



THE PHYSICS MAJOR

Lynn Cominsky to Join Department

The SSU department of physics and astronomy has just completed a nationwide search for a new faculty member to replace Dean Richard Karas. The result was the appointment of Dr. Lynn Cominsky as associate professor of physics and astronomy.

Dr. Cominsky graduated from Brandeis University in 1975, magna cum laude in physics with honors in chemistry. She worked the next two years at the Harvard-Smithsonian Center for Astrophysics where she analyzed data from the UHURU x-ray satellite and helped prepare the fourth UHURU catalog of astronomical x-ray sources.

Dr. Cominsky then resumed her education at MIT, where she received her Ph.D. in physics in 1981. As a graduate student she frequently worked as "duty scientist," sending commands to the SAS-3 satellite. She discovered the x-ray pulsar which became the first transient x-ray source to have a measured binary orbit.

Following the re-entry of SAS-3 into the earth's atmosphere in 1979, Dr. Cominsky coordinated the 1979 and 1980 Worldwide X-ray Burst Watches. Optical watchers on the ground, in conjunction with a Japanese x-ray satellite, found ten objects which emitted bursts in visible light and x-rays simultaneously. The data have yielded binary properties of these objects.

After completing her Ph.D. dissertation, "X-ray Burst Sources," Dr. Cominsky moved to California to begin postdoctoral research at the UC Berkeley Space Sciences Laboratory. There she discovered the first eclipses from an x-ray burst source. She also developed computer codes to study diffusive radiation transfer in the atmospheres of stars heated by x-ray emitting companions. Her code has been used to calculate optical bursts from thirty-five varieties of binary systems.

(continued on back page)

Poland Returns from Vice-Presidency

After two years as acting vice-president of Sonoma State University, Dr. Duncan Poland will return to full-time duties in the department of physics and astronomy in the fall.

"I have missed the interaction with the students and the involvement with physics. I am looking forward to my return to those activities," Poland stated.

His colleagues welcomed him back by electing him department chairman.

Dr. Poland was never totally away. Despite a heavy load of administrative duties he managed to teach one course each year while in the administration. In Fall 1986 he will teach the digital electronics laboratory, the modern physics lab, and Physics 214, the second course in the calculus-based introductory sequence.

Welcome back, Duncan!

Faculty Win Awards

Two members of the SSU physics and astronomy faculty are prize-winners.

In 1985 the California State University system began granting \$2500 awards to faculty for Meritorious Performance and Professional Promise. One of SSU's twelve winners the first year was Dr. Saeid Rahimi.

In 1986 both Dr. Rahimi and Dr. Joe Tenn won MP³ awards.

This year the first annual Friends of the SSU Library Faculty Award for scholarly achievement went to Dr. Tenn. This award consists of \$500 to be spent on library acquisitions of the winner's choice.

Rahimi Awarded Grant

Dr. Saeid Rahimi has been awarded a grant from the College Science Instrumentation Program of the National Science Foundation. The \$17,000 award is matched by Sonoma State University, so a total of \$34,000 is being used to enhance the physics and astronomy department's solid state laboratory.

The purpose of the award is to improve the quality of semiconductor characteristics measurements in Dr. Rahimi's physics of semiconductors course.

Grant funds have been used to purchase five Micro Miniature Refrigerators (MMRs) to enable students to carry out measurements at temperatures down to that of liquid nitrogen (77 K). This will complement existing high temperature capabilities. Dr. Rahimi plans to have five stations, each equipped with an MMR, other instruments, and a microcomputer for data acquisition and analysis.

A lock-in amplifier and a light chopper for use in photoconductivity experiments have been ordered. The grant will also provide five printers to facilitate data manipulation and curve plotting for the students as they perform their experiments.

The solid state lab is growing in more ways than one. The Darwin basement is being remodeled so that next year's students will use the new equipment in an enlarged lab.

New X-ray Detector

by John Dunning

This fall we look forward to the arrival of a new x-ray detector in our physics program. We are fortunate to be able to expand our offerings in both the quantum laboratory and in the applied nuclear laboratory.

The detector is a semiconductor diode made of ultrapure germanium. When operating it is cooled to liquid nitrogen temperature and run as a reverse biased diode. An x-ray photon interacting in the diode will upset the equilibrium. This upset is proportional to the energy deposited. It will be recorded using our recently purchased multichannel analyzer system.

In our popular quantum physics lab, Physics 316, we will be able to offer expanded x-ray fluorescence work. Here the new detector will replace an older silicon system. The energy range will be doubled. This will improve an already interesting Mosley's law experiment. Additionally, the higher resolution of the new system will allow the fine structure lines of the heavier elements to be directly separated for the first time at Sonoma State.

We will also be able to offer new experiments in the applied nuclear lab course. Here the new detector will be part of a second independent germanium system. It will have very high resolution in the 20 to 200 keV energy region. The radioactive decay of plutonium and uranium both produce x-rays in this energy region. Their presence can now be detected. Swedish scientists apparently used this approach to confirm the existence of plutonium in the dust from the Russian reactor accident.

Neutron activation is an exquisitely sensitive and simple technique for measuring trace element concentrations. Many isotopes which emit gamma rays in the 20 to 200 keV region can now be detected.

