



# THE PHYSICS MAJOR

## Physics Students Score on Putnam Exam

Each year mathematics students from throughout the United States and Canada compete in the William Lowell Putnam Mathematical Competition.

In addition to a number of national prizes, SSU entrants compete for local prizes donated by the mathematics department faculty and by Mrs. Helen Putnam, a Sonoma County supervisor who became interested in the competition when she saw students wearing "SSU Putnam Team" tee shirts a couple of years ago.

Two of the local winners this year are physics students.

Geoffrey Wilson, a junior physics and chemistry major, finished first among SSU entrants. Because he also scored among the top 25% of competitors nationally, he qualified for a special \$1000 prize donated by mathematics professor Dr. Donald Duncan. Thus Geoff won a total of \$1250.

Chris Ray, a sophomore majoring in physics and mathematics, was third among this year's local entrants. His achievement won him \$50.

Both Wilson and Ray will be back on the SSU Putnam team next year.

## Don Martin Wins Writing Prize

SSU physics student Donald Martin has won an honorable mention in the 1983 Griffith Observer essay contest.

Don's article, "Adrian van Maanen: How a Good Scientist Went Wrong," will appear in the magazine later this year.

In addition Don wins a \$50 cash prize.

Don's essay was originally written as a term paper in Dr. Tenn's historical astronomy course, discovering the galaxies, last spring. Van Maanen was a Mt. Wilson astronomer who, early in this century, held back the progress of astronomy by erroneously discovering that the "spiral nebulae" must be close by and hence could not be other galaxies.

This is not the first time that SSU has done well in the annual contest. In 1979 psychology student Reiko Hibbett Crane won an honorable mention with her Astronomy 100 term paper, "Madness or Genius? The Method of Johannes Kepler," also written for Dr. Tenn. And Dr. Tenn himself won honorable mention for "The Search for Solar Neutrinos" in 1976.



## Tenn Commemorates Eddington

December 28, 1982, marked the centennial of the birth of one of the founders of astrophysics, Arthur Stanley Eddington. Dr. Joe Tenn of the SSU Department of Physics and Astronomy, unwilling to see the event ignored, published a centennial tribute to Eddington in the Nov/Dec 1982 issue of Mercury, the journal of the Astronomical Society of the Pacific, and presented a summary of the article in the "What Physicists Do" series last November.

## Grant Brings New Equipment

A Hewlett-Packard logic analyzer, two HP oscilloscopes, and three Apple II computers enhance the Department's digital electronics and microprocessor applications laboratories (Physics 312 and 412).

Last fall the Department received a \$19,100 grant through the CSU system as the University's share of \$2,250,000 appropriated by the Legislature to "promote education in engineering, computer sciences, and related fields." The money was requested by Governor Brown under the somewhat euphemistic name of the Investment in People program. Sonoma State qualified for a share of the money because of the new Computer and Information Sciences degree program which began in 1982.

Dr. Duncan Poland put together the campus proposal with the assistance of Dean Richard Karas, Dick Gordon and Ed Glasser of the Computer Center, and Bill Clark of the Educational Opportunity Program office. The Physics and Astronomy Department's involvement in this is through its digital electronics and microprocessor applications courses initiated by Dr. Karas a couple of years ago. These courses are electives for physics majors and are required for Computer Science majors who elect the "systems" option in that program. Only the Department's part of the proposal was funded by the Chancellor's Office.

The grant has enabled the Department to purchase two Hewlett Packard model 1740 dual trace, 100MHz oscilloscopes, one Hewlett Packard model 1615A logic analyzer, and three Apple II computers with 48K memories, super serial cards, disk drives, and Zenith monitors.

Last year Hewlett Packard in Santa Rosa donated a model 1740A oscilloscope loaded with accessories to the Department, so there are now three of what it is hoped will be the upper division lab standard scope in the coming years, replacing the aging Tektronix 561A's that have provided so many years of service.

The new Apples bring the microprocessor lab complement to ten, a start toward meeting the needs of the growing number of computer science majors. (By its second year, computer science will be the third largest major program on campus, with more than 300 majors.)

