

DEPARTMENT OF PHYSICS
CALIFORNIA STATE UNIVERSITY, CHICO

Summer 2000 NEWSLETTER



Josh Striemy, David Kagan and Phil Gash make liquid nitrogen ice cream at a luncheon reception for our graduates.

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New Faculty Member Joins Department

For the first time in thirteen years we have hired a full time tenure track faculty member. Our new professor is Dr. Xueli Zou [Sue-lee Zoe]. Dr. Zou was raised in Changchun, China and completed her undergraduate work at Northeast Normal University there. She then served as a National Textbook Writer and Editor for The People's Education Press in Beijing where she helped to write the science curriculum and text books for Chinese schools. She will earn her Ph.D. in Physics Education this summer from Ohio State University where her thesis advisor is the well known textbook author Alan Van Huevelen.



Xueli's thesis work centers upon student conceptual understanding of issues in calculus based physics courses. In particular, she developed hands-on instructional methods that addressed student misunderstanding of internal energy changes during inelastic collisions.

We are delighted to have the spirit and energy that Xueli will bring to our department. Dr. Zou's deep understanding of modern pedagogic techniques based on the insights of Physics Education Research will add new strength to our teaching mission. She will help us establish a stronger program in teacher preparation with the new General Physics degree and be involved with K-12 teacher outreach efforts through the CSU Chico Center for Mathematics and Science Education.

Ed Millet Retires

Dr. L. Edward Millet has announced his retirement effective June 2000. He earned his bachelors degree in Physics from Brigham Young University in 1962 and went on to get his Ph.D. there in Solid State Physics in 1968. Ed joined the faculty at CSU Chico in 1967. He was Department Chair from 1972-75 and again 1984-90. Ed has also served as the unofficial department historian.



Dr. Millet is a dedicated teacher. Some of his most challenging and innovative teaching was in the course he developed called, "Relativity and Albert Einstein." This course was an upper division thematic requiring students with limited mathematical skills to grasp the sophisticated ideas of special and general relativity. Ed developed many clever hands-on exercises that helped the students understand the significance of these profound ideas in modern physics.

We will all miss Ed's big smile and his gentle, quiet sense of humor. However, he will participate in the faculty early retirement program and join us to teach classes in the spring semesters. Ed and his wife plan to take advantage of their free time by traveling. Rumor has it that they intend to visit the Great Wall of China. Congratulations Ed. Enjoy your retirement.

Inaugural McGie Service Award Earned

The first recipient of the Michael McGie Service Award is Jonathan Nay, a senior majoring in Physics and Math. He is a superior student, some faculty say he is as sharp as any we have ever had. Yet, the McGie Award is primarily for service to others, an area in which Jon is without peer. He teaches tutorial classes for the Alliance for Minority Participation and volunteers to tutor as part of the ongoing program of the Society of Physics Students. Most SPS members tutor two hours a week. Last year, Jon tutored twenty hours per week without pay. While many faculty members worried that he wasn't giving himself enough time to study, he continued to excel in his classes. This year however, he has cut down to a mere ten hours per week of tutoring. We are delighted to be able to present the first McGie Service Award to someone that has so truly earned it.



Michael R. McGie received his BA in Chemistry in 1957 from Chico State College. In 1966 he earned a Ph.D. in physics from UC Davis. Then he chose to return to Chico State to give back to the community of his origins. While on the faculty for 32 years, Mike always gave of himself for his students. They often recall a kind or encouraging word at a critical moment in their college experience. He also served as department chair for 10 years and was very active in campus-wide governance. Mike's service to others represents the best of the teaching profession, and this award is intended to encourage this commitment in our students. To be eligible, a student must be a physics major with a 3.50 overall GPA. The primary consideration is demonstrated service to others, and financial need is also considered.

We appreciate this year's generous donors: Lisa & Brian Washburn, Elaine Eastham, Dr. Cheuk & Theresa Chau, Dr. David Kagan, Irene and Steven Eggert, the Society of Physics Students and Dr. John Young.

McGie Service Award Y\$2K Challenge!

The Department of Physics established the McGie Service Award last year in honor of Mike McGie's tradition of service and to reward students that help us maintain this culture of service. However, we must raise \$4000 dollars to permanently endow the Michael R. McGie Service Award. The tradition of service runs deep in our chapter of the Society of Physics Students and they have agreed to match, dollar-for-dollar, all contributions made between now and October 1st, 2000. Therefore, it is our challenge to raise \$2000, the Y\$2K Challenge. *Please send your contributions for the Michael McGie Service Award to the Department of Physics, California State University, Chico, Chico, CA 95929-0202.* Thank you so very much for helping us maintain our heritage of service to others.

