THE NEWSLETTER OF THE UNIVERSITY OF TENNESSEE DEPARTMENT OF PHYSICS AND ASTRONOMY

CROSS SECTIONS

SPRING/SUMMER 2006

Record-Breaking DAMOP Meeting in Knoxville

by Suzanne Parete-Koon

WATCH OUT! Someone let the Noble laureate loose with a dewar full of liquid nitrogen! Pop! Pop! Pop! went a multitude of red, blue, and yellow balloons as Bill Phillips flung them from the two-gallon cooler. They came out at a freezing 77.6 Kelvin (-320 °F) and flat as a Frisbee, but as the air inside them warmed to room temperature, each balloon expanded to a sphere about half the size of the cooler it had just escaped. Most popped as soon as they hit the carpet.

Phillips, who won the 1997 Nobel Prize in physics for his work on laser cooling and trapping of atoms, was demonstrating that physics is fun while simultaneously illustrating what happens to an ordinary gas when it cools to 77.6 Kelvin—its atoms slow down, causing the gas to occupy less space. He was followed at the podium by Eric Cornell, who won the 2001 Nobel Prize in physics for discovering a new form of matter—the Bose Einstein Condensate.

Jim McGuire of Tulane University (left) talks with Governor Phil Bredesen at DAMOP 2006.

Phillips and Cornell were speaking at a Nobel Symposium as part of the 37th meeting of the Division of the Atomic, Molecular, and Optical Physics (DAMOP). The meeting, held May 16-20 at the Knoxville Convention Center and hosted by the University of Tennessee and Oak Ridge National Laboratory, broke all previous DAMOP records with 953 attendees and 765 submitted abstracts, of which 64 were invited papers.

"This was a 20 percent increase in traffic above last year's DAMOP meeting in Lincoln, Nebraska," said Charles W. Clark, the 2006 DAMOP chairman. "We received the equivalent of about 50 full symposia proposals, competing for 17 available. We also have more women represented in the invited program than we have had in recent years."

Joe Macek (left) presents Nobel Laureate Bill Phillips with a UT sweatshirt.

The meeting's local organization and management was led by three co-chairs, Physics Professors Joe Macek and Bob Compton of UT, and David Schultz of ORNL, who was also the 2006 DAMOP Secretary/Treasurer. Knoxville had to compete with two other venues to get the meeting.

"To beat the competing venues, we put together a proposal that offered better hotel rates and a nicer meeting space for the money," Macek said. "We also had a larger pool of people available to help organize the conference and we were able to attract more local high profile speakers, like (Governor) Phil Bredesen and (Associate ORNL Director) Michelle Buchanan."

The meeting opened with a talk by Governor Bredesen, who said that he would like to reconnect the public and the political process to the importance of basic scientific research. Since it is the general public who decides where the government's resources get distributed, Bredesen emphasized that scientists

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A Message from Soren Sorensen, Department Head

Wishing for the Future

OUR FACULTY AND STAFF are full of great ideas for improving the department and the educational experience of our students. Several times a month people come into my office or send me e-mails asking, "Why don't we do this or why don't we implement that?" And way too often my answer is, "I wish we could, but I don't see how to fund it."

Historically we used to get most of our funds through the university in our regular state funded budget. But over the last 20 years our grant funding has increased substantially and we are now able to fund our research to the tune of $8-9M a year from research grants. This is more than double the ~$4M we receive from the State of Tennessee each year for salaries for faculty and staff, graduate students, and for operating the department in general. We are very proud that we have been able to fund more than two-thirds of our physics enterprise through competitive external grants.

Unfortunately, there are many areas where we need to strengthen the department and are not able to use state or research funds, but instead must rely on donations from our alumni and friends. Let me in the following outline a few of these areas.

A planetarium at The Science Center in St. Petersburg, Florida, similar to the one envisioned in our department. (Photo courtesy of The Science Center.)

Astronomy and astrophysics has for some time been one of the fastest growing areas of science. The student interest in these fields is huge. The department is currently implementing a new concentration in astronomy for our undergraduates in order to meet this demand. In addition to teaching our own majors, we also teach more than 1,000 other UT students each year in our general education astronomy courses. This is often these students' only chance to learn about science and we have to do our best to give them a meaningful learning experience and an understanding and appreciation for science. In particular, we have to make the laboratory experience as interesting as possible. This year we have managed, with financial help from the university, to install 10 new telescopes on the roof of the Nielsen Physics Building, so each student in the lab-based astronomy courses will be required to make real observations of the night sky two or three times per semester. These observations will be stored by a computer and will then form the basis for the student's lab exercises the rest of the term.

The next great step forward in our teaching and outreach efforts in astronomy will be a ***planetarium***. It turns out that with modern digital technology it is possible to install a wonderful 25-foot planetarium dome in the high-bay room 108 in Nielsen that used to house our infrared spectrometers. Such a planetarium, together with a set of well thought-out presentations, would provide all our students with a wonderful astronomy experience, which would supplement the real observations from the roof. In addition we would be able to enhance our bi-monthly public telescope observation sessions by using the planetarium to explain in more detail the observations people can do on the roof. The envisioned planetarium will have seating for 30 people and can be installed in Nielsen 108 for $400-500k. This is unfortunately more than an order of magnitude too much for us to finance from the annual funds we get for improving our educational equipment. Therefore we hope that one of our alumni with a strong interest in astronomy might be able to help us acquire this wonderful addition to our astronomy program.

