

# *The* **PHYSICS MAJOR**

SONOMA STATE UNIVERSITY

DEPARTMENT OF PHYSICS AND ASTRONOMY  
2002



## **Hichwa Selected**

Dr. Bryant Hichwa will join the regular faculty of the SSU Department of Physics and Astronomy in the fall of 2002.

Dr. Hichwa earned his Ph.D. at the University of Notre Dame and has much experience in both the academic world and industry. After teaching physics at Hope College in Michigan for ten years he spent twelve years at Optical Coating Laboratory, Inc. (OCLI) in Santa Rosa, part of that time as vice president of research. In 2000 he became president of MetroPhotonics (USA), Inc., a Santa Rosa outpost of a Canadian telecommunications company.

Throughout his industrial career he has simultaneously pursued his love of teaching, mostly at SSU. He is currently teaching Analytical Mechanics and Light and Optics as a part-time instructor.

As a full-time faculty member Dr. Hichwa intends to pursue an active research program in optical Micro-Electro-Mechanical Systems (MEMS), a field in which he distinguished himself at OCLI. The holder of several patents, he has numerous plans for devices which SSU students can help design and test.

A dedicated environmentalist, Dr. Hichwa is the president of the Madrone Audubon Society and serves on the board of the Audubon Canyon Ranch, a non-profit organization that promotes environmental research and education of elementary school children.

He also has a passion for nature photography, especially native wild orchids, and enjoys tromping around in remote woods and bogs in search of the perfect flower or wildlife picture. He enjoys dabbling with digital photography of the images he takes while listening to both classical and jazz music.

## **Salazar Labs to Open in Fall**

After two years of remodeling, Salazar Hall, the former library building, will reopen in Fall 2002.

Approximately one-eighth of the building will be devoted to the Cerent Science and Engineering Center, a complex of new laboratories to be used by the master's program in Computer and Engineering Science (CES) and by a number of departments in the SSU School of Science and Technology. (Formerly Natural Sciences, the School was renamed this year).

Of particular interest to the Department will be the new electronics, photonics, and materials labs. The electronics lab will be used for physics classes this fall.

The W.M. Keck Microanalysis Laboratory, funded by a grant from the Keck Foundation secured by Dean Saeid Rahimi, will include a new scanning electron microscope and a confocal microscope. According to the Dean, "This lab will help our graduate and undergraduate students become involved in projects with strong applicability to the high tech job market and graduate programs in their fields."

The new photonics laboratory will be used for physics courses in the spring. In addition, the Agilent Technologies Communications Laboratory will feature a variety of industry-leading photonics, optics and communications test instruments used by graduate students in CES, as well as undergraduate students in applied physics.

## **TEM Coming**

The Department of Physics and Astronomy will soon receive a transmission electron microscope (TEM), a gift from Syracuse University. The TEM will be used by Drs. Izaguirre and Weiss for their research in photonics, biomolecular electronics, nanotechnology and thin film materials. Students and faculty from other departments will be encouraged to use it as well. The TEM will be an excellent complement to the Department's existing characterization equipment and to the scanning electron microscope in the new Keck Lab.

The TEM works by sending a beam of high energy (80-120 keV) electrons through a sample which can then be analyzed in either real space or reciprocal space (diffraction). It is capable of magnifications up to one million times with a resolution of 4.3 angstroms. This provides the user the capability to observe objects that are on the scale of a single atom.



*New Chair*

## Changes, Changes, Changes

This has been a year of great changes for the Department of Physics and Astronomy.

Dr. Sam Greene taught his last class in December 2001 after 35 years at SSU. During this time he taught nearly every course in physics and astronomy, from the popular Extraterrestrial Intelligence and Interstellar Travel to Quantum Physics and an occasional special topics course in General Relativity.

It was the first year at SSU for Professors Enrique Izaguirre and Brock Weiss. Read more about them elsewhere in these pages.

