GUSTAVUS ADOLPHUS COLLEGE
PHYSICS DEPARTMENT

August 2005

On-Campus Edition

Gustavus Physics

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Fall Semester 2005

Dates to Remember

- Sep. 7 Classes begin
- Sept. 27-28 Nobel Conference
- Oct. 22-25 Reading Days
- Nov. 6-17 January Term and Spring Registration
- Nov. 24-27 Thanksgiving Break
- Dec. 16-20 Final Exams

Radiations from Olin Hall

This annual newsletter offers highlights of the 2004-2005 academic year and summer, news from current students, recent graduates and faculty, and information about the physics program for the year ahead. An online version with color photos will be available at http://physics.gustavus.edu early in the fall semester.

In May, we bid farewell to the fifteen physics majors from the Class of 2005. Graduates from this and recent classes continue to pursue a variety of graduate and professional degree programs and careers. May was also a sad time for us for another reason, the sudden death of Jennings Ellis, lab coordinator, on May 31. Jennings will be missed around the department. Gustavus physics students participated in funded research with faculty in Olin Hall this summer, as well as at universities and national laboratories across the country. There was a new face around the department this summer. We welcomed Jim Miller, lab coordinator and computer support person on August 1. In addition to research this summer, faculty traveled and attended conferences around the world. Faculty continue to assume leadership roles on campus and nationally. (See subsequent columns and photos for these and other stories.)

A. Jennings Ellis

It is with deep sadness that we report the untimely death of our friend and colleague Jennings Ellis on May 31 at his home in Saint Peter. The faculty of the physics department planned to take Jennings out to lunch on that day to celebrate his retirement. When he didn't meet the group in Olin, as arranged, and didn't answer the door to his house, a neighbor called the authorities, who found that Jennings had passed away. A memorial service was held on June 29 at the Episcopal Church of the Holy Communion in Saint Peter.

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Jennings Ellis and Jim Miller

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Jennings was born on August 25, 1944, in Houston, Texas. He attended St. John's School in Houston from kindergarten through high school. He graduated with honors from St. John's in 1962 and went on to college at Duke University. Following graduation from Duke, Jennings moved to Iowa to teach. He completed the M.S.E. degree in physics and science education at Drake University in Des Moines in 1972. He owned a farm near Oskaloosa, Iowa, and had an uncle and cousins there.

In 1970, Jennings returned to St. John's School to teach physics and chemistry. Jennings went to Abu Dhabi, United Arab Emirates, in 1976 as an industrial and physical science instructor to help train employees of the Abu Dhabi National Oil Company for the petrochemical industry. From 1981-1983, he pursued graduate studies in engineering and public policy at Carnegie Mellon University. He returned to Texas to teach at St. Stephen's school in Austin and later moved to Washington, D.C. to serve as chairman of the math and computer science department at Islamic Saudi Academy.

Jennings joined the Gustavus faculty in 1992 under the 3M and NSF funded visiting high school teacher program. He was an important part of the success of that program in continuing the education of physics and chemistry teachers in the upper Midwest. He found a permanent home teaching labs in the physics and chemistry departments in 1994. Jennings quickly became a part of the Gustavus community, advising students interested in science teaching careers, advising APO, and being Santa to everyone. His role of Galileo will long be remembered by the many astronomy and physics students.

Jennings was also active in the Episcopal Church of the Holy Communion. He served as junior warden, senior warden, region representative, and on the diocesan council. He was particularly proud of his role as director of the church restoration following the 1998 tornado.

Jennings will be missed by his friends and colleagues in the physics and chemistry departments.

Introducing Jim Miller

We are excited to have a new face around the department. **Jim Miller** joined us this summer and will serve as lab coordinator for General Physics and coordinate computer support for the department. Jim received his B.S. in physics from the University of Minnesota and his M.S. in physics and M.S. in mechanical engineering from the University of Michigan. He has worked as an engineer for Owens Corning, Honeywell and TSI incorporated. Most recently, he was a research scientist at Pacific Northwest Laboratory in Richland Washington, where he conducted energy research and developed internet-based applications and other database tools. He has a number of publications in energy measurement and fluid flow and is a member of the American Society of Mechanical Engineers and American Society of Heating, Refrigerating and Air-Conditioning Engineers. He will be teaching General Physics I and Classical Physics I labs this fall. Jim comes to St. Peter with his wife Laurie and three boys, Joe, Carl, and David.

