Eighth Reunion
The Department held its eighth reunion on April 25, 2009, to honor the retirement of Professors Joe Tenn and Bryant Hichwa.
Over 110 alumni, students, faculty, staff and friends attended the festivities in the SSU Commons.
For more photos of the Reunion, see http://www.phys-astro.sonoma.edu/news/reunion2009/

GLAST Has Launched! Long Live Fermi!
By Logan Hill '06

Last June the long awaited launch of the Gamma-ray Large Area Space Telescope (GLAST) was realized as the observatory was carried into orbit on a Delta II rocket from launch pad 17B at the Kennedy Space Center in Cape Canaveral, Florida.

Prof. Lynn Cominsky is a scientific co-investigator on GLAST, and has been working on the project for over 16 years. She is also the GLAST Press Officer and the lead for GLAST’s Education and Public Outreach (E/PO) program, the largest source of support for SSU’s NASA E/PO group. On the side of the rocket, under the United States flag, is the GLAST logo, designed by the NASA E/PO’s own scientific illustrator, Aurore Simonnet.

Several of the E/PO group members tried to attend the launch, but only Dr. Lynn Cominsky was able to wait it out through a week of frustrating delays until the satellite finally took off atop the rocket. Other E/PO team members who got to enjoy the parties and a week at the beach included Aurore Simonnet, Kamal Prasad, Kevin John '07 and Laura Chase.

After NASA successfully launches a scientific satellite it often gets renamed. For GLAST, the public suggested over 12,000 different names which were narrowed down to just a few. Finally the name Fermi was chosen, to honor the Nobel-prize winning Italian-American physicist Enrico Fermi, who built the first nuclear reactor at the University of Chicago and also suggested ways to create cosmic gamma rays through the acceleration of charged particles.

So now the Fermi Gamma-ray Space Telescope is orbiting 350 miles above us and is actively detecting gamma rays from across the universe. Fermi catches these energetic rays from many sources such as blazars and active galaxies, neutron stars, and the mysterious gamma-ray bursts, and it has even discovered a new class of pulsar. For recent news about Fermi, see:

http://www.nasa.gov/fermi

Successful launch marks a milestone of 16 years of dedication.
Credit: NASA
Credit: Educator Ambassador Linda Smith
The SSU Physics and Astronomy Department continues to improve its research infrastructure and capability to perform cutting edge research. This year we saw the acquisition of a number of new items into the department as well as a number of existing systems coming on line for the first time.

One of the most significant advances in our infrastructure comes from the brand new liquid nitrogen plant housed behind Darwin. The plant was built by the School of Science and Technology under the direction of Dean Saied Rahimi. The system produced by Cryomech, a world leader in cryogen production, will produce 20 liters of liquid nitrogen a day. Liquid nitrogen is a cryogen with a temperature of 77K (-196 °C). It will be used by our department as well as Chemistry, Biology, and the Student Health Center. The nitrogen will be used for basic research, refrigeration, and instructional labs. It is a key component to cool and operate the new departmental 17 Tesla Superconducting Magnet. With the installation of the new nitrogen plant, the magnet is now finally coming online. Other significant items coming online include a large Nexus glovebox system produced by Cryomech, a world leader in cryogen production under the direction of Dean Saeid Rahimi. The system is designed such that the electron gun and optical system are kept under high vacuum and the specimen is differentially evacuated to low vacuum by another pumping system, allowing even non-conductive samples to be observed. Physics major Aimee Santos is currently refurbishing the system. This unit will be another tool to support the on-going and new research programs involving thin films.

The Department was the recipient of a generous gift of two astronomical telescopes from Sir Peter Michael, the owner of the Keck Microanalysis Laboratory. The telescopes are a Celestron C-8 and a C-10 and have made an immediate impact to the Department’s programs. The large telescope is equipped with a GPS system, which allows rapid set-up and selection of astronomical objects. The telescopes have been integrated into our Public Viewing Night program to increase the number of objects visitors can view, and to create multiple viewing areas to ease congestion in the main observatory. The telescopes are also being put to use for our Astronomy classes and are available for use at the observatory by our majors.

This year we received a number of generous donations which support not only our “What Physicists Do” lecture series, but also came in the form of support for undergraduate researchers. The Horace L. Newkirk Endowed Assistantship and the Mike and Sheila McQuillen Summer Research Award continue to support students to do research with faculty. The research experience has a dramatic impact on the students, providing them with experiences that propel them onto graduate programs and successful careers in science. Other scholarship funds, such as the Physics and Astronomy Scholarship, the Sol and Edith Tenn Scholarship, and the Joseph S. Tenn Scholarship, also support and provide students with opportunities they would not have if not for the generosity of donors.

