

The **PHYSICS MAJOR**

SONOMA STATE UNIVERSITY

DEPARTMENT OF PHYSICS AND ASTRONOMY
2003



Cerent Labs Make a Difference

Sonoma State University's M.S. program in Computer & Engineering Science (CES), now in its second year, has had a huge impact on the Department of Physics and Astronomy. Founded by physics professor Saeid Rahimi, now Dean of the School of Science and Technology, the program raised a substantial sum from companies and individuals, mostly in the local telecommunications industry.

The result was the establishment of the Cerent Engineering Sciences Complex in Salazar Hall, the former library building.

Besides several computer science laboratories, the complex includes four labs directed by members of the Department: the Rolf Hsley Photonics Laboratory and Agilent Technologies Telecommunications Laboratory, both directed by Dr. Bryant Hichwa, the Electronics Laboratory, directed by Dr. Enrique Izaguirre, and the W.M. Keck Lab, codirected by Dr. Brock Weiss, and the subject of its own article on p. 7.

According to Dr. Hichwa,

"The Cerent labs represent a unique and invaluable opportunity for the faculty and students of SSU. The students and faculty now have the tools and systems to do cutting edge research in several areas of technology. These laboratories give our students a level of experience and expertise that students at other schools can only dream of. They allow our students to develop the self confidence to truly compete in the high technology job market into which they are thrust. Our faculty can give our students real problems, similar to what they will encounter as they enter either graduate

school or the industrial sector. The Cerent laboratories are a huge step forward for Sonoma State University."

Physics courses in electronics, photonics, and materials are now being taught in the Cerent labs, and many physics students are doing projects in them.



Ramirez Honored as Distinguished Alumnus

Roberto Ramirez, ('72) was one of four recipients of the 2002 Distinguished Alumni Award from the SSU Alumni Association. He is the second physics graduate to be so honored, the first being Richard Defreez ('80), who was selected in 1995.

Ramirez, who has taught mathematics and physics for many years at Healdsburg and Windsor High Schools, has been called "the perfect role model." A native of Mexico who came to California at age 16, he was still perfecting his English when he transferred from Santa Rosa Jr. College to what was then Sonoma State College. He remembers being helped by professors Duncan Poland, Garrison Sposito, and Sam Greene. By the time his degree was awarded in January 1972 he had already started graduate school at UCLA, where he earned his teaching credential.

The mentor of many students who have been the first in their families to go on to earn college degrees, Ramirez has also been honored with the 2002 Carlston Family Foundation Teacher of the Year Award, 1994 California Human Development Corporation's Outstanding Individual Award, and the Hispanic Chamber of Commerce of Sonoma County Award for Distinguished Community Service and Exemplary Leadership in the Hispanic Community.



Newkirk Assistantship donor Nadenia Newkirk and 2003 recipient Jerilynn Schisser

From Australia to Mars? Elemental Analysis and the Newkirk Assistantship

Jerilynn Schisser

For the spring semester of 2003 I was awarded the Horace L. Newkirk Assistantship and worked with Dr. John Dunning to analyze lake bottom sand samples from southwestern Australia. The analysis of these samples is part of research being conducted by Dr. Kathy Benison, a sedimentologist in the Department of Geology at Central Michigan University. The samples are from Australian acid saline lake environments where the lakes and ground waters are unusually acidic, having a pH of 2.4 to 3.0. The mineral precipitates from these lake bottoms may be quite similar to the chemical composition of the Martian surface. We hope that our analyses will be used to help make up a catalog of "known" spectra from terrestrial samples to which the Martian data can be compared.

Here at SSU, Dr. Dunning and I prepared the samples and used X-Ray Diffraction (XRD) and the Scanning Electron Microscope (SEM) to analyze the sand and minerals for elements. The XRD easily identified major peaks, and for some samples it identified all elements present. Other samples were a bit more complicated and required having the SEM confirm or deny the possible elements as identified by XRD. In the process I got to increase my skills at material analysis using XRD and I got to learn how to operate the SEM, using it for both imaging and elemental analysis.