Student Awards and Sigma Pi Sigma Induction

Student Achievement Awards

Each year the physics department recognizes physics students for their achievements with a variety of awards, scholarships, and nominations.

Matthew Wiebold ('06) has received the Milward T. Rodine Memorial Physics Award for 2005. This cash prize is named for the longtime Gustavus professor of physics (who taught here from 1933-1969) and is awarded annually to rising senior physics majors on the basis of interests and scholarly achievements.

Joshua Jacobson ('06) was awarded the Gerald and Julia Swanson Scholarship in Physics. This scholarship was established to honor the work of the physics department faculty who provided graduate Gerald Swanson with a background that prepared him for graduate study in physics and for a career with the Bendix Corporation.

Dorea Ruggles ('06) was selected to receive the John Chindvall Scholarship in Physics. This endowed scholarship was established in memory of 1970 Gustavus graduate John Chindvall by his parents and friends.

In consultation with the Physics Department, the Department of Mathematics/ Computer Science has chosen **Michael Phillips ('06)** as the winner of the 2005-06 John Borneman Prize *Par Excellence* in Mathematics. This award is named in memory of John Borneman, a 1955 Gustavus graduate, by his family. It is presented annually to an outstanding student in the fields of mathematics and physics.

Meghan Brummer ('06) has received the Julian A. Crawford Memorial Prize in Physics. The prize is named in memory of the former chair of the Gustavus physics department (1967-69).

Andrew Cockerill ('08) received the Harold Q. Fuller Memorial Award in Physics, which is given to the first-year student who has the highest overall record in Classical Physics I and II.

Matthew Bergman ('07) received the Positive Derivative Award for a rising junior. This award is given to a student in recognition of her or his improvement in physics, and promise of future achievements. The award consists of a check adequate to pay for a yearly student membership in AAPT, SPS, IEEE, ASME, or a similar organization.

Sigma Pi Sigma Inductees

Sigma Pi Sigma, the national physics honor society, was founded in 1921 and is a member honor society of the Association of College Honor Societies. The Gustavus chapter of Sigma Pi Sigma is only a little over a year old. Nomination and election are by the faculty, based on a combination of student achievement in course work research, and participation in department and SPS activities. The following members of the class of 2005 were elected to lifetime membership in Sigma Pi Sigma: **Cory Christensen, Alan Evans, Carl Ferkinhoff, Jolene Johnson, Brendan Johnston, Jared Lee, John Purdham, and Kelly Younge.**

Faculty Activities

Although **Dennis Henry** spent most of the summer in St. Peter, he and wife Mary did enjoy a 12-day journey by rail, ship, and air to and around British Columbia in mid-June. The beginning of that month was dominated by responding to the sudden death of Jennings Ellis, as well as compiling the record of the work of the Instructional Infrastructure Advisory Committee during Dennis' past two years as chair. He represented that committee and the department chairs throughout the summer on the search for a Director of Instructional and Media Services, and assisted the admissions staff during visits of prospective students.

Prof. Henry has the vista-dome deck all to himself on VIA RAIL's "Skeena" streamliner between Jasper, Alberta and Prince Rupert, British Columbia, Canada on this overcast day in early June.

A major summer project was the editing and narrating of his forthcoming DVD "Indiana, Minnesota, and Early Amtrak Railroad Memories: 1964-72", which is based on his movies taken during that period and previously availably commercially on VHS tape. The new edition should be available in late September, and contains documentary footage that has been included in his presentations to the Lexington Group in Transportation History and other groups, with a focus on the history of St. Paul Union Depot. He has been invited to present two lectures on this latter work in the Chicago area in late October. He continued his work as a consultant for Teltech in the area of interference of residual magnetic fields in structures with CRT displays, and he engaged in various writing and reviewing projects for journals. July concluded with a Henry family reunion in the ancestral home territory of Northfield.

"DC" will be teaching Classical Physics III and two lab sections again this fall, following work in August on updating the department's lab manual for that course. He was re-elected in the spring to another term as department chair, through the end of the 2006-07 academic year. This year he completes his three-year term on the Academic Operations Committee. He is looking forward to working with students on research and lab development projects of mutual interest, and advising majors.

