The PHYSICS MAJOR

SONOMA STATE UNIVERSITY **DEPARTMENT OF PHYSICS AND ASTRONOMY**
2000

NASA Education and Public Outreach Projects at SSU

Lynn Cominsky and Laura Whitlock

In the past year we have received over $4 million of grant funding from the National Aeronautics and Space Administration for the development at Sonoma State University of Education and Public Outreach (EPO) projects for three different NASA programs.

LEARNERS. Over 171 proposals were submitted to NASA's Leading Educators to Applications, Research and NASA-related Educational Resources in Science (LEARNERS) program for enhancing K-12 science, mathematics, technology, and geography education. The SSU team was one of the seven groups to be selected as recipients of grant funding. Our project, entitled "Space Mysteries: Inquiry-driven Web Explorations that Teach Physical Science and Mathematics Standards" will develop three high school level video-based web modules addressing space science, mathematics and technology concepts. Our partners in this effort include four high school teachers and Videodiscovery, Inc., a leading educational software developer in Seattle, Washington.

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MSCES Program Approved

Sonoma State University's innovative master's degree program in Computer and Engineering Science received final approval from the California State University Board of Trustees in March.

The program, which will begin in Fall 2001, is designed to "further the working skills and practical knowledge of engineers, computer scientists and similar professionals." It is anticipated that most students will be working at local companies, which will pay their hefty tuition. The program will receive no state support, but will start with a large endowment. Over $5 million has already been pledged, mostly by individuals and companies in Sonoma County's booming telecommunications industry.

Dr. Saeid Rahimi, who has spearheaded the project for the past three years, is serving as interim program director until a permanent director takes over in January. The search for the director has already begun.

"We hope that this program will be stimulating for both the student and instructor, projecting new ideas and quality information that may produce a thesis that could produce a change in our lives," says Dr. Rahimi.

The interdisciplinary program will benefit the Department of Physics and Astronomy. The program will share laboratories in photonics, electronics, and semiconductor devices with the Department. These labs will be in Salazar Hall, which will be remodeled after the library moves into the new Jean and Charles Schulz Information Center in August. Physics courses in photonics and semiconductor devices will be taken by some students in the program, and several other physics courses will be prerequisites for the program. The Department is already seeing new students taking some of its courses in preparation for entering the program, according to the department advisor, Dr. Joe Tenn.

Duncan Poland to Retire, Sort of

The SSU Department of Physics and Astronomy's long-time chair, Dr. Duncan Poland, has decided to retire. He is doing so in the popular Faculty Early Retirement Program (FERP), which will allow him to continue half-time for a while. Unlike Dr. Sam Greene, who uses FERP to teach full-time in the fall and take off spring semesters, Dr. Poland plans to be here both semesters next year, as he finishes his current term as Department Chair. He sends the following message to past and current students:

Thirty-five years of sharing the joys and pains of students as they each make their personal transformation into productive adulthood in physics, astronomy, other fields of science, and outside of the sciences seems the limit of my entitlement. For me it began in 1965 with a decision to come to a new college where the opportunities seemed limited only by one's imagination and willingness to work. The next year it was decided that there would be a physics department at Sonoma State College. I chose to give up teaching both chemistry and physics and become half of the new physics department. It has been a rare privilege for me to see the vision of this department grow and strengthen as each new faculty member joined the department. The faculty members have not always agreed, but have agreed to disagree in a civil manner. This has been the best department on campus by most measures; sheer size is a notable exception. The curriculum evolved as the department became Physics and Astronomy and the College became the University.

The Department is now in the process of making one of its most sweeping curricular changes, while striving to preserve the best aspects of the previous curriculum and pedagogy. We are increasing the lecture and laboratory curriculum in applied physics, especially applied optics, while maintaining our faith in the physics that underlies the applications. It is time for me to make room for a new, younger faculty member to bring to the department and students some of the most current practices in the field. It has been wonderful hearing from you and feeling that I was a part of your career and life. We faculty feel blessed to have had so many students that were eager to learn about physics and astronomy. Thanks for being among them. Now it's time for me to get back to my grading. My warmest regards to all of you.