Another collaborator is Dr. Darby Dyer, a geologist at Mount Holyoke College who specializes in using the Mossbauer spectrometer. One of these spectrometers will be carried to Mars on the next lander. Dr. Dyer and Dr. Benison will be presenting preliminary data at the Lunar and Planetary Science Conference in Houston this spring. Eventually they may publish a paper on the spectral data of these saline acid environments, and possibly another paper, depending on the data from Mars. Dr. Dunning would be listed as a co-author on these papers when published, and my name may appear as well. Wow! Thanks to the faculty of the Department of Physics and Astronomy for the

honor of being awarded the Newkirk Assistantship and to Nadenia Newkirk for endowing it. It has been really exciting work and a wonderful learning experience for me.

SSU Students Selected for Summer Research Projects

During the summer of 2002 Tiffany Borders held an intern position at the Space Telescope Science Institute in Baltimore. She worked with the Hubble Heritage team and was in charge of processing images from the Hubble Space Telescope as part of the Hubble Heritage Project. Tiffany was responsible for the September 2002 release of Hoag's Object, the October release of NGC 4319, and the November release of NGC 6369. The Hubble Heritage Project delivers HST images to the public once a month at <http://heritage.stsci.edu>. Tiffany states, "Among the benefits from this internship was the opportunity to learn about the many processes of HST image analysis and reduction as well as the experience of contributing to a team collaboration." Tiffany will speak in the Mt. Tamalpais lecture series (<http://www.mttam.net/astronomy.html>) on Sept. 27 about her experiences with the Hubble images.

This summer Tiffany will be working for the National Radio Astronomy Observatory in Socorro, New Mexico. She will work with Debra Shepherd and Mark Claussen on "VLBA Water Maser Observations of the Early B Protostar G192.16." Tiffany is very excited about this opportunity to work in the field of radio astronomy on a very intriguing research project.

Last summer Ashley Wiren participated in a research experience for undergraduates program in infrared astronomy at the University of Minnesota. She worked on projects such as photometry of M33 and preparation for the soon-to-be-launched Space Infrared Telescope Facility (SIRTF).

Next summer Ashley will go to the University of Delaware to do research in physical ocean science and engineering. There she will work with the acoustic Doppler current profilers aboard the U.S. Coast Guard ship Healy.

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Wiren.



Biophysics and Neurobiology

Enrique Izaguirre

Physics is one of the most fascinating trips that humankind can take, and the drive to understand can cause physicists to become tireless workers. Physics is constantly overlapping many fields. Biomolecular electronics and biophysics have recently undergone a revolution which has driven physics into new lands of discovery. The undergraduate level has become a challenge for instructors and researchers who train future scientists in this multidiscipline field of study.

Here at Sonoma State, I am interested in contributing to this great educational effort from the research and pedagogical points of view. Since my arrival at SSU two years ago, I have been especially dedicated to strengthening our curricula so as to help blend the disciplines of physics and biology. I am developing new courses in this combined field that will help prepare students to study biophysics and its applications. I am currently teaching a new course in neurobiology and neural networks, and in the fall I will introduce a molecular biophysics course.

It has been a rewarding experience to teach neurobiology and neural networks to the physics, biology and psychology students. I am impressed with the positive reaction the students have to working in multidisciplinary groups. The biology and psychology students benefit from the mathematical and analytical skills of physicists, and physics students benefit from the laboratory skills and vocabulary of the biology and psychology students.

It was a real challenge to work with all of them doing neural recording in worms and horseshoe crabs. During the course we also explored advanced techniques of confocal and fluorescent microscopy by staining the neurons of *C. elegans* worms, and we used a scanning electron microscope to visualize the ommatidia of an invertebrate compound eye.

Students matched their experimental observations with numerical data using numerical simulations packages. I can say with satisfaction that this course has been an incredible experience for me and my students, experience that we will add to next term with the new course in biophysics. In the next course we will explore the molecules of life and the molecular processes. We will study the basic principles of cell

biology, molecular motors, protein dynamics and other biomolecules; our students will become familiar with appropriate equations and will understand the basics of molecular biology and the physical phenomena involved in life.

