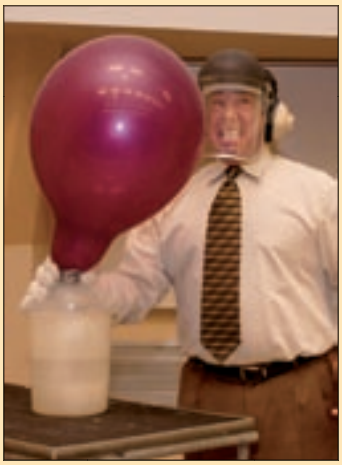
Physics Matters

Department of
Physics and Astronomy

Winter 2005–2006

Kenneth Alhadeff, vice president of the WSU Board of Regents, assists in the demonstration of physics principles during the Showcase 2005 luncheon. These demonstrations were part of the Distinguished Faculty Address offered by physics Professor Mark Kuzyk: "From Black Holes to the Internet: How We Use the Scientific Method to Understand the Mystery of Things Unseen."

The physics and astronomy department was honored this past April to have two of its distinguished faculty take a prominent part in WSU Showcase 2005. The Showcase is a daylong event to acknowledge individuals who excel in scholarship, research, and artistic achievements. Professor Mark Kuzyk was selected to deliver the Distinguished Faculty Address during the Showcase's University Luncheon in Webster auditorium. His talk, entitled "From Black Holes to the Internet: How We Use the Scientific Method to Understand the Mysteries of Things Unseen," was delivered to a full house, and included dynamic and crowd-pleasing demonstrations assisted by Tom Johnson.

Mark's eloquent speech and thought-provoking audio-visual aids showed his enthusiasm for teaching physics: "If you can show and not just teach, you can garner more interest amongst the students in the subject matter…My students never know what is going to happen, so they stay attuned, enabling them to learn better." Mark, whose research is world renown, has been teaching at WSU for fifteen years.

Beasley Coliseum was filled with WSU's best and brightest academic minds for the evening's Celebrating Excellence Recognition Banquet. Among the group was Professor Yogendra (Yogi) Gupta, recipient of not one, but two of the University's highest honors. Yogi was presented with the distinguished Eminent Faculty Award, and formally named Regents Professor beginning August 2005. Criteria for the Eminent Faculty Award mandates that the recipient has "changed the thinking in his or her field by making lasting contributions through teaching, research, creative scholarship, and service." The award, first presented in 2000, is considered the highest honor for faculty, and is accompanied by a monetary award of $15,000. For more on Kuzyk and Gupta's awards, please visit www.showcase.wsu.edu/index.html.

As you can see, our masthead has changed. As of December 2004, we officially became the Department of Physics and Astronomy. Given our change of name—and all of the privileges and responsibilities that come with it, as well as the plethora of events in the department this past year—we hope you will find this issue interesting.

Washington State University
World Class. Face to Face.

Greetings from the Chair

As I enter the final year of my four-year term as chair of the Department of Physics and Astronomy, I would like to reflect a bit. Although the overall fundamental goals of our program and the aspirations of our faculty, staff, and students remain largely constant, there have been significant changes in the details. A few of the changes have created serious challenges for the department, but many are part of a foundation that positions us for a bright future.

Programmatically, the department took on an important challenge four or five years ago; namely, to rebuild astronomy at Washington State University. With this year's addition of assistant professor John Blakeslee, and the conversion of Michael Allen's position to a full-time instructor, astronomy at WSU has reached its first important "critical mass" plateau. Our lower division astronomy courses are extremely popular; they are always filled to capacity. In addition, we are attracting students to our undergraduate and graduate degree programs whose primary interests are in astronomy and astrophysics. As of last year, it was apparent that the time had come for us to change our name to include astronomy. And so, we have.