It was also the first year of Dr. Joe Tenn's term as chair. With Dr. Cominsky on leave and Dr. Dunning half retired, Dr. Tenn had to wear several hats. He continued as department advisor, chaired the search committee which considered 139 applicants before choosing Dr. Bryant Hichwa for the new faculty position, and also chaired the RTP committee, which evaluates nontenured faculty.

It's been an exhausting year," he reports. "I am looking forward to next year, when Brock Weiss will be advisor, Lynn Cominsky will head the RTP committee, and we won't need a search committee. I really appreciate all the work Duncan Poland did for the Department during his years as chair."

"In many ways the hardest thing for me will be giving up the advising position after so many years. It has been a privilege and a pleasure to work closely with students and to help them to achieve their goals, not just meeting degree requirements, but also finding suitable jobs or graduate schools afterward."

The new department chair also found time to present a talk on the Bruce Medalists at the American Astronomical Society meeting in Washington and a poster, titled "What Can You Do with a Bachelor's Degree in Physics," at the spring meeting of the northern and southern California chapters of the American Association of Physics Teachers.

Dr. Tenn intends to continue as liaison with the Department's graduates. He is especially proud that so many have kept in touch. More than one-half of all SSU physics graduates are now listed on the phys-astro.sonoma.edu website, and he hopes to get permission to add even more.

## Graduates Making Plans

*Zach Wiren*

Here we have the future plans of our graduating group of physics majors:

**Chris Crosher**, who graduated with a double major in physics and computer science in December, has accepted a research assistantship in chemical and nuclear engineering at the University of New Mexico, where he participated in a Research Experience for Undergraduates (REU) program last summer.

**Justin Flory** will be putting off graduate school plans for a year or two while better deciding which field he would like to pursue. In the meantime he will continue working at TrueTime in Santa Rosa.

**Michael Laufer**, who will complete a double major in math and physics, plans to take some time off to ponder graduate school.

**Linda Lindsley** will be a graduate student in materials science at Arizona State University in the fall and will get a head start by beginning her research assistantship there in July. At the moment she hopes to turn self-assembling single-electron transistors into the focus of her doctoral work. She knows she will feel at home in the program at ASU because she participated in an REU program there in January.

**Shawna Moyer** is going to continue in the world of the gainfully employed for the time being. At some later point she admits to possibly reconsidering on the issue of graduate school.

**Danny Paulson** will remain at Sonoma State University to obtain his teaching credential. He intends to teach high school physics.

**Sarah Silva** will continue her work with Dr. Cominsky over the summer while searching for a long term job opening, hopefully in the optics/photonics industry. Should this not work out to her satisfaction, graduate school is forming the core of her backup plan.

**Kevin Thomas** is the second member of the graduating class who will remain at Sonoma State for farther education. He plans to obtain a master's degree in English before continuing on the physics path. His ultimate goal is to secure a science writing position.

**Zach Wiren** has accepted a teaching assistantship in physics at Oregon State University, where he took part in an REU program last summer. He is remaining open-minded about future career and study paths so as not to close off possibly interesting avenues of travel. His current backup plan is to live out his life dream of owning a straw beach hut someplace desolate.

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Brock Weiss, Ashley Wiren, and Zach Wiren.

## X-ray Analysis Upgrades

*John Dunning*

Our X-ray diffraction (XRD) analysis program has improved with the addition of the 2002 edition of Jade 6.1 and a new computer. Exceptional performance is now obtained with the default settings, making it easy to select the most likely compounds from our database. The database is current through September 2001. For unknowns beyond the database, pattern indexing generates a most likely crystal structure from the angular positions of the first nine peaks.

Some alumni may remember the older X-ray fluorescence air unit which lost sensitivity for elements below calcium. We are soon to add an energy dispersive X-ray (EDX) detector attached to a scanning electron microscope. Nondestructive elemental analysis will be possible as no sample coating will be involved. Historical specimens, thin films, minerals in intact rocks, and stamps are some of the samples we will be able to analyze. The combination of XRD and EDX forms a powerful analytic tool.