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Steve Mellema spent a month of the summer on a family trip to Malaysia. They saw family and friends there and traveled extensively around the country - visiting Singapore plus nine of Malaysia's 13 states during the month. Highlights included a driving trip through the ancient, central rain forest of the Malay peninsula, complete with "Watch out for Wild Elephants Crossing" signs, as well as snorkeling and SCUBA diving in the pristine waters of a coral reef on a small island (Pulau Perhentian) off Malaysia's northeast coast.

After returning to St. Peter, Steve has been working with senior Sharon Jaffe on a research project involving optical imaging in highly scattering media. They have spent over a month building and characterizing a new high-power, infrared diode laser system. This fall

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Faculty Activities (continued from p. 4)

(Continued from page 4)

Steve will teach PHY-390 Quantum Mechanics, and will also team teach PHY-305 Experimental Modern Physics with Paul Saulnier. In January Term, Steve will offer a scientific programming course "FORTRAN and C++ for the Physical Sciences". The only prerequisite for that course is PHY-200, Classical Physics I.

Prof. Mellema and sons Dan and Jacob leaving for a SCUBA outing on Pulau Perhentian.

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Chuck Niederriter had great summer with his family. Part of the time was spent working at home while his wife, Debbie, worked at summer school. A good deal of time was taken up in preparation for this fall's Nobel Conference on Einstein. Chuck also spent a lot of time pushing the wind project ahead. With the newly acquired Wind analysis Software Package, he was able to overlay wind data with topographic information for the area to determine the best turbine site or sites. The software also allows one to explore the interaction of multiple turbines, in the event that the College decides to invest in two. Chuck is putting the finishing touches on a web based alumni newsletter, incorporating information gathered from physics alumni from the last 25 years. A significant amount of time was spent attempting to revitalize the St. Peter Education Foundation, soliciting donations, and writing a piece for the summer edition of the District 508 Highlites magazine.

In early August Chuck attended the AAPT meeting in Salt Lake City, giving a paper on the wind power project, serving as Minnesota section representative, learning what is new in physics and astronomy education, and visiting with alumni and colleagues from across the country. Chuck made two trips to Pennsylvania this summer, one with the entire family to visit the grandparents, and one for a high school class reunion. August was also a busy time with construction of the new Habitat for Humanity house. The house was almost completed as part of the building and trades class at St. Peter high school. But there was still a lot of work to do, including moving it to the north end of St. Peter. Chuck and his sons helped prepare the site, set forms for the footers, level the basement, and move the house onto the foundation. There will be plenty of small projects for SPS and other groups to help with this fall.

Prof. Niederriter hiking in the mountains above Salt Lake City.

The restful summer ended with a flurry of activity preparing syllabi, a lab manual, and the department newsletter. Maybe another two

Faculty Activities (continued from p. 5)

weeks of summer would have been nice, but, as they say: "all good things must come to an end." Chuck will be teaching Classical Physics I, one of its lab sections, and Mechanics this fall. But, he also expects to be busy doing previews for the Nobel Conference and writing grant proposals for wind turbines.

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This has been a very exciting summer for **Tom Huber**. After applying for funding for the past several years, he received word this summer that he has been awarded an NSF grant from the division of Civil and Mechanical Engineering. The project will be to study a technique developed with collaborators at the Mayo Clinic for measuring vibrational modes. In a manner somewhat similar to a beat frequency, they have shown that they can produce vibrations of very small objects by using the interference of two different ultrasound frequencies. The vibrations are picked up by using a laser Doppler vibrometer. This three-year NSF grant will allow two Gustavus students each summer to do on-campus research. Towards the end of July, Tom spent a week at the Mayo Clinic using ultrasound excitation to make measurements of the vibration of hard-drive suspensions. Knowing how these suspensions vibrate is critical because a hard disk head can crash if the 1 cm long suspension oscillates at the wrong frequency. He is working on analysis of these measurements and an invited talk on this project for the October Acoustical Society of America meeting in Minneapolis.

The original motivation for this ultrasound excitation technique was to develop a non-contact manner to study vibrations of the reed in pipe organ reed pipes. This summer Tom completed and submitted two papers to the Journal of the Acoustical Society of America on vibrations of pipe-organ reeds and how these were measured using ultrasound stimulated excitation. Other projects this summer included preparing the lab manual for the General Physics course, and getting ready for his FTS "Energy - where are we and what's next?" Tom will be continuing this fall on acoustics projects ranging from ultrasound to guitars. Make sure that you let Tom know if you are interested in faculty-student research in acoustics.