Unhappily, I report that several faculty have left the department for various reasons. Chief among them is George Lake, Moonsoo Kang, and Sudha Swaminathan. On the plus side, we recently hired John Blakeslee, Peter Engels, and Pamela Blakeslee, an astronomer, an atomic physics experimentalist, and half-time instructor, respectively. All are very talented young people, and we are happy to welcome them to the department. In addition, we are searching this year for another full-time instructor. This will help us offer a sufficient range of courses for our students.

Among staff, we have a new fiscal person, Laura Krueger, who has worked on the WSU campus for 14 years. Additionally we welcomed Edythe (Edie) McPherson to our main office. Edie has worked for WSU since 2000. Finally, Mary Guenther's position was upgraded and her hours were increased to meet the ever-growing demand for more formalized recruitment activities. Mary's efforts for the department are paying off; we have more honors students than ever before expressing an interest in majoring in physics. For photos of these staff members please go to page 4.

The budget continues to challenge the department. Thus far, additional funding requests have been granted to keep us healthy. Better yet, this year the additional funds were granted at the beginning of the fiscal year. Thus, we have greater flexibility to run the department and the opportunity to recruit aggressively for next year's graduate cohort.

Personally, the greatest change over the past couple of years is a far greater understanding and appreciation of the dedication and hard work of the faculty, staff, and students that make our department thrive. This is worth a lot to me. Having said this, some things do remain the same. You will read in the following pages numerous examples of recognition for high quality teaching, research, and productivity. This continues unabated. Given what I have seen as chair, it doesn't surprise me in the slightest.

Sincerely, Steve Tomsovic

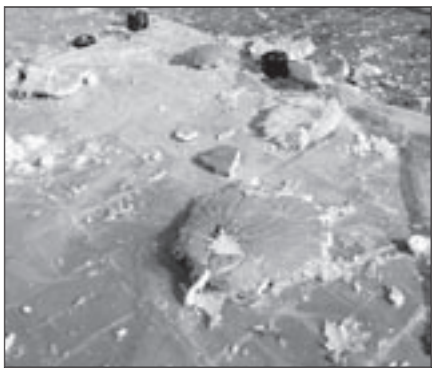
Pumpkin Toss

Curtis Osterhoudt and Katherine Hegewisch, dropping a pumpkin and watermelon.

Three, two, one, drop!

It seemed highly appropriate that Washington State University's Physics Club would begin Dad's Weekend 2004 with a big splat. More than 200 staff, students, and their families gathered on Webster plaza for the first annual "Operation Pumpkin Drop." Graduate student and master of ceremonies Francis Morrissey came dressed in a black robe for his 17th-century role as Galileo Galilei. Galileo described his theory of falling bodies, lecturing briefly on the mathematical equation that refuted the current Aristotelian thinking of his time. In support of his theory, Galileo introduced a simple demonstration that would help prove his point—and so began the drops.

With student volunteers in place, the crowd shouted in unison, "three, two, one…" The onlookers let out a large gasp just prior to a "thump, thump" as the fruit hit the ground. Pumpkins, watermelons, cantaloupes, and a University of Southern California "Trojan soldier" were dropped from the 12th floor of the Webster Science building. Although the drop seemed simple enough, physics students and staff members spent countless hours ensuring the event was safely executed. Even so, pieces of fruit projectiles were seen throughout the plaza. Although no major injuries were reported, department chair Steve Tomsovic was almost a casualty when the Trojan figure drifted over the crowd and fell straight onto his head. Unharmed, Tomsovic smiled and said he was pleased with the event.



One young skeptic in the crowd refuted Galileo's theory of falling bodies. She maintained the pumpkins did not land at exactly the same time. Galileo conceded her observations seemed correct. As he explained, however, the weather was a factor; it was after all, a windy and blustery autumn day. Graduate student volunteers Katherine Hegewisch and Aubrey España agreed that the wind and rain, and perhaps even their own human error, attributed to not releasing the fruits at exactly the same moment. Not to be discredited, Galileo challenged the young observer to conduct her experiment in a vacuum state. He was confident his theory would stand the test.