Another year has passed and we reflect back on those that have helped make it possible. We thank our Donors for helping the Department maintain its traditions and offering new opportunities. Private donations have been crucial in the growth and continuation of excellence in the Department of Physics and Astronomy. As the State of California struggles with its budget and continues to make deep cuts into education spending, it is donations from private individuals that allow us to maintain a healthy program.

The “What Physicists Do” lecture series is supported entirely through donations. This highly successful program has now completed its seventy-sevens semester. The series has been tremendously successful and brought some of the foremost physicists in the world to our campus to share their thoughts and research. The series founder, Dr. Joe Tenn, will be stepping down this year and Dr. Scott Severson (scott.severson@sonoma.edu) will now spearhead and organize the series. Please feel free to contact Professor Severson with any questions or suggestions that you might have.

The research experience has a dramatic impact on the students, providing them with experiences that propel them onto graduate programs and successful careers in science. Other scholarship funds, such as the Physics and Astronomy Scholarship, the Sol and Edith Tenn Scholarship, and the Joseph S. Tenn Scholarship, also support and provide students with opportunities they would not have if not for the generosity of donors.

If you would like to support our program and students please see http://www.physastro.sonoma.edu/PublicSupport.html or contact the SSU Development Office at (707) 664-2712 or contact the Department.

Another year has passed and we reflect back on those that have helped make it possible. We thank our Donors for helping the Department maintain its traditions and offering new opportunities. Private donations have been crucial in the growth and continuation of excellence in the Department of Physics and Astronomy. As the State of California struggles with its budget and continues to make deep cuts into education spending, it is donations from private individuals that allow us to maintain a healthy program.

The “What Physicists Do” lecture series is supported entirely through donations. This highly successful program has now completed its seventy-sevens semester. The series has been tremendously successful and brought some of the foremost physicists in the world to our campus to share their thoughts and research. The series founder, Dr. Joe Tenn, will be stepping down this year and Dr. Scott Severson (scott.severson@sonoma.edu) will now spearhead and organize the series. Please feel free to contact Professor Severson with any questions or suggestions that you might have.

This year we received a number of generous donations which support not only our “What Physicists Do” lecture series, but also came in the form of support for undergraduate researchers. The Horace L. Newkirk Endowed Assistantship and the Mike and Sheila McQuillen Summer Research Award continue to support students to do research with faculty. The research experience has a dramatic impact on the students, providing them with experiences that propel them onto graduate programs and successful careers in science. Other scholarship funds, such as the Physics and Astronomy Scholarship, the Sol and Edith Tenn Scholarship, and the Joseph S. Tenn Scholarship, also support and provide students with opportunities they would not have if not for the generosity of donors.

If you would like to support our program and students please see http://www.physastro.sonoma.edu/PublicSupport.html or contact the SSU Development Office at (707) 664-2712 or contact the Department.

Another year has passed and we reflect back on those that have helped make it possible. We thank our Donors for helping the Department maintain its traditions and offering new opportunities. Private donations have been crucial in the growth and continuation of excellence in the Department of Physics and Astronomy. As the State of California struggles with its budget and continues to make deep cuts into education spending, it is donations from private individuals that allow us to maintain a healthy program.

The “What Physicists Do” lecture series is supported entirely through donations. This highly successful program has now completed its seventy-sevens semester. The series has been tremendously successful and brought some of the foremost physicists in the world to our campus to share their thoughts and research. The series founder, Dr. Joe Tenn, will be stepping down this year and Dr. Scott Severson (scott.severson@sonoma.edu) will now spearhead and organize the series. Please feel free to contact Professor Severson with any questions or suggestions that you might have.

This year we received a number of generous donations which support not only our “What Physicists Do” lecture series, but also came in the form of support for undergraduate researchers. The Horace L. Newkirk Endowed Assistantship and the Mike and Sheila McQuillen Summer Research Award continue to support students to do research with faculty. The research experience has a dramatic impact on the students, providing them with experiences that propel them onto graduate programs and successful careers in science. Other scholarship funds, such as the Physics and Astronomy Scholarship, the Sol and Edith Tenn Scholarship, and the Joseph S. Tenn Scholarship, also support and provide students with opportunities they would not have if not for the generosity of donors.