New student projects will be available in several areas. In fact, we need help designing some of the auxiliary equipment such as a low background counting chamber and the x-ray system target assembly.

All in all we look forward to an exciting fall semester.

Observatory Anniversary Celebrated

On May 1, 1986, the SSU physics and astronomy department celebrated the tenth anniversary of the university observatory.

Dr. E. Margaret Burbidge, one of this planet's leading astronomers, was the principal speaker at the celebration. Known as one of the quartet, B²FE, who first explained how the chemical elements are produced in stars, Burbidge has made significant observations of stars, galaxies, and quasars. Now director of the Center for Astrophysics and Space Sciences at the University of California, San Diego, she has also been director of the Royal Greenwich Observatory, president of the American Astronomical Society, and president of the American Association for the Advancement of Science.

At Sonoma State, Dr. Burbidge spoke on "Observing the Universe Today and Tomorrow." She reviewed how we gather information about the universe from telescopes and solar system missions, and she spoke hopefully about the forthcoming Hubble Space Telescope, for which her group has built one of the principal instruments.

The celebration included a review by observatory director Gordon Spear of the observatory's first decade. Perhaps the most astonishing figure he presented was the fact that Miriam Carolin has observed on 604 of the 1203 nights that the observatory has been used. Many humorous anecdotes about the observatory were presented.

More good stories about observing at the SSU were told by Donald Martin, '83, who came back from Kitt Peak to present a student's view.

University President David Benson welcomed the hundred or so guests. A beautifully decorated cake designed by Teresa Bippert Plymate, '84, who also flew in from Tucson for the occasion, and abundant champagne kept the guests from being too unhappy over the only no-show: Halley's Comet, hiding behind clouds.

THE PHYSICS MAJOR No. 11 May 1986

Published by
Department of Physics and Astronomy
Sonoma State University
Rohnert Park, CA 94928
(707) 664-2119

Edited by Joe Tenn

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Physics Majors Excel in Math Contest

by Duane Strawser

All of the Sonoma State University students who scored points on the 1985 Putnam Exam were physics majors. Chris Ray, Doug Epperson, and Brian Nottingham won local cash awards, while Ken Ritley was fourth. Ray and Nottingham are double majors in physics and mathematics.

The Putnam Exam tests creativity and problem solving ability rather than theoretical knowledge. Regarded as a major international competition, the Putnam Exam began in 1939 and is run by the Mathematic Association of America.

Funded by the estate of William Lowell Putnam, this year's competition drew 2079 contestants from 348 institutions from throughout the United States and Canada. Ray placed in the top 164 with an overall ranking of 326 and received a local prize of \$1000; Epperson received \$150, and Nottingham won \$100.

Local prizes come from a fund established by SSU math faculty.

"This year's team did an outstanding job," commented Rick Luttmann, professor of mathematics and coordinator of SSU's competitors. "Placing in a top percentage is very hard in this contest, considering the competition. These students should be recognized for their achievements."

Sonoma County Supervisors Helen Rudee and Jim Harberson attended the ceremonies where the prizes were handed out. Natural Sciences Dean Don Farish presided, and SSU President David Benson presented the awards.

This was the sixth time in the last seven years that physics majors won the top local award. Highest scorers at Sonoma State were Chris Ray (physics and mathematics), 1985 and 1984, Geoff Wilson (physics), 1983 and 1982, Doug Brown (mathematics), 1981, and Richard Montgomery (physics and mathematics), 1980 and 1979. Wilson is now a graduate student in applied physics at Stanford University, and Montgomery is solving physics problems as a graduate student in mathematics at the University of California, Berkeley. Ray has one more year at SSU.

Scholarships Available

Each year Sonoma State University awards a number of scholarships based on academic merit. The awards, contributed by local companies and individuals, are mostly in amounts of \$500 or \$1000. One scholarship, the Joe S. Tenn Scholarship, is always awarded to a physics major. It has been donated by the professor's brother and sister-in-law each year since 1980 as a birthday present to him. Of course physics majors are eligible for nearly all of the other awards as well.

The only physics major winner of an SSU scholarship in 1984-85 was Ken Ritley, who won (what else) the Joe S. Tenn Scholarship. In 1985-86 Ritley won the Tenn Scholarship again, and Peter Rooney was awarded an Edgar & Beulah Dryden Scholarship.

There is no reason why physics majors shouldn't win many more scholarships. All they have to do is compile excellent academic records and apply. Applications for each academic year are due in mid-March of the preceding year.

Joel Drake Hawaii Bound

"I have lived in Rohnert Park since I was seven years old," says Joel Drake. "It is time to move on."

So the senior physics major applied to five graduate schools, all far away. All offered him assistantships to pay his way to a Ph.D. After considering such schools as Georgia Tech and Auburn, Joel decided to accept an offer from the University of Hawaii. He plans to pursue research in elementary particle physics or fusion after earning his doctorate. Best wishes, Joel.

Karas Takes Leave, Deanship

by Mary Jane Pahls

In March 1984 Dr. Richard Karas became a consultant to ComputerLand's international division. His project--putting together a personal computer training course for computer technicians in Beijing, China--grew into full-time work by summer, and he was granted a year's leave of absence to try out the fast pace of the business world.