As Galileo himself lamented, it would take the likes of mathematician and physicist Sir Isaac Newton to give total credence to Galileo's mathematical equation. Galileo's equation was based on the Archimedean approach to motion, i.e., falling bodies in proportional to their density, not their weight, as Aristotle had claimed. Much later in history, Galileo's theory of falling bodies came into play when Einstein explained the theory of mechanics of the cosmos. Clearly, without Galileo's contributions to the study of falling bodies, motion might still be a mystery.

If you plan to be in town for Dad's Weekend 2006, be sure to keep Saturday mid-morning open for the next pumpkin toss event.

Paul Anderson Display Adorns Webster Lobby

Professor emeritus Ed Donaldson and Regents Professor Tom Dickinson have constructed an impressive display of former physics professor Paul Anderson's glass vacuum equipment on the first floor of Webster building. Anderson, who served as chair of the physics department (1931–1961), applied his creations to studies involving the physics of metal surfaces.

Regents Professor Tom Dickinson, left, with Professor Emeritus Edward (Ed) Donaldson, standing in front of the Anderson Display.

World Year of Physics 2005

The year 2005 has been set aside to celebrate Einstein. Professor Sudha Swaminathan, scientific instructional tech supervisor Tom Johnson, director of undergraduate laboratories Gordon Johnson, graduate student Katherine Hegewisch, and undergraduate Joel Bale orchestrated several events to help commemorate Einstein's seminal papers of 1905. As way of commemorating the "World Year of Physics 2005, Einstein in the 21st Century," the department hosted students and teachers from several high schools in Washington, including Ferris High School, Medicine Wheel Academy, Havermale Alternative High School, and East Valley High School. Each event included a discourse on Einstein's papers given by a department faculty member, hands-on lab experiments, and a physics demonstration. A yearlong display of Einstein's accomplishments can be found on the ground and first floors of Webster building. The department has received financial support for the project from the American Association of Physics Teachers' Bauder Fund.

Gary Collins and Sudha Swaminathan lecturing on the significance in 1905 of Einstein's work.

Laura Krueger

Edie McPherson

Mary Guenther

We Welcome Three New Faculty

The department is pleased to present three new faculty. John Blakeslee is an astronomer who has worked extensively with data from the Hubble Space Telescope and large ground-based observatories in Arizona, Hawaii, and Chile. His research interests include galaxy clustering, gravitational lensing, large-scale motions in the universe, and the stellar content of galaxies. John did his undergraduate work in physics at the University of Chicago and his doctorate at the Massachusetts Institute of Technology, where he studied the properties of the rich star cluster systems that populate the halo regions of massive galaxies in dense environments. He also worked on problems of the extragalactic distance scale and the age of the universe. John then spent a three-year research fellowship at CalTech, where he continued his observational studies using the William Keck Observatory on Mauna Kea, Hawaii, and the Palomar Observatory in California.

After CalTech, John enjoyed a fruitful year at the University of Durham in England, where he did research related to gravitational lensing and theoretical modeling of galaxy stellar populations, before joining The Advanced Camera for Surveys team at Johns Hopkins University as a research scientist. A third generation instrument installed on the Hubble Space Telescope in early 2002, the Advanced Camera has increased the imaging power of Hubble by an order of magnitude, bringing the distant universe into sharp focus. John used the Advanced Camera to study the properties and evolution of galaxies and clusters over most of the age of the universe. He looks forward to building upon this work and exploring new astronomical avenues at WSU. He is accompanied to the Palouse by his wife Pam and three children.

Pam Blakeslee is a welcome addition to our teaching staff. Pam earned her undergraduate degree in physics from the University of Chicago and a doctorate in physics from the Massachusetts Institute of Technology, where she studied the effects of oxygen intercalation and other forms of doping on the properties of high-Tc superconductors. She has taught physics and science education courses at several universities, including the California Institute of Technology, Towson University, and Loyola College in Maryland.