Observatory Upgraded

Simultaneously with the return of Dr. Gordon Spear to full-time teaching after four years in the University's Information Technology department, the SSU Observatory has been substantially upgraded this year.

The upgrades have been made possible, in part, by a series of private contributions, including two Pentium class computers, a Macintosh, and an SBIG ST-7 CCD camera with a rotating filter wheel. The new CCD system is now installed on the Epoch Instruments computer-controlled telescope and was used for classes and research projects this spring. The new system provides observers with substantial improvements in sensitivity, resolution, and dynamic range over the previous one. It is capable of recording objects at least as faint as 17th magnitude. Students are complaining that the faintest objects recorded are now too faint to conveniently compare with many of the standard astronomical catalogs. Any Messier object can be recorded with exposure times of a few seconds, and it is believed that any galaxy or nebula in the NGC or IC catalogs could be recorded with exposure times of a few minutes. The filter wheel will enable students to produce tricolor images and to obtain standard BVRI photometry of stars and nebulae.

Student Chris Trechter assisted with obtaining photometry of the primary eclipse of the interacting binary star Z Draconis. This system has a variable period due to mass transfer events and a possible elliptical orbit. Other students will continue to monitor this system and additional poorly studied interacting binary systems. The data will be used for period studies and analysis of the light curves of these variable star systems. Students will also be participating in a continuation of Dr. Spear's galactic anti-center survey for new variable stars in the fall.

How about the future? If funding can be obtained through grants or donations Dr. Spear would like to add a modern spectrograph with CCD detector, an adaptive optics system to minimize the effects of the notoriously poor local seeing, and a computer interface for the Celestron-14 telescope. Of course, Dr. Spear is always looking for students interested in participating in ongoing research programs.

Current images and preliminary research results are posted to the Observatory page on the Department website. Follow the links to "images" and "research."

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Written by Allan Baker, Lynn Cominsky, John Dunning,, Viviane Pierre-Louis, Duncan Poland, Gordon Spear, Joe Tenn, and Laura Whitlock.

Marc Asaro, Brooke Haag, Justin Flory

Summer Research Experience for Physics Majors

Three SSU physics majors have been selected for Research Experiences for Undergraduates (REU) programs at research universities this summer.

Marc Asaro will be doing research with physics professor Daniel Reich at the Johns Hopkins University. The research will consist of the synthesis of superconductors in low-dimensional systems and development of other novel zero, one, and two-dimensional nanostructures. When asked about what benefits he may get out of this program, Marc replied, "This will be the first time I will be exposed to high level research on the cutting edge of condensed matter physics. And the best thing about it is, I'll be working beside the researchers. Also, I believe this experience will give me an advantage when I go to graduate school because I will have already had a taste of what the research community is like."

Justin Flory will work with Dr. Romel Gomez at the University of Maryland Materials Research Science and Engineering Center on the nanomanipulator project. The goal is to design and build a manipulator system that allows the positioning of tiny probes with sub-nanometer control. Potential applications include nanometer device fabrication, electronic and magnetic characterization, and inspection and manipulation of biological specimens. Justin says "I am very excited about this opportunity, and I am looking forward to narrowing my field of interest. I think that this summer program will help me do that."

Brooke Haag will be working with Peter Garnavich, a Harvard fellow, on light curves for binary stars, at the University of Notre Dame.

Meanwhile, back at SSU, Michelle Curtis, Tim Graves, and Sarah Silva are working with Dr. Lynn Cominsky on Education and Public Outreach for NASA's GLAST and Swift observatories.

A Partnership For Education

R. Allan Baker

Since 1995 Lockheed Martin Missiles and Space Co. (LMMS) has granted $2 million to the California State University Foundation to fund projects of mutual interest to LMMS and the CSU engineering and computer science departments

The program's objective is to enhance the recruiting of engineering and computer science graduates from the California State University system.