In addition several students are doing research in topics closely related to the material learned in the classroom. I am especially interested in protein research with applications to biophotonics devices and biomolecular electronics.

As an example, lipid films doped with dyes and proteins are significant because they have the ability to self assemble and their electrical and biocompatible properties make them the most prominent candidates to interface electronics and optics with living organisms.

Students Farzaneh Rasti, Tedman Torres, and Mark Loguillo are currently working intensely on the use of surface plasmon resonance in organic films with biomolecules, and on organic films and synthetic tubular membranes with applications in optical devices.

I strongly believe that our department with its dynamics and strengths and exceptional student body makes Sonoma State University one of the best places to start a strong career in physics.

Dept. Hosts Physics Teachers

On April 4-5, 2003, the SSU Department of Physics and Astronomy played host to the Northern California/Nevada Section of the American Association of Physics Teachers. Dr. Joe Tenn, currently president-elect of the section, was the local host, and all of the Department's faculty, most of its staff, and several students participated.

The meeting began on Friday with workshops. Paul Robinson of San Mateo High School, Dean Baird of Rio Americano High School, Lonnie Grimes of Oakmont High School and Dan Burns of Los Gatos High School gave new teachers teaching tips in electricity & magnetism and waves, and Dick Cooper of Gettysburg College demonstrated Contemporary Laboratory Experiences In Astronomy (CLEA). Meanwhile Dr. Tenn was hosting the chairs of the physics and astronomy departments of the California State University system in their annual meeting.

That evening, after a small banquet on campus, Dr. Lynn Cominsky and the NASA Education and Public Outreach Group provided refreshments, and then Department Technician Steve Anderson put on a spectacular laser light show. The evening ended with observations at the SSU Observatory led by Dr. Gordon Spear and students Gray Slater and Tiffany Borders.

Saturday saw a full day of talks and demonstrations related to physics teaching. After a welcome by Dean Saeid Rahimi and the popular "Show and Tell," Dr. Cominsky gave the invited lecture on the physics of nuclear weapons.

More than 100 physics teachers were wowed by the Cerent Lab Complex, where Steve Anderson, Professors John Dunning, Bryant Hichwa, Enrique Izaguirre, and Brock Weiss, and students Tim McKernan and Tom Bittancourt demonstrated the new instruments. An added attraction was cookies in the labs, thanks to Sarah Silva ('02) and friends.

E/PO Group Moves

Logan Hill

For the NASA Education and Public Outreach (E/PO) Group, the transition from Darwin to their new location, dubbed "the Fort," is now finished. Situated in the northwestern corner of campus, the fort was the smallest of the three old Tech High School buildings.

Professor Lynn Cominsky directs the group which develops and refines tools for the teaching of NASA science to the public. She has other NASA endeavors as well, such as being a part of the GLAST and Swift mission teams and working on the Federal Advisory Committee that recommends policy to NASA.

Manning the battlements is a host of employees. Tim Graves ('01) is the Instructional Technology Consultant, who forges the swords and shields of code and interconnected hardware for the group, and North Bay Science Project Site Director Sharon Janulaw is out drawing in elementary and high school teachers to implement the E/PO group's tools as well as other teacher support utilities. Program Manager Phil Plait, with the "Bad Astronomer" standard held high, is the Group's emissary of pseudo-science debunking and public relations; Assistant Program Manager Sarah Silva ('02) oversees the use of the group's coffers; and Aurore Simonnet designs the standards and heraldry of various NASA projects as the Scientific Illustrator for the group.

The standing guard is composed of student assistants who handle a variety of tasks: Tiffany Borders, knight of GLAST Telescope Network (GTN) support; Michelle Curtis, knight of Science Writing and Web Support; Logan Hill, knight of Science Writing, Gray Slater knight-captain of Group Support and GTN, Schell Scivally, knight of Computer Administration, Ashley Wiren, knight of North Bay Science Project and Web Support. In addition, Dr. Gordon Spear coordinates the GLAST Telescope Network development [following article].

