

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



**NEWSLETTER**  
**2002**

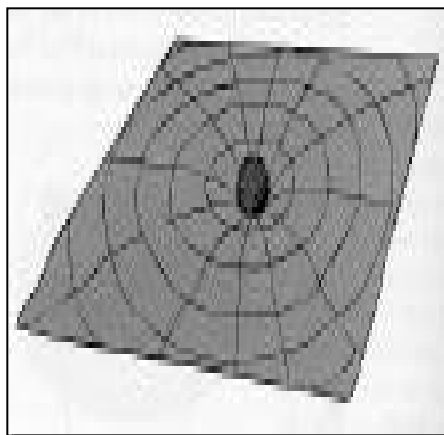
Department of Physics  
California State University, Chico  
Chico, CA 95929-0202

## G Whiz John Young

The Gravitational Constant is one of the most important yet least accurately known of all the physical constants. In classical physics it appears in Newton's Law of Gravity and in General Relativity it determines the space-time curvature. Major advances in cosmology, instrumentation, and computing power have made theoretical calculations and experimental measurements possible that drive the need for a more accurate determination of  $G$ .



The original "Cavendish Experiment" was performed over two hundred years ago using a torsion pendulum. The factor limiting these experiments is the inability to accurately determine the torsion constant. John Young's idea is to obtain  $G$  by balancing the gravitational force against radiation pressure from a laser beam instead of the torsion thus the experiment is independent of the torsion constant.



The idea is to start with no masses in the vicinity of the balance so that the torsion band is in an essentially untwisted state. Then introduce the masses while at the same time increasing the intensity of the laser beam to keep the band from twisting. The goal is to measure  $G$  to an accuracy of 0.5% or better.



## Remembering Bob Plumb

June 19, 1923 - Dec. 9, 2001



Lewis R. Plumb was born in Ogdensburg, N.Y. on June 19, 1923. He was awarded his bachelor of arts from Syracuse University in 1945 cum laude. He earned his master's degree in engineering from the University of California at Los Angeles in 1950. Bob was Senior Engineer at the Jet Propulsion Laboratory at the California Institute of Technology in Pasadena for several years. Plumb started at California State University, Chico in 1958. He was on the faculty for 26 years until he retired in 1983 when he earned Emeritus status.

Energy Conservation was a repeated theme in Bob's work. He served as Chair of the Northern California Solar Energy Association and as a member of the California Energy Education Forum. In addition, he conducted in-service workshops for K-12 teachers on energy issues.

Bob's deep love of animals moved him to help found P.A.W.S. (Pet Assistance and Welfare Society). Bob used his considerable mathematical and computer skills to develop robust models of animal population dynamics. He based his work on the 1902 rabbit propagation study of Leonardo of Pisa, also known as Fibonacci. His main contribution was to demonstrate that the mathematics of population dynamics can be done by first principles from discrete mathematics as opposed to continuous statistical methods. Plumb used his results to argue tirelessly for the spay and neutering of pets.

Bob Plumb was well known for his almost inexhaustible efforts to help students learn physics. Student evaluations included written statements such as, "always willing to help whenever I have a problem," "patient and sympathetic to student needs" and "very concerned about student success." One of Plumb's teaching triumphs occurred in 1974. He introduced a course entitled, "Contemporary Applications of Physics." The highlight of the course was a one-week field trip during which the students were housed at the Alameda Naval Air Station. They visited the NASA Ames Research Center, the Stanford Linear Accelerator, the Livermore Fusion Research Laboratory (at what is now LLNL) and the General Electric Nuclear Research Center.

According to David Kagan, "Bob Plumb was dedicated to his students and spent long hours in his office working tirelessly with them. He was a pioneer in developing the use of computers for classes in our department. He gave me a ride to campus everyday for many years. I'll never forget the kindness that he showed to me as a young faculty member. I, and others in the department, will always remember him for his years of dedicated service to the department. He was a founding father of our department's legacy of dedication to student learning.

## SPS Wins NS Softball Tournament

For the second time in tournament history, the Society of Physics Students at California State University, Chico has won the Natural Sciences Softball Tournament. After losing a thrilling ten inning contest to SAACS (Chemistry), SPS fought their way up through the losers bracket with back-to-back victories. The first win was against their arch-rival Omicron (Biology). Then they faced a rematch against SAACS. The championship game was close until a two out rally in the top of the seventh earned SPS the margin of victory. Powerful hitting performances by Lukas Kennedy, Jon Nay and Lindsay



Rowland combined with the excellent fielding of Dave Atkinson led the way to SPS's first championship since 1995. SPS is the proud owner of the Infamous Howie Trophy for the next twelve months.