Since the partnership began, 181 projects have been funded with the participation of over 250 students. In 1999 eighty-four proposals were submitted to Lockheed Martin from 13 campuses. Of these, 49 projects were funded and six were chosen to present their findings before Chancellor Charles B. Reed of the CSU system, a vice president of Lockheed Martin, and a panel of scientists and educators in the CSU office in Long Beach. Last summer, under the guidance and tutelage of Dr. Saeid Rahimi, I was among the six students chosen to make my presentation on Optical Fiber Interferometric Sensors.

The trip to Long Beach was memorable in many ways. Meeting other students with similar interests and sharing ideas and experiences was exciting. I also got the opportunity to network with educators throughout the CSU system and engineers and scientist at Lockheed Martin. Perhaps the longest ten minutes of my life occurred when I gave the presentation itself. Standing, alone, in the middle of a ring of scientists and educators was a humbling but valuable experience which I will be able to take with me to job interviews or other speaking engagements. The question and answer period gave me valuable experience thinking on my feet.

This experience was a furthering of my education that goes beyond the classroom. The progressive thinking physics department at SSU and caring and conscientious teachers like Saeid Rahimi made this opportunity possible.

(Allan Baker has accepted a teaching assistantship at San Francisco State University, where he will begin studies toward an M.S. in physics in the fall.)

Sonoma State Again Leads CSU in Physics Majors

Sonoma State University continues to lead the California State University System in the percentage of its undergraduates majoring in physics.

The CSU is in no danger of being overrun with physics majors. The United States has to import a large share of its technical work force. Despite surging demand from employers, the number of physics majors has dropped throughout the country in the last few years as students have sought less demanding subjects. At SSU there was a sharp decrease in the mid-nineties, but the number has increased every semester since reaching a low in Spring 1998. At the end of the Spring 2000 semester there are 44 physics majors at SSU.

In Fall 1999 only 0.22% of the 288,997 undergraduates in the CSU were physics majors. At SSU 0.64% were majoring in the subject.

The growth of technical industry in Sonoma County has made it possible for an increasing number of SSU physics graduates to find professional positions without leaving the area. This has contributed to the growth in majors, especially in the popular applied physics concentration within the Bachelor of Science program, according to department faculty. Other contributing factors include the popular astronomy program, and a dedicated faculty whose members have won several honors, the most recent in 1999, when Dr. Saeid Rahimi was honored by the SSU faculty with one of two Excellence in Teaching awards.


Haag, Wolfe Share Newkirk

The faculty committee selecting the winner of the fourth Horace L. Newkirk Assistantship faced an impossible decision: two equally outstanding candidates. Their solution was to make two awards. With their own contributions, and an additional one from Nadenia Newkirk, to supplement the income from the Newkirk endowment, they awarded assistantships to both Brooke Haag and Justin Wolfe.

Brooke Haag transferred to SSU this year from Hartnell College in Salinas, where she learned much and was inspired by physics teacher Jesse Cude. As a Newkirk Assistant Brooke assisted Dr. Duncan Poland in the Physics 216 laboratory course.

Justin Wolfe attended Modesto Junior College for parts of three years. While there, due to the influence of two excellent instructors, Peter Wiinikka and Ken Meidl, he decide to become a physics major with the goal of becoming a community college instructor. Justin transferred to Sonoma State in the fall of 1999. As a Newkirk Assistant Justin aided Dr. John Dunning with the Physics 116 laboratory. This experience falls perfectly in line with his future goals. "The experience of the lab with Dr. Dunning has only hardened my resolve, and made me promise myself that if nothing else, I must be enthusiastic about the subject."

Physics Majors Win Ten Scholarships This Year

No fewer than ten physics majors won scholarships in Sonoma State University's merit-based scholarship program for the 1999-2000 academic year. The large number reflects the high quality of current physics majors, according to department faculty.