Another problem we are currently facing is our lack of endowed chairs. Most physics departments have several endowed chairs to attract or retain great professors. In any area of science where UT and ORNL both have strength we are able to hire top-notch researchers through the Distinguished Scientist program and more recently the Governor's Chairs program. Unfortunately, this program does not make it possible for us to do the same in areas where Oak Ridge National Laboratory has no interest, like astronomy and medical physics.

The best way for us to quickly build strength in astronomy here at UT would be to have an endowed chair in astronomy and/or astrophysics. We currently have a very strong program in computational astrophysics and a chair would allow us to expand into other areas of astrophysics, cosmology, or even observational astronomy. An endowed chair is a large monetary commitment, so we are also looking for donors for junior level chairs, where the yield from the endowment would be used for a substantial salary increase and research funds for an outstanding junior level professor.

An increasingly important area of physics is medical physics. Several of our recent graduates, in particular in nuclear and high energy physics, have gone into this field by going through a two- to three-year residency program after their terminal degree at UT. After certification the salary level for medical physicists is often a factor of two larger than in academia, so there are strong financial incentives for going into this field. At UT we would like to strengthen the educational opportunities for our students by starting a master's and maybe even a Ph.D. program in medical physics. The ideal scenario would be an endowed chair in medical physics, where the holder of the chair would be responsible for building up this program. Other options would be endowments that would enable us to hire one or several of the medical physicists in our area in joint positions between UT and their respective hospital(s). Many of our alumni have made a career in medicine or medical physics and it is our hope than one of you will be interested in helping us establish this program in medical physics.

Finally, but not least, we always have a great need for endowments for scholarship funds for our students. Many of the best students in Tennessee used to go out of state, because they could get better scholarship offers there. We need to reverse that trend and there are many signs that we are starting to do so. We have a great educational program and we now have increased scholarship funds through the Bugg, Hurst, Ritchie, and Talley endowments. This, combined with the HOPE scholarships, has increased the quality of the undergraduate students here at UT. We need to maintain this trend by continuing to improve our program and by offering more scholarships to the best and brightest students from Tennessee.

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need to be able to present their work at a level accessible to the ordinary citizen.

In keeping with the theme of accessible science, the DAMOP meeting had several public outreach events: Educators' Day, a day-long workshop for local high school and community college science teachers; a physics symposium targeted at students; and a public talk about the physics of football by University of Nebraska Physics Professor Tim Gay.

Louis Bloomfield of the University of Virginia speaks at the DAMOP 2006 Educators' Day program.

Gay, who will be the 2007 DAMOP chairman, used footage from the Nebraska Huskers' games and demonstrations to illustrate basic physics concepts. During one demonstration, he dropped a melon encased in a Tennessee Vol's football helmet from the top of a very tall ladder. The helmeted melon survived the fall with only a slight crack while a second melon, dropped without the helmet, burst into pieces on impact. Gay explained that padding in the helmet slowed down the rate of the melon's momentum change, resulting in less concussive force. His football physics lectures entertain thousands of fans at every Huskers' home football game.

The keynote speaker at the conference banquet was Patricia Dehmer, the Associate Director of the Office of Basic Energy Sciences of the U.S. Department of Energy. Her presentation, "The Making of the American Competitiveness Initiative: How Societal Needs and Science Got Together and what it Means for You," outlined the U.S. government's new strategy to keep America leading in scientific and technological innovation. The initiative involves increasing federal investments in critical research, and improving the quality of the American education system to provide children with a stronger foundation in math and science. She mentioned that Tennessee Senator Lamar Alexander played a key role in developing the initiative.

"Science has always had broad bi-partisan support," Dehmer said. "You have a responsibility to work with your government representatives to advance the cause of science, regardless of their party affiliations."

The DAMOP meeting also enabled graduate students from many institutions to mingle and meet leaders in the fields of atomic, molecular, and optical physics. During the talks and poster sessions, researchers from around the globe collaborated to discuss the cutting edge in a variety of subjects, including astrophysics, quantum computing, atomic and optical clocks, laser control of atoms, and ultra cold gases—just to name a few.

Noble Laureate Phillips summed up the conference spirit when he concluded his DAMOP lecture by saying, "The kinds of things that we are looking at today represent avenues of research and opportunities for learning new things that are every bit as exciting today, at the beginning of the 21st century, as things were for scientists in Einstein's time at the beginning of the 20th century."

Suzanne Parete-Koon (M.S., 2001) is a Ph.D. candidate in physics.

Photos courtesy of James Sternberg (Ph.D., 1999).