The group is handling the public education for the US portion of the XMM-Newton X-ray satellite; GLAST (Gamma-ray Large Area Space Telescope), expected to launch in 2006 to observe gamma-ray sources in the energy range of 10 keV to 300 GeV; and the Swift satellite, which will locate the sources of gamma-ray bursts and is due to launch in late 2003.

The group has developed several tools to help educate the public about these and other projects, ranging from Swift slinkies and logarithmic study guides, to interactive web-based video games.

SSU Has a New Telescope

Gordon Spear

A new robotic telescope system is available for student use. Purchased for the NASA E/PO program for the Gamma-ray Large Area Space Telescope (GLAST), the new telescope system will support the GLAST mission and will be used to monitor blazars, other active galaxies, and cataclysmic variables. Dubbed RTS1, the system will provide opportunities for K-12 students and their teachers as well as SSU students to participate in scientific research. The system consists of a Celestron 14-inch telescope on a

Paramount telescope mount, the first commercially available telescope mount designed specifically for robotic use.

The system also includes an Apogee AP47 CCD camera with integrated BVRI photometric filters. It is currently installed at the SSU Observatory (SSUO) for evaluation and software development, and can presently point reliably to within 10 arcseconds on the sky. The Apogee CCD camera is estimated to be at least 6 times more sensitive than the SBIG ST7 camera that has been in use at SSUO on the 10-inch Epoch telescope for the past several years. It is estimated that the new system can achieve reliable photometry for 15th magnitude objects with 2-minute exposures.



The new system will soon move to the California Academy of Sciences' Pepperwood Preserve north of Santa Rosa. While this system will initially be run from a control room at the Preserve, the system will ultimately be Internet-accessible for remote operation.

The venerable C14 telescope used at SSUO since its founding in 1976 has been disassembled and is in storage. After RTS1 has been safely moved to its new home, it is hoped that this old telescope will be reinstalled at SSUO, but with a new mount. Yes, we are currently seeking a donor for a new mount.

Exterior lighting for the new residence halls adjacent to the stadium area where the SSU Observatory is located will be turned on sometime this summer. Once that happens any research at SSUO will be limited to bright objects. However, the observatory should still be available to allow introductory astronomy students and the public to view bright objects such as the moon and planets. As strangely as such things often turn out, high speed Internet access for the Observatory will also become available this summer. Thus, when we are no longer able to see faint objects, we will have the ability to rapidly send images to other locations.

With light pollution now increased to unacceptable levels, might it be possible to relocate the Observatory to a dark site at some off-campus location? A fundraising proposal has been submitted to the University to establish such a facility. While the University administration is generally supportive, the economy may not allow a rapid start for such a major fundraising project. We will continue to explore such an opportunity, but we will proceed slowly. Regardless of the short-term situation, research in observational astronomy will certainly continue at SSU and students will still have opportunities to participate in exciting research programs in astronomy.

Teaching to Demystify Physics

Michelle Curtis

After many years in industry, during which he often taught evening courses at SSU, Dr. Bryant Hichwa joined the regular faculty last fall. This spring he was one of a handful of professors nominated for SSU's Excellence in Teaching Award.

I sat down with Dr. Hichwa to discuss his first year as a faculty member in the Department of Physics and Astronomy. What came across in the conversation was his enjoyment of being a teacher and how happy the last year of teaching has made him. The enjoyment and satisfaction he has experienced stems from his interaction with students, being able to share his knowledge of physics as well as of industry and business, and especially seeing his students succeed.

Dr. Hichwa incorporates into his teaching his own educational experiences and his work in industry. Underlying his teaching philosophy is the notion of "learn how to do it." The significance of students to learn not only what a text-book offers, but the skills that they will carry with them throughout their academic and professional careers, is incorporated into his approach in the classroom. No matter what he has done professionally he has always found himself enjoying teaching, whether in business through mentoring or in classroom instruction. Helping students understand is truly important to him.