The deadline for applying for scholarships for an academic year is the preceding February 15. See <http://www.sonoma.edu/Scholarship/>forinformation and to download applications.

Physics majors honored in 1999-2000 for outstanding academic achievements and promise were **Angela Duprez**, Gertrude Cassidy Memorial Scholarship, **Anne Farley**, Physics and Astronomy Scholarship, **Justin Flory**, Joseph A. and Betty Rattigan University Founder's Scholarship, **Brooke Haag**, Ernest L. and Ruth W. Finley Foundation Scholarship, **Jeremy Hieb**, Physics and Astronomy Scholarship, **Kimberly Ognisty**, Forrest W. and Ida J. Benson Scholarship, **Ed Ott**, Physics and Astronomy Scholarship, **Lorraine Siebler**, Joe S. Tenn Scholarship, **Tyana Stiegler**, Ernest L. and Ruth W. Finley Foundation Scholarship, and **Kevin Thomas**, Sally L. Ewen Memorial Scholarship.

Dr. Rahimi to be Interim Dean

Professor Saeid Rahimi has been appointed interim dean of the SSU School of Natural Sciences for the 2000-01 academic year. He will replace retiring dean Anne Swanson while the university conducts a national search for a permanent dean.

A member of the Department of Physics and Astronomy since 1982, Dr. Rahimi was awarded the Santa Rosa Chamber of Commerce Award for Excellence in Teaching in 1999. This follows a similar award he received from SSU earlier that year. Both awards commend his enthusiasm for teaching and his development of several advanced applied physics courses and laboratories as well as a popular lab for nonscience students, "The Physics of Toys."

This year Dr. Rahimi has been devoting most of his time to the new MS program in Computing and Engineering Science, but he has found time to teach three courses in the fall and a new course, Physics of Semiconductor Devices, in the spring.

Cosmologists Meet at SSU

The "Cosmic Genesis and Fundamental Physics" conference held at Sonoma State University in October 1999 gathered well over a hundred cosmologists, astronomers, particle physicists, and others, from string theorists to giant telescope builders.

In response to a challenge issued by NASA administrator Dan Goldin, the Department of Energy, NASA, and the National Science Foundation supported the Sonoma conference with the intent of making the research dollar stretch farther — or, as one participant phrased it, getting "more Big Bang for the buck."

Dr. Lynn Cominsky was the local host for the conference, which was cohosted by the Lawrence Berkeley National Laboratory, SLAC, and other institutions. A number of SSU students attended talks and listened to world-famous cosmologists discussing recent developments and proposals for new instruments and missions. Proceedings are on the web at <http://www.quarkstothecosmos.org/program.html>.

GREGORY SEEGER ('74) is the owner of Sport Select, providing software to ski areas and sporting goods stores.

BRUCE ODEKIRK ('78) is vice president of technology for Sarif, which develops and manufactures high resolution projection LCD components, and 3C Semiconductor in Vancouver, Washington. He earned his Ph.D. in applied physics at the Oregon Graduate Institute of Science & Technology in 1982.

RONALD R. BLEAU ('/79) is a staff engineer with Lockheed Martin Aeronautics Co. in Marietta, Georgia, where he is avionics chief for F-22 advanced product development.

JOHN J. HALL ('80) is teaching at El Molino High School in Forestville.

MARY C. SILBER ('81) is an associate professor of applied mathematics at Northwestern University. She earned her Ph.D. in physics at the University of California at Berkeley in 1989.

PETER SIECK ('82) is a senior scientist with AFG Development Corporation in Petaluma, where he develops new window coatings for buildings and cars.

KEVIN ABLETT ('83) is a programmer with Technology Builders Inc. in Atlanta, based in Santa Rosa.

Applied Nuclear Lab Benefits from Rackbeta Scintillation Counter Donation

John Dunning

Our Applied Nuclear Laboratory offers working knowledge of alpha, beta, and gamma detection methods. This fall we are fortunate to offer upgraded experiments. Berlex Biosciences in Richmond has donated a Wallac Rackbeta Liquid Scintillation Counter and an associated 486-33 PC to run it.