If you would like to support our program and students please see http://www.physastro.sonoma.edu/PublicSupport.html or contact the SSU Development Office at (707) 664-2712 or contact the Department.

Another year has passed and we reflect back on those that have helped make it possible. We thank our Donors for helping the Department maintain its traditions and offering new opportunities. Private donations have been crucial in the growth and continuation of excellence in the Department of Physics and Astronomy. As the State of California struggles with its budget and continues to make deep cuts into education spending, it is donations from private individuals that allow us to maintain a healthy program.

The “What Physicists Do” lecture series is supported entirely through donations. This highly successful program has now completed its seventy-sevens semester. The series has been tremendously successful and brought some of the foremost physicists in the world to our campus to share their thoughts and research. The series founder, Dr. Joe Tenn, will be stepping down this year and Dr. Scott Severson (scott.severson@sonoma.edu) will now spearhead and organize the series. Please feel free to contact Professor Severson with any questions or suggestions that you might have.

This year we received a number of generous donations which support not only our “What Physicists Do” lecture series, but also came in the form of support for undergraduate researchers. The Horace L. Newkirk Endowed Assistantship and the Mike and Sheila McQuillen Summer Research Award continue to support students to do research with faculty. The research experience has a dramatic impact on the students, providing them with experiences that propel them onto graduate programs and successful careers in science. Other scholarship funds, such as the Physics and Astronomy Scholarship, the Sol and Edith Tenn Scholarship, and the Joseph S. Tenn Scholarship, also support and provide students with opportunities they would not have if not for the generosity of donors.

If you would like to support our program and students please see http://www.physastro.sonoma.edu/PublicSupport.html or contact the SSU Development Office at (707) 664-2712 or contact the Department.

Another year has passed and we reflect back on those that have helped make it possible. We thank our Donors for helping the Department maintain its traditions and offering new opportunities. Private donations have been crucial in the growth and continuation of excellence in the Department of Physics and Astronomy. As the State of California struggles with its budget and continues to make deep cuts into education spending, it is donations from private individuals that allow us to maintain a healthy program.

The “What Physicists Do” lecture series is supported entirely through donations. This highly successful program has now completed its seventy-sevens semester. The series has been tremendously successful and brought some of the foremost physicists in the world to our campus to share their thoughts and research. The series founder, Dr. Joe Tenn, will be stepping down this year and Dr. Scott Severson (scott.severson@sonoma.edu) will now spearhead and organize the series. Please feel free to contact Professor Severson with any questions or suggestions that you might have.

This year we received a number of generous donations which support not only our “What Physicists Do” lecture series, but also came in the form of support for undergraduate researchers. The Horace L. Newkirk Endowed Assistantship and the Mike and Sheila McQuillen Summer Research Award continue to support students to do research with faculty. The research experience has a dramatic impact on the students, providing them with experiences that propel them onto graduate programs and successful careers in science. Other scholarship funds, such as the Physics and Astronomy Scholarship, the Sol and Edith Tenn Scholarship, and the Joseph S. Tenn Scholarship, also support and provide students with opportunities they would not have if not for the generosity of donors.

If you would like to support our program and students please see http://www.physastro.sonoma.edu/PublicSupport.html or contact the SSU Development Office at (707) 664-2712 or contact the Department.
Kamal Prasad has led students in a course in robotics, and at Cali E/PO group. At Roseland University Prep School in Santa Rosa, Monday of each month throughout 2009 at:

is also celebrating the IYA with monthly special episodes dedicat-
sponsoring the 100 Hours of Astronomy with events such as Pub-
E/PO group helped organize many events, including "From Earth
the 213th American Astronomical Society meeting in Long
mal every-day education and public outreach; attending 2008's
California Science Teachers Association conference in San Jose,
the 23rd American Astronomical Society meeting in Long
Beach, and the National After-School Association conference in
New Orleans, as well as delivering local talks here at SSU and Ac-
tive Galaxy pop-up presentations to elementary and middle school
students throughout the Bay Area.

With 2009 being the International Year of Astronomy (IYA), the E/PO group helped organize many events, including "From Earth to the Universe" banners and lectures on campus, as well as co-
spooning the 100 Hours of Astronomy with events such as Pub-
lic Viewing Night at SSU and a special lecture by UC Berkeley
Professor Alex Filippenko (See accompanying article by Katherine
Wyman about IVA at SSU). 