The logic analyzer allows synchronous state measurements and asynchronous timing diagram measurements. Data can be read out in binary, octal, hexadecimal, or even decimal form.

Department faculty and staff are looking forward to using the new equipment.

## Know Your Faculty: Rich Karas

Dr. Karas started his education at UCLA but earned all of his degrees at the University of California, Berkeley. His Ph. D. was in atmospheric and space sciences and was achieved with balloon-borne experiments to probe the earth's magnetosphere and the causes of the aurora. He has done research in Canada, Alaska, and Greenland, and spent a year as a post-doctoral researcher in Norway before returning to Berkeley. There he taught three years in the Division of Interdisciplinary and General Studies and continued his research on the aurora. He also revamped some of the undergraduate laboratories in the Berkeley physics department and wrote lab manuals for them. He came to Sonoma State in 1974 and quickly achieved great popularity in the Physics 210 general physics course. He is proud that his students have scored exceptionally high on the Medical College Aptitude Test. He has taught history of physical science and environmental physics. Probably his major contribution to the curriculum has been in electronics: he established the courses in digital electronics and in microprocessor applications. Dr. Karas was honored as Sonoma State's Outstanding Professor in 1977-78. He served as department chairman from 1976-82 and as acting dean of the school of natural sciences for the last three semesters. During that time he played a leading role in the establishment of the popular new degree programs in computer science. The department is looking forward to welcoming him back to full-time teaching in the fall. Rich and Sandra Karas and three-year-old Kate live on Sonoma Mountain, overlooking the campus.

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## Know Your Faculty: Sam Greene

A graduate of the Polytechnic Institute of Brooklyn, Dr. Greene earned his Ph. D. in theoretical physics at Syracuse University. He came to California to work at the Lawrence Radiation Lab in the early 1960s. In 1966 he became one of the first members of the faculty of what was then the physics department of Sonoma State College. He has introduced many new courses into the curriculum and has taught almost every physics and astronomy course in the catalogue. In addition he has taught a variety of special topics courses, everything from "quantum, mind, and esp" to "gravitation and general relativity." In recent years he has become involved in experimental physics as well: he has taken over direction of the laser lab and is currently interested in digital electronics and microcomputer interfacing. He has just begun a term as department chairman, a position he held for six years back in the late '60s and early '70s. He travels extensively during vacations; he has his own raft and equipment and likes to run white water rivers.

## Twenty-five Semesters for WPD

Every Monday at 3:30 p.m. physics and astronomy students and faculty start gathering in Darwin 108. Over coffee and cookies they chat and get acquainted with the week's speaker.

It is almost time for "What Physicists Do," the university's oldest public lecture series. Founded in 1971 by Dr. Tenn, the series brings scientists and engineers from throughout northern California (and occasionally from beyond) to the campus to present semitechnical descriptions of their work.

Last fall Stanford University professor Arthur Schawlow became the fifth Nobel laureate to speak in the series. His lecture, "Spectroscopy in a New Light," was a version of the Nobel lecture presented in Stockholm less than a year earlier.

Other highlights of the fall series were a description of surface physics "enlightened by synchrotron radiation" by Xerox Palo Alto Research Center scientist Stig Hagstrom, and the latest on the magnetic fusion energy program by a Lawrence Livermore physicist. A member of the Stanford team which may have discovered the long-sought magnetic monopole, a Berkeley cosmologist, and a Hewlett-Packard scientist working with liquid crystals also spoke.

The spring has seen the chairman of Stanford's electrical engineering department speak on the development of an artificial ear, a UC Berkeley physicist explain how properties of solids can be obtained directly from the Schroedinger equation, and a description of the recent discovery of a pulsar spinning 642 times per second by the Berkeley radio astronomer who found it.

Richard Bube, chairman of Stanford's materials science department, described solar cells, and a UC Davis physicist explained how he uses particle induced x-ray emission (PIXE) to study everything from air pollution to the Gutenberg Bible.

Not all of the speakers are visitors. Professors Rahimi, Spear, and Tenn spoke in the fall series, and student Geoffrey Wilson gave an account of his summer research at Argonne National Lab.