The training course project led to Dr. Karas' becoming technical coordinator for a computer exposition that summer in Beijing. Appointed director of technical services for ComputerLand China in the fall, he began traveling back and forth between the Chinese capital and the Bay Area every four to five weeks.

In China Dr. Karas trained the ComputerLand sales force and Chinese technicians, managed sales engineering, and provided spare parts for the computers. Back in the States he dealt with vendors and acted as liaison to the U.S. Commerce Department, handling the complex business of export regulations. He also negotiated many of the service contracts for businesses in China and trained Chinese technicians to service products under ComputerLand's warranties.

Although Dr. Karas enjoyed the excitement and challenge of working in China, he found that the hectic commuting made family life difficult, and he missed ties to the academic community. So when he learned of an opening for Dean of Administrative Services at SSU he decided to apply. In August 1985 he returned to the campus as an administrator.

The new job keeps Dr. Karas as busy as ever. He is responsible for institutional research, admissions and records, financial aid, the computer center, and media services. He also sits on several campus-wide committees and carries out other assignments for President David Benson.

Those who know Richard Karas (SSU's Outstanding Professor in 1977-78) will not be surprised that he has made time to teach one class each semester since assuming his new position. He believes that "a Dean needs to be in the classroom to be aware of what's going on in the university."

He is currently teaching digital electronics. In the fall he will return to an old favorite, Physics 210 General Physics. He looks forward to the course because it attracts students from a variety of fields, especially those interested in the health professions and environmental studies.

How I Spent My Sabbatical Year

by Joe Tenn

I enjoyed a sabbatical leave during the 1984-85 academic year. My professional activities away from Sonoma State actually began during the summer of 1984 when I served as the director of the Summer Science Program at the Stanford Linear Accelerator Center. This is an affirmative action program which brings eighteen to twenty undergraduate students to SLAC each summer. I was invited to direct the program because I had written letters of recommendation for a number of SSU students who had successfully participated in the program.

During my stay at SLAC I supervised students from throughout the country, served as liaison between them and their research supervisors, and presided over a morning lecture series which brought scientists and engineers from SLAC and nearby institutions to explain their work. I also accompanied the students on field trips to a number of Bay Area scientific institutions.

I spent the academic year visiting the University of Massachusetts, Amherst. During the fall semester I taught one course, the equivalent of our Physics 114 (Introduction to Physics I), through Extended Education, and it was useful to see other students in the same course. I became acquainted with the way this course--among others--is taught at a large university, and I must say that students here have an advantage. Every problem set and every test in the regular course there is machine-graded multiple choice. The instructor is conscientious and hard-working, but he lectures to 300 students at a time. Laboratory work is minimal compared to what our students get.

At U Mass I audited courses in electricity and magnetism and quantum mechanics. I came away with some useful problem sets and ideas.

One of the greatest benefits of the sabbatical was having time to converse with other physicists and astronomers, to attend colloquia, and to read. I visited other departments as well. At Clark University I gave a colloquium, "Thoughts on the Undergraduate Physics Curriculum." Only about 0.4% of the nation's undergraduate college students major in physics; at Sonoma State the figure is 2.0%. It is quite possible that we lead the country in the percentage of physics majors, and others are interested in how we do it.

I attended a three-day symposium on modern astrophysics at Cornell University where I met many of the world's leading astrophysicists. I also visited Keith Brister, '82, who is now a graduate student at Cornell. In addition I attended a meeting of the American Physical Society in Washington, D.C. in April.

I visited faculty at Amherst College, Smith College, Mt. Holyoke College, Wellesley College, Harvard University, and the U.S. Naval Observatory.

On the way home I visited the Yerkes Observatory in Wisconsin.

A considerable amount of my time, especially in the spring, was spent on research in the history of astronomy. With access to the wonderful old libraries of the Massachusetts colleges, I wrote three articles for astronomy magazines. The first, "The Hugginses, the Drapers, and the Rise of Astrophysics," won fourth prize in the annual essay contest sponsored by the *Griffith Observer* in 1985. I gave colloquia on the topic to the Astronomy group and also to the freshman physics majors at U Mass. I gave a similar talk in the "What Physicists Do" series at SSU in November.

Another article, "Simon Newcomb," won honorable mention in the 1986 *Griffith Observer* essay contest. Both articles will appear in the magazine soon. The remaining article, "The Catherine Wolfe Bruce Gold Medal of the A.S.P." has been accepted for publication in *Mercury*, the journal of the *Astronomical Society of the Pacific*.

My sabbatical year was both productive and enjoyable. My only regret is that I waited fourteen years to take one.

Stellar Research by Spear

When SSU Observatory Director Gordon Spear goes on sabbatical leave next year he will not lack for things to do.

The busy astronomer has been gathering data for years, and much of it is ready for analysis.

His longest-running program is a study of Be stars. Several observing runs at Mt. Laguna Observatory of San Diego State University have already led to publication of periodic behavior in some of these stars. The latest run found student Lydia Fowler assisting in the observations.

