineering), Maninder Kaur (Physics) and Mike Browne (Physics) also attended the meeting, with support from Provost Carmen Sigler, Dean Belle Wei, College of Engineering.



Superconducctivity

Professor **Lui Lam's** new book, S*cience Matters: Humanities as Complex Systems* (co-

(Continued on page 9)

DEPARTMENT OF PHYSICS AND ASTRONOMY NEWS

(Continued from page 8)

edited with Maria Burguete from Portugal), was released in November, 2008. The publisher is World Scientific, the world famous publisher based in Singapore. Science Matters is a new discipline that treats all human-related matter as part of science, in the tradition of Aristotle and da Vinci. The book is an outcome of the First International Conference on Science Matters, Portugal, co-chaired by Lam in May, 2007. Support and sponsorship of the next conference on *Arts and Science: Humanities as Science Matters* are most welcome. For more information see:
https://www.wspc.com.sg/general/7066.html

Professor **Michael Kaufman** completed work on a paper "Water, O_2 and Ice in Molecular Clouds" with collaborators at NASA Ames, University of Michigan and Smithsonian Astrophysical Observatory, to be published this fall in the Astrophysical Journal. The paper is the first to simultaneously consider the effects of UV radiation and grain surface chemistry on the structure of, and emission from, the surface layers of star-forming clouds. Predictions in the paper will be tested with the Herschel Space Observatory (http://sci.esa.int/science-e/www/area/index.cfm?fareaid=16), due for launch in 2009. Herschel's spectroscopic capabilities will allow for a census of dominant oxygen-bearing species. Kaufman is a member of an international team of astronomers recently awarded 140 hours observing time for the Herschel Oxygen Project (HOP). For more information, see:
http://www.ipac.caltech.edu/Herschel/miniwksp_talks/11_HOP_aug2008.pdf

Star-forming Clouds

DEPARTMENT OF COMPUTER SCIENCE

Dr. Teng Moh Receives Prestigious Award from IBM

By Dr. Kenneth Louden

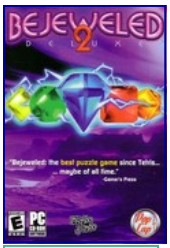
Dr. Ten Moh, Assistant Professor of Computer Science has received a prestigious $25,000 Faculty Award from IBM. The IBM Faculty Award is a competitive worldwide program intended to:

- Foster collaboration between researchers at leading universities worldwide and those in IBM research, development, and services organizations; and
- Promote courseware and curriculum innovation to stimulate growth in disciplines and geographies that are strategic to IBM.

Dr. Moh has been working with researchers at IBM's Silicon Valley Lab on a new certificate program of four courses on Enterprise Database Management using IBM's DB2 on large zOS systems. His current work is on an application development course (including PowerPoint slices, speaker notes, homework, and hands-on lab) for undergraduate and graduate students in Computer Science, MIS, and related fields.

Computer Science Undergrad — An Online Game Whiz!

Michael Fromwiller, a San Jose State student, is being credited with creating the world's most addictive online game. As reported by Yahoo! Games News Service on September 22, 2008, "An amateur game maker and World of Warcraft junkie, the San Jose State undergrad decided to break more than a few laws by creating an unauthorized clone of the great puzzle game Bejeweled (called, laughingly, Besharded) that could be played in the middle of a Warcraft session. While such insolence normally leads to a barrage of cease and desist letters, Bejeweled publisher PopCap Games opted for a much different strategy. They hired him."



Bejeweled 2

For more information, go to: http://videogames.yahoo.com/feature/is-this-the-world-s-most-addictive-game-/1248496.

DEPARTMENT OF METEOROLOGY

NEW SUMMER PROGRAM

The Meteorology department has received federal funding to develop a summer field course. Students will learn practical skills including the placement and operation of meteorological equipment, analysis of data, forecasting for operations, and presentation of results.

Funding will allow for the purchase of equipment, as well as travel, etc. Funding will also provide support for faculty to develop this new class. The money (requested $500,000 over three years) is about to arrive on campus!

WELCOME NEW FACULTY!

Two new faculty have joined the Meteorology department: Drs. John Abatzoglou and Menglin Jin.