It is not unusual to find visitors from Berkeley, San Francisco, Ukiah, and even Eureka in attendance at the lectures. They help keep everyone in touch with the latest developments in research. What will the 26th series bring?

## Student Profile: John Palmerlee

The day after his high school graduation, John Palmerlee got his pilot's license. He has worked in and around airplanes much of the time since, but now he is studying physics at Sonoma State.

The road to SSU has been a twisting one—it is ten years since that high school in Eugene, Oregon. During that time John has worked in a pizza parlor, flown, studied physics for a year at the University of Redlands, earned an aircraft mechanic's license, been a counselor in a children's camp, refurbished antique aircraft, explored for caves and panned for gold in the Sierras, worked as an aircraft mechanic, played cornet, and hauled fish out of Bristol Bay, Alaska in his own plane.

John came to Sonoma State in 1981 from Sacramento. He was looking for a small university with small classes where he could get to know the faculty. Some of his friends were SSU grads and they recommended it to him.

John enjoys his studies here, and he is doing well. This spring he is especially enjoying statistical mechanics with Dr. Rahimi and scientific programming with Dr. Spear. In the latter class he is writing a program to calculate the attenuation of sound which carries over the top of a wall. As one might guess, the problem was suggested to him by the Department's acoustic specialist, Dr. Barnebey. Numerical complex integration is fascinating, according to John.

John Palmerlee expects to graduate in 1985. What then? He would like to start his own company to design and produce high efficiency devices, perhaps pedal cars.

## Meet Saeid Rahimi

by Kerry King

The newest member of the Sonoma State University physics and astronomy department is Dr. Saeid Rahimi.

His appointment was the result of a national search in 1982 for an experimental solid state physicist who would add strength to the department in both teaching and research.

What is solid state physics? Dr. Rahimi says that it is really "condensed matter physics," including both crystalline (structured) and amorphous (nonstructured) solids. It includes the study of the electrical, optical, and chemical properties of solids.

Dr. Rahimi's education began in Iran, where he was among the ten percent of the students selected to attend a university. He could have gone to medical school, but he chose to emphasize physics and engineering.

He received his B.S. from the University of Shiraz in 1971, and his master's degree two years later, with a thesis titled "Symmetry properties of ferroelectric materials."

After three years of college teaching in Iran, he came to the United States for further graduate study in 1976.

At Pennsylvania State University he was awarded the physics department prize for excellence in teaching as a graduate teaching assistant. He completed work for his Ph. D. in 1981.

Dr. Rahimi explained that his doctoral dissertation was on "Current-controlled processes at metal-semiconductor contacts."

"This was basic research in the electrical properties of such contacts. A series of experiments on different contacts on germanium agreed with the models developed for the cases of injection and extraction of minority carriers in the vicinity of Schottky barriers."

"While basic research in physics was the direction of that work, its possible application in solid state electronic devices was the source of funding," he added.

As a postdoctoral researcher at the Oregon Graduate Center, Dr. Rahimi conducted research on deep centers in gallium arsenide.

"The study of deep-level impurities in semiconductors has more direct application to devices than my Ph. D. dissertation," he explains. It was during the course of that study that he had a chance to become involved in projects of immediate interest to "high-tech" industries.

He published a review article on this field with Professor John Blakemore.

When asked what attracted him to SSU, Dr. Rahimi credited two of the university's outstanding graduates for bringing Sonoma State to his attention. Rick DeFreez, (BS, '80) and Bruce Odekirk (BS, '78) were among the graduate students he met in Oregon.

Dr. Rahimi's plans at Sonoma State include teaching and the creation of more research programs for students.

This spring he is teaching the senior course in statistical physics, the second course in the introductory calculus-based physics series, and two lower division labs.

According to one of his Physics 209B students, "Saeid is a considerate and knowledgeable physics professor who uses his dry wit to help make physics fun to learn."

Another student reports that she plans to take more physics because she no longer fears it.

"He takes a real interest in his students," and "I love his dry sense of humor," were the most common statements when students were asked about the new professor.

In the fall he will teach the senior course in solid state physics, Physics 214 again, and two more laboratories—Physics 209A and Physics 216.