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

## Two Top Students Inducted Into ΣΠΣ

Jon Nay and John Eltgroth have become the thirty-fourth and thirty-fifth members of 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 thirty-five 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, Warna 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 Striely
2001	Kathryn Roscoe, Keith Bein
2002	John Eltgroth, Jon Nay



## Michael McGie Service Award Presented



This year's recipient of the Michael R. McGie Service Award is Eric Edlund, a senior planning on heading to graduate school after completing his degree next year. Eric has earned a summer internship at the University of West Virginia studying plasma physics. He has served as the Executive Vice-president of SPS for the last two years and spent untold 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.

**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 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 Chelsea Green has earned the award. Chelsea is completing her senior year at Chester High School and is planning to major in physics at Chico beginning next year. She recalls that her interest in physics started the day she witnessed a launch of the space shuttle. In addition to being an excellent student Chelsea is an athlete and also active in school governance. We look forward to Ms. Green joining our department.

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.

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



## Advisory Board Meeting “Focus on Technology”

The Department of Physics Advisory Board was treated to four presentations by faculty on the use of technology to improve both the knowledge and skills of our students. The presentations included Lou Buchholtz’s “*On The Frontier...Computer Applications in Upper Division Courses.*” Chris Gaffney illustrated changes in Physics 4A, “*Newton’s 3rd Law: True at Every Instant or True on Average?*” Xueli Zou discussed advances in Physics 4B, “*Technology Enhanced Student Learning in Introductory Electromagnetism,*” while Cheuk Chau presented “*Data Acquisition in 4C Labs*”

Afterward the board discussed issues related to the use of technology in the physics program. It was generally agreed that the skill base of our students will be enhanced by this new type of hands-on pedagogy made possible by interactive data acquisition technology.

Mark Anderson stated that this was a “big step in the right direction having the students use tools they are already familiar with (computers) to analyze data.”

Gary Grim said, “the department has done a tremendous job with the amount of technology they’ve brought into the classroom, exposing the students to much higher end technology than ever before.” He felt that the pedagogic success should be monitored over the next few years to see if the end result is optimum. He felt having the students think about the data they are getting is great.

The importance of teamwork skills was addressed. The faculty explained that by strategically grouping students together by skill level and then mandating rotation of various responsibilities within the group learning is enhanced.

The consensus of the board was that the students are learning to graph data and understand it, using less time to take data and more time manipulating and analyzing it. In the process, students are learning vital workplace skills. The exposure to high-end software is also extremely valuable in the market place. In addition, the members agreed that the students using this type of equipment in this manner will be strong independent learners, which is an important skill that will serve them well regardless of their career choice.



The First Law of Thermodynamics is...  
There's no such thing as a free lunch!

## Department Hosts Paul Hewitt President’s Visiting Scholar

Paul Hewitt was named a President’s Visiting Scholar and spent May 7-10 in our department sharing his expertise in physics teaching with our faculty, staff and students. On Tuesday May 7<sup>th</sup> he had dinner with five local high school physics teachers.

On Wednesday he presented the first Paul G. Hewitt Scholarship for Future High School Physics Teachers at the Department of Physics Graduates Luncheon (see photo below).

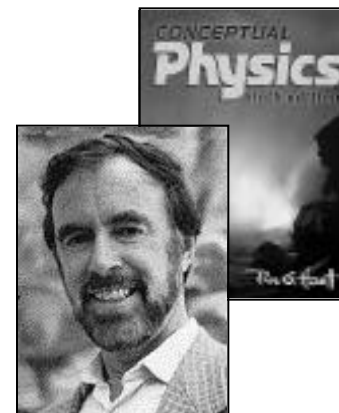
On Thursday Paul had lunch with the Center for Math and Science Education Faculty Cadre. Later that evening he delivered a public lecture entitled, “Physics as a Study of Nature’s Rules” and had dinner with department faculty. On Friday Hewitt presented the department seminar, “The Joy of Vectors – An Elementary Approach”.

Paul G. Hewitt, former boxer, uranium prospector, sign painter and cartoonist began college at the age of 28 and fell in love with physics. His name is now synonymous with his renowned textbook *Conceptual Physics* now in its ninth edition. In 1987 he wrote a high-school version of *Conceptual Physics*, now in its third edition.

Hewitt’s teaching career began in 1964 at City College of San Francisco. His conceptual approach changed the central concepts of physics from mathematical language to common English. By explaining physics rather than proclaiming physics and by extensive use of analogies as a teaching tool, Hewitt brought physics within the grasp of nonscientists. Paul Hewitt simply has changed the way physics is taught to both non-science and science students as well.

In recognition of Hewitt’s achievements, the American Association of Physics Teachers honored him in 1982 with their Millikan Award — a highly prestigious prize for outstanding contributions to physics teaching. Hewitt is presently a column editor for *The Physics Teacher*, the monthly journal of the American Association of Physics Teachers.

Paul Hewitt has made an immediate impact on the excellence of our program by his visit. Perhaps more importantly, his establishment of the Paul G. Hewitt Scholarship for Future High School Physics Teachers at California State University, Chico will help us attract quality students to the teaching profession for years to come.