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For **Paul Saulnier** the summer of 2005 was filled with research, class prep, and a family vacation. The research consisted of four main projects; sonoluminescence, low-coherence interferometry and its relationship to optical bandwidth, speckle statistics, and the use of radial distribution functions as a means to study swarming behavior in nature. These projects involve the production of light from sound waves, studying the impact of reduced optical bandwidth on coherence length, measuring speckle intensity statistics as a function of polarization, and using the radial distribution function to investigate the organizational structure of zooplankton swarms in response to different experimental conditions. Paul and the four research assistants had fun and even managed to learn some things, play some wallyball (of course Chuck and Paul won all the games), and watch some movies ("I don't have much money, but I promise you will always have a roofus over your head" – Rufus T. Firefly in Duck Soup)

Andrea Olson '07, Eva Cornell '08, Mike Phillips '06, Ben Olson '07

Faculty Activities (concluded)

Jim Miller joined the physics department this summer as physics lab instructor/manager and will be supporting the department's network and computers. Jim previously worked as a research engineer at the Pacific Northwest National Laboratory in Richland, Washington. Richland is in eastern Washington in the Columbia basin desert on the dry side of the Cascade mountain range. Jim says he doesn't expect to be relocating black widow spiders from his basement anymore, but does expect to be swatting a few more mosquitoes. He's already enjoying the lively Minnesota weather and windsurfing on Waconia and Cannon lakes. Jim and family also headed up North to harvest their limit of panfish on Camp Lake near Mille Lacs.

Jim Miller windsurfing in the Columbia Gorge, using a small sail because of the high wind.

Visiting Speakers Program

The physics program is enriched by colloquia given by distinguished scientists and engineers from universities, national laboratories, and industry. These complement talks at SPS meetings given by students and faculty about their internships and research. Steve Mellema coordinated our colloquium series last year, when we hosted the following speakers:

Dr. Russell Palma, Physics Department, Minnesota State University—Mankato and the University of Minnesota, "The Sun and Early Solar System: Genesis and Stardust," November 18, 2004.

Dr. Richard Fuller, Emeritus Professor of Physics, Gustavus Adolphus College, "The Manhattan Project—revisited," April 18, 2005.

Dr. Jason Smerdon, Department of Geological Science, University of Michigan, "Climate Change During the Last Millennium: Views from a Physicist in the Earth Sciences," April 21, 2005.

Speakers in the Works

Dr. Mellema is negotiating with the following speakers and we hope to have them visit Gustavus during the 2005-2006 academic year.

2006 Potential Speakers:

- **Dr. Debbie Lightly Mascaro,** Materials Science, University of Utah
- **Ms. Lauren Fry**, Engineering, Michigan Technological University
- **Dr. Glennys Mensing,** Biomedical Engineering, University of Illinois
- **Ms. Tracy Melin**, TomoTherapy, Madison Wisconsin
- **H. Ali Jaafur**, Chariman, Minnesota Medical Physics

Graduating Class of 2005

The Class of 2005 and faculty posed on Commencement Day, May 29, in front of *Starburst*, just outside Olin Hall where they were often seen playing catch with a frisbee. They are identified below, with their post-graduate plans (from left to right.)

Christian Gunberg, Seeking employment in Virginia before applying to Law Schools
Andrew Heggem, Law School, William Mitchell
Kristofer Storvick, Finish Gustavus coursework in Fall, then apply to law schools
Jared Lee, Graduate Teaching Assistantship, Meteorology, Penn State University
Jonathan Mueller, Seeking technical employment
Steven Mellema, Professor
Alan Evans, Scientist, Assist Medical, Minneapolis
Brendan Johnston, Luther Seminary, Saint Paul
Kelly Younge, Graduate Fellowship, Physics, University of Michigan
Tom Huber, Associate Professor
Cory Christenson, Graduate Teaching Assistantship, Physics, University of Arizona
John Purdham, Graduate Assistantship, Physics, University of Michigan
Dennis Henry, Professor and Chair
Chuck Niederriter, Professor
Seth Hayek, Graduate Assistantship, Engineering, Michigan Technological University
David Fowler, Dual Degree and Graduate Studies in Electrical Engineering, University of Minnesota
Jolene Johnson, Graduate Teaching Assistantship, Physics, University of Minnesota
Paul Saulnier, Associate Professor
Carl Ferkinhoff, Teach for America, Baltimore, Maryland

Not pictured:
Aboma Merdasa, Seeking technical employment

Graduation Day

Professor Saulnier congratulates physics graduates as they enter the field for commencement exercises.