Bill Phillips (far left) stuffs one of many balloons into liquid nitrogen. They came out flattened at -320 °F (above). Phillips, who won the Nobel Prize in physics in 2001, demonstrated the fun of physics at a Nobel Symposium during DAMOP 2006.

Academy Honors

Distinguished Professor Ward Plummer Elected to the National Academy of Sciences

IT WAS A PRETTY GOOD WEEK FOR WARD PLUMMER.

On Monday afternoon, April 24, he sat patiently in the third row of the SERF auditorium, watching students go forward to accept their accolades at the physics department's Honors Day ceremony. There was one presentation of particular interest to him—the Fowler-Marion Award—traditionally reserved for an exemplary graduate student. He was not disappointed when the name was called. The honoree, Robert Moore, is finishing a Ph.D. under his direction. The very next morning, the National Academy of Sciences announced that Plummer had been elected to join their prestigious ranks. Yet it would be difficult to say which honor pleased him more. To Ward Plummer, the two are interconnected.

Ward Plummer (photo by Jack Parker)

"My legacy," he said shortly after the announcement, "will be the minds I molded, not the papers I wrote or the prizes I won."

And papers and prizes there have been. His CV lists more than 300 refereed publications and more than a dozen honors and awards. He was among the Most Cited Physicists from 1981 to 1997 and author of one of the top 100 papers published by the National Institute of Standards and Technology in the 20th Century. He was recently named Guangbiao Jianzuo Professor of Physics at Zhejiang University in Hangzhou, China. But it's the graduate students and post-docs (70 and counting) whose careers he has guided who are, he contends, the cornerstone of his work. In fact, when the American Vacuum Society honored Plummer with the Medard W. Welch Award in 2001, the citation specifically mentioned his work in "the mentoring of promising young scientists." (For an example, see "Nottingham Timeline," on page 5).

John Pierce is one of those Plummer alumni. He graduated with a Ph.D. in 2003 and now holds a postdoctoral position with Sandia National Laboratories in California.

"He is so active in learning, investigating, discussing, and promoting new concepts that people naturally form networks around him," Pierce said of his mentor. "This provided a ton of opportunities to me as a student. I was exposed to a constant stream of new people and new ideas.

"He makes new concepts a priority," Pierce continued. "If someone makes an interesting discovery, he brings them in as a guest speaker as soon as he can. If a student makes an interesting observation in the lab, he has them give a talk about it right away so that it can be discussed. Everybody learns."

That sense of building collaborations and following what's new has been central to Plummer's success. In 1992 he accepted an offer to become a distinguished professor of physics at UT and a distinguished scientist at Oak Ridge National Laboratory. He spearheaded the Tennessee Advanced Materials Laboratory at UT, the incubator for the new Joint Institute for Advanced Materials that will make the university a leader in materials research, design, and fabrication. Materials, or more specifically, their surfaces, are his favorite research playground. He likes to get down to the atomic scale to see what's going on with the electronic, magnetic, and structural properties because, as he has said many times, "whoever controls the materials will control the science and technology." Keeping an eye on key areas for discovery is part of his responsibility as a new Academy member.

The National Academy

The National Academy of Sciences was established in 1863 and is charged with advising the federal government on scientific matters. Plummer was among 72 new members and 18 foreign associates elected this year, bringing the active membership to more than 2,000, including more than 200 Nobel laureates. Members are elected in recognition of distinguished and continuing achievements in original research. Election to the Academy is considered one of the highest honors bestowed upon a scientist or engineer. At a reception where the university honored this achievement, Plummer spoke little about his own work, instead focusing on the importance of training students and young faculty. Ultimately, he said, he would like to see UT celebrating the election of the *next* generation to the Academy.

And while the congratulatory e-mails and phone calls started early on April 25 and lasted throughout the week, for his students, everything was pretty much the same.

"When talking with him you would never know of his accomplishments," said Moore, the Fowler-Marion winner. "He tirelessly works to promote not only the accomplishments of the physics faculty but the potential of their students. While his position requires great effort and significant time, his door is always open and he always makes time to interact with students. I have enjoyed the many hours sitting in his office as we figure out the physics behind the exotic materials that fascinate us. His physical insight and attention to detail have trained me for my up and coming career in physics."

Ward Plummer: Selected Honors & Awards

Davisson-Germer Award, 1983

Humboldt Senior Scientist Award, 1987

Honorary Professor of Physics at the Institute of Physics, Chinese Academy of Sciences, October 2000

Medard W. Welch Award from the American Vacuum Society/Fellow of the AVS, 2001

Guangbiao Jianzuo Professor of Physics at Zhejiang University, Hangzhou, China, 2006

National Academy of Sciences, 2006

Murat Özer Wins Nottingham Prize

PHYSICS GRADUATE STUDENT MURAT ÖZER has claimed some pretty big honors lately, in large part because of the precise attention he gives to systems that are incredibly small. His most recent award is the prestigious Nottingham Prize, which he won at the Physical Electronics Conference, held June 18-21 at Princeton University. The award was split between Özer and Paul Snijders of the Kavli Institute of Nanoscience Delft (The Netherlands). Both are students of UT Physics Professor Hanno Weitering.