Last year Dr. Spear began participating in a unique program. The McMath Telescope, part of the national observatory complex on Kitt Peak near Tucson, was designed and for a long time used for solar research only. Then someone realized that it could be used to obtain extremely high dispersion spectra of moderately bright stars. Since then the telescope has been used day and night. The first night operator was SSU graduate Don Martin, '83. Don's job was to gather data over long periods for various astronomers. Dr. Spear became one of those users and obtained spectra of all the Be stars in the northern sky. When he analyzes those spectra next year he expects to find evidence of more periodic behavior.

In June Dr. Spear will make another trip to Arizona. He intends to survey a number of sunlike stars, using the enormous dispersion of the solar telescope to examine one of the spectral lines of oxygen. Information obtained could shed new light on the question of convection in stellar atmospheres. Again, some of the data will be obtained by a resident observer, and again, that observer will be a Sonoma State graduate. Don Martin has moved on to the bigger telescopes, but Claude Plymate, '81, is now the night observer on the McMath.

There is likely to be much more for students to do when Dr. Spear returns in a year. After all, both these research projects are sidelines; the main objective of the sabbatical is to learn more about imaging systems preparatory to installing a CCD system on the SSU Observatory telescope.

Students Selected for Summer Programs

Each year a number of national laboratories and other institutions provide programs whereby undergraduates can participate in research during the summer.

Most of the programs are quite competitive. A handful of participants are chosen from a large number of applicants from throughout the nation.

And nearly every year SSU physics students are among the winners.

In 1984 Lou Sanchez-Chopitea was chosen for the program at the Stanford Linear Accelerator Center. Lou did so well that he was invited back to work at a regular position during the following summer; this year he has been working one or two days a week at SLAC during the academic year.

Also in 1984 Michael Bick worked in the summer program at the Lawrence Berkeley Lab.

In 1986 it will be Allyson Bishop, selected by the Argonne National Laboratory in Chicago for its summer research program.

Student Profile: Peter Rooney

Guess which SSU physics major is a junior high school dropout? Hint: He will receive his B.A. with Distinction and Cum Laude. Another hint: Five graduate schools, including UC San Diego, Stanford, and Texas, are eager to support him through graduate school. (He has accepted UCSD's offer.)

Peter Rooney has followed an unconventional path. The Massachusetts native dropped out of the eighth grade to work on a Nevada ranch. When he returned to Boston after a year he found high school boring, so it was off to work. While still a teenager he joined with a few partners to found what quickly grew into a multimillion dollar chain of natural foods stores.

The next few years found Peter starting a logging company in Maine and supervising construction projects. In 1982, at age 25, he decided to get an education.

"I went to Harvard summer school, took a biology course, enjoyed it, and decided to prepare for medical school."

Peter's mother lived in Sebastopol, and she sent him information about Sonoma State, including the fact that admission was fairly open. Perhaps his high test scores could make up for that lack of a diploma.

He entered as a chemistry major with the intention of transferring as soon as possible. He applied for admission to Harvard, Stanford, and UC Berkeley, and was admitted to all three. Homesick, he thought, for New England, he went back to take a summer course at Harvard.

He never enrolled. "I found that I had changed. I couldn't stand the New England environment anymore. So I accepted Berkeley and went off to Utah for the summer."

A serious illness forced him to drop out of Berkeley during the fall semester. Spring found him back at SSU.

"I had no intention of coming back here, but I still wanted to go to medical school, and only at Sonoma State could I take the first and second semesters of organic chemistry at the same time."

"Coming back really made me appreciate Sonoma State. The contrast between here and Berkeley is striking. Resources at Sonoma State are more accessible to the student."

He was still a chemistry major intent on medical school. He enjoyed organic chemistry but happened "almost on a whim" to take the modern physics course.

"Physics seemed so mysterious to me that I took 314 to complete the introductory sequence. Tom Barnebey taught that class, and all of us worked very hard. It was the hardest class I had that semester. We all had such fun in there and it was such a stimulating class that I switched majors to physics."

The choice has obviously agreed with Peter Rooney. Only one B and two A-'s (none of them in physics) keep him from graduating with a perfect grade point average.

He is not sure what he will specialize in at UCSD. Theoretical physics seems likely.

"I went the BA route because it was more flexible for me. I wanted all the theory courses, but I didn't have time for electronics." He has enjoyed advanced labs, though, including Dr. Greene's course in lasers and holography and Dr. Rahimi's semiconductor course. He has also been working on some temperature-dependent Hall effect measurements using the microminiature refrigerator in the solid state lab.

His physics studies have no specific goal as yet. "Basically, I am pursuing intellectual curiosity," he concludes.

Alumnotes

KEVIN ABLETT (BS, 6/83) is an engineer at Optical Coating Lab, Inc., Santa Rosa.

GEORGE AMORINO (BS, 1/86) is a graduate student in biomedical engineering at California State University, Sacramento. He plans to specialize in the design and application of diagnostic and therapeutic systems for cancer patients. George writes, "The Senior Design Project for the Applied B.S. was extremely beneficial, since I learned how to take a practical engineering problem and reduce it to some general optimization and compromise decisions."

SCOTT C. ANDERSON (BS, 1/78) is a self-employed software writer in Sonoma County. His latest program, Fantavision, is distributed nationally by Broderbund Software. Scott demonstrated this animation program in the "What Physicists Do" series May 12. It was easy to see why it has sold 20,000 copies.

