



UNIVERSITY OF OREGON
DEPARTMENT OF PHYSICS
1274 University of Oregon
Eugene OR 97403-1274



Department of Physics
Phone: (541) 346-4751
Fax: (541) 346-5861
kevan@uoregon.edu
Editor: Jim Brau
<http://physics.uoregon.edu>

The University of Oregon is an equal-opportunity, affirmative-action institution committed to cultural diversity and compliance with the Americans with Disabilities Act. This publication will be made available in alternative formats upon request. © 2008 University of Oregon

Nonprofit
Organization
U.S. Postage
PAID
Eugene OR
Permit No. 63



Physics

O
UNIVERSITY
OF OREGON

UNIVERSITY OF OREGON DEPARTMENT OF PHYSICS

SPRING 2010

SPS Enhances the Oregon Experience



SPS Officers: Advisor Stanley Micklavzina, Kayla Wegleitner, Tamela Maciel, Alice Tasker, Robbie Carter, James Utterback, Eric Carlson

Physics in the classroom is essential to the development of a young physicist, but it alone is not sufficient – necessary but not sufficient! Over the past decade, UO physics students brought the local chapter of the Society of Physics Students to life. This professional association for students broadens the physics education experience, and creates meaningful social interactions. Around 2002, led by physics alum Sandra Penney and Stanley Micklavzina as advisor, the local chapter came to life. Students engage in activities, receive professional journals, and even gain access to scholarships.

The local SPS chapter received an SPS Chapter Award from the national office in recognition of its success. Many students contributed to this, but particularly notable were the efforts of Alice Tasker and Tamela Maciel. Tamela Maciel received the Outstanding Leadership Scholarship from the national SPS office in June, 2008. Current officers are James Utterback, Kayla Wegleitner, Eric Carlson, Susan Kasper and Robbie Carter, and Stan continues as advisor. They organize events and a regular meeting that features a speaker every two weeks, mostly physics faculty describing their research, but also other faculty, such as the classics professor who shared the mind-bending revelations and histories of Galileo and Copernicus. While SPS often brings the physics to the students, sometimes

Faculty Profile - Steve Hsu

Since joining the Oregon physics faculty in 1998, Professor Steve Hsu has pursued his extraordinary range of interests with many unique projects. He came to Oregon from Yale, where he was a member of the physics faculty. Prior to that he had earned a Ph.D. from UC Berkeley and was a Junior Fellow at Harvard. Steve's physics interests are broad, but they generally relate to application of quantum field theory to topics of exotic phenomena, beyond the current state of knowledge. For example, he has important work on the state of matter deep within neutron stars, the entropy of the universe, the predictions of string theory in an open universe, and the production of tiny black holes at the Large Hadron Collider (LHC). With the LHC now in operation, the tiny black holes are one of the exotic objects that experimentalists will look for. His contributions to quantum information theory have shown how reconciling quantum theory with gravitation imposes bounds on information and information processing.

Steve also pursues an active interest in encryption and information security technologies. In 2000 he co-founded a startup company, SafeWeb, in California. This was a pioneering effort in what is now known as SSL VPN appliance technology. The company was acquired by Symantec in 2003. He then co-founded another company called Robot Genius, an information security startup, also in California.



Steve Hsu

These interests are not enough for Steve, as he also follows very closely modern finance, and is very knowledgeable on many of its esoteric processes. Here he is interested in topics like option pricing, volatility, behavioral finance and market efficiency. He has given a clear exposition of the subprime crises in talks at UO as well as other universities.

Department News

Graham Kribs has been awarded the Ben Lee Fellowship at Fermilab, supporting a year long visit to interact and collaborate with theorists and experimentalists.

The American Institute of Physics has given the 2009 Science Writing Award for broadcast media to the producer/director and writer of "Absolute Zero," a film describing the harnessing of cold and the race to reach the lowest temperature possible. **Russ Donnelly** was the Principal Science Consultant for the film.

Tamela Maciel has been selected as a prestigious Marshall Scholar, the third Marshall Scholar from the University of Oregon in the scholarship program's 55-year history.