Murat Özer

The prize is the latest in a series of honors Özer has earned this year. In April he won both a University Chancellor's Citation for Professional Promise and a Paul H. Stelson Research Fellowship from the physics department. He was first author on a paper in the March 2006 issue of *Nature Physics* showing that films only a few atom layers thick can carry enormous supercurrents—defying theories that superconductivity is typically weak at the nanoscale. The potential for electronic currents flowing through atomic-scale components with no resistance opens a whole new realm of prospects. Imagine, for example, ultra-fast quantum computers that could process data and perform calculations at speeds far faster than anything currently possible.

"Özer has been driven—unstoppable—in stellar research at the convergence of several subfields of physics and is bringing excellent recognition to the department, the college, and the university," said Physics Professor Jim Thompson, who has been a co-advisor on Özer's work.

The Nottingham Prize is named in honor of the late Wayne B. Nottingham of the Massachusetts Institute of Technology. The award, which includes a certificate and a $1000 prize, recognizes the best paper, based on a Ph.D. thesis, given by a student at the Physical Electronics Conference. This annual meeting is devoted to new research results in the physics and chemistry of surfaces and interfaces, with emphasis on the fundamental science in materials systems including metal, semiconductors, insulators, and biomaterials.

Among previous winners with UT connections are John Pierce (Ph.D., 2003) and Joseph Carpinelli (1996), who did doctoral research at UT. Both were students of Distinguished Professor Ward Plummer, who won the prize in 1968 when he was a graduate student at Cornell. (Weitering was also an advisor to Carpinelli.) Özer and Snijders are a welcome addition to those ranks.

"I am extremely proud of both students with this clean sweep of the Nottingham awards," Weitering said.

Nottingham Timeline

1968: Graduate Student Ward Plummer of Cornell wins the Nottingham Prize.

1977: S.-L. Weng of the University of Pennsylvania becomes the first of five Plummer students to win the award.

1990: Hanno Weitering joins the Plummer group as a post-doc.

1992: Plummer moves to the University of Tennessee; Weitering follows in 1993.

1996: Joseph Carpinelli wins the Nottingham Prize. His advisors are Plummer and Weitering.

2003: Plummer student John Pierce of UT wins the award.

2006: UT (and Weitering) student Murat Özer wins the Nottingham Prize.

View to a Hill

The Hill underwent a facelift this winter, with the parking lot replaced by new green space, lights, and benches. The photo above left shows the current view from the roof of the Nielsen Physics Building.

Now You See Them; Now You Don't

New Japanese-U.S. Institute for Exotic Nuclei

DAVID DEAN ISN'T AFRAID OF THE UNUSUAL. A nuclear physicist with a penchant for the exotic, he will take that fearlessness with him when he travels to Japan to begin working with the newly-funded Japan-U.S. Theory Institute for Physics with Exotic Nuclei (JUSTIPEN).

The Department of Energy announced in March that it will provide a grant to support this new center. JUSTIPEN will provide an international hub for scientists intrigued by out-of-the-ordinary nuclei, specifically rare isotopes. Isotopes, of course, are atoms of the same element that have different numbers of neutrons but the same number of protons. Rare isotopes are those that occur naturally (after the explosion of supernovae, for example) but exist only briefly before they decay. Because their nuclei are so far from stability, they are generally categorized as "exotic nuclei." Using powerful accelerators to create such rare isotopes here on Earth can help physicists better understand the structure of nuclei and the microphysics of the universe, as well as give them an interesting avenue to test the Standard Model. JUSTIPEN will support this work within an international framework.

"The idea was to generate some international collaborations between the Japanese and U.S. scientists who are interested in this kind of physics," said Dean, who is a distinguished R&D staff member at Oak Ridge National Laboratory with an adjunct position in the UT Physics Department.

The timing couldn't be better. RIKEN (short for Rikagaku Kenkyusho: the Institute of Physical and Chemical Research) is a Japanese institution devoted to science and technology. In 2007, they will bring online a new Rare Isotope Beam Factory to generate rare isotopes for study. JUSTIPEN will be located at this facility, which is in Wako, near Tokyo, Japan.

"It's a very big facility, and having a theory institute there was an idea that came from both experimentalists and theorists," Dean explained.

So interesting was the potential project that in late 2004 the Department of Energy asked him to "put something together" for a proposal. At the time, Dean was the chair of the Rare Isotope Accelerator Theory Group Executive Committee. Working with colleagues including Witold Nazarewicz (a professor of physics at UT with a joint appointment at ORNL), he sketched out a plan following conversations with several members of the Office of Science, Office of Nuclear Physics, including Associate Director Dennis Kovar, and Sidney Coon, the Program Manager for Nuclear Theory.

"That's when we sort of laid out the parameters of the proposal," he said. "We had a lot of encouragement from Rick Casten, chair of the DOE/NSF Nuclear Science Advisory Committee and also Baha Balantekin, chair of the American Physical Society Division of Nuclear Physics; Baha is also co-principal investigator on this." Casten directs Yale's Wright Nuclear Structure Laboratory. Balantekin is the Eugene P. Wigner Professor of Physics at the University of Wisconsin.