The solid state course is designed "to prepare students for graduate school, for work in industry, or to take the new course on the physics of semiconductors." The latter course, already introduced into the catalog by the new faculty member, will be offered for the first time in the spring of 1984.

Dr. Rahimi has a number of independent study students. Their projects include theoretical and practical aspects of solar cells, instrumentation, and work on the construction of a semiconductor research laboratory.

The majority of this construction will occur in the summer when time and help will be more available.

In the future Dr. Rahimi intends to introduce students to more research on solar cells, perhaps in conjunction with local industry.

When asked, "What would you do for six months to a year, if you could," Dr. Rahimi's response was at first disbelief, then a snicker, then an answer: "research and reading." More time is always needed to keep up with the ever increasing speed of science expansion, he explained.

## Know Your Faculty: John Dunning

For relaxation Saeid Rahimi enjoys listening to music and reading newspapers.

Asked which person made the most difference in his life, he replied,

"My mother. She was the driving force of our family. As long as any of her children were in school, she worked very hard for them. She was always there for us."

Two of his brothers and his sister are engineers in Iran. The remaining brother teaches industrial engineering at Wichita State University.

The new professor's view of the SSU physics and astronomy department is that it "has potential for producing outstanding pure and applied physics graduates. It only needs more funding and faculty in various areas—and more equipment."

A native of New York, Dr. Dunning received his B.S. and M.S. at Yale before earning his Ph. D. in experimental high energy physics at Harvard. He stayed on at Harvard for three years of teaching and research and then came to Sonoma State in 1968. Here he became interested in nuclear and environmental physics. He likes to lead students to do their own experiments and to work independently in the lab. He established the nuclear and x-ray labs. His favorite course is probably Physics 100, where he has brought his enthusiasm and dramatic demonstrations to more than a thousand nonscience students. John has conducted research in geothermal energy and in coal gasification, and has spent summers learning new techniques at Los Alamos and Oak Ridge National Laboratories. Two years ago he spent a sabbatical at the Stanford Linear Accelerator Center working with synchrotron radiation. He is interested in biomedical applications of x-rays and hopes to upgrade the Department's x-ray lab soon. John lives in the country near Sebastopol.

## Know Your Faculty: Gordon Spear

Dr. Spear earned all of his degrees in astronomy, at the University of Pennsylvania, in his hometown of Philadelphia. While a graduate student he taught astronomy, physics, and meteorology at a small college. The research for his Ph. D. was conducted at Mt. John Observatory, in New Zealand, where Gordon was one-half the staff of the isolated observatory for nine months. Afterward he moved to Houston for research at the NASA Johnston Space Center and some teaching at the University of Houston. He helped establish the SSU Observatory in 1976 and has been its director ever since. He has introduced several courses into the curriculum, including the two advanced astronomy labs. He teaches all three labs and most of the other astronomy courses as well. For several years he has been in charge of the first physics lab course, that rigorous introduction to experimental physics, Physics 116. He regularly teaches programming for scientists and has taught two special topics courses in computing: FORTH and computer graphics. He supervises a number of students in individual research projects at the observatory and last year published a paper with two of them. Dr. Spear's current research interests include the evolution of interacting binary systems and variability mechanisms for emission-type B stars and Seyfert galaxies. Gordon and Barbara Spear and two-year-old Nicholas live in Rohnert Park.

## Alumnotes

Keith Brister (BS, physics, 1982) is completing a successful year as a graduate student and teaching assistant in physics at the University of California, Berkeley. Next year he will transfer to Cornell University where he will pursue a Ph. D. in applied physics.

## Alumnotes

Many of the Department's graduates have written recently, some in response to Dr. Tenn's annual questionnaire. Unfortunately, contact with a few graduates was lost. Graduates: Please notify the department of any change of address. You can even write without getting a questionnaire.

Mark Zimmerman (BS, 1982) is employed at Hughes Aircraft Company's Denver lab. Mark writes that he is working on the software for a microwave sensor that will fly on a weather satellite in 1985. The satellite will measure eleven different properties of the atmosphere every few kilometers over the entire earth's surface every twelve hours!