This instrument has a multichannel analyzer which displays the beta spectrum directly. Isotope identification is simplified, and alpha particle detection is possible. A new experiment using these features is being designed. Older alumni may remember the now retired Beckman LS-150 where the beta pulse height spectrum was obtained manually one channel at a time.

Biology and Chemistry will also benefit greatly as routine sample counting is streamlined, and there are new smaller vials. Corrections for chemiluminescence and quench can be automatic.

Donations Essential to Department Programs

Private donations are extremely important to the Department of Physics and Astronomy at Sonoma State University. State funding for equipment has disappeared, and every aspect of instruction is stressed by shrinking budgets.

This year the largest employer of SSU physics graduates, Optical Coating Laboratory, Inc. (now part of JDS Uniphase), donated a monochromator and a spectrometer with a CCD detector. Such donations greatly enhance the instructional laboratory program.

Donations are the sole support of the Department's public programs, the "What Physicists Do" public lecture series and the Public Viewing Nights at the SSU Observatory; they fund the Horace Newkirk Student Assistantship; and they allow some equipment purchases.

Donors since last year's newsletter are listed below. The Department is grateful to all.

#63851 **Public Programs**. Charles Carpenter ('88), California City; Harold Dean Chaney ('75), Fairfield; Clover Stornetta Farms Inc., Petaluma; Donald J. Farmer, Sebastopol; Dale Houston (IN MEMORY OF RUTH CLARY), Petaluma; Martha ('88) and Alex Hunt, Healdsburg; Carl and Linda Marschall, Grass Valley; Francis and Patricia Marshall, Petaluma; Max Machinery Inc., Healdsburg; Charles and Norma McKinney, Windsor; Bernard and Barbara Meyers, Novato; Michael Miller, Moon Valley Circuits, Glen Ellen; Robert and Bertha Rains, Santa Rosa; Donald and Ann Rathjen, Pleasanton; Timothy and Shirley Sullivan, Santa Rosa; Robert S. Tuttle DDS, Santa Rosa.

#63852 **Physics & Astronomy Equipment & Supplies**. Paula ('86) and David Bennett, Santa Rosa; Teresa A. Bippert-Plymate ('84), Tucson, AZ; John Philip Cabaud ('80), Sonoma; Dennis ('78) and Meredith Goodrow, Santa Rosa; Katherine L. Rhode ('89), Middletown, CT; David Shoaf ('75), American Fork, UT; Richard Gary Wong DC ('75), Santa Rosa.

#75380 **Horace L. Newkirk Memorial Student Assistantship Fund**. Lynn Cominsky & Garrett Jernigan, SSU; Nadenia Newkirk, Santa Rosa; Duncan & Marion Poland, SSU.

#75960 **Physics & Astronomy Scholarship** (endowment). Lynn Cominsky & Garrett Jernigan, SSU, Duncan & Marion Poland, SSU.

#77020 **Science At Work** (endowment for the "What Physicists Do" series). IN MEMORY OF RUTH CLARY: Marvin and Elfi Chester, Occidental; Joseph Tenn, SSU; Charles and Norma McKinney, Windsor; Robert and Bertha Rains, Santa Rosa.

#85960 **Physics & Astronomy Scholarship** (current). Joseph Tenn, SSU.

Other department funds include
#63850 **Radio Telescope Project**
#63853 **SSU Observatory**.
#63855 **Student Development Program**
#78380 **Joseph S. Tenn Scholarship** (endowment).