Eps’ Chronicles is nearing its one-year anniversary, and the comic is also celebrating the IYA with monthly special episodes dedicat-
ed to IVA objects such as Venus, the Whippled Galaxy, and the Andromeda Galaxy. Look for these special “Epsisodes” on the first
Monday of each month throughout 2009 at:
http://spacedaychronicles.org

The 2008-09 school year also marked the rise of the robotics for the E/PO group. At Roseland University Prep School in Santa Rosa, Kamal Prasad has led students in a course in robotics, and at Cali,Calmecac in Windsor, Kevin John and Logan Hill ran an after
group hosted Robo Rally in May. Bringing togeth-
er Sonoma county high school MESA students to build robots and compete in challenges with stipend
and event prizes was great fun! 

Dr. Kevin McLin has been keeping GORT, SSU’s Gamma-ray
Optical Robotic Telescope, up and running with the help of stu-
dents Katrina Wyman, Eric Lundy, and Blaine Gilbreth. In addition, Dr. McLin has begun working with Professor Jesse Kim Coble at Chi-
cago State University to incorporate GORT observations into their astronomy curriculum. GORT was also a featured guest at two “Thursday Nightlife” sessions at the California Academy of Science-
enes in San Francisco. The first was during the IYA 100 Hours of As-
tonomy event over April 2 – 5. The second was as part of the Yuri’s
Night party hosted at the Academy and cosponsored by NASA Ames Research Center. Dr. McLin also operated GORT at Night-
life on April 30, when the theme at the Academy was robots.

GORT also had a “first” this past December. On the morning of De-
ember 3rd, GORT caught its first gamma ray burst (GRB). These elu-
usive objects emit blasts of gamma rays typically lasting only a few
seconds to minutes, after which they are never seen again. Sometimes it is possible to see a rapidly fading opti-
cal or X-ray afterglow to the GRB:

This is what GORT saw on December 3rd, the fading optical coun-
terpart to the burst. And this was quite fortuitous because other
telescopes around the world that were positioned so that the GRB was above the horizon were either already in daylight or experienc-
ing stormy weather. If not for GORT, this GRB afterglow would not
have been seen at all.

Laura Chase continues to keep the E/PO group running on a daily
basis, even after giving birth to her second beautiful daughter, Abi-
gail. She has helped to ensure the bills are paid, the files are filed, and materials get shipped to teachers across the country, all with the help of her army of students including Sabrina Colas, Billie Jo Hoyt, and Diamante Rueda.

NASA Education/Public Outreach News
By Logan Hill ’06 and Kevin McLin

Hot on the heels of the launch of the Fermi Gamma-ray Space
Telescope, the NASA E/PO group hosted their fourth, bi-annu-
al, Education Ambassador’s Conference here at SSU. The event
brought together sixteen master teachers from across the country,
including two new members to the EA team, Neta Apple and Wil-
liam D. Panczner, in order to hone education outreach skills.

The five day conference involved live demonstrations from E/PO
members and the EAs alike, showing off the best of the current pre-
sentations of NASA science and math content, developed here at
SSU. The best of each presentation were expanded upon and ways to strengthen weak spots were discussed. The training materials are online through the E/PO group's website:
http://epo.sonoma.edu/

Once the conference was over, the E/PO group went back to nor-
mal everyday education and public outreach; attending 2008’s
Student Achievements
By Prof. Scott Severson

It has been a busy year for our current students and we would like to acknowledge some of their outstanding plans for participation in
summer internships, post-graduation employment or graduate study.

In the summer, Adam Dye will be attending the SPIE Optics and Photonics Conference and Short Courses as well as the Center for
Adaptive Optics Summer School. Jared Fuhle will be working in NASA E/PO group here at SSU. Bill Garcia will be conducting sum-
mer research at the National High Magnetic Field Laboratory in Tallahassee Florida. Blaine Gilbreth was selected for the San Diego
State University Research Experiences for Undergraduates (REU) program in Astronomy. Brooks Hanley will be working with Dr.
Qualls supported by the McQuillen scholarship. Jay Hubbard and Austin Powell will also be working with Dr. Qualls this summer.
Bryce Terrell will be studying Energy Auditing and be completing independent study in Green Sustainability. Katherine
Wyman will be studying Non-Radial Oscillations in Radio Pulsars at the NRAO in Green Bank, West Virginia.