Jim Brau was elected Fellow of the American Association for the Advancement of Science, being cited "for distinguished contributions to the field of elementary particle physics, particularly for developing and applying new technologies to facilitate precision tests of the Standard Model."

Message from the Department Head

I am delighted to report that undergraduate physics majors have garnered several major awards and fellowships in the past year. Sophomore Courtney Klosterman has been awarded an Intel Scholarship, senior Jamie Utterback was awarded a Goldwater Scholarship, and Senior Lindsay Wills received an honorable mention for the same award. More recently, as described elsewhere in this newsletter, senior Tamela Maciel was the third UO student ever to be awarded a Marshall Scholarship. Several of our majors have been awarded University and College merit-based endowed scholarships in recent years as well. The Department is very proud of all of our majors and we look forward to tracking their careers in the coming years - as they start receiving this newsletter! Such endowed scholarships and awards play a vital role in career development, particularly in an era of rapidly increasing tuition. With substantial help from new UO President Richard Lariviere, the Department has invested new effort into developing funds for new scholarships and awards, preparing our majors to be competitive for a broad range of honors, and in helping to formulate strong nomination packages when necessary. Please consider helping this important and energizing project.



- Steve Kevan

kevan@uoregon.edu

Continued on Page 2

Continued on Page 2

Donnelly Addresses Power Plant Pollution

Hsu Continued

He also recently produced, in collaboration with Professor Schombert, an interesting work on the relationship between GPA and SAT scores and the relevance of hard work. Readers will find much that is interesting at his blog (<http://infoproc.blogspot.com>).

Since joining the Oregon physics faculty more than a decade ago, Steve Hsu has been exceptionally productive on many fronts.

SPS Continued

it is necessary to take the students to the physics. A memorable trip to the Pine Mountain Observatory was rewarded on a cold night, when the clouds parted and the group got a good look at the heavens. SPS has assisted with Stan Micklavzina’s Science Circus presentations including one at Portland Community College which was combined with a behind-the-scenes tour of OMSI. The group visited OSU’s Wave Research Facility for an afternoon of tsunami simulations. SPS plans to continue exploring Oregon’s physics related facilities.

SPS members are creating small, modulated laser kits for young students to learn about the fascinating properties of lasers. These kits allow K-12 students to build a modulated laser diode circuit and conduct experiments. The laser kits are part of a broader effort by Professor Miriam Deutsch, and the Oregon Center for Optics, for an optics summer camp to inspire future scientists. The SPS efforts are enhanced by grants, including an SPS National Marsh White Outreach Grant of \$300 (obtained with the help of Oregon Center for Optics administrator Brandy Todd) and an \$8000 APS grant for Laserfest 2010.

The recently increased level of SPS activity is fostering a community of undergraduate physics majors. A local star gazing party is being planned as well as a possible venture back to Pine Mountain Observatory. SPS plans to continue biweekly seminars, to expand its activities, and to create the necessary and sufficient conditions for maturing physicists.



Russ Donnelly

Russ Donnelly is well known for his fundamental research in low temperature physics. But today he is focused on environmental research. His recent, large contract with the Pacific Northwest National Laboratory is aimed at an entirely new approach to emissions cleanup, which could change the operation

of pulverized coal fired plants, and eliminate the need for chimneys in these plants.

In 1978 Russ published the paper “Feasibility Study of Condensation Flue Gas Cleaning (CFGC) System” in the journal Environment Science & Technology. He proposed, with co-authors John Cooper and Richard Ostermeier, a new technique to control emissions of SO₂, as well as NO₂, sulfates, and heavy metal vapors. The work was stimulated earlier by the local uproar over the odor from the Weyerhaeuser paper plant in Springfield. Working with Weyerhaeuser’s support, Russ demonstrated the smell could be removed using a liquid nitrogen cold trap. This eventually led to the paper, which argued that cryogenic condensation of pollutants was economically feasible.

Today, concern over global climate change drives efforts to find revolutionary breakthroughs in contaminant capture, with simplified techniques at reduced cost. Russ’ new large contract will enable him to evaluate the feasibility, effectiveness, and cost of using cryogenic techniques for capturing pulverized coal power plant emission products and selectively separating them for appropriate disposition. He will develop laboratory-scale demonstrations to prove feasibility and generate data as input for power plant scale estimates. The work will lead to an analysis of the technical feasibility of the cryogenic approach to simultaneously capture most of the contaminants from existing coal fired power plants. If this project is successful, Russ will have contributed an important tool to the world-wide arsenal to address man-made contributions to global climate change.