Cory Christenson shakes hands with Prof. Mellema while Profs. Huber and Henry look on.

Steve Wright picks up Pat Wright's diploma.

The families of the graduates celebrate in Olin.

A "circle photo" of the class of 2005 and the faculty.

There is always time for a little frisbee.

Student Summer Research and Internships

At the end of the spring semester we had received information from more than ten students about summer research appointments and internships. We expect to hear many interesting SPS talks based on their work and experiences. The following appointments were known at press time:

Meghan Brummer ('06), Northern Michigan University in Astronomy
Eva Cornell ('08), Gustavus with Paul Saulnier, supported by NSF-RUI grant
Joshua Jacobson ('06), SURF Program, Mayo Clinic, Rochester, Minnesota
Sharon Jaffe ('06), Gustavus with Steve Mellema, Presidential Collaboration Grant
Joni Nordberg ('06), University of Wisconsin's Synchrotron Radiation Center
Andrea Olson ('07), Gustavus with Paul Saulnier, supported by NSF-RUI grant
Ben Olson ('07), Gustavus with Paul Saulnier, supported by PRF grant
Mike Phillips ('06), Gustavus with Paul Saulnier, supported by PRF grant
Dorea Ruggles ('06) SURF Fellowship, NIST, Washington, D.C.
Matt Wiebold ('06), Universityof Minnesota Electrical and Computer Engineering

Summer Research Experiences

Joni Nordberg spent the summer working with Associate Scientist Ralf Wehlitz at the University of Wisconsin's Synchrotron Radiation Center and wrote the following:
" We used synchrotron light to doubly and singly ionize sodium and then potassium. We were studying the double to single photoionization ratio for these elements as a function of the incident photon energy. Much time was spent taking data and analyzing data and comparing the results with those for Helium, Lithium and other elements where data were available. The University provided opportunities for me and the other students to get to know the campus in Madison including participation in a SROP conference where I was able to learn about future graduate school opportunities. "

After returning to the US from Chile in July, **Sharon Jaffe** has been working for Professor Mellema, doing research in optical imaging. She reported the following: "We have been building a modified Mach-Zender interferometer using an infrared diode laser. The hope is that someday this setup could be used to image three-dimensionally, useful in an application such as cancer detection."

Eva Cornell and **Andrea Olson** worked in Paul Saulnier's optics labs this summer. They wrote the following: "One of our two projects this summer dealt with light interference and coherence length. Interference patterns will appear if the coherence length of a light source is greater than the path length difference between the two arms of a Michelson interferometer. We built a Michelson interferometer and found an interference pattern using white light, which had a coherence length of about 10 microns. We then detuned the interferometer so that the interference pattern just barely disappeared. Finally, we placed a filter before and after the beam-splitting cube, which lengthened the coherence length of the light to about 90 microns and made the interference pattern appear.

Our second project was a continuation of swarm work performed by previous groups. We were able to generate graphs of the probability of brine shrimps' locations to determine if they exhibited grouping patterns or if they were randomly distributed. We developed a new way of illuminating the shrimp, found different computer programs to analyze the individual video frames, and rewrote parts of the swarming analysis program. Our future goal is to determine whether different light intensities and wavelengths affect how the shrimp swarm."

The Society of Physics Students or Physics

The Society of Physics Students (SPS), or physics club, is a student-run organization that provides many different kinds of opportunities for students (physics and non-physics). From opportunities to help out in the community to physics phun, and everything in between, there is something for just about everyone.

Weekly SPS activities, range from bowling to waterpolo, and hopefully are interesting to students and faculty alike. Traditionally scheduled early on Friday evenings, these activities allow first year students an opportunity to get to know the upper level students and professors outside the academic setting. Last year the activities included volleyball, softball, football, soccer, ultimate Frisbee, wallyball, dodgeball, capture the flag, bowling, waterpolo, cards, bonfires, and movies. Although wallyball is still one of the favorites, dodgeball, with 10 balls and 20 people in a racquetball court, is gaining ground.