Dr. **John Abatzoglou** received his PhD from UC Irvine in 2006. Most recently, Dr. Abatzoglou has worked at the Desert Research Institute in Reno. His research interests include regional climate change, especially in California and the western United States; synoptic and dynamic meteorology; and fire weather.

Dr. Abatzoglou will be starting his career at SJSU with funding already in place from both the NSS and NOAA. In addition, he and Assistant Professor Craig Clements are starting a new collaboration on Fire Weather research. He is passionate about climate change, and is looking forward to teaching a section of our SJSU Studies class on Global Climate Change. He will also be taking over our senior-level Synoptic Meteorology classes.

Dr. **Menglin Jin** received her PhD from University of Arizona in 1999. Most recently, she was affiliated with both Goddard SFC and the University of Maryland. Her research interests include analysis of satellite data; determination of global climate change from satellite-derived records of earth's skin temperature; and lastly, investigations and simulations of urban meteorology.

Dr. Jin will be starting her career at SJSU with funding already in place from NSF. In addition, she and Assistant Professor Craig Clements have a proposal submitted to measure and simulate urban weather phenomena.

Dr. Jin will be teaching two sections of our SJSU Studies class on Global Climate Change. In future semesters, she will teach majors and graduate classes on a variety of topics, including Satellite Meteorology.

DR. CRAIG CLEMENTS' RESEARCH—From Cold to Hot

Cold

New faculty member Dr. Craig Clements joined a scientific expedition to Greenland this past summer. He participated in a variety of experiments related to measuring the boundary layer - and slept in a tent on the snow! Dr. Clements' experiences are posted on his blog at:

http://met112.blogspot.com/

Hot

In recent weeks, Dr. Clements and his "fire weather" students gathered data during a controlled burn in the nearby Grant Ranch region. During the burn, a "fire tornado" developed, and the students captured the event on video! It can be found at:

http://www.youtube.com/watch?v=Kue063LMgaE. The best part is about one minute into the video. Dr. Clements was especially excited as the instruments captured high-quality data associated with the vortex.

MOSS LANDING MARINE LABS

Boundary Mixing and Exchange in the Monterey Submarine Canyon

Dr. Erika McPhee-Shaw's ongoing projects include the NSF-funded "The Role of Canyons in Boundary Mixing and Exchange with the Ocean Interior," which focuses on the loss of internal tide energy to boundary layer turbulent mixing within the Monterey Submarine Canyon. The idea that canyons act as hotspots for deep mixing and boundary-interior exchange has important implications for our understanding of global climate: Mixing at approximately 1000- to 2000-m depth is known to be the major control on the rate of meridional overturning circulation (also known as the global thermohaline "conveyor belt circulation), and this study will help describe the specific physics of mixing and exchange that are not yet been adequately parameterized in global ocean/atmosphere circulation models. McPhee-Shaw and co-PI James Girton (University of Washington) are advising both MS (Katie Morrice, MLML) and PhD (Samantha Brody, UW) students on this project. The field work was completed in August 2008 on board the *R/V Point Sur* and the *R/V John Martin*. Other work on boundary layer mixing and exchange is being completed through a manuscript nearing submission: McPhee-Shaw, E. E., and J. Ryan, 2008, "Boundary Layer Intrusions and Suspended Particulates, an Investigation of Detachment and Dispersal from the Outer Shelf."

The Physical Oceanography lab has many ongoing projects involving ocean observing systems. Although funding for CICORE (Center for Integrative Coastal Observation, Research, and Education) is coming to an end, much of the monitoring and observing work that Dr. Kenneth Coale and Dr. McPhee-Shaw led through this program is continuing through several additional efforts linked to the Central and Northern California Coastal Ocean Observing System (CeNCOOS). Two ongoing grants are funded by NOAA: "A regional system for observations and decision support in central and northern California bays and coastal waters" ("CeNCOOS Bays") (lead PI John Largier, UC Davis), and "CenCOOS: Long-term monitoring of environmental conditions in support of protected marine area management in Central and Northern California" (lead PI Steven Ramp, MBARI). Luke Beatman is working as a technician maintaining MLML's weather station, water quality monitoring stations, shipboard underway data mapping, and serving of data to the public via the internet.