One student summed up his experiences by noting, Dr. Hichwa "...doesn't decide what his students are capable of, he lets the students decide for themselves." Another commented on how rewarding being in Dr. Hichwa's classes has been, noting "there is less pressure to perform, more importance placed on learning." Another student remarked that interesting features of his lectures are the interjections about how a topic that is being discussed has been approached in industry and how the details of a particular technology are used.

I asked Dr. Hichwa what experiences he has had in his own academic career that have influenced his teaching style. One comment he made that sticks in my mind was about teachers who talk down to their students, by not taking the time to understand the problem they may be having with a subject. This influence also poses one of the biggest challenges he has faced over the last year: learning to address student questions and issues with the matter at hand, and then being able to address the underlying issue in the most beneficial manner for the student. How well his students learn also improves his own learning experience, providing him with fresh perspectives and approaches in the way he teaches, which excites him a good deal. "...to see you guys approach a problem in a way I never thought of," helps Dr. Hichwa work on being a good teacher by learning to listen.

What sums up the interview for me is that, "...it's not always a question of getting the problem right or knowing the answer, but making the problem work."

CHARLES BULLEN ('75) is the owner of a computer consulting firm, Olympic Computer Solutions, in Port Townsend, Washington. He is a retired radio electronics officer in the merchant marine.

Farewell to SSU

Tyana Stiegler

If someone had told me four years ago that I would be studying physics for the rest of my life, I would have laughed in their face. Why would I want to torture myself for the next ten years? Now, I am going to attend UC Davis and study graduate physics for the next six years. My ultimate goal is to teach at a university and conduct research. Although I cannot wait to start, I know I am going to miss Sonoma State U. All the hard work, late nights, and happiness took place on this campus. Success, unfortunately, requires that I leave this most memorable place behind.

I chose to attend Sonoma State because it was a small school with an amazing physics program. I learned to love it because of the wonderful students and talented teachers. The small group-oriented environment gave me a chance to excel in the study I love most. My classmates and I have worked hard for every grade, encouraging and helping one another. We were never satisfied until we all understood, which was never an easy accomplishment. Whenever we seemed to get it, our professors would throw another wrench in the works. I am very grateful to them for that, it kept me challenged and interested.

The key to making it in this highly competitive field it never giving up. Through tutoring and grading for lower division classes, I learned of my love for teaching. I found that I have the ability and the passion to help unlock the hidden potential in my students. The greatest accomplishment for me is helping a student reach a point where they stop and say, "I get it, I understand now." I always see the light that goes on in their eyes and it is like an explosion of knowledge in their minds — it is at that point that I know that I have made a difference to them. I have helped them open a door and that will be with them for the rest of their lives. Making that kind of a difference to someone is incredibly important. If it were not for teachers with that same gift, I would never have gotten as far.

I look back on what I have accomplished and I am proud. I have encountered many difficulties, worked long hours, shed blood, sweat, and tears for what seemed very little reward at the time, and I have loved every minute of it. Why wouldn't I? I have been living my dreams for the last four years and I intend to give them everything I have. UC Davis is just the next stage. Therefore, although I will miss Sonoma State, I cannot wait to attack the challenge of graduate school. If you do not set your sights high, you may never know how far you have the potential to go.

JIM RECTOR ('76) has retired after 23 years as a network operations specialist with Sprint in Sacramento.

RON BLEAU ('79) is a Senior Staff Research Engineer for Advanced Development Programs with Lockheed Martin Aeronautics Company in Ft. Worth, Texas, where he conducts research in advanced sensors and systems for LM Aero Products.

RICHARD K. DEFREEZ ('80) is principal scientist and photonics research and development manager of Pacific Scientific Instruments in Grants Pass, Oregon. He was formerly on the faculty of Linfield Research Institute and the Oregon Graduate Institute of Science and Technology, where he earned his Ph.D. in applied physics in 1985. He was honored as one of Sonoma State University's Distinguished Alumni in 1995.