Michael Helm (BS, physics, 1982) is happily employed as an applications programmer for the superconducting magnet group at the UC Lawrence Berkeley Laboratory.

David Munton (BS, physics, 1982) is doing very well as a first year graduate student and teaching assistant at the University of Texas, Austin. He is enjoying taking electricity and magnetism from John Wheeler. Congratulations, Dave, on getting all A's your first semester.

Stephan Crandall (BA, physics, 1982) has been working for Mattel in the Los Angeles area, designing computer games for home computers.

Kitty Chelton (BA, physics & biology, 1981) is a graduate student in biophysics at the University of California, Davis. Kitty is working as a research assistant in nuclear medicine at the UCD Medical Center in Sacramento. She recently returned to the campus to describe her work at a meeting of the Society of Physics Students.

## Know Your Faculty: Duncan Poland

A native of Michigan, Dr. Poland earned his bachelor's degree at the University of Michigan and his Ph. D. in physical chemistry at the University of Wisconsin. He then spent two years on postdoctoral research at the National Bureau of Standards in Washington, D.C. He helped establish the Department when he came to Sonoma State in 1965. A specialist in solid state physics and electronics, he is currently updating his expertise while on sabbatical and preparing to teach the digital electronics course in the fall. It may be hard to tell that he is on sabbatical: he seems to appear on campus several days a week, often carrying his Osborne computer. An expert in helping the Department cope with the bureaucracy, he has served as department chairman twice, as chairman of the Division of Natural Sciences, as Dean of Faculty, and as chairman of several faculty committees. Duncan and Marion Poland and their two grown children live in Santa Rosa.

## Student Profile: Holly Wallace

by Mary Howland

Holly Wallace was a carefree world traveler unable to find a goal until her wanderings brought her face to face with some of the harsher realities of this world.

Now she is getting ready to do research at the Stanford Linear Accelerator Center.

Holly began traveling after she dropped out of the University of California, Berkeley, where she had majored in architecture for two years.

She took odd jobs and traveled to Mexico, Hawaii, Tahiti, Thailand, and India.

It was the journey to India that brought Holly to a turning point in her life. In a foreign land, surrounded by people trapped in a cycle of poverty, Holly began to appreciate the opportunities available to her back home.

"I saw how people in India struggle to survive, and I realized that the opportunity to choose what to do with my life is really a privilege," she explains.

Holly also decided that she wanted to do something significant with her time. She wanted to make a contribution to society. What would she do?

The answer came to her when she was housebound in Sri Lanka during the monsoon season. She recalls,

"I had been reading about Eastern religions, but I had finished all the books on that subject. There was only one book I hadn't read. It was The Tao of Physics, by Fritjof Capra. I was bored, so I started reading it."

Capra's somewhat mystical examination of physics was Holly's first encounter with the subject. She was fascinated.

"Something just clicked, and I had to learn more about it."

She returned to California and entered the physics program at SSU in the fall of 1979.

"I chose Sonoma State because it was a small university with an excellent physics department, and I needed to be away from the distractions of life in the Bay Area."

The study of physics has changed Holly's life.

"Before I came back to school I was undisciplined and unable to accomplish anything. Now most of my time and energy are devoted to my studies. It takes a real inner determination to keep me going through some of these classes," she adds.

When she receives her B.S. in physics in 1984 Holly expects to enter graduate school. She has not yet chosen a field, but she is currently interested in energy production.

In the meantime she will spend a summer at SLAC. One of just twenty students chosen from several hundred applicants for the summer program there, she will attend daily lectures by leading physicists and work on one of the SLAC research teams.

"This is a tremendous opportunity to see what it is like to do real physics," Holly notes.

She is unlikely to waste it.

## Alumnotes

John Philip Cabaud (BA, physics, 1980) is employed by the Jarrell-Ash division of Fisher Scientific Company as the company's field service engineer for northern California.

John P. Norton (BA, physics, 1974) is news editor of the Pueblo Chieftain, in Pueblo, Colorado.

Greg Seeger (BS, physics, 1974) is now employed as a software development engineer at ElectroScale, Santa Rosa.

Eileen Leidel (BA, physics & English, 1977) wrote last year that she was working as an associate engineer with Ford Aerospace, Palo Alto.