A handwritten signature in black ink, appearing to read "D. J. Kelly".

The Department of Physics Annual Fund

The Physics Department Annual Fund supports the educational and scholarly activities of the department. In recent years, it has provided research equipment for the optics and solid state laboratories. In addition, the fund has helped add technology to our classrooms by completing a computer projection system. This system will allow us to bring simulation software and other state-of-the-art educational software into the classroom.

This year the fund made possible a \$1000 scholarship to the College of Natural Sciences Outstanding Student Leader. It is your generous contributions that allow us to offer these wonderful scholarships which, in turn, attract and retain the most diligent and devoted students. This year's donors deserve special thanks: Harvey Peck, Chris Kosmakos, Matthew Smyers, Thomas Hall, Robert Bartholomew, Boyd Reasor, Jon Bolstad, Dirk Borges, James Guynn, Jeffrey Mallory, Joe Polen, Bart Fredericks, Cheuk Chau, Lockheed Martin, and the Society of Physics Students.

Contributions to the Annual Fund can be sent to the Department of Physics, CSU Chico, Chico, CA 95929-0202.



The Arloe Anania-Murray Physics Scholarship

The Arloe Anania-Murray Physics Scholarship Fund honors the memory of our former department secretary, Arloe Anania-Murray. She brightened the department with her outgoing personality; her work and dedication were appreciated by faculty, staff and students. At the time of her death, it was her wish that contributions be made to a scholarship fund for students in the Department of Physics. This wish was characteristic of Arloe's compassionate love and genuine interest in our students.

This year two students were honored. Roy Fisher is a junior physics major from Oroville and Tristan Ragsdale is an entering freshman from Mt. Shasta High School. Both of these students have earned this recognition with outstanding scholarship in physics.

A deeply felt thank you to the following donors: Dr. Edward & Johanna Millet and the Society of Physics Students.

Contributions to the Arloe Anania-Murray Physics Scholarship can be sent to the Department of Physics, CSU Chico, Chico, CA 95929-0202.

Mary Murphy-Waldorf New Stockroom Technician

Mary Murphy-Waldorf was hired this year to be our new stockroom technician. Mary has worked on campus for the last ten years in the College of Agriculture where she was known for her strong work ethic, positive attitude and resourcefulness. She has shown all these skills as she has rapidly learned the ropes here in physics.

Mary and her husband are currently in the process of having a house built on the east side of Chico. Her daughters, Heather and Jamie, sometimes grace the stockroom with their smiles. Mary is a wonderful addition to our department and we are very glad she has decided to join us.



Twelfth Annual Pumpkin Drop

The Society of Physics Students has become famous for the annual "rite of fall," the Pumpkin Drop. The reenactment of Galileo's legendary Tower of Pisa Experiment has become an institution for local grade school teachers and their students. This year's rendition featured pumpkins dropped in time with the cannon blasts of Tchaikovsky's 1812 Overture. The last pumpkin was filled with liquid nitrogen creating a spectacular finale.

For more information about the CSU, Chico Society of Physics Students chapter visit their web page (<http://phys.csuchico.edu/sps>).

What's Does A Gaffer Have To Do With Physics?

First of all, what is a gaffer? A gaffer works making films. The gaffer is responsible, along with the lighting director, to ensure that scenes are properly lit. Their concerns range from the technical to the artistic.

What does this have to do with physics? One of our graduates, Matt Smyers is a gaffer. After graduating in 1993, Matt went to Columbia College of Chicago and earned a Master of Fine Arts in Film. In a recent phone conversation we learned that a gaffer must manage an energy budget determined by the power available for lighting on the set. At the same time, the gaffer must be creative enough to provide for the artistic lighting needs of the film.

Once again, we have found that our graduates have a fabulously rich variety of careers. You can find out more about the careers of our graduates on our web site <http://phys.csuchico.edu>. You may even find a lost friend.



Physics Students Earn Internships

Experiential education is the latest buzzword, but physics majors have long know of the advantages of internship programs. The Department of Physics encourages all of our students to seek internships. This year four students will add an internship experience to their education:

Kathryn Roscoe will spend the summer at the University of Arizona studying with the Global Oscillation Network Group (GONG) as part of the Research Experience for Undergraduates program.

Tim Sweeney, Cynthia Abundabar, Robert Foster and **Jason Allen** are Quality Assurance Interns at SpectraPhysics in Oroville, CA.