The basic premise is that each year, the institute will support American scientists as they visit Japan to help untangle the mysteries of exotic nuclei. A short-term visit will be one to four weeks, while a long term visit can last from three to six months. The plan is for 12 short-term visitors for 2006 and as many as twice that number in subsequent years. JUSTIPEN hopes to fund two or three long-term visitors each year. While the U.S. provides travel and local support for the researchers, Japan will provide the infrastructure (offices, computers, networking, etc.).

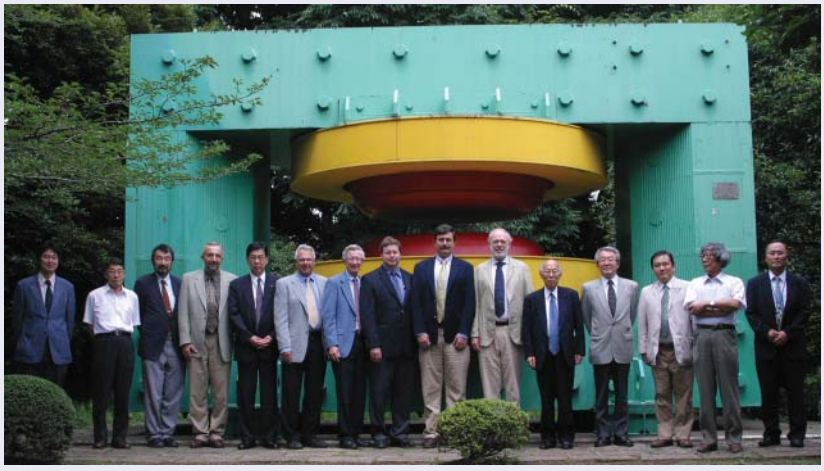
In the future, U.S. scientists may get to return the hospitality, as Dean said the Japanese researchers "are working on their end for reciprocal grants to travel to the U.S., and it's likely that we will host some of them at the Joint Institute for Heavy Ion Research" in Oak Ridge.

Takaharu Otsuka of the University of Tokyo will serve as the institute's managing director. Dean, one of two associate directors, is the principal investigator on the U.S. side and will administer the grant through the University of Tennessee. A steering committee that includes Dean and Nazarewicz will review the applications of the physicists (both theorists and experimentalists) interested in going to JUSTIPEN.

When asked if students could apply, Dean's answer is a whole-hearted "Yes."

"I'd like to see a good mix of young people and senior people going over," he said. "I think it's important that students, post-docs and junior faculty have exposure to international science. When you have that exposure, you actually learn how other communities do science, and . . . that's a refreshing point of view."

More information on JUSTIPEN, including an online application for researchers, is available at http://www.phys.utk.edu/JUSTIPEN.



UT's Dr. Witold Nazarewicz (fourth from left) and Dr. David Dean (eighth from left) travelled to Japan for JUSTIPEN's official opening on July 11.

Physics Graduate James Frank Wilson

From the Laws of Physics to the Court of Law

JAMES FRANK WILSON sits at the dining room table in his Oak Ridge home and gives an account of how he left the laboratory for the law. He is tall and polished, with a quick laugh and an easy smile, and it's easy to picture him as both the proud father of four and the quintessential Southern attorney and gentleman. Yet this native of Murray, Kentucky, hadn't planned on a legal career when he first came to Tennessee more than 30 years ago. Back then, the natural laws were the object of his study. But for Wilson, looking at the big picture to make associations and draw conclusions is an essential part of life, and part of the scientist's perspective that influences him still. It was that manner of thinking that eventually led him to the courtroom.

James Frank Wilson

Wilson graduated from Murray State College (now university) in 1966 with a bachelor's degree in physics and math, just one course shy of a third major in chemistry.

"In my mind, I have an undergraduate degree in chemistry when I count the radiation chemistry courses I had in graduate school," he says, smiling.

After graduation he accepted a U.S. Atomic Energy Commission Radiological Health Physics Fellowship in the Physics Ph.D. program at UT and headed to Oak Ridge. He and his wife, Pat, were married that summer. She began teaching at Willow Brook Elementary School and he started graduate work. (They will have been married for 40 years this August.) Their first home was a 565 square foot, converted flat-top in Oak Ridge. He paid 24 cents per gallon of gas to fuel his daily commute to Knoxville.

After finishing a master's degree in physics with a major in health physics and radiation safety in 1971, Wilson thought he should check the employment waters. The assessment was not very promising.

"I looked around for a job and did not find any in health physics at the time, so that was a little discouraging," he says. With a growing family, he decided to consider some other options.

"While I was in the Ph.D. program, I began taking graduate level courses at night," he says. "I took several business courses because I hadn't had any as an undergraduate science major and because I thought I might pursue an MBA degree. One of the courses I took was business law. I did well in the course and enjoyed the subject matter. After I graduated from law school, I taught business law to UTK seniors in the College of Business."