Peter Engels is an experimentalist who recently joined the department. Peter has a broad expertise in atomic, molecular, and optical physics. In his doctoral thesis, he conducted experiments with laser cooled, slowed, and compressed atomic beams. He investigated atom lithography—a novel technique for creating sub-100 nm features using fundamental atom-light interactions, in combination with self-assembled monolayers. In addition, he developed new atom optical elements in the form of special atom chips that for the first time could guide a continuous atomic beam around curves.

Peter received his doctorate from the University of Hannover, Germany, and also performed research at Princeton University. His work in molecular physics includes research studying the flow of vibrational energy (IVR) through aromatic molecules. These studies, done in the group of Professors G. Scoles and K. Lehmann at Princeton, allow one to draw important conclusions about laser-controlled chemistry. Before joining WSU, Peter worked as a postdoctoral researcher in the group of Nobel-prize winner Eric Cornell at JILA/University of Colorado.

While at Colorado, Peter led an experiment investigating the fundamental properties of degenerate quantum gases. When cooling a cloud of atoms down to temperatures that are just few billionths of a degree above absolute zero, the atoms become a new form of quantum-mechanical matter, a so-called Bose-Einstein condensate (BEC). Because of the difficulties involved in obtaining these ultracold temperatures, creating a BEC had been a seventy-year-long dream before being realized in the group of Eric Cornell/Carl Wieman for the first time in 1995. Since then, the study of ultracold quantum gases has advanced to one of the most active fields of modern atomic physics. These systems allow a fundamental insight into quantum mechanics, but also serve as unique model systems in the field of condensed-matter physics, nonlinear dynamics, and quantum optics.

Peter is currently setting up a new atomic physics lab. His experiments will exploit modern advances in laser cooling and trapping to study degenerate quantum gases including, but not limited to, the celebrated Bose-Einstein condensates.

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Where Are They Now?

Paul Adams ('86 M.S.) is a professor of physics at Fort Hays State University in Hays, Kansas, where he also joined the Council of Faculty Senate Presidents (COFSP) in 2001. After graduating from WSU with his master's degree, Paul went on to teach at FHSU on and off for the next fifteen years, earning his doctorate in science education from Purdue University along the way. In 1998, Paul was named Teacher-Scholar-Innovator of the Year. He also has the honor of being the first Anschuntz Professor of Education for Fort Hays State University. Adam's advisor was professor emeritus Miles Dresser.

Thomas E. Bratvold ('93 B.S.) is the deputy director of the Radiological Control Program for CH2M Hill, Hanford Group. Tom dropped us a line to let us know that he had been certified in the American Board of Health Physics. We always like hearing our alumni's success stories.

Professor emeritus at the University of Puget Sound, **Bert Brown** ('49 B.S.) comments: "I am delighted to see that astronomy is being rejuvenated at WSU. The Jewett Observatory was just after my time, but I suspect it was the brainchild of Professor Sidney Hacker of the Math Department, [who] had a strong interest in astronomy and, I believe, had known famed astronomer Henry Norris Russell at Princeton. I got my first astronomy instruction from Professor Hacker, as well as an introduction to the concepts of automatic computers. But it is probably more logical that astronomy is now within the Physics [and Astronomy] Department, with new staffing and repaired equipment." Bert received his master's degree from the California Institute of Technology in 1953, and his doctorate from Oregon State University in 1963.

Charles V. Collins ('70 Ph.D.) recently retired from Northrop Grumman Corporation. He and his wife Carron live in Aurora, Colorado. Professor Collins' doctorate chair was retired professor Howard Miles.

Professor emeritus **Miles Dresser** makes an annual spring pilgrimage to help teach physics to grade school teachers in Yakima's South Central Washington Educational Service District 105. The district owns the kit materials and passes them from school to school. The district currently requires that all teachers have three days of training for their kits. Two of those days are related to the details of the specific kit and one day is a science content enrichment day so that the teachers have some background breadth in the science and technology behind the kits.