At the Fall AGU meeting in December '08, Dr. McPhee-Shaw and MLML's Dustin Carroll will lead presentation of a CeNCOOS project examining along-coast variability in upwelling delivery of nutrients with CSU and UC colleagues including Greg Crawford and Frank Shaughnessy (Humboldt State), Karina Nielsen (Sonoma State), and John Largier (UC Davis). Dr. McPhee-Shaw's class "MS 263, Data Analysis Techniques in Marine Science" made great progress in Spring '08 working with CeNCOOS High-Frequency Radar surface current data to develop programs extracting these data from servers around the state, combining data to calculate current vector fields, and to develop models predicting trajectories of hypothetical coastal oil spills.

They are in the process of taking over the daily maintenance of MBARI (Monterey Bay Area Research Institute)'s Elkhorn Slough-Land/Ocean Biogeochemical Observatory (LOBO) via funding to McPhee-Shaw and Dr. Ken Johnson (MBARI) through the Elkhorn Slough National Estuarine Research Reserve's Tidal Wetland Project. Craig Hunter is leading oversight of instrument maintenance and data communication, and a new student, Tanya Novak, will be enrolling to work on this project for an MS thesis. Formal transfer of responsibility from MBARI to MLML is planned for October 2008.

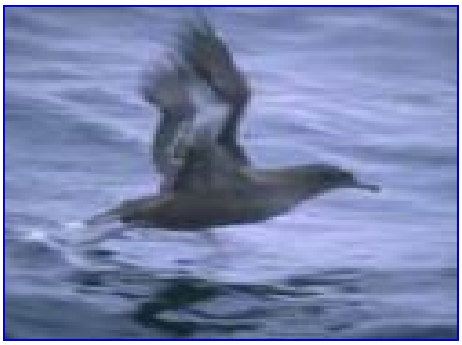
Dr. McPhee-Shaw and Dr. Laurence Breaker are collaborating with Dr. James Harvey and Dr. Josh Adams on the California-Seagrant-funded "Connectivity of west coast marine sanctuaries: tracking sooty shearwaters throughout dynamic upwelling." They are greatly enjoying working with MS student Melinda Nakagawa on this project, and she is leading analysis of satellite wind fields over the course of the birds' tagged flight patterns.

Dr. McPhee-Shaw's primary public science outreach activity this summer was traveling to Scotland with two other American scientists, and naturalist/narrator Phillipe Cousteau, to be filmed for a Discovery Channel show exploring the science behind the possibility of a Loch Ness monster. She was the oceanography/physical-limnology expert for the discussion, and may manage to succeed in introducing the term "internal wave" into American living rooms when the show airs this winter!

MOSS LANDING MARINE LABS

Dr. Jim Harvey and Team Research North Pacific Harbor Seals and Local Shearwaters

Much of the past summer was spent by Jim Harvey and his team working on various research projects they were conducting throughout the North Pacific. In early summer (late May and early June), Jim and some students assisted with the capture and sampling of harbor seals in San Francisco and Tomales Bays, in collaboration with former MLML student Denise Greig. Denise is pursuing her Ph.D. from the University of St. Andrews in Scotland investigating diseases of harbor seals in central California. They have captured and sampled about 1,000 seals in the past 5 years assessing survival, movements, foraging, and diving, and these recent data are just part of this massive dataset.



Sooty Shearwater

Later in the summer (June) Jim and others helped Josh Adams (USGS, another former MLML student) capture and satellite-tag Sooty Shearwaters off Santa Barbara and Monterey Bay (this work is funded by Sea Grant through MLML to assess the use of the California current system). Co-PIs include Erika McPhee-Shaw and one of Jim's students (Melinda Nakagawa) who are helping model environmental conditions, especially winds, and their effect on movements and foraging of shearwaters. They placed 30 satellite-linked tags on shearwaters and the movements can be visualized on the following website: http://www.seaturtle.org/tracking/?project_id=282&dyn=1221272828.

In July, Jim traveled to Glacier Bay, AK to help one of his students (Colleen Young) with her thesis project that involves assessing the impacts of human disturbance to harbor seals. Daily observations were conducted from a bluff, as seals rested on Glacial ice floating in one of the most northern fjords in this national park. The National Park Service funded this work.

Harbor Seals

From August 20th to September 6th, Jim was at sea with former MLML student Scott Benson as they assessed the environmental conditions of Leatherback sea turtles in the offshore. Aboard the NOAA ship David Starr Jordan with 12 other scientists they conducted CTD casts, a series of water sampling while underway, XBTs, net sampling for jelly fish, and turtle tagging from near shore out to 140 miles. This was a collaboration between NMFS and MLML, funded by NOAA.