NORMAN BASHAM (BA, 6/85) is a programmer with the Briareus Corp. in Los Angeles.

ROLAND BEGIN (BS, 6/80) is a technical consultant for ETA Systems, Inc. in St. Paul, Minnesota, where he develops courseware for the ETA 10 supercomputer. Roland earned an M.S. in physics at Colorado State University in 1984. He writes, "There is an enormous market for people having skills in both physics and numerical analysis and interests in new algorithmic development for vector and parallel supercomputers."

MICHAEL BICK (BS, 6/85) plans to begin graduate school in physics at San Francisco State University in Fall 1986.

WPD Series Brings Speakers

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It's 3:30 on a Monday afternoon. Miriam Carolin has brewed another strong urn of coffee and brought out the cookies. Students and faculty begin to gather outside Darwin 108 to meet the speaker. Who is it this week? An astronomer describing the latest planetary mission or a forthcoming satellite experiment? an industrial scientist explaining how optical memories work? or perhaps a Nobel laureate describing his work and the resulting trip to Stockholm.

More visitors arrive, including many from off-campus. It is not unusual to see visitors from Kelseyville, Oakland, and San Francisco, or even from Eureka. It's time for "What Physicists Do."

The popular lecture series, now in its 31st semester, has brought all of the above and more to the SSU campus. In March 1986 William A. Fowler of Caltech became the sixth Nobel laureate to speak in the series. (Fowler's visit to the campus included a memorable luncheon sponsored by the Society of Physics Students where many students got to chat with the pioneer nuclear astrophysicist.)

Lecturers are asked to present their talks at the level of *Scientific American*. Students learn about everything from career opportunities in biomedical engineering to the latest attempts to detect extraterrestrial intelligence. Speakers come from industrial labs and from such research centers as Stanford University, the University of California, Berkeley, NASA Ames Research Center, and the Lawrence Livermore National Laboratory.

Professors Sam Greene, Gordon Spear, and Saeid Rahimi directed the series from Fall 1984 through Fall 1985, while series founder Joe Tenn resumed direction in Spring 1986. The series motto will remain the same: *Physics is what physicists do late at night.*

George Amorino, A system for the observation of cadmium-radiation sensitization in sodium-deficient bacteria. (Dr. Dunning, 1985)

J. Keith Gamble, Construction of pulsed dye laser. (Dr. Greene, 1985)

The following policy will govern all future Senior Design Projects:

The Senior Design Project has been established to provide students with an opportunity to gain experience with engineering concepts. While the project need not result in a piece of functioning hardware, a formal written report and oral presentation are required. The report must include a detailed design for the project. The report will normally consider such factors as efficiency, cost, practicality of the project as well as quantitative projections about performance. The report should be sufficiently detailed so that another student could unambiguously reproduce any calculations (or build the hardware) at a later time. A copy of the Design Project Report must be submitted to the Department Chair or his or her designee so that a permanent record of all Senior Design Projects may be maintained by the Department of Physics and Astronomy.

Senior Design Projects will often involve electronics and computer applications, but may also involve optics, astronomical or nuclear instrumentation, or other areas of physics. Students are expected to have completed appropriate coursework prior to beginning the Design Project. Before registering for the Senior Design Project a student must complete the application form, secure the support of a faculty supervisor, and obtain the required departmental signatures.

THIS APPLICATION PROCESS MUST BE COMPLETED IN THE SEMESTER PRECEDING ACTUAL REGISTRATION IN THE COURSE.

Dr. John Dunning will serve as the Department Coordinator for projects in Fall 1986. Students interested in undertaking projects then should contact him.

Senior Design Projects Popular

When the Department instituted the Applied Physics concentration within the B.S. program in physics in 1984 it established a new course. Physics 493 Senior Design Project is required for those students who wish to earn the B.S. with the concentration in Applied Physics.

Senior Design Projects completed to date, and the supervising professors are

David Fassett, *Presentation and session level software interface for a simple local area network.* (Dr. Karas, 1984)

Milton Hagler, *Antenna pattern measurements on an operating PAM radar.* (Dr. Poland and Ross Goodwin, '78, Hewlett-Packard Co., 1984)

Tom McBride, *Hardware design of a simple local area network.* (Dr. Karas, 1984)

Greg Melancon, *Low level software design for a simple local area network.* (Dr. Karas, 1984)

John Palmerlee, *Modeling of an infinite line source of sound.* (Dr. Barnebey, 1985)

New Laser Experiments

SSU'S laser program, under the direction of Department Chairman Sam Greene, continues to grow. Each spring the laser and holography course is offered, and each spring there is a new experiment or two.

Currently, students Susan Osborne and Harvey Hecht are pursuing a new project in laser spectroscopy. Using some equipment from the chemistry department in conjunction with the physics and astronomy department's five-watt argon laser, they are observing and measuring fluorescence in iodine atoms.

Meanwhile, Barbara Kelly and Mark Robinson are making a wraparound white light hologram, one in which the image changes as the viewer walks around a cylinder.

Other students are levitating an oil drop on a beam of laser light or using a laser beam to transmit information using Raman diffraction from acoustic waves in water.

Senior physics student Allyson Bishop will attend graduate school at UCLA in medical biophysics in September. Allyson, who won a fellowship, transferred to SSU from the University of California, Davis as a freshman.