Visitors are encouraged to stop by our laboratory in Darwin 33. We usually have something interesting being analyzed. The next offering of the X-ray analysis course, Physics 384, will be in the Fall of 2003. This laboratory is a joint endeavor with Geology.



*Jeremy Hieb and Dr. Enrique Izaguirre*

### Jeremy Hieb Wins Newkirk

This year Jeremy Hieb was awarded the sixth Horace L. Newkirk Assistantship. The holder of a degree in art from UC Santa Cruz, Jeremy expects to receive a B.S. in physics with a concentration in applied physics in December 2002. Here is his story:

Thanks to Nadenia Newkirk and the establishment of the Horace L. Newkirk assistantship, I am helping Dr. Enrique W. Izaguirre, Steve Anderson, John Collins, Nicole Petta, Viviane Pierre-Louis and Sarah Silva research Langmuir-Blodgett Films.

It has been a time of transition for the Department and I am glad to be a participant in the transformations.

We have tried to focus the labs to a higher resolving power by updating equipment and dedicating lab space. Though the evolution is time consuming and costly, much progress has been made.

The reorganization would not be as meaningful without a unified goal. Dr. Izaguirre has provided us with such a goal and the potential for development is tangible. He has shown us methods of implementation, while giving us the necessary tools, encouragement and theory. Steve Anderson has provided us with technical wizardry and an insightful knowledge to complement and implement theory. The students are sharing with each other. The neat thing has been the passage of knowledge, in collaboration rather than in competition.

My particular research involves the theory and construction of a scanning near-field optical microscope. This instrument will allow us to resolve images smaller than the wavelength of visible light. It requires a coordinated combination of optics, electronics, and mechanics, coupled with a bit of good fortune.

When I first applied to SSU I distinctly remember reading the short biography of Horace L. Newkirk and the award created in his memory. Now, having such an honor has given me a feeling of a focus and contribution. In remembrance of Horace L. Newkirk, thank you.

### Plait Publishes *Bad Astronomy*

Dr. Philip Plait, a Department of Physics and Astronomy staff member, has written a popular book titled *Bad Astronomy*, based on his famous website (<http://www.badastronomy.com>) which debunks astronomical myths and misconceptions. In the book, he gently guides the reader through the various ways astronomy is spun, folded and mutilated by the press, in movies, and in urban legends. He uses humor and personal anecdotes to discuss such topics as astrology, UFOs, why the sky is blue, why the Moon looks bigger on the horizon, and even the people who think that NASA faked the Apollo Moon landings.

The book came out in March 2002, and is currently in its second printing.

### What has SPS been up to?

*Sarah Silva*

The SSU chapter of the Society of Physics Students has had an exciting year. We started with a picnic in August. Here all the faculty and students came to welcome in the new school year. In addition SPS did a fundraiser with NASA's Universe Education forum and raised enough money to buy T-shirts for the club. We are now preparing for the end of the year party for students and faculty, yeah!

The current officers are Sarah Silva, president, Linda Lindsley, vice president, and Zach Wiren, treasurer. The new president for next year will be Gray Slater, the new vice president will be Tiffany Borders, and the remaining officers will soon be announced. Next year should be an exciting one. There are plans to go to Chabot and Ferguson Observatories. Have a good summer!

## A Busy Year for Dr. Izaguirre

*Kevin Thomas*

This year in the Department of Physics and Astronomy has seen some major changes. Plans for new laboratories are in progress, many seniors are graduating, and the Department has welcomed two new full-time professors. I had a chance to sit down with one of these, Dr. Enrique Izaguirre, and talk about his first year teaching here and his goals for the future.

Dr. Izaguirre is very happy here at Sonoma State. "This place is great. I especially love to work with students," he says. This is why he came here in the first place. He appreciates the diversity of interest among our students because it allows him to explore many different areas.