In the fall, Michael Duncan will be attending the Physics Masters program at Fresno State University. Adam Dye will be attending the Optical Sciences Ph.D. Program at the University of Arizona. Chris Johnson will be attending the Physics & Astronomy Masters program at San Francisco State University. Aimee Santos has been admitted to the School of Education credential program at Sonoma State University. Katherine
Wyman will be attending the Astronomy Masters program at Wicklary University.

Kevin Bratford will be taking part in California’s IMPACT teaching program. Kenneth Martinelli will be joining Sonoma Photonics in Santa Rosa. And finally, Bradley Yearwood will be returning to industry following his degree by joining Calis
Networks in Petaluma. We wish all of our students the best of luck this summer and in all their future endeavors!

Our team of Educator Ambassadors at the July, 2008 training

GRB081203A

MESA students practice for a event.

AlumNotes
Paul Goodwin (’71) was chief scientist of Varian Dynamical
Corp. in Kasilof, Alaska whom he passed away on October 21,
2008. He earned a Ph.D. in physics at the University of Alaska,
where he taught courses in philosophy and developed a physics pro-
gram for the Alaska native community. He was at one time presi-
dent of Earth Science Consulting and Technology Corp. and of the
Fairbanks Native Association, Inc.

Frederick Aridi, Jr. (’75) is a systems integration and test proj-
ect engineer for the Space and Exploration Systems Division of
Lockheed Martin in Sunnyvale.

Peter Connell (’76) has been promoted to associate professor of
physics at Westminster College in Utah. He earned his Ph.D. in
astrophysics at the University of Utah.

Doug Merrick (’78) is the vice president of operations at Imara
Corporation, a Medina Ohio startup company developing a new
high power lithium ion battery for power tools, outdoor equipment
electric and electric automotive applications.

Ron Blais (’79) retired in 2008 from Lockheed Martin Aeron-
amics Company in P. Wirth, Texas, where he was a senior staff
research engineer conducting system engineering and research and
development for product improvements. He now raises cattle and
works on vintage motorcycles.

John Philip Cahaba (’50) is the president of Serve Rite, an en-
gineering services firm in Sonoma.

Brett Morgan (’82) is an independent computer programmer in
San Diego.

Michael Rogen (’54) is a real estate agent with Paragon Real
Group in San Francisco. He retired after many years with
Moore Precision Machines, Inc., Burlington, where he was the
vice president of electronics sales and marketing.

George Amundson (’56) died of cancer 13 September 2008. He
was an assistant professor in radiation oncology at the University
of Virginia, where he did research in the radiosensitization of
prostate cancer. He earned his Ph.D. in cellular and molecular
radiobiology at Colorado State University in 1995 and his M.S.
in biomedical engineering from California State University,
Sacramento in 1998.

Chris Ray (’87) was promoted in 2007 to professor of physics and
astronomy at St. Mary’s College of California. He earned his Ph.D. in
physics in 1994 at the University of California, Davis.

Christopher Cook (’80) is director of nanotechnology at Axon
Technologies in Billerica, MA. He previously built a thin film
laboratory at MIT’s Lincoln Laboratory.
The breadth and depth of the fields of physics were on display in Darwin Hall most Mondays as the What Physicists Do series entered its thirty-ninth year. From “Physics for Future Presidents” to “Cosmic Colliders,” the series offered something for everyone. Every colloquium was unique, insightful, thought provoking and (at least for geeks like me) entertaining. You’re bound to have a winner. It’s no wonder that large audiences of SSU students and other physics fans gathered to hear distinguished and renowned scientists present their latest work and answer questions.

Are you curious about astrophysics or cosmology? There were dozens of different presentations dealing with the latest observations and theories of the universe we inhabit. We heard about planetary science in results from the Mars Phoenix Lander and in plans for the Kepler planet-finding space telescope. We learned about the history of large optical telescopes in California and progress with the Large Binocular Telescope in Arizona, and in plans for the NASA-funded robotic telescope GORT operated by Kevin McLaren as part of the “100 Hours” activities taking place at the California Academy of Sciences in San Francisco.

SSU’s direct involvement with “100 Hours of Astronomy” began on April 3rd at 5pm with a special Public Viewing Night at the Sonoma State University Observatory. Sonoma State students, professors, and amateur astronomers participated in the worldwide star party by stargazing at the sky through the many on-site telescopes, or by watching SSU student Katherine Wyman remotely operate GORT to take images of nebulae and galaxies from her computer at the observatory. Also on display at the PVN were the “100 Hours” webcast and a slideshow of astronomical images and descriptions compiled by another Physicis and Astronomy student Chris Johnson.