Jim is currently serving on the Board of Directors for the SJSU Research Foundation, The SJSU Sustainability Taskforce, the Reserve Advisory Council for the Elkhorn Slough National Estuarine Research Reserve and the Research Advisory Group for The Marine Mammal Center. One of the recent awarded grants involved the purchase of a rigid hull inflatable boat (RHIB) and new electronics to be used for whale disentanglement activities. Part of the responsibility (Director of MLML, Kenneth Coale, defines it as a liability) associated with this purchase is the commitment to assist with removing fishing gear from large whales off central California. Other grants have paid for specialized gear for this activity and training. Two training sessions have been sponsored by MLML, with instruction from NMFS. Jim also held a special workshop at MLML for the USGS to assist with their ability to identify and quantify marine mammals during their acoustic research.

Two papers were accepted for publication during this period, and they have submitted four proposals, two of which were NSF proposals (Antarctic whale research and supplementing the dive and boating capabilities at MLML). The summer was spent by students from the Vertebrate Ecology Lab studying in Suriname (turtles), Glacier Bay (seals), Bering Sea (seabirds), San Francisco Bay (seals), Monterey Bay (seabirds, turtles) and Hawaii (monk seals). They are all back safe and sound.

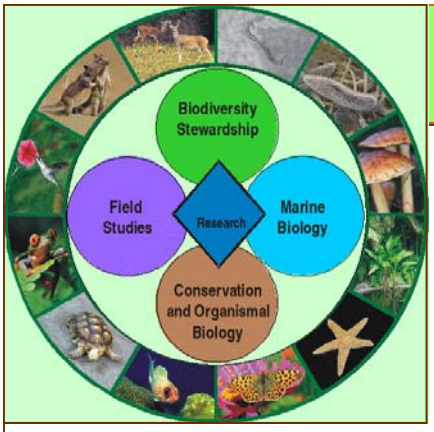
DEPARTMENT OF BIOLOGICAL SCIENCES NEWS

WELCOME NEW FACULTY!

The Department of Biological Sciences welcomed two new faculty this semester who enhance our instructional and research capacity. Both bring teaching and postdoctoral experience.

Miri Van Hoven is a geneticist with research experience from her postdoctoral work in Kang Shen's lab at Stanford University and her graduate work in Cori Bargmann's lab at the University of California San Francisco. Her main focus is on neuronal synaptic partner selection in *Caenorhabditis elegans* during development. She has developed a novel method to visualize synaptic partner choice using fluorescent markers, and is using the technique to identify genes that participate in this process. Miri's teaching experience includes general biology and cell biology lecture appointments at Dominican University. She will be teaching cell biology and genetics for majors and non-majors, and she eagerly assumed responsibilities for teaching our Seminar in Advanced Genetics for graduate students.

Nishanta "Nishi" Rajakaruna is a plant biologist with interests in plant evolutionary ecology, ethnobotany, and green technologies such as phytoremediation. His primary research includes the study of the ecology and evolution of plants growing on serpentine soils. He takes advantage of both field and laboratory environments in his work. He comes to us from a faculty appointment at College of the Atlantic where he had an active research program as well as extensive professional leadership experience. Most recently he hosted the Serpentine Ecology Conference that was attended by over 100 scientists from 27 countries, and he is now editing a volume based on the scientific exchanges at the conference. He will be teaching various courses in Plant Biology and Ecology, and has taken over directorship of the Herbarium, a repository that houses an extensive collection of plant materials.



BIODIVERSITY CENTER

Under the new directorship of **Elizabeth McGee**, the Biodiversity Center, a university organized research unit, has launched several initiatives to expand awareness of global issues of habitat and species loss.

Elizabeth McGee assumed the directorship this semester and hosted the Center's open house on September 17th. She has enhanced the Center's computer facilities and launched a colloquium featuring a diverse slate of speakers. Recently Chris Golden from the College of Natural Resources at UC Berkeley spoke on 'Bushmeat Consumption, Harvest Sustainability, and Potential Public Health Consequences of Conservation Enforcement: a case study from Northeastern Madagascar'. Amanda Grebner from Our City Forest in San Jose spoke October 9 on 'One Million People, One Million Trees'. The Biodiversity Center invites faculty and the community to participate in its activities.