He is one of the driving forces behind the establishment of new labs on campus and the expansion of research programs in the Department. This, too, capitalizes on his love of teaching, for as he puts it, "Researching with students is fifty percent teaching." Currently working with him are the Department's Newkirk Award winner, Jeremy Hieb, the recipient of the Michael and Sheila McQuillen Summer Research Assistantship, John Collins, physics majors Viviane Pierre-Louis, Sarah Silva, Tiffany Borders, and Ashley Wiren, and chemistry major Nicole Petta.

Dr. Izaguirre's research interests include biophotonics, the study of how biological agents and organisms interact with light, and biomolecular electronics, the use of biological materials to fabricate electronic circuits. "You can learn a lot from nature," he proclaims, also pointing out that by their very nature, his research areas are heavily interdisciplinary.

He has already initiated collaborations with the Biology Department and Chemistry Department, and he's working hard to encourage students from other disciplines to join the research groups. "The student mentality is 'I can't work with you if you're not a professor from my department,'" he observes, a stereotype that he wishes to break. To help foster interdisciplinary cooperation, Dr. Izaguirre has given various lectures on campus, including one in the M\*A\*T\*H colloquium series. But this professor's educational outreach and recruiting extend beyond the borders of the campus. He has given talks on his research at community colleges and high schools to attract students to the SSU physics program.

Dr. Izaguirre's innovation hasn't just been with new research programs and collaborations. He brought his fresh knowledge of the fields with him and used it to update the department's digital electronics and photonics classes. Many of the students are doing advanced projects and learning new techniques.

Dr. Izaguirre has also been busy fundraising. He was awarded a Mini-Grant from SSU's Research, Scholarship and Creative Activity Program (RSCAP) to fund his summer research project entitled: "Characterization and study of the self assembly of multi-component Langmuir-Blodgett films," and a larger grant from the CSU Program for Education and Research in Biotechnology for next year. As he described it, "Most of the money is for the students, and that's the important thing."

Dr. Izaguirre hopes to have the new labs completed by the end of the summer so that by the fall semester, research can proceed at full speed when students return from break. Despite all that he does here at the school, he manages to find time to get out to the gym and explore the local area.

## The SSUO Needs an Offspring

*Dr. Gordon Spear*

The SSU Observatory (SSUO) has served students and the department efficiently and effectively since its construction in 1976. In the early days students obtained photographic images using astrographic cameras and did single channel UVB photoelectric photometry. Now the observatory has matured and students use a computer-controlled telescope to obtain CCD images of active galaxies, search for new variable stars, and search for apsidal motion in massive binary star systems. Of course, students also find time to obtain images of nebulae and other deep sky objects that inspire the imagination. In addition, a CCD spectrometer system is being developed by students Tiffany Borders and Ashley Wiren with assistance from Dr. Enrique Izaguirre. Soon students will be able to obtain spectra of bright stars and nebulae. Furthermore, the Observatory is scheduled to obtain a high bandwidth network connection which should enable video streaming of images from the Observatory to the campus and to the internet. Yes, the Observatory has matured!

Unfortunately, the Observatory's "progress clock" is ticking. It is time for SSUO to have an offspring. If you are on campus you have probably seen the extensive construction taking place in the fields to the west of the stadium area where the Observatory is located. This construction site is to become a three-story apartment complex for 650 students. The first phase of construction is scheduled to be complete by Fall 2003. Obviously, this means that the Observatory will effectively become unuseable for research because of the exterior lighting that will accompany the new housing complex. It really is not possible to do observational astronomy next to a parking lot. Yes, the clock is ticking, and SSUO will need to spawn a new place for students to get practical experience in research-level observational astronomy and astrophysics.

The Department has established a committee to explore various options and to develop a plan to provide students with appropriate hands-on experience with astronomical instrumentation and techniques. We are currently considering nearby locations for a remote observatory with a half-meter to one-meter class telescope. The telescope and all instrumentation would be computer-controlled and operated from campus. An internet connection should be available to allow downloading of the data obtained.