Ruth Clary, 1909-1999

Ruth Clary, the delightful nonagenarian who attended the "What Physicists Do" lectures for more than a decade and who hosted the regular attendees for dinner at her home after the last lecture each semester for several years, passed away Dec. 14, 1999. Several of her friends made donations in her memory to the endowment fund for the series, and in May, after the last lecture of the spring series, Dr. Lynn Cominsky and her husband, Dr. Garrett Jernigan, hosted the first Ruth Clary Memorial Dinner at their Little H-Bar Ranch in Petaluma, with Mark Robinson ('93) making superb lasagna in the Clary tradition.

MICHAEL BROWN BICK ('85) is a graduate student in physics at San José State University, where he expects to complete his M.S. in August 2000. He has accepted an assistantship for doctoral studies at UC Riverside.

JON JURGOVAN ('85) is a patent attorney with Morris, Manning & Martin in Atlanta. He earned his J.D. at Washington & Lee University and his M.S. in electrical engineering at California State University, Fullerton.

TOM McMAHON ('85) works at the University of Arizona, where he is the principal systems engineer for several instruments that will fly on orbiting astronomical observatories. He described his work in a "What Physicists Do" lecture in March.

Student Internships Provide Valuable Experience

This year four SSU physics majors gained valuable work experience as paid interns at local companies while simultaneously pursuing their degrees.

Scott Berry reports: Internships are very beneficial for college students. They provide the student with very valuable job experience, they allow the student to make contacts in industry and academia, and they are a great way to make extra money for school. An additional benefit is that the student gets to try out a field or company before committing to it. My first internship was in the Summer Science Program at the Stanford Linear Accelerator Center (SLAC), and my current one is at Optical Coating Laboratory, Inc. (OCLI) in Santa Rosa. My SLAC internship was academically oriented and consisted of daily classes in particle physics-related subjects, laboratory experience working on a project with a scientist, and weekly field trips to various San Francisco Bay Area laboratories and science-related companies. I think the biggest factor in getting accepted to this program was the instructor recommendations. My research project consisted of building, testing, and mathematicalmodeling of a type of particle detector called a drift chamber. I really enjoyed this internship and I learned a lot about physics and working in a lab. This experience was very different from my current internship at OCLI. I heard about the OCLI position through an instructor. At the interview I was glad I had taken applied physics classes on electronics and lasers, since they asked me a lot of questions about these subjects. At OCLI I work on a product called MicroPac under the supervision of a research and development engineer. MicroPac is basically an inexpensive portable spectrometer that can be plugged into a computer. During a typical day, I carry out experiments to test the various parameters of the product in order to find ways of improving it in preparation to selling it in the near future. I spend a lot of time in an optics lab taking data and the rest of my time is usually spent writing up my findings. While working at OCLI, I have learned a lot of little details that I did not expect to learn and it has improved my understanding of what is really involved with developing and selling a product. Between these two internships, I feel that I have learned a lot of very important things that I would not normally have learned at school and I would recommend that any student try to participate in an internship at least once while at college. (Scott has accepted a teaching assistantship in physics at Oregon State University where he will begin work toward a Ph.D. in the fall.)

Angela Duprez is also an intern at OCLI, where she worked full-time last summer and part-time during this academic year. In her "What Physicists Do" lecture in April she described how a little knowledge of thin films, fiber optics, and LabVIEW helped her to complete an automated test station for filters used in fiber-optic communications systems. Angela will become a full-time engineer in the prestigious Engineering Development Program at OCLI after graduation in May.

Laura Odeh, a senior, has been assisting managers and marketing and communications integrators, whose jobs involve advertising, literature, and public relations, in the Communications Resource Center at Agilent Technologies in Santa Rosa. She says, "I got a foot in the door and started looking around in other departments. I actually have been hired as a marketing engineer in the Component Test MSU, Inbound Planning Solutions group. I will start August 1st as a full-time Agilent Employee. The job, as it has been explained to me, involves being a sort of 'investigator.' I will go out and talk to customers, other businesses, etc. to try to figure out what the next generation products should look like. After we come up with the product, we then give it to the Product Generation Units. We're sort of like the "idea" center of Agilent. I'm excited! Seems like a nice blend of being able to use my creativity with my technical knowledge!"