Allyson entered Sonoma State undecided whether to major in physical education or to become a physical therapist. She decided to take general education courses first. That is how she happened to take Physics 210 General Physics from Dr. Richard Karas.

"I was inspired by the class," she explains in her gentle tone. Intrigued by how mathematics applied to reality, she decided that physics was what she wanted to study.

"Dr. Karas always made it a point to use practical examples, and I rather liked that," she says. This appreciation for the practical explains her liking for lab work. Allyson particularly remembers the modern physics lab, Physics 316, and its spectroscopy experiment.

"Paula Bennett, my lab partner, and I spent a long time working on that particular experiment. When we finally finished, it was a major accomplishment and a great personal satisfaction."

"I am glad, now, that I chose physics as my major, and especially that I came to Sonoma State. I like the atmosphere of a small school, the personal attention, and the access to equipment for experiments. I have always enjoyed the instructors in the Department, and their general method, which is an emphasis on problem-solving and techniques, rather than on memorization of facts. My favorite class? That was Physics 481 and 482, Applied Nuclear Chemistry and Physics and its lab."

"I won't deny it," she laughs. "I was born in Oakland. And we've lived in areas like Monterey and Burlingame, but mainly I have lived in Rohnert Park since I was five years old." She describes herself as one who is always willing to "try new things," and this includes trying to improve her recipe for chocolate chip cookies, something she is obviously very proud of. When not devoting time to making cookies, measuring radiation in the lab, or studying for exams, she likes to bicycle.

Allyson's interest in the medical field stems from the fact that her mother, grandmother, and several aunts are all nurses. She hopes to work in a medical center after finishing graduate school, and although not exactly sure what her specialty will be, she knows it will have something to do with radiology.

Alumnotes

WILLIAM F. CABRALL (BA 6/76) works for Martin Marietta in Colorado as a systems/project engineer on the space station. Bill earned an M.B.A. in finance at the University of Denver in 1985.

KITTY CHELTON (BA, 6/81, physics and biology) is a radiophysicist at the Laboratory for Energy-Related Health Research at the University of California, Davis. She earned a Master's Degree in biophysics at UC Davis in 1985. Kitty writes, "My strong background in nuclear physics from SSU is the basis for the work I am doing now."

JOANNE del CORRAL (BS, 6/83) has been teaching part-time in the SSU Department of Physics & Astronomy. She and her husband, Department Technician Steve Anderson, are expecting a little physicist in October.

RICK DeFREEZ (BS, 1/80) is an assistant research professor at the Oregon Graduate Center, where he earned his Ph.D. in applied physics in 1985. He now conducts research in high power semiconductor lasers as well as remote sensing. Next year he will teach at Portland State University while continuing his research at OGC.

JAMES EYER (BA, 1/83 physics and management) works for Pacific Gas & Electric Company in Belmont. As a conservation representative he performs energy use surveys and helps promote energy conservation by commercial customers. Jim is also working on an M.A. in Management at SSU. He writes, "Both my computer-related courses and my energy courses have helped me immensely. I consider my physics education to be invaluable."

TIMOTHY FINNEGAN (BS, 6/84) accepted a research assistantship in the Nuclear Engineering Department at the University of Wisconsin upon graduation. He is now working at the Sandia National Lab in New Mexico, performing research for his master's degree at Wisconsin.

MICHAEL HELM (BS, 8/82) is an applications programmer for the superconducting magnet group at the UC Lawrence Berkeley Laboratory. His computer generated plots recently graced the covers of the *LBL Research Review* and *Scientific American*.

DAVID LAPP (BA, 6/84) recently completed his teaching credential at SSU. He has been student teaching in Petaluma and also teaching part-time in the SSU Department of Physics & Astronomy. According to David, "Both the breadth and depth of the curriculum prepared me well for all areas of high school physical science teaching."

DONALD W. MARTIN (BA, 8/83) is a Large Telescope Operator at Kitt Peak National Observatory. He operates the 2.1-meter and 4-meter telescopes for astronomers from throughout the world. Don writes, "My background and experience in physics, astronomy, electronics, and lab work has been extremely helpful."

DOUGLAS MCKENZIE (BS, 6/83) works for Geodimeter, Inc. in Novato, on electro-optical distance meters. He also plays guitar with Teresa and the Brewers, a blues/rock band.

Student Profile: Dan Nottingham

by Juan Reyna

Dan Nottingham is known by members of the SSU Society of Physics Students as the originator of the current plan to build a radio telescope for the University.

This may be only the beginning. Dan is planning on a career of designing, building, and operating astronomical research equipment.

Nottingham transferred to Sonoma State at the suggestion of his cousin, Brian, who is also a physics major here. Dan attended Modesto Junior College prior to transferring; there he took "as many astronomy classes as possible." He also tutored an introductory astronomy course and worked with Dr. William Luebke as an assistant at Astronomy Open House, Modesto's version of Public Viewing Night.

Asked what it is about astronomy that he finds interesting, Dan's reply is immediate: "A large curiosity, a need to know . . . and the excitement of discovery. I feel this field will allow me to be creative and inventive in an effort to discover and explain." This answer is accompanied by a controlled excitement, an enthusiasm that is contagious, and an intelligent discourse on radio telescopes.

