

DEPARTMENT OF PHYSICS  
CALIFORNIA STATE UNIVERSITY, CHICO  
*Dedicated to providing the highest quality undergraduate education in physics*

NEWSLETTER  
2003



Physics 4C students study the properties of light using equipment from a grant entitled "An Integrated Research-based Twenty-First Century Physics Learning Laboratory." (see next page)

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## Faculty Build A Twenty-First Century Physics Learning Laboratory

A \$28,316 grant from the CSU Chico Center for Excellence in Learning and Teaching for “An Integrated Research-based Twenty-First Century Physics Learning Laboratory” was awarded to **Xueli Zou, Cheuk Chau, Chris Gaffney, and Eric Dietz**. These funds were used to purchase twelve laptop computers, LabPro interfaces and several sets of detectors for the 4B and 4C laboratory. This equipment combined with new teaching methods based on Physics Education Research will create a student-centered learning environment that integrates the research-based curricula and computer technology. Engineering and science students will work cooperatively with their peers in teams of two to four to not only conduct experiments, but to creatively design experiments themselves. Studies have shown that these strategies produce a significant gain in conceptual understanding and problem solving expertise when compared with more traditional instruction.



## Faculty Publications: From Simple Pendulums to Quasiclassical Physics

Our faculty had a great deal of success publishing their work in the last year. **Ed Millet** explained a clever approximation he uses for “The Large-Angle Pendulum Period” in the March 2003 issues of *The Physics Teacher*. **David Kagan and Chris Gaffney** have teamed up for two articles; “Beats in an Oscillator Near Resonance” in the October 2002 issue of *The Physics Teacher* and “Colliding Magnetic Pendula: When is a Collision Not Collision-like” in the May 2002 issue of the same journal.



**Phil Gash** explained how the glass portion of a thermometer affects its reading in “So You Thought a Thermometer Measured Temperature?” in the February 2002 issue of *The Physics Teacher* while **David Kagan** shared an interesting problem in vectors algebra in “An Old Pilot’s Yarn” in the November 2002 issue.



**Lou Buchholtz** published his research paper, “Aspects of the Quasiclassical t-matrix Boundary Condition,” in the *Journal of Low Temperature Physics* in November 2002.



## Michael McGie Service Award Presented



This year's recipient of the Michael R. McGie Service Award is Tony Visco, a junior planning on heading to graduate school after completing his degree next year. Tony already has a degree in another field, but “caught the physics bug” at Lake Tahoe Community College where he is still known as “The Legend.” He has served as a vice-president of SPS for the last two years and spent many hours tutoring beginning students.

Michael R. McGie received his BA in Chemistry in 1957 from Chico State College. 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 on behalf of 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 3.0 overall GPA. The primary consideration is demonstrated service to others with financial need as an additional consideration. We thank this year's donors: Society of Physics Students, Cheuk-Kin and Theresa Chau, Michael and Nancy McGie, Sandra Thomas, Tom Love.

**Contributions to the Michael R. McGie Service Award 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 hard 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 the award will be shared by Justin Stimatze and Kevin Meagher. Justin is a triple major; physics, computer science and math. Kevin has interests in the areas of nanotechnology and quantum computing. Both students share their love of physics by providing free tutoring through SPS and richly deserve this recognition.

The minimum requirement for the Arloe Anania-Murray Physics Scholarship is a 3.0 overall GPA. The primary consideration is scholastic achievement in physics while financial need and service to others are also considered. We thank this year's donors: Society of Physics Students and Michael and Nancy McGie.

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



## SPS Hosts NS Softball Tournament



Last year, for only the second time in tournament history, the Society of Physics Students at California State University, Chico won the Natural Sciences Softball Tournament. This year they hosted the tourney. Although our on-field performance wasn't up to last year's standard, the tournament was wildly successful due to the fabulous chicken barbeque put on by SPS.

The 15<sup>th</sup> Annual Pumpkin Drop was one of the best yet. Aristotle made an appearance and debated Galileo as pumpkins fell to the cheers of the crowd. The use of computers to play the music helped the pumpkins hit precisely with the cannon blasts of the 1812 Overture.

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

## Record: Five Students Inducted Into ΣΠΣ

David Atkinson, Eric Edlund, Greg Johnson, Erin Jordan and Cory Poole were inducted this year into the CSU Chico Chapter of Sigma-Pi-Sigma. Sigma-Pi-Sigma honors outstanding scholarship in physics; encourages interest in physics among students at all levels; promotes an attitude of service of its members towards their fellow students, colleagues, and the public; provides a fellowship of persons who have excelled in physics.

The California State University, Chico Chapter of Sigma Pi Sigma was founded on May 10th 1983. Two students, Peggy Hartsell and Ernie Baragar were primarily responsible and it is fitting that they became members in our first induction ceremony. Since that time forty outstanding physics students, faculty, and staff members, have been honored with membership in Sigma-Pi-Sigma. Their names are permanently inscribed in the chapter membership plaque on display outside the Physics Department Office.