SPS Volunteers help with a Habitat House.

Twelve students presented summer and academic year research at SPS meetings. We also had one honors thesis defense and four outside speakers, in addition to six business only meetings. The SPS club helped organize "Science Saturday" and hosted approximately 100 grade school aged children for demonstrations. The club also provided physics demonstrations during Gustavus' annual Nobel Conference.

The SPS club participated in several work days with the local Habitat for Humanity chapter, helping build a house and shed. They also built a t-shirt cannon as part of a fund raiser for Habitat. About 15 students from SPS participated in G.I.V.E. (Gusties In Volunteer Efforts) day, raking leaves, washing windows, and whatever else is needed.

A good time was had by all at the Spring Picnic.

SPS Officers for 2004-05

Society of Physics Students Chapter Officers for this year are:

Senior Co-President: **Erika Galazen ('06)**
Junior Co-President: **Nate Souther ('07)**
Treasurer: **Dorea Ruggles ('06)**
Activities Coordinator: **Mike Phillips ('06)**
Sophomore Rep: **Kristen Burson ('08)**

Alumni Association's First Decade Award To Go To Physicist

Physics department alumni continue their domination of the Gustavus Alumni Association's First Decade award. The Physics Department claims 6 of 16 winners. Previous awardees include Woody Ediger ('80), Chad Olinger ('85), Jim Wade ('86), Annette Boman ('88) and Kirsten Tolefson ('92). This year **Debbie Lightly Mascaro ('95)** will be returning to campus to receive the award as part of the Reunion/ Homecoming/Family weekend festivities October 7 & 8. Debbie graduated Summa Cum Laude with her B.A. in physics from Gustavus in 1995. After working for a year as a senior laboratory technician in biophysics at the University of Minnesota's Hormel Institute, she attended graduate school in materials science at the Massachusetts Institute of Technology. As an NSF Graduate Fellow, Debbie studied electronic, photonic, and magnetic materials, earning her Ph.D. from MIT in 2004. She has done research at the IBM T.J. Watson Research Center, MIT Lab of Organic Optics and Electronics, NDSU Center for Nanoscale Science and Engineering, and the Mechanical Engineering Labs at the University of Utah. Debbie will be on campus earlier in that week to give a presentation on her work and to meet with Gustavus students and faculty. Watch for details in the weeks to come.

Study Abroad Possibilities

Gustavus has one of the highest percentages in the country of students who choose to study abroad during their college career. For physics majors, careful planning for a study abroad experience is essential. There are several study-abroad programs available that can integrate more easily with our major.

The semester- or year-long program with the physics department at the University of Wollongong in Australia allows students to take a full range of physics courses. There are also programs at the University of Lancaster, England, and the Gustavus exchange program with the Science University of Malaysia.

None of these programs requires any knowledge of a foreign language, and courses may be taken to fulfill both physics-major and general-education requirements.

Students interested in studying abroad should talk with their academic advisors.

For more information contact the Office of International Education located in the International Center next door to Olin Hall. The study-abroad coordinator is Carol Moline (x7546).

A Study Abroad Story, *by Sharon Jaffe*

When I left for Santiago, Chile in February of 2005, I had no idea what I was in for. I was scared, excited, nervous, and totally overwhelmed. When I got there I was greeted by a hot South-American summer, the Andes Mountains, and an intense, different culture, that is very unique due to the isolation Chile has had since the Spanish conquest. However, over the semester I grew accustomed to the culture and people, and learned to speak Spanish fluently. Also I learned more about myself, in terms of living independently, with confidence and self-sufficiency. I truly believe that the experience was life-changing and recommend studying abroad to anybody and everybody.