First General Physics Graduate Earns Teaching Credential

Samantha Baumgartner, our department's first graduate in the General Physics Option, has earned her primary authorization to teach physics and a secondary authorization in Geoscience. Samantha graduated last spring and has spent the year in the CSU Chico Credential Program. She was a student teacher at Paradise High School in their physics class under the mentorship of Mr. Bryne Pedit.



The General Physics Option in Physics was specifically designed to meet the requirements of the California Commission on Teacher Credentialing for admission into a credential program. Our department instituted this degree two years ago to provide a more directed pathway for our graduates to become teachers. Samantha joins seven previous graduates that have entered the vital profession of high school teaching. We hope that she enjoys a rewarding and successful career.

Physics Graduates That Have Become Teachers

The first time students really see physics is in high school. The importance of first impressions highlights the deep debt we owe to the high school physics teachers. Their hard work today creates the physics majors of tomorrow. We are very proud that so many of our graduates have chosen teaching as a profession and we salute these individuals.



Richard Aglipay (1983) - Trinity High School

Darryl Brock (1973) - Lakenheath, England

Lonnie Grimes (1973) - Oakmont High School

Brian Hoffman (1987) - Rancho Verde High School

Michael Janus (1996) - Placer High School

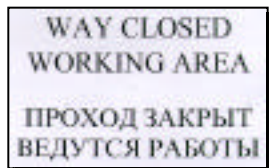
Richard Radcliffe (1987) - Live Oak Alternative Schools

Brian Willard (1997) - Santa Ynez High School

Dr. Buchholtz Goes to Russia

Louis Buchholtz traveled to Finland and Russia last August. He presented his paper, "Critical Current of Superfluid ^3He in a Realistic Channel," at the 22nd International Conference on Low Temperature Physics in Helsinki, Finland. Then he continued eastward to present his paper, "Superfluid Density of States at a Diffuse Surface," at the International Symposium on Ultralow Temperature Physics in St. Petersburg, Russia.

Upon his return, Lou regaled the department with the harrowing tales of his travels. While the trip was invigorating, he was very glad to get home. He brought back a gift for the students which was the sign pictured below. He "found it in" (read: swiped it from) an area that was being renovated. These signs now adorn the SPS room and several hallways.



Physics Graduate Heads For Scripps

Jason Jordan, famous for playing Galileo at the Pumpkin Drop, has been accepted into graduate school at Scripps Institute of Oceanography. Jason will be a graduate student in the Applied Ocean Science Curricular Group. He has also been awarded a Regents Fellowship for outstanding entering graduate students.

Jason has been a very active student here at Chico. He is a double major in Mechanical Engineering. He has been awarded a Floyd English Scholarship and last summer he earned a Research and Creativity Award for the project, "Balancing Creativity with Radiation" with Dr. John Young. In addition, one year ago Jason had an internship at Brigham Young University in Provo, Utah where he studied Electron-hole Interactions in Polydiacetalene. We wish Jason the best as he heads off to new adventures.



Gaffney and Chau Make Novel Diffusion Measurements

When a pure, transparent fluid floats on top of a transparent solution there is an abrupt change in the refractive index at the interface between the fluids. As these two fluids diffuse into one another the abrupt change smears out into a continuously changing refractive index in the mixing region. Light incident on this region will be refracted due to this gradient in refractive index. Dr. Chris Gaffney and Dr. Cheuk Chau have used a clever optical arrangement using a standard HeNe laser to monitor

this gradient over time. From the data they collect they can obtain the solution concentration profile over time and hence information on the diffusion process itself. Their data has yielded the diffusion coefficients for several combinations of solutions and the results are consistent with the values measured by other techniques. They have reported their success at the American Association of Physics Teachers Meeting at the University of the Pacific last November 6th.



Five Year Program Review Highlights Department Issues

Every five years the Department of Physics conducts a self study to assess the quality of our program and the direction of our department. During this process we reviewed student data, American Institute of Physics Reports, curriculum at other universities and the professional development activities of our faculty. The key findings of this self study report are:

- Our department continues its tradition of a strong collegial atmosphere focused on creating and maintaining a student-centered learning environment.
- From assessment of national norms we have learned that we are a very normal physics department in terms of our curriculum and number of majors, yet we are extraordinary in terms of the quality of our graduates.
- We have seen many dramatic changes recently such as, a new degree program, workload flexibility, budgetary discretion, recruiting efforts and development activities. We must maintain the quality of our assessment plans to monitor the effects of these changes on our department and our students.
- We are struggling to find the space and equipment funding necessary to maintain the quality of our program.
- A significant number of faculty can be expected to retire in the next five years and we must maintain a clear vision of our goals as well as our traditions as we replace these quality people.