## Physics Students Win Scholarships

Four physics majors were among the winners of University Scholarships last year.

University scholarships, for "outstanding scholastic achievement over the last thirty units," are awarded on a competitive basis each spring for the following academic year.

Among the 1982-83 winners were the following physics majors:

Joanne del Corral won the Joe S. Tenn scholarship. This award, made each year to a physics major, is donated by Dr. Tenn's brother and sister-in-law as a birthday present to the professor. Joanne will receive a B.S. in June 1983 and then enter the teaching credential program. She declined a graduate assistantship at Worcester Polytechnic Institute when she decided to become a high school teacher.

Mary Howland was awarded a Forrest and Ida Benson scholarship, one of a number provided each year by the local philanthropists. A journalism graduate of San Jose State University, Mary is seeking a second bachelor's degree in physics before embarking on a career as a science writer.

R. Jeff Porter, a double major in physics and environmental studies, won the Kenneth Stocking scholarship, awarded annually to honor the professor who founded the School of Environmental Studies and Planning.

Geoffrey A. Wilson, a junior majoring in physics and chemistry, was awarded a Joyce Sallady memorial scholarship. These awards are made with funds contributed by faculty of the School of Natural Sciences in memory of the former administrative assistant.

Current student Joanne del Corral described her work last summer at the Stanford Linear Accelerator Center. She worked on Fourier analysis of permanent magnetic quadrupoles.

And SSU graduate Kitty Chelton described her research as a graduate student in biophysics at UC Davis.

The SPS toured two research labs during the year. In October students and faculty visited the laser fusion and tandem magnetic fusion projects at Lawrence Livermore National Laboratory.

During the January break students toured Dr. Richard Packard's low temperature lab on the UC Berkeley campus, admiring facilities where temperatures as low as half a milliKelvin have been reached in experiments on fourth sound. On the same day the group toured the Lawrence Berkeley Lab and observed the successful attempt to fuse gold foil to quartz glass with low energy ion beams from the 88-inch cyclotron.

Other SPS activities included a talk by Dr. Joe Tenn on how to prepare for and choose a grad school and several films and videotape presentations.

Membership in the Society of Physics Students is "a great buy at only \$10" according to Tom Foss. Members receive a subscription to Physics Today and the SPS newsletter as well as discounts on a number of technical journals and such popular magazines as Scientific American and Astronomy.

## Know Your Faculty: Joe Tenn

A native of southern California, Dr. Tenn earned his bachelor's degree at Stanford University. He then joined the Peace Corps and became a member of the first group of volunteers to go to Ethiopia. For two years he taught math and physics to tenth graders in Addis Ababa. He earned his Ph. D. in theoretical physics at the University of Washington with a dissertation on the theory of liquid helium. After coming to Sonoma State from Seattle in 1970 he became interested in astronomy and astrophysics; he now teaches about half physics and half astronomy. He initiated both the historical course on the discovery of the galaxies and the course on the latest discoveries, frontiers in astronomy. In the mid-1970s he took two advanced courses in astrophysics and spent portions of three summers on research in stellar spectroscopy at the Lick Observatory. He enjoys teaching mathematical physics, and next year he will teach the senior course in quantum physics. He founded the "What Physicists Do" lecture series and has directed it for nearly all of its 25 semesters. For several years he has been academic advisor to all physics majors. Joe and Eileen Tenn live in Santa Rosa with Shanna, 10, and Steven, 8.

## Society of Physics Students

This year was a busy and productive one for the local chapter of the Society of Physics Students. Under the leadership of Robert Ohlson and Tom Foss, the SPS held meetings, field trips, and a spring picnic.

The chapter started the year with a lecture by Dr. Tom Barnebey on his work as principal (and only) scientist of Sound Solutions acoustical consulting services of Santa Rosa. Tom told SPS about acoustics problems he has worked on for Bay Area clients.

Also from the private sector, two of the Department's graduates, Tim Engel and Keith Soreng, described their careers as engineers with Optical Coating Laboratory, Inc. and Fairchild, respectively.