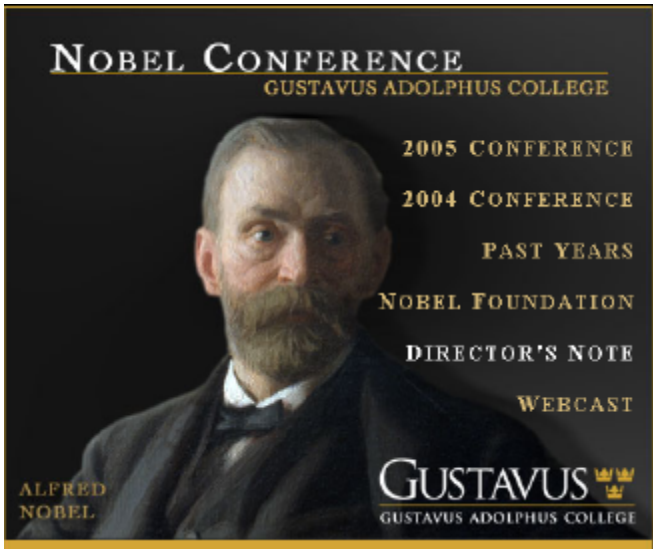
While in Santiago, I lived with a typical Chilean family: Sandra, Alberto, Albertito, and Agustin. The two kids were nine and four years old, and were endlessly sharing their Power Rangers, songs, drawings, and school work with me. The younger could already count to 14 in English (27 in Spanish), and the older liked practicing his contractions with me. Every night I watched "Brujas", the season's soap opera comedy with Sandra, who helped me understand the crazy Chilean slang. Due to Chile's isolation (mountains, Antarctica, desert, and ocean) the language has a unique twist, with unique words, verb tenses, and many expressions that do not exist elsewhere. Often Alberto (dad) and I would sit around listing these *modismos* (slang expressions), laughing about how funny they speak in Chile.

In the classroom I had the opportunity to take some non-physics classes (a very exciting prospect for me). However, in addition to swimming, Pablo Neruda poetry, and Spanish, I still took a course in geophysics. Although it was taught in Spanish, it was very approachable from a general physics background. Actually, since most of the people in my class were geology majors, I was better prepared for the class than them! We learned about standard geophysics concepts, in a country where plate tectonics and seismology are very applicable and relevant. The fault line on the western border of South America is one of the most active in the world, and small earthquakes are nearly constant, with large earthquakes and erupting volcanoes a common occurrence. The "real job" of my geophysics professor was as a seismologist for the Seismological Survey, and he would often get called off on important emergencies around the country during class-time. When we were lucky he would remember to send someone to tell us that class was cancelled.

During my five months in Santiago, I felt like a sponge, constantly absorbing information, names, places, and experiences. Since coming back to the United States in July, it has been a constant readjustment process, and is truthfully as difficult as they say it is.

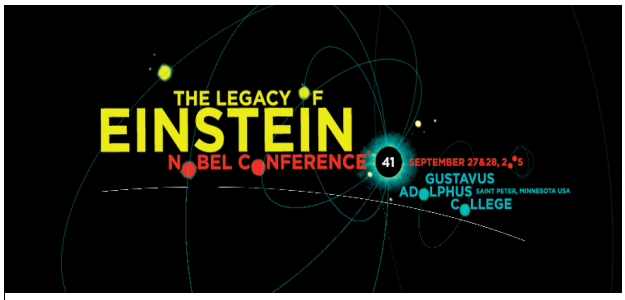
Nobel Conference

The Nobel Conference came into being in 1963 when, emboldened by the smashing success of a gathering on campus of 26 Nobel laureates for the dedication of the Nobel Hall of Science as the first American memorial to Alfred Nobel, President Edgar Carlson and other college officials approached the Nobel Foundation for permission to hold an annual science conference using the Nobel name. The vision for this conference was to bring cutting-edge science issues to the attention of an audience of students and interested adults; and to engage the panelists and the audience in a discussion of the moral and societal impact of these issues.



Nobel Conference XLI: The Legacy of Einstein September 27 and 28, 2005

In the fifty-year period from 1905 until his death in 1955, Albert Einstein contributed more to physics than any other person before or since. 1905 was truly an extraordinary year in the history of physics. In the same year that he received his Ph.D. from Zurich University, Einstein published breakthrough papers on the special theory of relativity, quantum theory, and Brownian motion, beginning an incredible scientific career. It took Einstein eleven more years to greatly extend our understanding of gravitation in his theory of general relativity, published in 1916. He continued to contribute to theoretical physics, in the areas of cosmology and unified theories for the remainder of his career, first in Berlin and later at Princeton. Albert Einstein was also socially and politically active for his entire scientific career, engaged as a peace activist, Zionist, advocate for world government, and supporter of the American civil rights movement.