Advisory Board Reviews Advanced Laboratory

The CSU, Chico Department of Physics Advisory Board met on October 30, 1999, to review the courses Optics (Physics 230) and Lasers & Their Applications (Physics 231). Their report included four findings and six recommendations.

Findings:

- These courses have the proper content for preparing employable graduates.
- These courses are taught by a knowledgeable and enthusiastic instructor.
- Report writing requirements are appropriate and vital.
- Student presentations develop valuable skills needed in industry.

Recommendations:

- Encourage more students to take the courses by considering adding them as major requirements, allowing substitution of one of the courses for Physics 202B or by adding an Applied Physics Option within our current degree.
- Add more computer interfaced equipment such as a CCD's with "frame grabbing" software and use industry standard image processing software such as IDL.
- Include "optical train" design using the Melles-Griot catalog and OSLO software.
- Encourage students to pursue internships in optics.
- Add field trips perhaps to SpectraPhysics.
- Add more laboratory time by reducing lecture time perhaps using video or web technology or having Environmental Health and Safety train students in safety issues.

Applied Optics Degree Option Approved

The primary recommendation of the Advisory Board was to implement an Applied Optics degree. Dr. Cheuk Chau, working closely with Dr. Greg Sanger of SpectraPhysics, has accomplished this goal. The explosive growth in telecommunications has led to a shortage of people trained in the field of optics. Therefore, the Applied Optics degree replaces advanced courses thermal and quantum physics as well as the second semester of mechanics and E&M with classes in materials engineering, optics, lasers and telecommunications.

The new course entitled, "Optics and Telecommunications" may possibly be taught by Dr. Sanger at SpectraPhysics. This local company has been very generous to the department by providing several students with internships and one student with a permanent job. In addition, they have supplied equipment to improve the optics and lasers courses.

If you or your firm are interested in getting involved with this program please just let us know.

Advisory Board Members

We wish to thank the members of the Advisory Board for their efforts to improve the quality of our program. If you are interested in becoming a member of the Advisory Board, please let us know. We would be delighted to have your input.

Mark Anderson is Business Unit Manager at SpectraPhysics in Oroville, CA.

Paul Bennett (BA Physics 1986) is a Database Administrator for Strategic Marketing Resources, Inc. He earned a teaching credential from California State Polytechnic University, Pomona.

Benjamin Catching (*BS Physics 1989*) is a senior program manager at Optical Coating Laboratory in Santa Rosa, CA. He has a MS in physics from the University of Delaware.

Joshua Fishkin (*BA Physics 1985*) is a senior engineering specialist at Boeing North American, Inc. in Seal Beach, CA. He was awarded a MS in physics and a Ph.D. in physics from the University of Illinois.

Thomas Gosnell (*BA Physics 1967*) is a radiation physicist at Lawrence Livermore National Laboratory in Livermore, CA. He earned a MS in nuclear engineering from the University of California, Berkeley.

Theresa Hartsell (*BA Physics 1984*) is a professor of physics at Clark College in Vancouver, WA. She earned a MS and a Ph.D. in astrophysics from the University of Colorado, Boulder.

Gary Grim (*BA Physics 1985*) is a post-graduate researcher at UC Davis. He earned a MS and Ph.D. in physics from University of California, Davis.

Donald Knifong (*BA Physics 1963*) is a data processing manager at the California State Department of Health Services in Sacramento, CA. He earned a MA in public administration from Golden Gate University.

James Millerd (*BS Physics 1987*) is a senior scientist at 4D Vision Technology, Inc. in Irvine, CA. He received his MS & Ph.D. in electrical engineering at the University of Southern California.

Scott Perry (*BA Physics 1970*) is a professor of physics at American River College in Sacramento, CA. He was awarded a MA in physics from the University of California, Davis.

Boyd Reasor (*BA Physics 1969*) is a senior software engineer at Lockheed-Martin Santa Clara, CA. He holds a teaching credential from CSU, Chico.

Danny Sorenson (*BA Physics 1983*) is a physicist at Los Alamos National Laboratory in Los Alamos, NM. He received his Ph.D. in physics from the University of California, Davis.

Dr. Greg Sanger is Business Unit Manager at SpectraPhysics in Oroville, CA. He earned a Ph.D. in Optics from the University of Arizona Optical Sciences Center.