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

Physics Department Annual Fund supports the educational and scholarly activities of the department. In recent years, it has provided funding for the Century of Physics hallway display featured in last year's newsletter. In addition, the fund has helped provide research equipment for the optics and solid state laboratories and increase the technology we have available in our undergraduate laboratory classes. These improvements have dramatically changed the way these courses are taught. This year the Annual Fund purchased the twelve missing issues of the American Journal of Physics to complete our departmental library which contains all issues from 1952 through 1990.

It is your generous contributions that 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: Bart Fredericks, Gary Grim, Tom Hall, Maamoun Elsayed, Dirk Borges, Jerry Thomas, Don Stoner, Jon Bolstad, Jeff Mallory and Don McCauley.

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

## ***The First Paul Hewitt Scholarship for Future High School Physics Teachers Awarded To Dave Atkinson***

The inaugural Paul Hewitt Scholarship for Future High School Physics Teachers has been earned by David Atkinson (see photo opposite page). Dave is a senior majoring in General Physics. He will complete his degree at the end of next year and plans to enter the Credential Program here at Chico. Atkinson has worked for PASCO Scientific and is currently teaching a section of Physics 4X, the problem session for Mechanics. In addition, Dave tutors several hours per week in the Society of Physics Students Learning Center.

Paul G. Hewitt's teaching career began in 1964 at City College of San Francisco. In 1971, the first "Conceptual Physics," was published. This book, now in its ninth edition, changed the way physics is taught to both non-science and science majors as well. 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.

**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.

Greg Sanger is Director of Advanced Business Development at SpectraPhysics. He earned a Ph.D. in Optics from the University of Arizona Optical Sciences Center.

## Congratulations To This Year's Graduates



This spring the Department of Physics had five students participate in graduation ceremonies! This puts us in the top 10% of physics degree granting universities nationwide! The four students that have completed their degree requirements are: Jon Nay, who is off to the US Navy Nuclear Propulsion Officer Program, Lukas Kennedy will enter the teacher credential program at CSUC, Roy Fisher will pursue a

masters in Near Eastern Languages at the Graduate Theological Union at UC Berkeley, John Eltgroth will be back next year for a few more classes and Brad Franzella will finish his work up next year then plans a stint in the Peace Corp. Congratulations to all of our graduates!



## Chair Visits Local High School Physics Classes



Encouraging the study of physics at all levels is part of the responsibility of all university physics departments. At Chico, we advance this goal by sending the chair of the department to all local high school physics classes at least once per year.

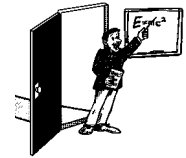
This year David Kagan presented a lesson on the physics behind the internet to students at six local high schools. The students began by conducting an experiment to test Snell's Law of Refraction.

The next step was to develop the concept of total internal reflection and its importance to the operation of optical fibers. Several samples of optical fibers were passed around the classroom for the students to examine.

"These class visits are valuable for three reasons: the students get to conduct an experiment that they otherwise could not, we get to recruit for our department especially our new optics program and we maintain our relationship with the local teachers who in turn provide internship experiences for our students planning to become high school teachers," Kagan explained.

## Dark Matter, Magic and Optics Highlight Spring Seminar Series

This spring the Physics Department Seminar Series covered a wonderfully wide range of topics that only a lover of physics could appreciate. Our emeritus faculty shared their current interests. Fred Boos presented "An Introduction to Curvature for Physicists." During his talk he actually conducted an experiment to



demonstrate gravitational time dilation. Mike McGie spoke on the topical issue, "Nuclear Terrorism: How Real is the Threat?"

Several speakers came from off campus as well. Three faculty members from CSU Sacramento, Lynn Tashiro, Mike Shea and Charles Newcomb illustrated their new approaches to teaching introductory physics. M. Scott Arnel of the UC Berkeley team of the Cryogenic Dark Matter Search (CDMS) described their experimental search for WIMPs and other exotic constituents of dark matter now being installed in the Soudan Mine facility in Minnesota. James Millerd (BS Physics 1987) presented "A New Type of Optical Interferometer" which his start-up firm, 4D Vision Technology, is moving into the production phase. Todd Powell (BS Physics 1990) gave us a sense of his career in his talk, "Software Engineering and Cancer Therapy."

The largest audience this spring came to see Dave Wall of San Francisco City College. His "Physics of Magic Roadshow" featured such intriguing tricks/experiments as "The Professor's Nightmare" and the "Zepf Zapper."

The Seminar Schedule can always be found on the department website [www.csuchico.edu/phys](http://www.csuchico.edu/phys). Perhaps next spring you'll be able to join us.

**Thanks  
to the Friends  
of Physics**

This year we  
got a **10%**

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students  
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