Miles uses materials for the workshop primarily drawn from the "Powerful Ideas in Physical Science" written by the American Association of Physics Teachers. He also utilizes materials from "Physics and Your World," a 100-level college course that he and Lisa Morris designed in the mid-1990s. The materials are taught in a very hands-on way with a minimum of lecture. Since teachers usually try to teach their classes in the same style in which they were taught, Miles models good teaching methods for elementary students as well as presents the concepts of science that are the background for their kit experiences. Miles teaches the content days for all first and second grade teachers in the district.

First grade teachers work on material properties of liquids and solids. Second grade teachers study the process of weighing and balancing. Miles reports that the teachers are very responsive to the workshops and are much more interested in physics (or at least physical science) after they have completed a session. Financial support for the teaching aids come from ESD 105, and the Department of Physics and Astronomy at WSU supports Miles with access to equipment for loan and with technical assistance for operation.

Jay Evett graduated with a bachelor's degree in physics from WSU in 1953. The department spoke with Jay recently regarding his illustrious career in physics. After graduation at WSU, Jay transferred to Northwestern University where he completed a master's degree in physics and later transferred to Oregon State University where he completed his doctorate, also in physics. Afterward, he went to work at Atomic Energy Commission in his hometown of Richland, Washington. Later in his career, Jay taught physics for a number of years in Minnesota, and then finally at Western Oregon University in Monmouth, Oregon. Jay retired in 1996 and lives in the Salem area.

Art Evett ('51 Ph.D.), Jay's brother, taught physics and chemistry for most of his career, which spanned over four decades. Professor Evett taught at Yale, the University of Arizona, and in the California school system. Art and his wife, Ora Jean, moved to the Salem area to be near his brother after they retired in the 1990s (see "In Memorium" p. 8).

Dana Franz ('01 M.S.) has relocated to Washington, D.C., where he is working at the Naval Research Laboratory. He indicates that he is enjoying his job immensely. Dana's major advisor was professor Mark Kuzyk.

George Fullmer, along with his wife **Mary**, returned to campus for George's Diamond Graduate Reunion. George has a rich history,

George and Mary Fullmer

having begun his studies in physics at Washington State College in the early 1940s. In 1943, he was commissioned as a meteorology officer in the United States Army Air Corp. During that time, he served two years as air traffic control officer on "the hump" (India to China). This cargo transport operation was the antecedent for the Berlin airlift. George finished his physics studies and graduated with a bachelor's in physics from the University of Washington. He was employed at Hanford until 1971, working for General Electric, Battelle, and Douglas United Nuclear. From 1971 to 1982 he worked for the General Electric Nuclear Energy Division at San Jose, California, and, following retirement, worked part time for GE until 1992.

George fondly remembers great professors such as Paul A. Anderson who advised his students, "WWII will be won or lost with technology. Your duty is to stay in school." He remembers another great faculty member, S. Towne Stephenson, trudging into microwave classes Monday mornings wearing snow boots. Years later George was pleased to find out the Physics Department was working with MIT in establishing effectiveness of radar during weather inversions, eventually affecting the outcome of the battle of Midway during WWII.