In the meantime, he finished his physics coursework, passed the language exam, and completed research for a Ph.D. Then came the defining moment: he had to decide whether to write his thesis and wait a year to enter law school or go to law school immediately. He decided on law school, finishing in nine consecutive quarters while working part-time. He tried to finish his physics dissertation by working on quarter breaks, but it proved to be too much.

"That's really about the only significant thing I set out to do that I never accomplished," Wilson says.

Physics and Chemistry Professor Robert Compton has known Wilson since graduate school, and the two have stayed in touch since then.

"James performed excellent work toward his Ph.D. thesis and was first author on a highly-cited publication in the *Journal of Chemical Physics*," Compton says. "Had it not been for the timing he certainly would have finished, but he needed to get into law school that fall."

Physicist to Counselor

At first, Wilson thought maybe he could combine his health physics background with a legal career in the nuclear power industry or perhaps patent law. But he said both would have required a move to a larger city, and he and his wife were settled on Oak Ridge to raise their family.

"When I graduated from law school I was one of two or three people in the country that had a health physics background and a law degree," he says. "I did get one job offer to be the 34th attorney in the Detroit Edison Corporate Legal Department," he adds, smiling. "I elected not to go."

ALUMNUS PROFILE

Instead he visited every attorney in Anderson County, explaining that he was going to open a private law practice and wanted to purchase used books and office equipment. On one such visit, a local lawyer named George Buxton, Jr., gave him a tip that would ultimately determine his life's work.

"(He) told me that there was a judge retiring in Morgan County and I could buy everything I wanted from him. So on April 5, 1976, I met for the first time Judge John Houston McCartt, a former county judge, district attorney general and criminal court judge. He was 75 or so then and had his office open from 9 to 12 on Saturdays only. He told me he didn't want to sell out; he wanted someone to come in and take over," Wilson explains. "I came back two days later and never left. I bought his building, his books, his desk, his chair, his phone number, and began representing his clients. I'm still in the same building after 30 years, 100 feet from the courthouse. It's the nicest place you could be if you're a lawyer."

He started out in general practice and has had a wide range of clients over the years. He has handled five murder cases ("I won four of them and pled the other one, but no I longer practice criminal law");

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(Wilson, Continued from page 7)

domestic and personal injury cases; land law matters from closings through litigation, with an emphasis on oil and gas law; and has represented individuals, oil companies, banks, utility districts and medical centers. But now he works primarily in the corporate, commercial, banking and real property sectors, particularly in the oil and gas industry. He's currently working with a company that's proposing a 60-well oil unit in Scott County. The prediction is that it could produce 1.5 million barrels of oil in 20 years, according to engineers, Wilson says, "and I have clients that are willing to devote $25 million dollars in development costs to find out."

As he explains, few physicists have regular meetings with venture capitalists who have millions of dollars to invest, and making the leap from science to law was, in some ways, challenging.

"There was a big culture gap, going from tests in physics where it was all math and formulas, to oral arguments and written essay responses," he says, although both require logical thinking and a penchant for solving problems. "Defending my master's thesis was actually very similar to presenting a court of appeals argument.

"It's really a matter of personality and self-discipline," he says. "Some people can make that change like that and some can't—I did."

One More Career

Beyond his three decades in law, Wilson has devoted much of his time to philanthropy and community development. He has been a Director of Rural Legal Services of Tennessee, the Tennessee Oil and Gas Association, the Clinch Valley Housing Development Corporation and the Methodist Hospital Foundation. He has been a trustee and finance committee chairman for the First United Methodist Church and president of the Morgan County Bar Association. He is an organizer and chairman of the Citizens First Bank. He and his wife also enjoy spending time with their children, Lindsay (an Oak Ridge High School senior), Krista (a UT undergraduate), and Ryan and Melissa (both of whom are UT alumni). Every now and then he likes to travel, particularly to Europe and the Caribbean.

"That gets me away from the phone and people who want to call me and talk business and allows me to spend time with my family," he says.

As for slowing down, he says, "I think about it every now and then, but I wonder what I would do. There's just so much fishing and golf that you can stand."

He says he might like to try teaching; he taught chemistry, physics, and business law early in his career.

"When I look back at my life, I decided in high school that I would get a Ph.D. in physics, and after that never considered any other options. And you should always look around," Wilson says. "I enjoyed physics in undergraduate and graduate school. I enjoyed my overall science background and the general education I received. I would just not ever fail to consider all available options, or not be willing to change. Life is all about change and you have to be flexible and opportunistic in your response to those changes."

For someone who doesn't flinch at shifting gears, there are always possibilities.

"I figure," he says, grinning, "I've got one more career left in me somewhere."

Rock & Stars

Astrophysicist Christian Cardall Joins the Faculty

Christian Cardall

NEW FACULTY MEMBER CHRISTIAN CARDALL IS MORBIDLY CURIOUS about how some stars die explosive deaths after leading such quiet lives. To get to the bottom of this mystery, he's working on large-scale computer simulations with the astrophysics theory group at Oak Ridge National Laboratory.

