

May 18, 2005

Dear Friends and Alumni,

Greetings. I hope this spring finds you all well and eagerly awaiting news from the physics program. Through support from the department and various outside entities and through some fortuitous scheduling by the Phi Beta Kappa chapter on campus, we managed to have a number of physicists speak to the campus and our students this past year.

### **Astronomy/Earth Day Speaker**

Our Astronomy/Earth Day speaker this year was Dr. Luis Aguilar, Investigador Titular (Professor) at the Instituto de Astronomia, Universidad Nacional Autonoma de Mexico (UNAM). Dr. Aguilar received his Ph.D. from the University of California at Berkeley in 1985, spent three years as a

Postdoctoral Fellow at the Harvard-Smithsonian Center for Astrophysics, and has held several visiting professorships at institutions in both the United States and Europe. He conducts research in Galactic and Stellar Dynamics and N-body simulations. As you may be able to determine from the picture that Luis provided to us, he enjoys sailing on the Pacific Ocean during his free time. Dr. Aguilar's public lecture was entitled "Extra-solar Planets." After a long time of dreaming



and speculating about the possibility of other planetary systems, the first firm evidence of a planet beyond the Solar System was unveiled in the last decade of the 20<sup>th</sup> century. Since then, a true avalanche of discoveries has occurred, including discoveries of planets that astronomers thought would not be possible. In his talk, Luis described the main techniques used to discover extra-solar planets and discussed the properties of these newly discovered planets. He also described the possibilities of future search programs and reviewed the likelihood of life on these planets. In addition to his general public lecture, Dr. Aguilar presented a more technical talk entitled "The N-Body Problem" to science & mathematics majors and faculty. The N-Body Problem is one of the oldest scientific problems, with a long tradition in mathematics, physics and astronomy. This problem is the one that led Newton to develop his version of calculus, and Poincare to discover the concept of "deterministic chaos." In astronomy, it promoted the development of several important fields as well and more recently, it has led to advances

in computer science hardware and software. Dr. Aguilar also spoke to our introductory course about extra-solar planets and his observatory in Mexico. Dr. Aguilar's visit was sponsored in part by the American Astronomical Society's Harlow Shapley Visiting Lecture program.

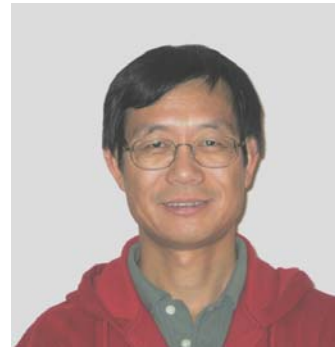
### **Other Speakers**

Our Phi Beta Kappa visiting scholar was Dr. Andrea Liu. Dr. Liu has taught at UCLA since 1994 and is professor of chemistry and biochemistry. She is the co-editor of *Jamming and Rheology* and has served on the editorial boards of *Journal of Statistical Physics*, *Physical Review E*, and *Soft Materials*. Her research in theoretical physical chemistry is directed towards the statistical mechanics of jamming and biophysical systems. Professor Liu is currently a member of the executive committee of the Division of Condensed Matter Physics of the American Physical Society and of the advisory board of the Kavli Institute of Theoretical Physics. While on campus, Dr. Liu presented a public lecture entitled "Jamming," which discussed the reason that everyday items such as coffee and cereal jam and refuse to flow. Dr. Liu also presented a talk entitled "Effective Temperatures in Driven Systems" to our Modern Physics class.

A third speaker that we brought to campus, again with the help of our Phi Beta Kappa Chapter, was Nicole Bell, Sherman Fairchild Post-doctoral Scholar at Caltech and a theoretical astrophysicist. Nicole presented the Lifto Amundson Lecture entitled "Mysteries from the Sun and the Universe," which discussed the resolution of the solar neutrino problem and the role neutrinos play in our understanding of origin and structure of the universe. Nicole also spoke to the introductory physics class about the detectors one uses to observe neutrinos. As an example of how wonderful these speakers are, this course meets at 8:00 a.m. and Nicole was still on Pacific Time (it felt like 6:00 a.m. to her), yet she presented an outstanding lecture.

### **New Faculty Member**

Our new faculty member, Dr. Sun, hit the ground running this year. By the time he arrived on campus in the fall, he had already obtained most of the equipment necessary for his research lab. During his first year, he taught our algebra-based physics course and digital electronics, involved several students in his research activities, contributed multiple papers to the March APS meeting, supervised an honors thesis, and established connections with the photodynamics group in USD's Chemistry department.