FACULTY RESEARCH

Several faculty are on leave this semester doing exciting work on a wide range of topics.

Bill Murray is coordinating studies on forest communities.
Leslee Parr and **Sabine Rech** are taking their sabbatical leaves at Hatfield Marine Station in Oregon. **Leslee Parr** is looking at the population genetics of marine organisms. Specifically, Leslee is investigating dispersal, recruitment, and gene flow of shrimp and crab larvae in relation to coastal circulation processes. **Sabine Rech** is studying the microbial activities of microbial populations associated with burrowing shrimp.
Shannon Bros is the Visiting Scientist this year at the Moss Landing Marine Laboratories where she is teaching seminars and advanced biostatistics, and conducting research based out of Jim Harvey's lab.

PROMOTIONS IN THE COLLGE OF SCIENCE

Paula Messina—Promotion to Full Professor

Paula Messina has been with the College of Science since 1998, after a highly-decorated career as a high school Earth Science teacher and new teacher mentor in New York City. She completed her Ph.D. in Earth and Environmental Science at the City University of New York earlier the same year, having conducted research in Death Valley during her school's summer breaks. She earned early tenure in 2003, and is delighted to celebrate her thirtieth consecutive year of teaching with the honor of promotion to full professor. Her assignment is split between the Geology Department and Science Education, developing and teaching courses as diverse as her areas of expertise: GIS (Geographic Information Systems), GPS mapping, geomorphology, and several content- and pedagogy-rich courses for prospective teachers, including Secondary Science Methods. She has adapted one such course (Earth Systems and the Environment) for online delivery, and has embarked on research delving into how students learn in Cyberspace. Among her most recent contributions is her involvement in the expansive redesign of the College Board's Advanced Placement Science curricula, having been selected to serve on a commission constructing and evaluating a new college level process-based environmental science course for high school students.

MORE PROMOTIONS—CONGRATULATIONS!

Natalie Batalha—Physics, Tenure and Promotion
Trish Bergthold—Math, Tenure and Promotion
Steven Crunk—Math, Promotion
Daryl Eggers—Chemistry, Tenure & Promotion
Michael Kaufman—Physics, Promotion to Professor
Suneuy Kim—Computer Science, Tenure and Promotion
Gilles Muller—Chemistry, Tenure and Promotion
Chris Tseng—Computer Science, Tenure

WELCOME NEW FACULTY AND STAFF

FACULTY

John Abatzoglou
Meteorology: Specialty of Synoptic Meteorology/ Forecasting

Jon Hendricks
Geology: Specialty of Paleontology / Paleoceanography

Menglin Jin
Meteorology: Specialty of Climatic Dynamics

Plamen Koev
Mathematics: Specialty of Applied Math

Jared Marushkin
Mathematics: Specialty of Applied Math

Nishantra Rajakaruna
Biological Sciences: Specialty of Plant Biology

Miri Van Hoven
Biological Sciences: Specialty of Genetics

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Dean's Office, Administrative Assistant

Tonja Green
Director, Medical Product Development Management Program (MPDM)

Renée Paris
Mathematics, Administrative Analyst/Specialist

COS ALUMNI SPOTLIGHT

GO SPARTANS!

ALUMNUS VISITS SJSU AFTER 57 YEARS!

Krishna Dixit & his wife in front of Tower Hall at San José State University

Krishna Dixit, class of 1951 made contact with the Biological Sciences Department about returning to SJSU for a visit after 57 years. This effort was coordinated between Biology Chair Dr. John Boothby and Carol Beattie, Development Officer for the College of Science along with Krishna's son, Kamal Dixit. On August 15, 2008, Krishna Kant Dixit, along with his family were able to return to SJSU and fulfill a lifelong dream.

Krishna Dixit graduated with a Bachelor's Degree in Biology, In an email to Carol Beattie, he writes about how SJSU impacted his life and lay the foundation for a brilliant career in this remarkable story:

"Many thanks for making our visit to my Alma Mater on (the) 15th (of) August, 2008 a most memorable & once-in-a-lifetime experience.