Cardall joined the department this spring as a joint faculty assistant professor. His research field is computational astrophysics, and he's part of the TeraScale Supernova Initiative, a national collaboration of scientists and mathematicians investigating the mechanisms behind the violent demise of massive stars (10 times our Sun's size), also known as core collapse supernovae. He's also interested in the merger of neutron stars—the crash of two already-expired stars. "The core collapse supernova is the violent death of a single star," Cardall said, whereas neutron star mergers are "sort of the violent afterlife some of them can have."

Cardall, a California native, earned the Ph.D. at the University of California, San Diego, in 1997. He went on to a post-doc position at the State University of New York, Stony Brook, before coming to Tennessee in 2000. Since then he has pitched in by teaching the Web-based general astronomy course, and with his new appointment, he'll teach honors introductory astronomy next spring.

"I'm looking forward to interacting with the students in the honors class," he said. While Web courses have certain advantages, he said teaching students in person is a good way to get to know them a bit better and gauge more quickly how well they're doing in the course.

When he's not tracking the life cycle of celestial objects or lecturing to students, Cardall enjoys spending time with his wife, Kimberly, and their three daughters. He also enjoys playing the guitar.

"I played in a rock band in college, but haven't had the opportunity since," he said, smiling. "So if anyone wants to start a band, I might be interested."

Honors Day 2006

IN KEEPING WITH TRADITION, the department took the last colloquium slot of the semester (April 24) to acknowledge student achievement with the annual Honors Day celebration.

Dean Bruce Bursten gave the Honors Day address.

Guest speaker Bruce Bursten, dean of the College of Arts and Sciences, both entertained and enlightened the audience with the story of his own career in science, which started at the University of Chicago and brought him to UT in September 2005. A distinguished professor of chemistry as well as dean, he encouraged the students present to capitalize on their unique perspective to engage others about science and its role in the world.

"You need to start becoming strong advocates of physics, and of science in general," he said.

Students were honored from the first year through the graduate level, with eight students inducted into Sigma Pi Sigma, the physics honor society. Michael Guidry was named the Society of Physics Students Teacher of the Year.

Sigma Pi Sigma Inductees

Shaun Ard, Steven Boada, John Carruth, Xiaoguang Li, Cinzia Metallo, Dan Parshall, John Sinclair, and Scott Thornton

Undergraduate Awards

Outstanding First Year Physics Student Award

Jacob Suggs

Robert Talley Award for Outstanding Undergraduate Research

Sean Lindsay

Robert Talley Award for Outstanding Undergraduate Leadership

John Carruth

Douglas V. Roseberry Award

Daniel Passmore

Robert W. Lide Laboratory Citations

Phil Evans

Matt Hollingsworth

Graduate Awards

Outstanding Graduate Teaching Assistant Award

Usama Al-Binni

Paul H. Stelson Fellowship for Professional Promise (First Year)

Jun Zhao

Paul H. Stelson Research Fellowship (Beginning Research)

Mikhail Batygov

Murat Özer

Fowler-Marion Outstanding Graduate Student Award

Robert Moore

Colloquium Awards

Madhusudan Ojha

Jason Smith

SPS Outstanding Teacher Award

Professor Michael Guidry

2006 Chancellor's Citations

These physics students were recognized at the Chancellor's Honors Banquet on April 12:

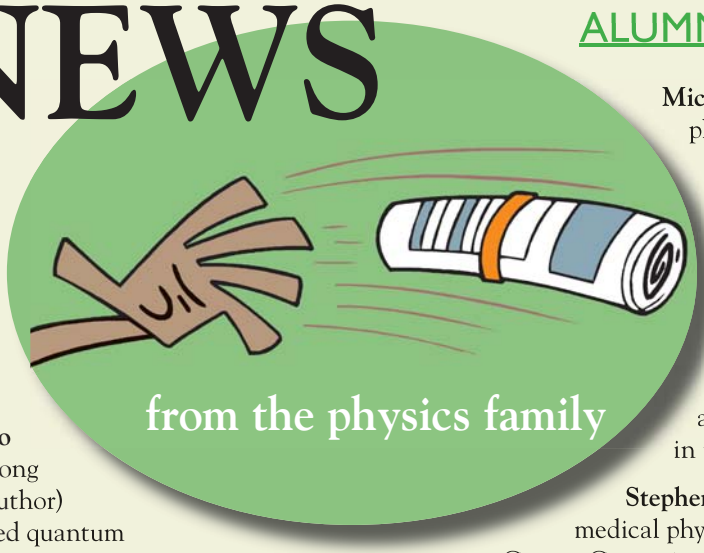
Chancellor's Citation for Academic Achievement:
John Carruth

Chancellor's Citation for Professional Promise:
Murat Özer and Dan Passmore

Professor Sorensen presents the Fowler-Marion Award to Robert Moore.

Michael Guidry was named the SPS Teacher of the Year.

NEWS from the physics family



FACULTY

Professor Ted Barnes gave the conference summary talk at Meson 2006, the international biannual meeting on meson physics. The conference was in Cracow, Poland, June 9-13.