The establishment of such a facility will require external funding, and a fundraising campaign will be established in the near future. If you have suggestions or ideas that could support the establishment of a remote SSU Observatory please contact me. If you are interested in the astronomy programs at SSU, we need your help.



*MacArthur Fellow Margaret Murnane of the University of Colorado spoke this year in "What Physicists Do," along with Nobel laureate Herb Kroemer and many other distinguished scientists.*

## Donations Appreciated

Private donations are extremely important to the Department of Physics and Astronomy. Donations are the sole support of the Department's public programs, they fund the Horace Newkirk Student Assistantship, and they allow some equipment purchases.

Thanks to two endowment funds, the Charles and Norma McKinney Fund and the Science at Work fund established by John Max, the "What Physicists Do" public lecture series now includes a few speakers each year from beyond northern California.. Current contributions are also important in maintaining this series and the Public Viewing Nights at the Observatory.

This year saw the beginnings of major efforts to support students working on research in the Department. Mike and Sheila McQuillen's contribution will support one student working full-time for the summer of 2002, and the McKinneys have started the Physics and Astronomy Student Research Fund with a \$10,000 challenge grant, which we hope will be more than matched by other donors. This will be an endowment fund, the income from which will support students doing research in the Department.

Other donors to Department funds this year:

#63851 **Public Programs:** Tom Barnebey (Sound Solutions Acoustic Consulting Services), Theodore H. Chenoweth, Marvin Chester, Richard de la Chaumière, Donald J. Farmer, Ed J. Le Du (Forestville Mini Storage), Robert & Katherine Furukawa, Gary Imm (Clover-StornettaFarms, Inc.), Jeffrey & Tina Kroot, Francis & Patricia Marshall, Oliver H. "Bert" Maxwell, Bernard & Barbara Meyers, Michael & Penny Miller (Moon Valley Circuits), James and Melinda Moir, Robert and Bertha Rains, Donald & Ann Rathjen.

#63852 **Physics & Astronomy Equipment & Supplies:** James Coale.

#63853 **SSU Observatory:** Bernard and Barbara Meyers, Philip Morris Companies, Inc., Catharine & Henry Sandbach.

#63855 **Student Development Program:** Lynn Cominsky & Garrett Jernigan, Joe Tenn.

#75960 **Physics & Astronomy Scholarship** (endowment): Lynn Cominsky and Garrett Jernigan

#75961 **Physics & Astronomy Student Research Fund** (endowment): Robert and Bertha Rains.

#77020 **Science At Work** (endowment for the "What Physicists Do" series): John Max (Max Machinery).

#78380 **Joseph S. Tenn Scholarship** (endowment): Robert S. Tuttle.



## An Interview with Dr. Weiss

*Linda Lindsley*

Asked about his first year here at Sonoma State, Dr. Brock Weiss replied, that it was "great." He said that though he was kept very busy, he enjoyed it very much. He found the students enthusiastic and had much fun interacting with them, both as teacher and as scientist.

He feels that his greatest accomplishment was the move into the new position here at Sonoma State — getting familiar with the environment and the part that he plays in that environment. He feels that he is an important part in the effort to broaden the research base here, bringing "new blood" and his great enthusiasm for physics research into the Department.

Dr. Weiss is very interested in getting a new research group established in materials science. He is looking forward to having access to the new facilities in Salazar Hall and to using them for both research and classroom activities. He is also planning to work on his teaching skills and to make an effort to broaden the range of courses that he teaches.

His students will participate in many facets of the research process, designing and building equipment, troubleshooting and repairing existing equipment, and exploring new equipment and its capabilities, in addition to doing the research itself, according to Dr. Weiss. He finds no reason that undergraduates cannot accomplish just as much as graduate students. The only difficulty he sees in the participation of the undergraduate students is a lack of research experience and the actual educational background to fully understand the results of their efforts.