On April 4th, award-winning UC Berkeley professor Alex Filippenko gave a free public lecture in Warren Auditorium on campus entitled “Dark Energy and the Runaway Universe.” Dr Filippenko is the 2004 recipient of the Carl Sagan Prize for Science Popularization, and was also selected as the Carnegie/CASE Professor of the Year among doctoral institutions. Known for his energetic teaching style, Professor Filippenko has also contributed much towards the discovery of Dark Energy, the poorly understood force that is accelerating the expansion of our Universe.

Are you interested in materials science and solid state physics? We learned about intermetallic materials where smaller means stronger and thinner means defect free and where new materials like graphene are showing novel characteristics for advanced electronics. We were told of new exploratory methods using antineutrons, x-rays, and gamma rays to detect and image atomic characteristics. And we got updates about how novel catalytic surfaces and ultra-short laser pulses can be used in commercial applications.

Do lasers and optics catch your fancy? We heard about new lasers developed to emit precise, high-frequency photons to scan bulk materials for particular atomic elements, like scanning a mountain for gold. We learned how x-rays, generated by lasers and synchrotrons, can be used to study the properties of nanoscale phenomena, like the electron structure of thin metals and the geometry of atomic surfaces. And we learned how a local company has developed rack-mountable, precision laser devices for use in nanoscale manufacturing operations.

Are you concerned about science and public policy? We were told about energy policy in Denmark and how that country is using technology, conservation, and its own renewable resources to become energy independent. And we learned what our politicians should (but probably don’t) know about climate change, energy options, and technologies that could help protect us and the planet.

All in all, it was a great year of learning What Physicists Do. And like the cookies, each presentation just made you want more. I, for one, can’t wait to see what the next series will cover. But for now, it is satisfying just to remember each of the terrific presentations and try to digest all the information they provided.
Newkirk Assistantship 2009
By Adam Dye

Adam Dye and Nadenia Newkirk at the annual Newkirk Award Luncheon

The Physics and Astronomy Department is establishing an observatory at the Galbraith Wild- lands Preserve in southern Mendocino County. The equipment will be used for advanced astrophysical research, undergraduate instruction, and K-12 educational outreach at Sonoma State University. During ground-based astronomical observation, the atmosphere can bend light coming from space and cause alterations of stellar images seen in a telescope. Dr. Scott Severson, Assistant Professor and OWPO Director, wants to determine how well stars, planets, and galaxies are viewed from the proposed location.

We are using a Hartmann Differential Image Motion Monitor (HDIMM) technique to calibrate simultaneously recorded data from an instrument called a seeing monitor. The seeing monitor is a commercially available device that tracks the change in apparent luminosity of a star. On the other hand, the Hartmann Mask method employs a concept known as wavefront sensing to interpret the shape and alteration of incoming light. A wavefront is an imaginary surface joining all points in space that are reaching the same point in space by a wave propagating through a medium. The wavefront sensor measures aberrations of an optical wavefront via spots formed on the CCD detector, which is therefore indicative of the original wavefront shape.

Over the summer, I wrote computer algorithms in Interactive Data Language (IDL) to reduce and analyze data from atmospheric turbulence measurements. My computer program code assimilates our Hartmann Mask data into a three dimensional (3d) array of coordinates, measures the shifts in independent spot locations, and calculates the characteristic seeing condition of the night sky. Atmospheric turbulence is characterized by the Fried parameter $r_0$, pronounced "r-naught", and is a measure of seeing quality. Using equations from Sarazin and Roddier (1990) and a given wavelength $\lambda$, sub-aperture diameter $d$, and separation distance $d'$, my program calculates the spot variance $\sigma$ and plots $r_0$ over time.

At the time of this writing, we are currently looking for evidence of a correlation between the seeing monitor data plot and the $r_0$ data plot. There is a noticeable correspondence, by visual inspection, of the atmospheric behavior shown in our results with the contemporaneous seeing monitor full-width-half-max (FWHM) recordings. The next step is to utilize existing data analysis tools for finding correlation patterns of these plots analytically, but writing new computer code from scratch may be necessary to handle such a task. We plan to publish this work in an appropriate scientific journal when complete and I sincerely hope that my computer algorithms will become a viable contribution to astronomical instrumentation of the future.