Alumnus Profile - Arthur Noxon



Arthur Noxon

What does Tubetrapping have to do with the Boy Scouts? The answer is Arthur Noxon (MS 1981). Arthur’s interest in low frequency acoustics has taken him from ripple tank simulations to the commercially manufactured corner loaded bass trap. By applying his insight into the physics of sound, envisioned with ripple tank simulations, he hit on the concept of the acoustic resistor, and his novel concept of the resistive-capacitive circuit applied to low frequency acoustic waves came alive. A huge UO lecture hall played a role in the evolution of his invention, but that’s another story.

After earning a graduate degree from the UO physics department, Arthur founded Acoustic Sciences Corporation (ASC) in Eugene in 1984 to build and sell his TubeTrap, the first portable bass trap. It opened an entirely new field of audio acoustics, and played a significant role in the explosive growth of high end audio, along with advances in audio speaker technology and solid state electronics. Motivated to improve the sounds that people listen to, ASC succeeded and achieved a worldwide business. The company continues to provide a variety of products and techniques. ASC also works on a number of acoustic projects, such as soundproofing, sound conditioning, and noise control. They bring a creative approach to each challenge confronting them.

Arthur’s business success, and his personal journey in achieving it, has motivated him to guide young people into discovery of their own scientific interests. Recognizing that school, and even museum demonstrations, often fail to help youth discover their own passions for science or engineering, Arthur has found through the Boy Scouts merit badge training program he can help to awaken this passion in some. Being taught in small groups outside the classroom, by a real expert, along with hands-on experiences, young scouts can open up to possibilities that they hadn’t imagined before. Electricity, electronics, nuclear science, photography, and engineering are merit badge topics that Arthur has taught. He endeavors to have the scouts discover their own aptitudes and excitement for science. But they get much more from Arthur; he brings a high level of expertise into the lives of these young people, a resource that is not easy to find.

A successful businessman and a valued contributor to his community, Arthur Noxon is an important alum of the UO physics department.

Alumnus Profile - Matt Anderson

Matthew Anderson (PhD 1998) is a faculty member in the Department of Physics, San Diego State University. Those of you who remember Matt will not be surprised to learn that he has been involved in some highly creative extracurricular activities as well. Following his PhD research on ultrafast quantum optics (“squeezing” light), and postdoc positions at Rochester and at Oxford, he embarked on a search to land a faculty position. This resulted in his publication of an acclaimed article in Physics Today, “So you want to be a professor!” which has led to 5 invited talks and conference panels. At SDSU he received the “2004 Excellence in Teaching Award,” given annually to one professor in the SDSU College of Sciences, and the “2007 Outstanding Faculty Award” of the Physics Department. Matt is also an inventor, holding two patents, with more in the works. His most successful one led to a new toy—the “StrobeFX”—co-invented with Tom Hughes (PhD, UO Physics, 1998). As seen in the photo, it is a multi-LED device with settable color patterns. It was licensed to SpinMaster Toy Company and has sold exceedingly well!



Matt Anderson

Some fun facts about Matt’s activities while at the UO Physics Department:

- Former president of UO physics graduate students.
- Three-time winner of Wonton Mechanics for his video creations: “Nightmare” (faculty morphing video), “I’m working on it!” (Pete Sellin, PhD, UO Physics, 1996, goofing off during grad school), and “Scratch” (chickens and Prof. Belitz).
- Also claims to be the first (perhaps only) person to launch a paper airplane from the top of Willamette Atrium, run down the stairs and catch it before it hit the ground (witness: Pete Sellin).

You Can Support UO Physics

Have you wondered how to support UO physics students? It’s easy, through the University of Oregon Office of Development. To learn more, go to the physics web page: <http://physics.uoregon.edu>, and click on the “Give Now” link.

To post recent alumni news, or to sign up for future electronic copies of the newsletter, please link to:

<http://physics.uoregon.edu/newsletter>