Donations Are Essential

Private donations have long been important to the Department of Physics and Astronomy, but in this era of state budget slashing they have become indispensable. Donations are the sole support of the Department's public programs, they fund the Horace Newkirk and Michael & Sheila McQuillen Student Assistantships and three scholarships reserved for physics majors, and they are nearly the only available source of discretionary funds for small purchases.

Income from two endowment funds, the Charles and Norma McKinney Fund and the Science at Work fund established by John Max, has permitted the Department to bring a few speakers from beyond northern California for the "What Physicists Do" public lecture series. As earnings from endowments dwindle current contributions are absolutely essential to continuing this series and the Public Viewing Nights at the Observatory.

The Student Research Fund, which includes a generous contribution from the McQuillens as well as the startup from the McKinneys, is being converted from an endowment fund to a current fund which will be spent over the next few years to support students who will conduct research with Department faculty both in summers and during academic years.

In addition to professor Bryant Hichwa, who contributed much valuable equipment to support the new photonics and lightwave laboratories, the Department is grateful to the following donors:

Physics & Astronomy Public Programs: Stephen and Elizabeth Bursch, Theodore Chenoweth, Marvin and Elfi Chester, Clover Stornetta Farms Inc., Albert Cognata, Donald J. Farmer, Forestville Mini Storage, James ('71) and Judy Hill, Francis and Patricia Marshall, Michael and Penny Miller, Nadenia Newkirk, Howard and Charlotte Pedersen, Robert and Bertha Rains, Robert S. Tuttle, DDS.

Physics & Astronomy Equipment & Supplies: Amy Weber Madruga ('97) and Greg Madruga ('96), SSU Alumni Association.

SSU Observatory: Claude Plymate ('81) and Teresa Bippert-Plymate ('84), Jo-Ann and Joseph Smith.

Physics & Astronomy Student Development Fund: Steven E. Anderson, Mike and Sheila McQuillen, Joe & Eileen Tenn.

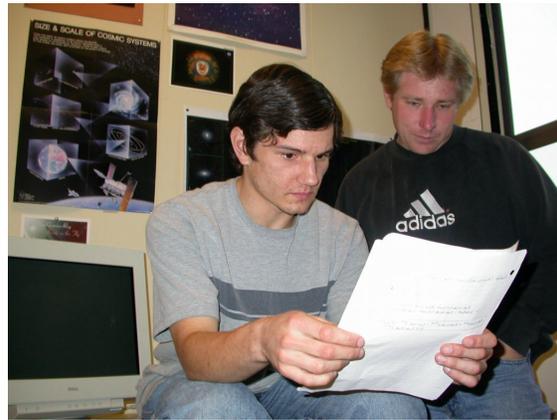
Horace L. Newkirk Memorial Student Assistant Fund: Nadenia Newkirk.

Physics & Astronomy Scholarship (endowment): Lynn Cominsky and Garrett Jernigan.

Science At Work (endowment for the "What Physicists Do" series): John Max (Max Machinery).

Sol & Edith Tenn Scholarship: Joe Tenn.

Physics & Astronomy Student Research Fund (endowment): Marvin and Elfi Chester, June F. Ferguson, Robert and Lois Gottlieb, Don Herriott ('72) & Roche Carolina Matching Gifts Program, Martha ('88) and Alex Hunt, Jeffrey and Tina Kroot, Valerie J. Leppert ('87) and Ronald Simenauer, Francis and Patricia Marshall, Nadenia Newkirk, Duncan and Marion Poland, Robert and Bertha Rains, Joe Tenn.



Torres Chosen for McQuillen

Tedman Torres (shown on left with Peter Quinliven) has been selected to receive the second Michael and Sheila McQuillen Summer Research Award. He will conduct research on optical and electronic properties of organic films this summer with Dr. Enrique Izaguirre.

Physics of Music Returns

Physics 300, the Physics of Music, will return to the class schedule this fall after an eight-year hiatus. The Department dropped the course when it had no one to teach it, but now Dr. Bryant Hichwa is ready and eager to offer the course. He describes the new version:

"Music has been an important and integral part of the human experience throughout history. In the Physics of Music we attempt to build a bridge between the modern world of technology and the historical roots of the many forms of music in our diverse societies. We will explore the science of sound and the relationship to the human voice, the various families of musical instruments including their historical evolution and the current methods to synthesize even the most complex of musical forms."