### C.S.U. Chico Sigma-Pi-Sigma Honorees

1983	Ernest Baragar, Danny Sorenson, John Mertens, Theresa Hartsell
1984	Joshua Fishkin
1986	Edward Noddings, Mitchell Louie, Steven Burke
1987	Anne Conley, Bryan Smith, Gary Grim, Benjamin Catching, Heather Clewett
1988	Anne Dougherty, Dennis Murray, Warnar Hettiarachchi
1992	James Martin, Anthony Zanatta
1993	Irene Eggert, Fred Boos
1994	Tracey Johnson
1995	Michael Janus, Tom Nielsen, Jerry Thomas
1996	Elias Afxentiou, Jason Trento
1997	Justin Mosier, Robert White
1998	Samansa Maneshi
1999	Samantha Baumgartner
2000	Joshua Strieby
2001	Kathryn Roscoe, Keith Bein
2002	John Eltgroth, Jon Nay
2003	David Atkinson, Eric Edlund, Greg Johnson, Erin Jordan, Cory Poole



## Faculty Share Their Expertise In Physics Education With Conference Presentations



"How Students Conduct Their Learning In The Investigative Science Learning Environment" was the title of **Xueli Zou's** invited talk at The Ohio State University last June 2002. In addition, she presented several contributed talks at American Association of Physics Teachers (AAPT) Meetings, "Experimental Designs In The Introductory Physics Laboratory" in San Francisco in November 2002, "Nontraditional Problems Developed And Used In The

Investigative Science Learning Environment" in Boise, Idaho in August 2002, and "The Development Of Student Scientific Investigation Skills: Cognitive Dimensions And Indicators" in Austin, Texas in January 2003.

Eighth Annual Conference of The Center for Excellence in Learning and Teaching featured two workshops by our faculty, "Introductory Physics Labs: They Are Not Just for Content Anymore" presented by **Xueli Zou, Cheuk Chau, Chris Gaffney** and student Orion Davies and "Do Game Shows Make Students Think?" presented by Tom Mattman, **Xueli Zou** and Neil Portnoy.

Other contributed talks presented at AAPT Meetings this year included **Cheuk Chau's** "Light Absorption Apparatus," **Phil Gash's** "Why Lowell Saw Canals on Mars and NASA Can't," **David Kagan's**, "SPS and Science Education for the Public" and "Humidity and the COR of Baseballs" by **David Kagan** and student Dave Atkinson.



## Dr. Eric Ayars to Join Department Faculty



Dr. Eric Ayars has been selected to join our tenure track faculty next fall. He earned his Bachelor of Science in Physics from Union Pacific College in Angwin, California. He went on to graduate study at North Carolina State University in Raleigh and was awarded his PhD in Physics in 2000. His thesis was entitled "Near-Field Raman Spectroscopy." Eric will bring to Chico his near-field optical microscopy system (NSOM) with which he will conduct research with our undergraduates.

Eric has been an assistant professor at Walla Walla College in Washington for the last three years and has developed considerable teaching expertise during this time there. He is a member of the American Association of Physics Teachers, the American Physical Society and the Honor Society. We are delighted to welcome Eric and his family to our department.

## **Physics Advisory Boards Holds Virtual Meeting Prepares for New Directions in Advanced Laboratory**

The Department of Physics Advisory Board, in preparation for the addition of our new faculty member, held a "virtual" meeting this spring. The purpose was to guide us toward choosing a new faculty member that will bring new directions to the Advanced Laboratory course.

We sent an email to the Advisory Board requesting that they give some thought to changes in the Advanced Laboratory course. We asked about new areas of physics that should be considered as well as new types of technology that should be added. In addition, we asked them to think about pedagogical issues such as the value of writing, informal and formal presentations. The email was followed up with a phone call from the chair.

**Dr. Derrick Booth** (MESA Director, Butte Community College) encouraged more independent research and experimentation. **Benjamin Catching** (Process Engineer, Optical Coating Laboratories Inc.) recommended more emphasis on material properties, solid-state physics and superconductors. He felt that surface physics methods such as XTS (proton scattering), ESC and SIMS (electron scattering) would be useful. **Dr. Joshua Fishkin** (Senior Engineering Specialist, Boeing North America) emphasized the importance of sensor technology. He advocated the inclusion of a strong writing component.

**Thomas Gosnell** (Radiation Physicist, Lawrence Livermore National Laboratory) pointed out that our current emphasis on nuclear physics is still very important, especially in the area of national security (proliferation and terrorism prevention). He stated that "the pipeline was running dry" of people with this training. **Dr. Peggy Hartsell** (Chair, Department of Physics, Clark College, Washington) felt that the skills associated with computer interfacing would be highly valued by our students as they moved into their careers. In addition, she echoed other members in suggesting more solid-state physics.