Dr. Weiss also sees his position as one supporting the new M.S. program in Computer and Engineering Science. Much of the technology in the telecommunications industry is based on materials science; he intends to actively seek master's students to participate in his research program. He also hopes to introduce a course in material characterization to the program.

Dr. Weiss claimed that Physics 100 Descriptive Physics is his favorite class to teach, as it is challenging and demanding lecturing to students who mostly have no real interest in physics or science in general. However, he has favorites at every level of physics instruction. In the introductory sequence, he enjoys teaching both Physics 114 (Mechanics and Thermodynamics), and Physics 314 (Modern Physics), where the students often ask the "craziest questions." In fall, he is looking forward to teaching the Physics of Semiconductor Devices course, as he has taught a nanomaterials class that was similar in nature and found it very enjoyable. In the future, he hopes to introduce a course in materials science to the Department's curriculum.

## Cominsky's "Sabbatical" Year

It may be hard to tell, but Professor Lynn Cominsky has been on sabbatical during this past academic year. Although she is absent from the classroom, she has been busier than ever, and is often spotted in Darwin, when not on airplanes, traveling from one meeting to another. Cominsky's Education and Public Outreach Group continued to grow as SSU physics graduate Tim Graves ('01) accepted a position as Instructional Technology Consultant, joining "Bad Astronomer" Dr. Philip Plait, Scientific Illustrator Aurore Simonnet and North Bay Science Project Site Director Sharon Janulaw, as well as students Sarah Silva (Web Curator), Michelle Curtis (Science Writer and Web Support), Tiffany Borders (Web and GLAST Telescope Network support), Linda Lindsley (GLAST Telescope Network programmer) and Gray Slater (Group Support.) Professor Gordon Spear is also working on GLAST, leading the GLAST Telescope Network development. During the summer of 2002, most of the GLAST staff will move to their new home in a building currently occupied by the Tech High School.

During the summer and fall of 2001, Cominsky gave lectures about gamma-ray astronomy at the Global Hands-On Universe Meeting, held at the Lawrence Berkeley National Laboratory, Western Kentucky University, and—to over 800 people—in the Silicon Valley Astronomy Lecture series at Foothill College. She attended meetings as a member of the GLAST and Swift mission teams, and the California Science Project, as well as NASA's Office of Space Science Education Council, and of the Experimental Program Advisory Committee for the Stanford Linear Accelerator Center. In September she organized press activities at the Two Years of Chandra Science Symposium in Washington, DC, where the big story, the discovery of an X-ray flare from the black hole in the center of the Milky Way, was televised by NASA.

In December, Cominsky was appointed to a committee that recommends policy to NASA: the Structure and Evolution of the Universe Subcommittee (SEUS) of the Space Science Advisory Committee. Her first SEUS meeting, in Cocoa Beach, Florida, was followed by the Coral Gables Conference on Cosmology and Particle Physics, where she gave an invited lecture, "How X-ray Experiments See Black Holes: Past, Present and Future."

Press activities continued in January, 2002, when Cominsky helped to coordinate activities at the American Astronomical Society Winter Meeting in Washington DC. Besides her usual duties organizing and moderating several scientific press conferences at this meeting, Cominsky also ran a science policy Question and Answer session with newly appointed Presidential Science Advisor John Marburger III. In April, Cominsky organized press for the last time as Press Officer for the High Energy Astrophysics Division of the AAS, which met in Albuquerque, New Mexico. After six years as HEAD's first press officer, she has passed the microphone on.

February found Cominsky again attending meetings of NASA's OSS Education Council, and of

the California Science Project. In March, Cominsky and Sarah Silva presented workshops to 7th and 8th grade girls about the Space Mysteries project at SSU's Expanding Your Horizons day, and Cominsky gave the same workshop a week later to teachers at the National Science Teacher's Association meeting in San Diego. In April Cominsky went to a SEUS meeting at NASA Headquarters to work on the "Roadmap" for future NASA missions.