To be able to visit my University campus again, for the first time in 57 years, after graduating in June 1951, overwhelmed me emotionally and spiritually. You see, I had dreamt and hoped over all these years (a lifetime, virtually) to be able to someday visit my College and say a quiet "Thank You" to the Institution & Faculty Members who helped me realize my true potential and make a successful career, despite all odds. They taught me patiently and helped me cope with challenging subjects (and a very challenging American English accent….which was more alien to a young student from a small hamlet town in India, than you could possibly imagine, as my medium of instruction up to High School was in the Indian "Hindi" language).

What was then San Jose State College (affiliated to the University of California) is today, a University in its own right. SJSU looked awesome, yet seemed to welcome us with open arms ….. as you & Dr. Boothby received us so graciously and patiently bore with my narratives, as I walked down Memory Lane to the period between 30th (of) January 1948 (when I landed after a month-long journey from India by ship) until February 1952, when I sailed back home.

Dr. Boothby with Krishna and family

You would recall my mentioning that while I had been offered admission at Stanford University, I chose to join San Jose State College because the then Dean & Faculty Members of the Biology Department made me feel so welcome (there were very few overseas students in those days, you know), encouraged me to develop my communication skills and drew the best from me, despite my limitations. This gave me the confidence that I needed & I have never looked back since.

I had learned to battle against odds & adversities from the tender age of 8, when I lost my father to a brief illness. I worked my way through school, as I was determined to hold my family together. What kept me going was my father's strength of conviction that education was the best investment a person could make & one that would ensure tangible & intangible benefits for a lifetime. He had the wisdom to sponsor his younger brother's graduation from Stanford University as far back in 1920, even while the conservative point of view in Indian families was that Western culture and education was undesirable (India was a British colony in those days). He believed that this decision would be the turning point

(Continued on page 16)

COS ALUMNI SPOTLIGHT

GO SPARTANS!

ALUM –Krishna Dixit

(Continued from page 15)

for our family ….. and it was! Years later, my uncle offered me a similar opportunity & sponsored my education in the U.S. I was discouraged by friends and relatives who had unpleasant memories of their association with the West but I was firm in my belief that they had gone there to imbibe the then prevailing negative influences of society but I would go there to learn something.

Much as I was keen to pursue a career in Medicine, I chose to return to India after my graduation, to look after my ailing mother and support my siblings. I built my career in the sugar industry, right up from a base executive position in 1952 to a general manager in 1959 and held various senior management positions such as Chief Executive Officer, Administrator & Director of the best reputed Sugar Companies in India for over 45 years. The Government of India bestowed upon me the prestigious National Safety Award for 4 years & included my name in India's "Who's Who" across Industries. I was also nominated to the Sugar Cane Control Board, Central Labour Advisory Board & various Committees of the Indian Sugar Mills Association. And by the Grace of God, at the age of 80, I continue to provide Management Consulting to some reputed organisations.

I owe my success to my father's convictions, my uncle's support and to San Jose State College for imparting the highest standards of true learning that blended academic brilliance with confidence-building measures to succeed despite adversities and emerge a winner – optimally realizing one's potential, across career options.

Last, but not the least, my wife – Kamal Rani Dixit – has been the constant and consistent source of my inspiration and unflinching support. We have completed 55 years of our marriage on (the) 13th (of) July, 2008 and are blessed with seven wonderful children, who are professionally brilliant and, more importantly, have grown up to be good human beings. We are truly blessed to have been able to gift them the best education possible within our means and pray that they make a meaningful contribution to Society at large, qualitatively & quantitatively.

Our best wishes to all faculty members & students of SJSU, particularly the Biology Dept, for a great future. I hope our children & grandchildren continue to visit your campus as it shall always hold a very special place in our hearts.

With warm regards & three cheers to SJSU & the Spartans!

Krishna Kant Dixit
Batch of 1951"

Krishna Dixit will become a member of the SJSU Alumni Association and is considering joining the College of Science Dean's Circle. For more information about these organizations, please contact Carol Beattie, the College of Science Development Officer for University Advancement at (408) 924-1328, cell (408) 313-1348 or at: http://www.sjsu.edu/advancement.

Carol, Mrs. Dixit, Krishna, and son, Kamal

The College of Science hopes that you enjoyed this edition of The Scientist. We look forward to your comments or suggestions to make future issues of our Newsletter even better. Thank you.

Cher Jones
Editor
sjones@science.sjsu.edu

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THE SCIENTIST

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