**Dr. James Millerd** (Senior Scientist, 4D Technology, Inc.) encouraged us to continue to integrate LabVIEW software and interfacing skills. He also stressed the value of presentation skills. **Scott Perry** (Professor of Physics, American River College, Sacramento, CA) recommended several new topics including non-linear optics (frequency doubling, phase conjugate mirrors, etc.), non-linear acoustics (acoustic levitation & sonoluminescence), NMR or ESR, projects in conjunction with the CSU engineering department, and even astrophysics such as collecting and analyzing data on variable stars. In addition, he encouraged undergraduate research, culminating in articles for publication.



## **Gaffney Set To Begin His Term As Chair**

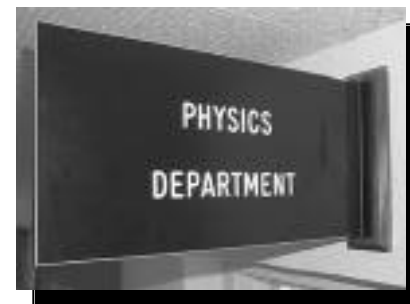


Starting near the end of August 2003 I will be officially assuming the position of department chairman. However, I am already prepping for the job by accompanying Dave to various meetings, chairs go to lots of meetings, whose outcomes will effect our department's future. I will also be working more intensively early this summer to get up to speed on departmental operations, i.e. I will be asking Lisa Washburn over fifty questions per day.

As may be obvious from these comments I have basically no training in management, and never considered it as part of my career as a physicist. I know this new position will have its challenges, especially given the rather dismal state of the state budget in the near future. All of this does not deflect my desire to be a strong advocate for this department, and I am quite happy to have this opportunity as department chair.

Since coming to CSUC in 1987 I have found the sense of community in this department to be quite unusual and quite refreshing. I believe this sense flows from our common purpose of attempting to provide to students, both majors and non-majors, the best education in physics that we can. While this last sentence may resemble an advertising sound bite, the reality is that the faculty and staff in our department truly enjoy working with students, and we are always hoping to infect a young, or not so young, person with the fascination we share for this discipline. My hope as chair is to help to nurture this community.

Of course the physics department at CSUC really extends beyond those folks who are currently here. My conversations with alumni, both majors and non-majors, in both formal (advisory board) and informal settings, have convinced me that current faculty and staff are simply part of a larger picture. While we do not always implement or agree with input from alumni, it is always carefully considered and quite cogent. Working with others who wish to protect what we have and improve what we can will be the most satisfying part of being chair.



## ***The Department of Physics Annual Fund Improves the Quality of Our Program***

The Physics Department Annual Fund supports the educational and scholarly activities of the department. Over the next few years, we intend to move the Advanced Laboratory in exciting new directions. This will require an infusion of new equipment and software.



It is your generous contributions that will allow us to make these wonderful advances in our program. On behalf of our students that benefit from the generosity of this year's donors, we wish to thank: Bryan T. Flaig, Tom and Deborah Nielsen, Bart Fredericks, Dirk and Donna Borges, Michael Griffin and Beverley Molnar-Griffin, Boyd Reasor, Tom and Judith Gosnell, Gary and Marcia Roseme, Robert Johnstone, Heather Brown, Beverly and Robert Bartholomew, Donald and Alice Stoner, James and Lisa Millerd, Jon and Maud Bolstad, Jeffrey and Loretta Mallory, Gary Grim and Anne Johnson-Grim.

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

## ***Paul Hewitt Scholarship for Future High School Physics Teachers Awarded***



The Paul Hewitt Scholarship for Future High School Physics Teachers has been earned by Lindsay Rowland. Lindsay is an honor student minoring in math and Spanish. She plans to earn a teaching credential in physics with a supplement in biology. She says she has always known that she was destined to become a teacher. We are delighted to be able to help her along the way.

Paul G. Hewitt's teaching career began in 1964 at City College of San Francisco. In 1971, "Conceptual Physics," was first published. Now in its ninth edition, it changed the way physics is taught to both non-science and science majors. In recognition of Hewitt's achievements, the American Association of Physics Teachers honored him with the 1982 Millikan Award for outstanding contributions to physics teaching. It is Hewitt's dedication to quality physics teaching that led him in 2001 to establish the Paul G. Hewitt Scholarship for Future High School Physics Teachers. The intent of this scholarship is to encourage those with a love for and knowledge of physics to share their enthusiasm for the science by becoming high school physics teachers.

We wish to recognize this year's donors: Society of Physics Students, Paul G. Hewitt, Michael and Nancy McGie, David Kagan.