Dan is enjoying his stay at Sonoma State, and he is glad that he chose this particular campus. Asked about his favorite classes, he laughs at his own reply: "Astronomy and physics--in THAT order!"

To redeem himself, he adds, "I am very happy with the quality of instruction in the math and science departments. I have been able to get involved in projects which may not have been possible at a large university. These include the radio telescope and the work I am doing on the standards of astrophotography.

Dan has been photographing Comet Halley since September. Currently enrolled in Dr. Gordon Spear's Advanced Astronomy Laboratory course, he is photographing Seyfert galaxies, tracking an asteroid or two, and learning the rudiments of spectroscopy. He is also taking Dr. Joe Tenn's historical course on the discovery of the galaxies, scientific programming, modern physics and electronics.

Asked whether he has any hobbies, he replies, "Well, I like astronomy, reading about astronomy, and learning about astronomy. . . ."

Alumnotes

TOM McMABON (BS, 6/85) is working as an astronomical research analyst on NASA's Kuiper Airborne Observatory. Shortly before flying to Australia to observe Halley's Comet, Tom wrote, "The rigorous physics program at Sonoma State has enabled me to comprehend and give input in technical matters. I find it very rewarding to converse intelligently with the astronomers that frequent the observatory."

JAY NOCETO (BS, 6/85) is a communication engineer with the New York Power Authority. He has also published articles on baseball. He writes, "Physics taught me how to solve problems of great complexity and gave me the confidence to undertake such problems."

Society of Physics Students Active

by Juan Reyna

The SSU chapter of the Society of Physics Students (SPS) has been busy. Foremost on the agenda is the membership drive to increase the number of active participants. Members have given introductory talks about the club to various physics classes in an effort to create more interest and involvement among physics majors, especially among new students.

What does the SPS have to offer?

There are guest speakers, field trips, projects, challenging sports activities against other clubs in the sciences, and club parties.

Guest speakers have included student Paula Bennett, who described her summer work at Optical Coating Laboratory, Inc., performing tests on lens material, and graduating senior Mary Howland, already working as an engineer at Compumotor.

Another interesting talk was given by Dr. Samuel Greene, who gave an informal lecture on the NOVA laser.

Ron Logsdon of the Career Development Center presented information on what is available there for students, and Ron Wickersham of Alembic Guitars gave a talk on acoustics. Bob Ferguson, from the Sonoma County Astronomical Society, spoke on Halley's Comet.

The SPS has enjoyed field trips to the Stanford Linear Accelerator Center and the Lawrence Livermore National Laboratory.

The most interesting project to date has been the construction of a radio telescope interferometer for SSU, in conjunction with Hewlett-Packard engineers. This project is expected to be two years in the making. Ken Ritley, current treasurer, talked about the future of SPS. "I have submitted the idea of creating a local chapter of Sigma Pi Sigma, which is an honor society for physics majors. Being a member of such a club would give you some prestige when applying for graduate school." Ken, who is very optimistic about the SPS, explains that some of its members are graduating seniors, and that the current members are mainly novices. "We have been busy," he laughs, adding that "I suspect, however, that we will be having many more activities in the future, especially if this membership drive is successful." Of course, he is sure that it will be.

Alumnotes

BRUCE ODEKIRK (BS, 6/78) is a materials scientist working in research and development for TriQuint Semiconductor, a Tektronix company in Beaverton, Oregon. He earned his Ph. D. in applied physics at the Oregon Graduate Center in 1982 and spent a year as a postdoctoral researcher at Southern Methodist University. Regarding his physics studies at SSU, Bruce writes, "Despite all the outstanding 'hands-on' lab experience, the most beneficial was the building of confidence in confronting difficult situations."

Radio Telescope on the Way

by Juan Reyna

Sonoma State University will soon have its own radio telescope--and it will be student-built! A 1.4 gigaHertz interferometer is in the design stage. The instrument promises to be of great benefit to the University and its students, not only after completion, but during construction as well.

The project was initiated by SSU student Dan Nottingham. Building a radio telescope occurred to him while he was talking with Dr. Gordon Spear. Following a suggestion by Dr. Duncan Poland, Dan contacted SSU graduate Clyde Underwood at Hewlett-Packard. It turned out that Underwood himself had such a project in mind, and that equipment for a radio telescope was being stored at the H-P plant in Rohnert Park.

Dan then enlisted the Society of Physics Students (SPS). The group met with Underwood and three other interested Hewlett-Packard engineers, Grant Moulton, Paul Vella, and Bruce Erickson. A joint venture was agreed upon. The Hewlett-Packard engineers offered to supply materials and know-how, while the SPS offered to supply students, time, and energy.

The construction of such a telescope will be a valuable learning experience for the students. In his original proposal, Dan explained, "Physics classes which deal with electromagnetic waves will find it useful to analyze the interference patterns of the interferometer. Electronics students will be able to experiment with new circuit ideas to improve the existing interferometer, computing students will write programs to improve the data analysis on the computer. Obviously, the list of beneficiaries is a long one."