Cominsky is looking forward to a short vacation with her horse, before starting to travel again in June. And she is eager to return to the classroom in the fall, to rest up from her "Sabbatical."



*Ashley Wiren and Tiffany Borders building a new spectrometer for the SSU Observatory as a project in Dr. Brock Weiss's modern physics lab.*

## Students Selected for Summer Research Programs

This summer Tiffany Borders will be heading off to Baltimore to work at the Space Telescope Science Institute in the Science Division under the supervision of Keith Noll, Lisa Fratarré, and Zult Levay. Tiffany will be working as part of the Hubble Heritage Program which works with images taken with the HST and delivers them to the web at <http://heritage.stsci.edu>. Tiffany states, "I am very excited to receive this opportunity to work at STScI especially at such an exciting time for Hubble and its new Advanced Camera for Surveys. I believe this will be a beneficial learning experience for me and my future as an astronomer."

Also this summer Ashley Wiren will be going to a Research Experience for Undergraduates (REU) program at the University of Minnesota. There Ashley will be assisting in various ongoing research projects in such areas as high energy and space physics. Ashley says "I am looking forward to doing research for the summer. Even with the specifics of the research unclear, I still think it will be a great experience."

Staying right here at SSU will be John Collins, who has been awarded the Michael and Sheila McQuillen Assistantship to work with Dr. Izaguirre on biomolecular photonics.

## What has SPS been up to?

*Sarah Silva*

The SSU chapter of the Society of Physics Students has had an exciting year. We started out with a picnic in August. All the faculty and students came to welcome in the new school year. In addition SPS did a fundraiser with NASA's Universe Education forum and raised enough money to buy T-shirts for the club. We are now preparing for the end of the year party for students and faculty, yeah!

Current officers are Sarah Silva, president, Linda Lindsley, vice president, and Zach Wiren, treasurer. In the fall the president will be Gray Slater and vice president will be Tiffany Borders. Next year should be exciting. There are plans to go to Chabot and Ferguson Observatory. Have a good summer.

## Alumnotes

**KENNETH LARSON** ('69, physics & mathematics) is retiring in 2002 as a professor of computer science at Southern Oregon University in Ashland. Ken earned an M.A. in mathematics at SSU in 1970 and a Ph.D. in information and computer science at UC Irvine in 1977.

**GARY ZUPAN** ('69) is a consulting software engineer. He earned an M.Ed. at Hyles-Anderson College in 1983.

**ROBERTO RAMIREZ** ('72) teaches mathematics and physics at Windsor High School and bilingual mathematics and science at SSU. He received a major teaching award from the Carlston Family Foundation in 2001.

**DON HERRIOTT** ('72) is the president and general manager of Roche Carolina, Inc., a South Carolina company which develops new pharmaceuticals and the technology for making them. He is also chairman of the South Carolina Chamber's Education Council and of the Governor's Workforce Education Task Force, and chair-elect of the South Carolina Chamber of Commerce.

**JAMES A. McBRIDE** ('75) is a Wealth Management Advisor with Merrill Lynch in Santa Rosa. Formerly vice-president and national accounts manager for the payment products division of Citicorp, he earned a B.A. in mathematics at SSU in 1976 and an M.B.A. at Pepperdine University in 1983. He has served as president of the SSU Alumni Association.

**ZEE BETTY HAKIMOGLU** ('75) is Vice President, Product Line Management, of Optilink Communications in San Jose.

**SHARON GILKISON MORGANELLI** ('76) is a project coordinator with Jones Hall Hill & White, a municipal finance law firm in San Francisco. She earned an M.B.A. in finance from California State University, Northridge.

**JOHN C. NELSON** ('76) is a Senior Research Specialist with the 3M Microreplication Technology Center in Petaluma.

**PAUL VANDERBILT** ('76) is an integrated circuit designer of 40+ Gbps communications chips with Applied Micro Circuits Corporation (AMCC) in San Diego.