Justin Wolfe, a junior, has spent the spring semester as an intern in the marketing department at OCLI, where he also works on the MicroPac. He reports, "My experience at OCLI has opened my eyes to the realities of the business world, I have seen what it takes to take a new product to market, and most importantly I am learning how physics, engineering and business come together to produce a marketable, profitable product. The one key element of my internship is the realization by my employer that to a student, the most important thing is your education."

Laura Odeh Graduation Speaker

Physics major Laura Odeh has been selected as student speaker for SSU's 39th commencement May 27, 2000. Laura has starred in five plays at SSU, including Cabaret and The Skin of Our Teeth. She is currently playing the lead in The Quick Change Room at Actors' Theatre in Santa Rosa, interning at Agilent Technologies, and taking light and optics, computer applications for scientists, physics of semiconductor devices, and two music courses. The last physics major commencement speaker was Mary Silber in 1981.

JOHN PALMERLEE ('85) is a web developer with Cafex Corporation in Larkspur.

BRUCE CLARK ('86) is an engineer in quality assurance and regulatory affairs with Toshiba Magnetic Resonance Imaging Systems in South San Francisco.

NASA Grants

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Swift. Swift is a medium-sized explorer satellite that is dedicated to solving the 30-year old mystery of gamma-ray bursts. Gamma-ray bursts are the most powerful explosions in the Universe. They occur about once a day, and we don't know their origin. We will lead the the EPO program for the mission, which will include components at the Pennsylvania State University, and the development of an instructional module by the Great Explorations in Math and Science (GEMS) group at UC Berkeley's Lawrence Hall of Science. Development of Grades 7-12 curriculum materials and extensive teacher training will be done. An additional Space Mystery module will also be developed as part of the Swift EPO program. Swift will be launched in 2003.

GLAST. We will lead the EPO program for the Gamma-ray Large Area Space Telescope, scheduled for launch in 2005. Our proposal includes the development of high school level instructional materials by TOPS Learning Systems, Inc., the creation of a team of GLAST Ambassador teachers who will help communicate high-energy gamma-ray science to educators, students, and the public, and the creation of an interactive exhibit on gamma-ray detectors at the Virtual Visitor's Center at the Stanford Linear Accelerator Center. Two more Space Mystery Modules will be developed. GLAST is designed to study high energy gamma-rays, which are produced by jets of particles shooting at near-light speed out of super-massive black holes, as well as in other exotic and extreme locations in the Universe..

Any interested physics majors who would like to help us develop educational materials for any of these projects should contact us. We have a great need for students who know something about web page design.

Introducing Dr. Laura Whitlock

Viviane Pierre-Louis

Dr. Laura Whitlock, a native of Alabama, received her BS at Southwestern (now Rhodes) College in Memphis in 1981, and her Ph.D. at the University of Florida in 1989. She worked at NASA Goddard Space Flight Center in Maryland until coming to SSU in 1999. She enjoys reading, and after getting accustomed to our West Coast climate, she now adds walking to her list of hobbies, enjoying it very much with her Dalmatian, Oppy (named after the famous physicist, J. Robert Oppenheimer).

During Dr. Whitlock's seven plus year stay at NASA, she held many positions. As a data archivist she reformatted data from old x-ray and gamma ray astronomy missions so they could be put online to be accessed by scientists all over the world. Then for four years she concentrated in the area of public education and outreach, where she gained fame for creating two educational websites, Imagine the Universe <http://imagine.gsfc.nasa.gov> and StarChild: A Learning Center for Young Astronomers <http://starchild.gsfc.nasa.gov>.