The project will be heavily documented. Every individual component used and its reason for being there will be recorded. The site of the interferometer is to be the roof of Darwin Hall, which fortunately is aligned east to west. One antenna dish on either side of the building is a good distance for interferometer measurements. The dishes will be adjustable in declination, and an object will be observed when it crosses the meridian.

The preliminary step in the present plan is to build a simple dipole antenna, which will be used to test circuitry which will later be integrated into the larger whole.

When the project is successfully completed Dan would like to have the results published, showing how it was planned, designed, built, and tested. Such a publication may be valuable to other groups of people planning similar projects.

In April the group had its first success when the first small dipole instrument detected the Sun. Enthusiasm is high, and some of the students and all of the engineers will continue to work on the project during the summer. In about two years the SSU radio telescope should be on the air.

Heliostat Brings Sun into Darwin

Soon Darwin Hall will have a microprocessor-controlled heliostat. The device, situated atop the concrete overhang at the south entrance of the lobby, will track the sun and reflect a beam of sunlight through a system of mirrors into a spectroscope.

There a diffraction grating will spread the light out into its constituent colors. Viewers will be able to see the solar spectrum "live" and note the absorption lines which astronomers use to determine the composition of the sun and other stars.

Computer science major William Stockton and physics major Roy Beck started with the no-longer-functioning heliostat built a few years ago by Eric Reiter. With considerable assistance from their employer, Compumotor Corp., they completely rebuilt the mechanical parts and introduced the microprocessor.

The latter device will be "smart" enough to open the roof when the sun is shining, close it when it's cloudy, and keep the beam of sunlight on the slit of the spectroscope.

A specially coated window, built by Bruce Kuhlman, '81, at Optical Coating Lab, Inc., will be used to let visible light in and keep heat out. The spectroscope was put into working condition by Keith Soreng, '81, for the original heliostat.

Alumnotes

JOHN PALMERLEE (BS, 6/85) is working for Tom Barnebey's company, Sound Solutions Acoustical Consulting Services, in Santa Rosa. He writes that he makes great use of the computer programming, electronics, and basic physics that he learned at SSU.

DENISE PAQUETTE (BS, 1/85) is an associate satellite operations engineer with Lockheed Missiles and Space Corporation, Sunnyvale.

JIM PISANO (BS, 6/82) entered graduate school in astronomy at the University of Virginia after a year of working at Optical Coating Laboratory, Inc., Santa Rosa. He is working on a master's degree with a thesis on the construction of a low resolution spectrum scanner.

CLAUDE PLYMATE (BA 6/81) is a stellar spectroscopy technician and observatory assistant at the McMath Solar Telescope of the National Solar Observatory, Kitt Peak, Arizona. He writes, "To say the view is inspiring does it no justice. I've seen Canopus, that gleaming treasure to the south, Halley's Comet still with a faint tail, and tonight for the first time I noticed Omega Centauri which seems to dwarf even M-13."

TERESA BIPPERT PLYMATE (BA, 6/84, physics & art) recently moved to Tucson where she often accompanies Claude up to Kitt Peak. She plans to continue her studies soon. Until her move she was president of the Sonoma County Astronomical Society.

KIM POWERS (BS, 6/84) is a graduate student and teaching assistant in the Physics Department at the University of Arizona.

Lynn Cominsky

(con't. from p. 1)

Since 1983 Dr. Cominsky has been working on the Extreme Ultraviolet Explorer (EUVE) satellite project at the Space Sciences Lab. Her experience in satellite operations led her to propose that the satellite be directed by the scientific team at Berkeley. After heading the group developing the software for satellite management and data analysis for two years, she was promoted to EUVE Systems Manager. In the latter position she has been directing the team developing the science payload hardware as well as the software.

Dr. Cominsky is not a stranger to SSU. She gave a lecture in the "What Physicists Do" series soon after arriving in California. This led to her being asked to teach Physics 214 in Spring 1982. She taught the course to general acclaim while holding down a full-time research post in Berkeley. Her second lecture in the series, in February 1986, led directly to her decision to apply for the permanent position here.

Dr. Cominsky says, "Teaching at Sonoma State was the most rewarding and fulfilling experience in my career. I look forward to teaching there full-time."

Alumnotes

MICHAEL ROGEN (BS, 8/84) is doing electronic and mechanical installations and repairs as a technician with a Santa Rosa firm. According to Mike, "In terms of a job the electronics and lab experience was most beneficial. Getting a job was only half the reason for studying physics, however. It is also rewarding to understand how and why things work in the world."

MARY C. SILBER (BS, 8/81) is a graduate student in physics at the University of California, Berkeley. She is conducting theoretical research in semiclassical physics. She writes, "While I was at Sonoma State, I loved being a physics student. I found the atmosphere within the department very encouraging, enthusiastic, and positive."

KEITH SORENG (BA, 6/81) is a production supervisor at Fairchild in San Rafael.

LEE STEELE (BA, 6/85) is a Senior Technical Writer working on contract with ARGOSystems in Sunnyvale.

DAVID TURKINGTON (BS, 6/85) is teaching high school math and physics as a Peace Corps Volunteer in Cameroon, West Africa.

TOMAS VERA (BS, 6/84) is an officer in the U. S. Navy. He is serving a tour as a gunnery officer and legal officer and is scheduled for a second tour in an engineering billet.