CLAUDE PLYMATE ('81) is site manager of the National Solar Observatory's McMath-Pierce Solar Telescope at Kitt Peak. He received the AURA Technology and Innovation Award in 2001 and earned an M.S. in astronomy from the University of Western Sydney in 2002.

MARY SILBER ('81) is an associate professor in Northwestern University's Department of Engineering Sciences and Applied Mathematics. She earned her Ph.D. in physics at the University of California at Berkeley.

STEPHAN CRANDALL ('82) is a manager with Polaris Networks in San Jose.

DAN O'DONNELL ('83) is a group manager for computing technology in the Computing Services Department at the RAND Corporation in Santa Monica.

STEPHANIE SNEDDEN ('83) is an astronomer at the Apache Point Observatory in New Mexico working on the Sloan Digital Sky Survey. An employee of New Mexico State University, she earned her Ph.D. in astronomy at the University of Nebraska, Lincoln.

GEOFFREY A. WILSON ('84) is a research physicist working on bioparticle detection at Pacific Scientific Instruments in Grants Pass, OR. He earned his Ph.D. in applied physics at the Oregon Graduate Institute of Science and Technology in 1992.



Keck Lab is Exciting

SSU faculty have long sought a scanning electron microscope (SEM) for analysis of materials. A proposal by School of Science and Technology Dean Saeid Rahimi and the generosity of the W.M. Keck Foundation have now brought that and more.

The Keck Laboratory, part of the Cerent Laboratory Complex in Salazar Hall, became operational in December 2002 with the installation of a Hitachi 3000N SEM with an Oxford Instruments INCA energy dispersive X-ray (EDX) analyzer, an Olympus Scanning confocal laser microscope (SCLM) and a Pacific Nanotechnology Nano-R atomic force (or scanning probe) microscope (AFM).

The SEM and AFM have had an immediate impact on research and teaching activities in the Department of Physics and Astronomy and several other departments at SSU. This spring students have used the new instruments in Dr. Brock Weiss's Modern Physics Laboratory course (Physics 316), and Dr. Enrique Izaguirre's selected topics course in Neurobiology and Neural Networks.

In Fall 2003 Dr. Weiss will offer a new course, Materials Characterization, which will provide students the opportunity to gain hands-on experience with all of the equipment in the Keck lab.

Already several physics students have used the Keck lab for research projects. In addition to Jerilynn Schisser, whose work with Dr. John Dunning is described on p. 2, Tim McKernan and Kris Tyson are examining glass surfaces under the supervision of Drs. Bryant Hichwa and Weiss, and Tom Bittancourt is looking at nanocrystalline diamond with Dr. Weiss.

Students and faculty in biology, chemistry, geology, and environmental studies also use the lab, which is still growing. An Auger electron spectrometer (AES), donated by Optical Coating Laboratory, Inc., is expected to be operational soon.

MICHAEL ROGEN ('84) is Vice President of Electronics Sales & Marketing for Maxon Precision Motors, Inc., Burlingame.

MICHAEL BROWN BICK ('85) is a graduate student in physics at the University of Hawaii at Manoa. He earned an M.S. in physics at San José State University in 2000, and did further graduate study in physics at the University of California, Riverside.

Record Number of SSU Astronomers at AAS Meeting

Sonoma State University was well-represented when the American Astronomical Society met in Seattle in January 2003. Professors Lynn Cominsky, Gordon Spear, and Joe Tenn, staff member Phil Plait, and students Tiffany Borders and Gray Slater enjoyed a week of spectacularly-clear weather and exciting astronomical research reports. Dr. Cominsky hosted the AAS press conferences, while Drs. Plait and Spear and the students staffed the GLAST and Swift booth, showing what the two forthcoming orbiting gamma ray observatories are expected to achieve. Dr. Tenn narrowly missed being elected chair of the AAS Historical Astronomy Division.