She has now teamed up with Dr. Lynn Cominsky to write proposals for space education projects. The focus of their projects is putting the information from some of NASA's current and future missions into the K-12 classroom to get kids excited while learning math and science. At the same time, they connect and offer information to the general public so that there is public support for the kind of science NASA does. She pointed out how NASA has until recently not been very concerned with public relations—with the exception of the Hubble Space Telescope program, which has a marvelous education and public outreach program that has really captured citizens' attention. Dr. Whitlock said, "I would bet you would be hard pressed to find a person over the age of 6 who doesn't know about the Hubble Space Telescope, who doesn't think it is a wonderful thing! Fortunately, NASA has learned that it needs to do that with all of the missions, not just Hubble Space Telescope."

When asked what brings her to SSU, Dr. Whitlock replied, "I have wanted to live in northern California since I first came here on a trip about fifteen years ago. Also, I have known Lynn Cominsky for a long time, and as we were doing similar kind of research in x-ray astronomy, we became friends. When she got into NASA's science education, as I was already doing that, it all just sort of jelled for me to finally live in a beautiful place and do the work I wanted to do."

Dr. Whitlock explains she is working with high energy missions Swift and GLAST. She is also working on an educational video game on the web. A high school student will advance through the game—not by blowing anybody up or cutting anybody's head off—but by learning math and science. The program team includes teachers from the Technology High School at SSU, Analy High in Sebastopol, Alabama, and Maryland. The program targets a broad spectrum of schools, since NASA only funds national programs. Dr. Whitlock's plans for the future is to stop writing proposals and work more with the programs she won the grants for.

This summer she will organize workshops for teachers in Sonoma County, helping them use technology in teaching high school math and science.

When asked how SSU, and specifically the Department of Physics and Astronomy, fit into the big picture, she said: "It gives me a home for the foreseeable future. They've been very welcoming to have me come and join them and do whatever it is I want to do to get science out. I think there is a part of them that realizes if I can get kids more excited about math and science, then the teachers are teaching better math and science in high school, and they wind up getting better physics students in college. I think they see there is a value for them in what I am doing, in addition to getting SSU out there with some pretty high visibility projects that we are doing. One thing you learn when you work for NASA is that you are highly restricted in what you are allowed to do, but now working at SSU all those restrictions are gone for me. Having them offer me a home has really broadened my pool from which I can just let my imagination and creativity run, which really is very nice."

The Department welcomes Dr. Whitlock, wishing her success in achieving her goals in bringing science and mathematics to more adults and kids.

PETER ROONEY (’86) is the executive director of the Forum on Technology and Innovation of the Council on Competitiveness in Washington, DC. The American Physical Society's Congressional Fellow for 1998, he earned his Ph.D. in physics at the University of California, San Diego.

VALERIE LEPPERT (’87) is an adjunct assistant professor in the Chemical Engineering and Materials Science Department at UC Davis. She earned a Ph.D. in materials science at Northwestern University in 1993.

DARITH PHAT (’87) is chairman of the Cambodia Management Institute in Rockville, MD. He earned a Ph.D. in bioengineering and spectrochemistry at École Centrale in 1991, and an MBA at the International Institute for Management Development in Lausanne, Switzerland in 1993.

GREGORY M. CRAWFORD (’88) is a district manager with Alza Pharmaceuticals in Vancouver, WA.

PHILIPPE ARGOUARCH (’88) is a senior software engineer with quios.com in San Francisco.

LOU SANCHEZ-CHOPITEA (’88) is a senior software engineer at Xilinx, a manufacturer of programmable logic control systems in San Jose.

IAD MIRSHAD (’89) is an applications engineer with Therma-Wave, Inc., a maker of metrology systems in Fremont. He earned a Ph.D. in experimental nuclear physics at the University of California, Davis in 1995.

LAUREN NOVATNE (’89) has been teaching part-time at Reedley College, Chabot College, and CSU, Fresno, where she earned her M.S. in physics in 1999.

ROBERT GREESON (’89) is a naval flight officer in the U.S. Navy.

KATHERINE RHODE (’89) was awarded a NASA Graduate Student Researchers Program fellowship to complete her Ph.D. thesis research in astronomy at Yale University. She earned an M.A. in astronomy from Wesleyan University in 1997.

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