**SCOTT C. ANDERSON** ('78) is chief technology officer of 3D Door, in charge of developing new techniques of streaming 3D animation over the Internet.

**ROSS GOODWIN** ('78, physics & applied mathematics) is business customer research consultant for Hewlett-Packard's Business Innovation and Technology Services. A former chair of the Bennett Valley School Board, he earned an M.B.A. at the University of California at Berkeley in 1980.

**DOUGLAS MORRIS** ('78) is a senior staff member for Motorola's Energy Systems Group in Lawrenceville, Georgia. Formerly an engineering manager and engineer, he has been awarded several patents.

**ALBERT PLAMBECK** ('78, physics & music) is senior marketing manager with KLA Tencor Corp. in San Jose. He has published papers on overlay metrology and the implementation of coherence probe microscopy.

**RICHARD MONTGOMERY** ('81, physics & mathematics) is a professor of mathematics at the University of California, Santa Cruz and a Sigma Xi Distinguished Lecturer for 2002-03. He earned his Ph.D. in mathematics at the University of California at Berkeley in 1986 with a physics-related dissertation and continues to work on the N-body problem.

**DOUGLAS GREENWOOD** ('81) is an internet software consultant in Tahoe City.

**STEPHAN R. CRANDALL** ('82) is a manager of software development at Cisco Systems, San Jose, where he develops ATM backbone switches.

**DAVID GOLDKIND** ('82) is a consultant on management and process engineering with Rebecca Robinson Associates, Inc. in Grass Valley.

**WILLIAM C. TOMLINSON** ('83) is the systems administrator for Royce Instruments, Inc., a Napa producer of test instruments used in the research and development of new silicon chips. He earned a second B.A., in management, at SSU in 1992, and an MBA, with a specialization in MIS, at the University of Arizona in 1994.

**TERESA BIPPERT-PLYMATE** ('84, physics & art) is the technical writer for the SOLIS project at the National Solar Observatory. SOLIS is a suite of solar telescopes that will take magnetograms and spectroheliograms, and should be deploying on Kitt Peak in Fall 2002.

**DAVID LAPP** ('84), teaches physics and calculus at Tamalpais High School in Mill Valley. He will spend 2002-03 at Tufts University where he has been awarded a prestigious Wright Fellowship. He earned his M.S. in physics in 1990 at DePaul University.

**BRENTON WHITE** ('84) is a product manager in measurement and automation software technology for Agilent Technologies in Loveland, CO.

**NORMAN BASHAM** ('85) is a senior software engineer at Moviso, the wireless arm of Vivendi Universal, and contributing architect on yourmobile.com, a wireless web site.

**KEYVAN FARAHANI** ('85) is the program director in the Image-Guided Diagnosis and Therapy Branch, Biomedical Imaging Program, the National Cancer Institute. Formerly, he was an assistant professor of radiological sciences and biomedical physics at UCLA, where he received his Ph.D. in 1993.

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

**BRUCE CLARK** ('86) is a senior quality engineer with TheraSense in Alameda.

**PETER ROONEY** ('86) is the majority staff director of the Subcommittee on Environment, Standards and Technology of the House of Representatives Science Committee. As the American Physical Society's Congressional Fellow for 1998 he worked in the office of Senator Joe Lieberman of Connecticut. He earned his Ph.D. in physics at the University of California, San Diego.

**SCOTT ROWLANDS** ('86) is a sales director for Westwave Communications in Santa Rosa. Formerly marketing manager with Alcatel in Petaluma, he has also worked at Optical Coating Laboratory, Inc., Santa Rosa.

**VICTORIA MOORE HEWITT** ('87) is the principal of Cook Jr. High School in Santa Rosa.

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**JON C. DAVIS** ('89) is a software support consultant for Hewlett-Packard, based at AOL Time Warner in Virginia.

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**VICTOR HIPKISS** ('96) is an engineer at Agilent in Santa Rosa.

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