## Know Your Faculty: Tom Barnebey

Dr. Barnebey is from southern California. He earned his B.S. in physics and astronomy and his Ph.D. in theoretical physics at UCLA. A musician and composer as well as a physicist, he worked as a professional musician before coming to Sonoma State. He is interested in gravitation and field theory and in many fundamental problems in theoretical physics. Tom has taught off and on in the department since 1974. He also runs his own business, Sound Solutions acoustical consulting services, in Santa Rosa. He teaches the physics of music course, the general education laboratory course (which he developed), and a great many courses in theoretical and experimental physics. Students looking for a project can always get an idea from him. Tom and Jan Barnebey live in the country at the north end of Santa Rosa.

## Student Profile: Jeff Porter

R. Jeff Porter has long been interested in energy. He came to SSU as an environmental studies and planning major, soon switched to physics, and by last summer was conducting research with solar cells.

This spring Jeff will graduate with a B.A. in physics and a minor in ENSP.

Last summer Jeff was selected to participate in a National Science Foundation supported undergraduate research program at Arizona State University.

Initially he worked on a project dealing with the performance of solar cells at different illumination levels. Jeff used a concentrating solar cell test bed system, tracking the sun all day and focusing light upon a single solar cell. One of his major problems was keeping the cell cool in the hot Arizona sun.

The experimenters evaluated the performance of each cell at different illumination levels throughout the day. Continuous testing was necessary because, in accordance with the requirements of a Department of Energy grant, manufacturers submitted a number of new experimental cells as the experiment progressed.

Jeff also worked on a spectral response project with solar cells. He described the work: "The spectral response test determined the amount of power generated in the cell by a beam of light from a narrow portion of the solar spectrum. By comparing the results from each of eighteen filters, a sensitivity graph was constructed. These data could then be used to compare one experimental solar cell to another, giving manufacturers a feedback loop."

Currently, Jeff is pursuing an independent study project under the guidance of Dr. Rahimi. Jeff is studying Schottky barrier solar cells. These cells differ in that they utilize metal to semiconductor junctions rather than the semiconductor to semiconductor (p-n) junctions used in conventional cells. Jeff is reading much about semiconductors and about solid state physics in general.

Jeff Porter's immediate goals include finding a technical position, preferably with a solar cell manufacturer. A more distant possibility is graduate school.

For relaxation Jeff enjoys playing his guitar. His greatest enjoyment, however, is the sun.

## Alumnotes

Mary Silber (BS, physics, 1981) is just completing her second year of graduate study in physics at the University of California, Berkeley. She is starting research in submillimeter astronomical spectroscopy.

Rick DeFreez (BS, physics, 1980) is pursuing a Ph. D. in applied physics at the Oregon Graduate Center. Rick is the coauthor of a paper appearing in the April 1983 issue of the Journal of Applied Physics and of two contributed papers presented at the 1983 Conference on Lasers and Electro-Optics. He is continuing the work on remote detection of methane in coal mines which he began as an American Physical Society summer intern while a student at SSU. Rick has a research contract from Bethlehem Steel Company.

Dr. Bruce Odekerk (BS, physics, 1978) received his Ph. D. in applied physics from the Oregon Graduate Center in 1982. Bruce's dissertation was titled "Electronic characteristics and photoelectrochemical activity of extrinsic ceramic strontium titanate and titanium dioxide." Now a postdoctoral researcher at Southern Methodist University in Dallas, Bruce is the fifth SSU physics grad to earn a doctorate. Congratulations!

Dr. Paul Goodwin (BS, physics 1971) is now associated with Psycho-tech Corporation in Anchorage, Alaska. Paul reports that he is developing a model of the human brain from the standpoint of mathematical physics. The goal is to develop a computer that can "think."

Robert P. Lucas (BA, physics & chemistry, 1976) founded Solar Energy Engineering, Inc. in Santa Rosa shortly after his graduation from SSU. President of the growing company for seven years now, he is engaged in manufacturing solar energy panels and related equipment.

William F. Cabrall (BA, physics, 1976) writes from Colorado that he is working for Martin Marietta Aerospace as a systems engineer integrating secondary payloads on the space shuttle.