### **Summer Activities**

The Lawrence Brothers Science Camp continues into its fourth year this summer, with members of the physics program continuing to contribute activities to the camp. This camp was initially funded through a very generous gift from the Lawrence family and was first announced at the Lawrence Brothers Celebration in 2001. This summer's theme will be a repeat of the first year's theme of "Vision" and will run from July 18-22. If any of you know young people (grades 7-9) who may be interested in attending this camp, you should direct them to [www.usd.edu/lbc](http://www.usd.edu/lbc) for more information.

The Masters of Natural Science program continues to grow and will graduate two more students this summer with an emphasis in physics. We expect continued growth of this program, particularly in response to No Child Left Behind legislation that emphasizes content knowledge for K-12 teachers. This summer, the physics program will offer two modules in physics—one that focuses on waves, sound and light and the other that focuses on electrical circuits, and will participate in an interdisciplinary module with a theme of "Forensics."

### **Graduating Seniors**

We continue to graduate a respectable number of students each year. In fact, our most recent four-year average numbers compare very favorably with the national statistics for undergraduate physics programs. Erin Konwinski graduated in December with a double major in physics and business. She is currently looking for a position that will allow her to combine her business degree with her knowledge of physics. We had three students complete the requirements for the physics degree this May. Maria Martin returned to USD and completed the requirements for the physics major this spring after having held a management position for SBC. Katie Jacobs graduated with two degrees—a Bachelor of Science in Physics in the College of Arts and Sciences and a Bachelor of Music from the College of Fine Arts, along with completing the requirements of the honors program. Katie will continue in a graduate program in geophysics at the University of Alaska-Fairbanks next year. Akin Odeniyi completed a triple major in Physics, Mathematics, and Computer Science and also completed the requirements for the honors program. He will be heading to New York after graduation to work for a software development company but eventually plans on completing a graduate degree, probably in engineering. I'm not sure either Katie or Akin slept while they were students here. They were two of the hardest working students I have ever seen.

### **Current Students**

Once again, the Joseph and Margaret Nelson Scholarship was awarded to Philip Maass, Zach Parsons, and Adam Tjaden. Andrew Van Osdol received the G.I. Moller Scholarship, which is given to an outstanding senior-level student who has been active in departmental activities. You may remember that Andrew had an internship last summer in NASA's Spaceflight and Life Sciences program. As a result of his experiences there, Andrew has decided to attend medical school after his graduation. This summer, Zach Parsons received another internship at Brookhaven National Laboratory where he will be studying neutrinos; Eric Omdahl will be working in Dr. Keith Weaver's lab in the USD medical school researching bacterial genetics; and Mike Janssen will be working with Jose Flores in Mathematics researching population models.

This past year our students presented their research activities in a variety of venues. Andrew Van Osdol presented a poster exploring the relationship between near earth asteroids and bolides at NCUR and IdeaFest and Akin Odeniyi (Laser Power Meter) and Zach Parsons (Study of a Direction Sensitive Photo-Sensor) presented at IdeaFest on our campus this spring.

### **Former Students**

*Tim Margheim (B.S. 2004)* spent the past year in Sioux Falls working as a

physics/math/computer science tutor. He will be entering the graduate program in applied physics at Texas Tech University this fall.


*Chris Tuschen (B.S. 2002)* completed the Applied Physics masters program at the University of Oregon and is working for Hynix Semiconductors in Oregon.

*Nataly Jager (B.S. 2003)* has been accepted into the graduate program in physics at the University of Kansas in Lawrence.

Many of the programs mentioned above require financial support including our visiting speakers and the G.I. Moller Scholarship. At this point in time, the G.I. Moller Endowment does not generate enough annual income to fund a scholarship at the level of a Promise. Thus, students receiving the Moller scholarship may receive less of a financial reward even though they may be more academically deserving than other Promise eligible students. The endowment has been growing but we would welcome additional contributions to the G.I. Moller Scholarship fund. Inquiries may be addressed to the USD Foundation or to me. I would be happy to work with you to increase the Moller scholarship or discuss options for endowing additional scholarships. Having scholarship money available in physics allows us to attract and retain some of the best and brightest students to our program.

Thank you for all of your support and I look forward to hearing from you.

Best Wishes,

A handwritten signature in black ink that reads "Tina Keller". The signature is written in a cursive, flowing style.

Tina Keller, Director