**Contributions to the Paul Hewitt Scholarship for Future High School Physics Teachers can be sent to the Department of Physics, CSU Chico, Chico, CA 95929-0202.**

## ***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, Business Unit Manager, SpectraPhysics, Oroville, CA.

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

Benjamin Catching (*BS Physics 1989*) Senior Program Manager at Optical Coating Laboratory. 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. 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. 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. She earned a MS and a Ph.D. in astrophysics from the University of Colorado, Boulder.

Gary Grim (*BA Physics 1985*) Researcher, QWIP Technologies, Davis, CA. He earned a MS and Ph.D. in physics from University of California, Davis.

Thomas Hall (*BA Physics and Math 1976*) Software Consultant, Chico, CA. He earned a M.S. in Computer Science from California State University, Chico.

Donald Knifong (*BA Physics 1963*) is a Data Processing Manager at the California State Department of Health Services. He earned a MA in public administration from Golden Gate University.

James Millerd (*BS Physics 1987*) is a Senior Scientist at 4D Vision Technology. He received his MS and Ph.D. in electrical engineering at the University of Southern California.

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

Boyd Reasor (*BA Physics 1969*) Senior Software Engineer at Lockheed-Martin Santa Clara, CA. He holds a teaching credential from CSU, Chico.

Danny Sorenson (*BA Physics 1983*) Physicist, Los Alamos National Lab. He received his Ph.D. in physics from the University of California, Davis.

## Congratulations To This Year's Graduates



This spring the Department of Physics had six students participate in graduation ceremonies! This puts us in the top 10% of physics degree granting universities nationwide! The five students that have completed their degree requirements are: Dave Atkinson who will enter the teacher credential program at CSUC along with Greg Johnson (not shown). Cory Poole and Eric Edlund are both off to physics graduate school, Cory at Maryland, while Eric is going to MIT (yes...the MIT!). Tim Sweeney's (not shown) plans are still pending.

Erin Jordan will be back next year to finish her degree and make plans for graduate school. Congratulations to all of our graduates!



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## Ed Millet Calls It Quits

Dr. L. Edward Millet announced his retirement effective June 2000. Since then, he participated in the faculty early retirement program and joined us to teach classes in the spring semesters. This year Ed decided to give up teaching altogether to go on a mission for his church. Ed and his wife Joanna are working throughout the state of Pennsylvania.

Millet earned his bachelors degree and Ph.D in Physics from Brigham Young University. Ed joined the faculty at CSU Chico in 1967. He was Department Chair from 1972-75 and again 1984-90. Ed is also the unofficial department historian.

Dr. Millet was 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 miss Ed's big smile and his gentle, quiet sense of humor.



## Yucca Mountain, Air Pollution, Electric Guitars.... It Could Only Be Physics Seminar!

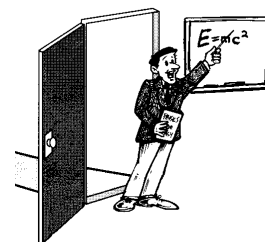
This spring the Physics Department Seminar Series featured several off campus visitors as well as a few alumni. The series began with "Physical Science and Nuclear Waste Disposal at Yucca Mountain" presented by Dr. William M. Murphy of the Geological and Environmental Sciences Department. Lou Buchholtz put in his two cents with "Bright Results from the Dark Side of the Bay: Recent Developments in Helium-3."



Our out-of-town guests included, "Near-Field Scanning Optical Microscopy" by Dr. Eric Ayars of the Physics Department of Walla Walla College in Washington, "A Study of Linear and Nonlinear Dynamics in Spin Systems" by Dr. John Nibarger of the National Institute of Standards & Technology and "Experimental Exploration of the Quantum Vacuum through the Casimir Force" by Dr. Umar Mohideen of the Department of Physics at UC Riverside.

Our graduates enlightened us with some of their work. "The Triple Point of Air: Where Politics, Science, and Public Health Meet" was presented by Dr. Marcus Watson (graduated 1996) of U. C. Davis and Dr. Thomas Love (graduated 1968) of CSU Dominguez Hills shared "A Gentle Introduction To Lie Algebras And Casimir Operators."

Then our students took their turn. Dave Atkinson described his efforts to replicate "The Rutherford Experiment," while Eric Edlund explained some of his work on "The Bubble Project." Cory Poole shared what he had learned about, "Quantum Computing, Teleportation and Cryptography." We were also treated to talks on "Nuclear Magnetic Resonance" by Erin Jordan, "The Nuances of Electric Guitar Physics" by Greg Johnson and "Computational Physics" by Brad Bittle.



You should consider joining us for seminar, either as a speaker or just a guest. The Seminar Schedule can always be found on the website [www.csuchico.edu/phys](http://www.csuchico.edu/phys). Perhaps we'll see you next spring.