Congratulations to **Assistant Professor Victor Barzykin** and his wife Danielle on the arrival of son Zachary, March 27.

Physics Professor Witold Nazarewicz has accepted a prestigious Carnegie Centenary Professorship from the Universities of Scotland.

Physics Professor Jim Thompson is part of an ORNL-UT scientific team inching closer to making wires that can carry electricity with no resistance, opening up the possibility of motors and magnets made of superconductors. The results were published in "High Performance High-Tc Superconducting Wires" in the March 31 issue of *Science*.

Dr. David Townsend, Adjunct Professor of Physics, has been invited as a Distinguished Scientist Speaker at the 2007 Nobel Symposium, "Watching Life through Molecular Imaging."

In the March issue of *Nature Physics*, **Physics Professors Hanno Weitering and Jim Thompson**, along with graduate student (and lead author) **Murat Özer**, explain how they used quantum mechanics to confine wandering electrons in lead—a soft metal—and consequently stabilize superconductors that are only a few atoms thick. (See article on Murat's Nottingham Prize on page 5.)

Joint Faculty Professor Zhenyu Zhang has been appointed to the editorial board of the distinguished journal, *Physical Review Letters*. He joined the board as a Divisional Associate Editor for Condensed Matter Physics. He was also part of collaboration with scientists from the University of Minnesota and Vanderbilt University who showed that laser light can successfully break the bonds between hydrogen and silicon at room temperature. The discovery, which can mean increased efficiency and revenue in the microelectronics industry, was reported in the May 19 issue of *Science*.

STUDENTS

The UT Graduate School has awarded **Valentina Kuznetsova** a Yates Dissertation Fellowship for 2006-2007. These fellowships provide recognition and financial support to outstanding doctoral students.

Congratulations to our Spring 2006 class:

Martin Djongolov (Ph.D.), **David Gaines** (B.S.), **Dane Gillaspie** (Ph.D.), **Karen Norton** (M.S.), **Scott Outten** (M.S.), **Daniel Passmore** (B.S.), **Gerald Ragghianti** (M.S.), **Steven Ratcliff** (B.S.), **Elizabeth Shroyer** (M.S.), **Christopher Smith** (B.S.), **Erick Smith** (B.S.), **Maria Torija-Juana** (Ph.D.), **Tammy Walton** (B.S.), **David (Kip) White** (B.S.), **Rachel White** (B.S.), **James Wicker** (Ph.D.), and **Bradley Wogsland** (M.S.)

ALUMNI

Michael Childers (B.S., 1993) is a physics teacher at Webb School of Knoxville.

Md-Said bin Kassim (M.S., 1990) is a manager with Telekom Malaysia in Kuala Lumpur.

Sean Lindsay (B.S., 2005) will start Ph.D. studies in astronomy at New Mexico State University in the fall.

Stephen Mahan (Ph.D., 2000) is a medical physicist with Mercy Regional Cancer Center in Cedar Rapids, Iowa.

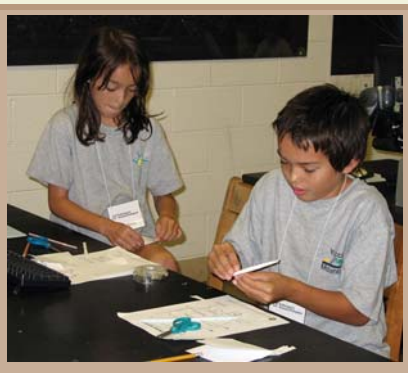
Anatoli V. Melechko (Ph.D., 2001) is a member of the research staff at Oak Ridge National Laboratory.

James T. Mooney (B.S., 1996) is a research engineer with the Center for Applied Optics at the University of Alabama in Huntsville.

Nathan Tittle (B.S., 2005) is a fabrication engineer with Micron in Manassas, Virginia.

The department is saddened by the loss of **Dr. William Thomas Milner** (Ph.D., 1968), who passed away on February 21. An experimental nuclear physicist, he was a member of the ORNL Physics Division from 1962 until his retirement in 2000.

Young rocketeers work on spacecraft design and assembly in the Kids U class, Rockets! taught by Space Science Outreach Director Paul Lewis June 14-16.



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The UT Department of Physics and Astronomy has several award and scholarship funds to support our vision of excellence in science education at both the undergraduate and graduate levels:

Undergraduate Scholarships

- The William Bugg General Scholarship Fund
- The G. Samuel and Betty P. Hurst Scholarship Fund
- The Dorothy and Rufus Ritchie Scholarship Fund
- The Robert and Sue Talley Scholarship Fund

Undergraduate Awards

- The Douglas V. Roseberry Memorial Fund
- The Robert Talley Undergraduate Awards

Graduate Awards & Fellowships

- Paul Stelson Fellowship Fund
- Fowler-Marion Physics Fund

Other Departmental Funds

- Physics General Scholarship Fund
- Physics Equipment Fund
- Physics Enrichment Fund
- Robert W. Lide Citations

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If you would like more information on how to make a donation or a pledge to our scholarship funds, please contact:

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