Professors Spear and Cominsky, Tim Graves, Tiffany Borders, Gray Slater, and two more coauthors presented a poster paper on the GLAST Telescope Network-American Association of Variable Star Observers blazar program.

The SSU contingent particularly enjoyed a dissertation session where Katherine Rhode ('89) presented "A Wide-Field Survey of the Globular Cluster Systems of Distant Spiral and Elliptical Galaxies," a summary of the doctoral dissertation she is presenting at Yale this summer, after which she will be an NSF Astronomy and Astrophysics Postdoctoral Fellow. Also in attendance were graduates Lance Erickson ('80) and Holly Jessop ('93).

MILTON HAGLER ('85) is the founder of Blue Bytez, a high-tech company that produces software specializing in project/task/document management in Viet Nam. Previously he founded VietCAD, which sells Autodesk products and provides CAD/CAM support and training in that country.

GEORGE AMORINO ('86) is an assistant professor in radiation oncology at Virginia Commonwealth University. He earned his Ph.D. in cellular and molecular radiobiology at Colorado State University in 1995 and his M.S. in biomedical engineering from CSU, Sacramento in 1988.

RICHARD FERGUSON ('87) is a pilot with United Airlines, flying to Latin America from Miami. He served as an officer in the U.S. Air Force after graduation from SSU.

CHRIS RAY ('87) is an associate professor of physics and astronomy at St. Mary's College of California. He earned his Ph.D. in physics in 1994 at the University of California, Davis.

GREGORY M. CRAWFORD ('88) is a field regional trainer for McNeil Consumer & Specialty Pharmaceuticals, a division of Johnson & Johnson. He lives in Tracy.

DAVID E. MARSHALL ('88) is an information technology consultant and math instructor at Humboldt State University, where he earned an M.S. in mathematical modeling in 1998.

LAUREN J. NOVATNE ('89) is the physics instructor at Reedley College. She earned her M.S. in physics at California State University, Fresno in 1999.

BILL KOBABE ('90) is the principal of Bill Kobabe Woodworking in Petaluma and a teacher of woodworking and physics at several schools, including Willow Wood Waldorf School in Sebastopol.

GREG DAVIS ('90) is the lab technician in the Engineering/Physics Department at Santa Rosa Jr. College.

NANCY KUNNARI ('90) is an engineering manager at Atmel Corporation in San Jose.

RAYMOND UBELHART ('91) is a lead software engineer at Sunrise Telecom in Santa Rosa and a graduate student in Computer and Engineering Science at SSU.

DAVY FIGARO ('91) is a microwave power sensor engineer at Agilent Technologies in Rohnert Park. He is also pursuing a master's degree in engineering at National Technological University.

JASON I. ALEXANDER ('92) is a marketing manager of organic light emitting diode displays for OSRAM in San Jose. He earned an M.S. in physics in 1995 at Indiana University - Purdue University at Indianapolis.

MICHAEL FINK ('93) is teaching science and mathematics at Cross & Crown Middle School in Rohnert Park. He earned his teaching credential at SSU in 1994.

MONIKA IVANCIC ('93) is associate director of the Magnetic Resonance Facility in the Chemistry Department of the University of Wisconsin-Madison. She earned her Ph.D. in Biochemistry and Biophysics at Oregon State University in 2001.

PAUL SOMERVILLE ('93) is a project manager for Coherent, Inc. in Santa Clara and a partner in MojoJava, a combination Cafe/Motorcycle shop in San Francisco. In his spare time he races motorcycles.

ELSE-MARIE SCHMIDT ('94) is an engineer at Agilent EEsof EDA in Santa Rosa.

SEAN FRASER ('95) is a lecturer in physics at the University of California, Santa Barbara, where he received his M.A. in 2002. He earned a certificate of advanced study in theoretical physics at the University of Cambridge in 1996 after spending a year at the University of Heidelberg on a Barry Goldwater Scholarship.

LESLIE KORMIER NELSON ('96) is a project scientist at WZI Inc., an environmental engineering and consulting firm in Bakersfield, CA.

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