Mike and Sheila McQuellen 2009 Research Award
By Mark Wiedman

Summer research opportunities are an integral part of any physics student’s time outside of class, especially the summer before their senior year. This is a time when students can get crucial hands-on experience in an actual research setting. A student can discover what fields of physics appeal to them and can even give an idea for topics in their senior capstone course as well as what to focus on for graduate school.

After being notified that I had received a research grant, thanks to a donation by Mike and Sheila McQuellen, I set to work immediately with Dr. Hongtao Shi and John Collins in the setup of a very low temperature vacuum pumped refrigeration system from Janis Technologies. This cryostat, as it’s called, has a very wide temperature range. It can go from over 300 Kelvin (room temperature) all the way down to about 10 Kelvin (-263 degrees Celsius). To get the low temperature, the system cycles compressed helium gas. To rise to a given temperature, a small copper coil heater around the vacuum chamber is used. A small temperature controller is utilized to regulate the temperature. One end of the cryostat known as the “cold head” has optical windows leading right into the sample holder which can hold small samples of various metals. As the system temperature fluctuates we can measure changes of certain physical and optical properties of the sample. These changes can tell us which temperatures and pressures optimally affect a given sample.

My objective was to build a setup to hold the cryostat and all of its electronic components and to write software that would take data as the system is pumped down. In the beginning, this task enabled me to work quite a bit with John Collins in the Darwin machine shop. We were able to build a cabinet that would hold the pumps and electronic components of the cryostat and even a stand to hold the cryostat itself. After the cryostat found a permanent setting, I set to work on getting all the components to communicate with each other using a programming language called LabVIEW. This gave me very valuable real-world experience in a language that is frequently used by many companies. I was able to write a program that allows the user to input a desired temperature, take real-time measurements, and then plot a graph of temperature vs. time.

There is so much that can be done with such an instrument that I was able to continue my research and design of the cryostat as my senior capstone project.

The project will be completed by May 2009 with the hopes that future students can use my program and system to conduct their own research.

The Society of Physics Students, SPS, completed another successful year. This year has been an exciting one for SPS club members. As many students are graduating the club has spent a good portion of our efforts this year in getting new students to become physics majors and reaching out to incoming students. With the number of students graduating the SPS club is undergoing somewhat of a new beginning at SSU, as the club will be comprised mostly of new students in the next academic year. We hope that we can maintain the same dedication to our field of study and continue promoting the physics program Thriving at SSU. In addition to traditional pizza lunch parties, many members engaged

Sigma Pi Sigma (ΣΠΣ) is the honor society for physics housed within the Society of Physics Students (SPS). Both organizations joined forces under the umbrella of American Institute of Physics in 1968. After a long petition process and the approval of the Sigma Pi Sigma National Office, SSU was granted a charter. During the April 25th retirement party for Professors Tenen and Hitchwa, our chapter was installed. Patrick Brown ’08, Adam Dye ’09, Katherine Wyman ’09, and Bradley Yearwood ’09 are among the first to be inducted into this Society for their outstanding academic performance, scholarship activities, and dedication to serving the community. As the advisor of the student club, I was much honored to be inducted as well. So congratulations to all inductees!

I would like to thank Prof. Hitchwa for being the Installing Officer. He joined this honor society many years ago when he was at Hope College. When the Installing Officer designated by the National Office had to cancel the trip due to a last-minute conflict, Prof. Hitchwa exemplified the mind of a Sigma Pi Sigma member as he served in this role. The induction ceremony was very meaningful and it inspired me and many others, especially our students. Consequently, this event will always remind me of the right-hand rule in physics and its ability to turn up unexpectedly.

A Sigma Pi Sigma Chapter may elect into its membership those students, faculty members and other qualified persons, either in or nearby the institution in which the Sigma Pi Sigma Chapter is located, who attain its standards of high scholarship in physics and other subjects, and who give evidence of professional merit, proficiency, and distinction. To qualify to be a member of this distinguished group as an undergraduate student, one shall have completed at least three semesters of full-time college work, shall rank higher than the upper one third of his college class in overall scholarship, and shall have completed at least three semester courses in physics. We certainly look forward to seeing more students become members of Sigma Pi Sigma in the future.
Farewell to Bryant Hichwa

Professor Bryant Hichwa has retired after five years of full-time teaching starting in 2002 and a semester in the early retirement program in Fall 2007. Dr. Hichwa's involvement with SSU started much earlier, in 1998, when he began teaching part-time while directing Research and Early Retirement program in the Fall 2007. Dr. Hichwa's interests at SSU were wide-ranging - he taught both introductory level and upper division courses in Physics and Physics of Music. He served as Department Advisor for several years, offering students the benefit of his experience in both the industrial and academic realms.