Nobel Conference XLI, will celebrate the 100th anniversary of Einstein's *annus miribilis*. The panel will consist of Wolfgang Ketterle, Thomas Levenson, Kip S. Thorne, Sylvester James Gates, Wendy Freedman, George F. R. Ellis, and Ira Flatow.

In addition, the *Physics Force* will give a physics demonstration show at noon on Tuesday and the world premier of ***Clockworks: Einstein Time*** will be Tuesday at 7:45 pm.

Olin Observatory

Located on the roof of Olin Hall, the Olin Observatory is open Sunday, Tuesday, and Thursday evenings during the academic year. Observatory assistants will help students, staff, faculty, and town folk view the astronomical sights through the Department's telescopes and binoculars. Take a break from studying and stop up sometime.

The observatory is equipped with six Mead LX-200 10" telescopes which can be used on the roof platform to view the Moon, planets, and many deep sky objects. The 16" LX-200 mounted in the dome provides spectacular views of deep sky objects. CCD cameras are available for photographing astronomical objects, or visitors may take pictures with their own digital camera or one of the observatory's.

Upcoming SPS Events:

The first meeting will most likely occur on September 12, at which time the new officers will outline their plans for fall activities. The faculty will also make brief presentations about opportunities for student collaborations in research and course development projects.

The Fall Picnic will probably be on Sunday, October 2, in Minnesota Square park. Come for the football, fun, and food.

Open house in the Olin Observatory, Saturday, October 8, 9:00 pm. Part of Reunion/Family Weekend.

Faculty Responsibilities:

- Department Chair - Dennis Henry
- Library Liaison - Tom Huber
- SPS Advisor - Chuck Niederriter
- Sigma Pi Sigma Advisor - Chuck Niederriter
- Pre-Engineering Advisor - Paul Saulnier
- Visiting Speakers Coordinator - Steve Mellema
- Observatory Director - Chuck Niederriter
- Education Department Liaison - Tom Huber

Steve Mellema continues to serve on the Faculty Compensation and College Budget committees. Dennis Henry continues to serve on the Academic Operations committee and Chuck Niederriter begins a term on the Faculty Senate. Paul Saulnier will continue to direct the *Shop Talks* program and Tom Huber will be serving on the Web Advisory committee.

Additional Student Awards

Sharon Jaffe and **Joni Nordberg** have been named Physics Departmental Assistants for Fall Semester, 2005. Each position has a nominal expectation of four hours per week in research, course development or other activities that will assist in the work of the department. Two other seniors will be appointed for the spring term.

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We're on the web!
http://physics.gac.edu

Editor's Note: This Newsletter is issued at the beginning of the fall semester for the benefit of current and prospective students, alumni, faculty and others interested in the physics program.

Students enrolled in the major course sequence will also receive copies of the current physics curriculum and advising guide and a users' guide to the physics software on the department's computer network. Seniors have received copies of the second edition of the AAPT brochure "Planning for Graduate Studies in Physics and Related Fields", written by Dennis Henry, and juniors will receive copies this fall.

All students are reminded to visit with their faculty advisor early in the fall semester, to discuss their plans for the year, research opportunities, pre-professional and graduate studies, study abroad, or any other items of mutual interest.

January Term 2006

Steve Mellema will teach FORTRAN and C++ for the Physical Sciences.

Paul Saulnier will offer Physical World, which is primarily intended for education majors.

Dennis Henry, Tom Huber, and Chuck Niederriter are taking leaves this January, and will be working on a variety of research and curricular projects.

Project Reminder

Juniors and Seniors are reminded that the physics major has a project requirement component for the major that must be completed by enrolling in Electronics and Instrumentation II, Optics, Astrophysics, Nuclear Physics, or Condensed Matter Physics.

Research or Internships?

A high percentage of our majors will complete at least one research internship or experience before they graduate. These experiences most often take place during the summers following the sophomore and junior years, but there are programs that will accept first-year students.

A research experience is valuable in many ways. It gives students a taste of what the "real world" of research is like and helps them to plan for future graduate studies and jobs. And, in both those cases, having such an internship on your resume can open a lot of doors.

So, if the kinds of appointments described by students in SPS meetings this year sound interesting, talk to your advisor or to Tom Huber, who is the department's internship coordinator. Check the bulletin board outside room 206 and the department web pages for announcements.