An engaging lecturer, who (with three exceptions) has steadfastly avoided teaching any laboratories, Prof. Hichwa has most enjoyed teaching courses in mechanics, modern, mathematical, statistical, and quantum physics, and astronomy and astrophysics. His lectures are always replete with historical insights into the personalities and circumstances behind the equations, as befits a scholar who is really a series of short updates on the recent accomplishments of our graduates, and is always compiled by Dr. Tenn who corresponds with all the graduates each year and knows almost all of them personally.

An inspiring and passionate teacher, Dr. Hichwa was awarded the 2005 SSU Excellence in Teaching award. A dozen students wrote in support of his nomination, with comments such as "Bryant Hichwa has to be the best teacher that I have ever had, not only on this campus, but in my entire academic career" and "As a teacher he goes above and beyond the call of duty. Knowing him has made a better person." He was also the driving force behind the donation of considerable amounts of laboratory equipment from OCLI and other companies to establish SSU's photonics laboratory within the Center Complex in Salazar Hall. SSU continues to benefit from hands-on experiences linked to the world in mathematically modeling these 250-year old instruments. This work has been done with collaboration with world-renowned concert bassoonist David V. Ranchar. Dr. Hichwa is also an active member of the Galpin Society, a professional organization in Europe that studies historical musical instruments.

Dr. Hichwa's interests at SSU were wide-ranging - he taught both introductory level and upper division courses in Physics and Physics of Music. He served as Department Advisor for several years, offering students the benefit of his experience in both the industrial and academic realms.

Rick DeFreez, '80 and Prof. Joe Tenn.

The issue of the Physics Major that you are now reading is the Department's 56th edition. Prof. Tenn started the yearly newsletter in 1974, and served as editor for 29 issues. Even though early editions were mimeographed (and had to be scanned in), all issues are, of course, available online. One of the recurring articles, "Alumni Note," is really a series of short updates on the recent accomplishments of our graduates, and is always compiled by Dr. Tenn who corresponds with all the graduates each year and knows almost all of them personally.

A dozen students wrote in support of his nomination, with comments such as "Bryant Hichwa has to be the best teacher that I have ever had, not only on this campus, but in my entire academic career" and "As a teacher he goes above and beyond the call of duty. Knowing him has made a better person." He was also the driving force behind the donation of considerable amounts of laboratory equipment from OCLI and other companies to establish SSU’s photonics laboratory within the Center Complex in Salazar Hall. SSU continues to benefit from hands-on experiences linked to the world in mathematically modeling these 250-year old instruments. This work has been done with collaboration with world-renowned concert bassoonist David Vanderlinch. Dr. Hichwa is also an active member of the Galpin Society, a professional organization in Europe that studies historical musical instruments.

Dr. Hichwa's interests at SSU were wide-ranging - he taught both introductory level and upper division courses in Physics and Physics of Music. He served as Department Advisor for several years, offering students the benefit of his experience in both the industrial and academic realms. Dr. Hichwa's knowledge of both musical instrumentation and photography are legendary - inspiring a multitude of student capstone projects as diverse as "Acoustic Research on Elephant Hearing," "Dance and the Physics of Dance," "Return of Depth of Field Image Compensation" (Melissa Crane 2007). His April 27, 2009 lecture in the "What Physicists Do" series, entitled "The Acoustics of Baroque Bassoons" summarized research he has been doing for many years to make sure that our new laboratories would be sufficient for our needs for many years to come. They are perhaps the most lasting legacy to the Department.

On top of all his accomplishments in the worlds of optics and electronics (where he holds 33 patents), teaching physics and music, Bryant has somehow found time with his wife Diane to be extremely active in many environmental organizations in Northern California, including the Madrone Audubon Society, a chapter of the National Audubon Society; The Sonoma Land Trust and Audubon Canyon Ranch. We have been treated to his breathtaking slide shows of birds and other wildlife both locally and from trips to Africa. Dr. Hichwa is the quintessential renaissance man, and we will not forget his many and varied contributions to the Department.