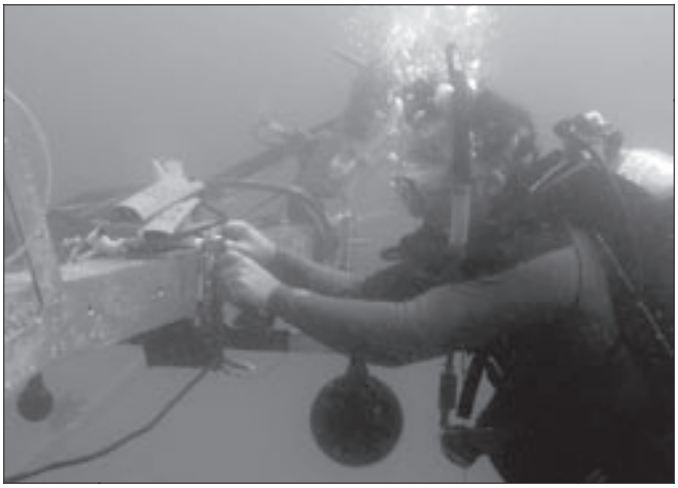
David W. Maughan ('64 B.S.) and his two brothers, **Paul** and **W. Lowell Maughan**, were honored by the Washington State University Alumni Association with individual Alumni Achievement Awards in May of 2004. In a ceremony at the Lewis Alumni Centre, the brothers were cited for achievements in "engineering, science, and medicine, and for bringing recognition to their professions and alma mater." David has been a research professor at the University of Vermont since 1974. He holds positions in the department of molecular physiology and biophysics, the cell and molecular biology program, and the biomedical engineering program. Maughan's major research interest is the cellular and molecular physiology of striated muscle, functional genomics, and proteomics. He is currently involved in six major projects with grants totaling more than $4 million for investigations critical to human health, including the molecular basis for diabetic cardiomyopathy. David earned his doctorate in physiology and biophysics from the University of Washington in 1971.

Retirement has not slowed down **David McDaniels** ('51 B.S.). He is loving every minute of it as the secretary/treasurer of a golf group in Oregon. In addition, David and his wife, Patricia, frequently travel throughout East Asia and Europe. When not playing golf and traveling, he continues to work on a book.

Eric T. Stubbs ('88 B.S.) has been working in Boise, Idaho, for eleven years at Micron Technology. He is currently a dynamic random access memory (DRAM) product manager. As most of our readers are aware, DRAM is a type of memory used in personal computers.

John C. Wacker ('65 M.S.) served as a project engineer at Honeywell Corporation until his retirement in 1999. He and his wife Kathleen live in sunny Florida. Professor Paul Bender served as John's major advisor.

Kevin Williams ('85 Ph.D.), former student of WSU physics professor Phil Marston, conducts research directed at understanding the interaction of sound with the ocean bottom. Williams is currently the



Kevin Williams in the Gulf of Mexico off the Florida coast near Destin, Florida, working on sensors.

Department of Ocean Acoustics chairman at the University of Washington. He and his group are studying penetration into, propagation within, and scattering from ocean sediments. Their latest ocean experiments were conducted off the coast of Florida and included deployment of a 30-meter long underwater rail system that had an associated tower that was driven by motor along the rail. The objectives were both to acquire large ensembles of scattering data and to allow high-resolution images of targets using synthetic aperture sonar techniques borrowed from the radar community. The ensemble scattering data is used to test scattering models that are statistical in nature, i.e., they predict the mean and variance of the scattered return. Ocean bottom sand turns out to be interesting from an acoustics point of view because it is neither liquid nor solid but a combination of the two (water plus sand grains). This fact implies additional degrees of freedom and somewhat more complicated constitutive equations. In addition to Williams, two other WSU physics graduates were involved in the experiment; Steve Kargl ('90 Ph.D.) and Todd Hefner ('00 Ph.D.) also were students in Marston's group.

Kirill Zhuravlev ('04 Ph.D.) landed a job at Los Alamos National Laboratory even before he defended his dissertation. Since moving to Los Alamos, Kirill has been studying the equation of state of water-carbon dioxide-nitrogen mixtures by means of transient grating measurements, using diamond-anvil cell (DAC). He is also involved with a second project studying nanocrystals under pressure. Kirill worked in professor Matt McCluskey's research group.

In Memorium

Philip Abelson ('35 M.S.), Washington State University alumnus and an illustrious icon of the science community, died in Bethesda, Maryland, on August 1, 2004. He was 91 years old.

Abelson is survived by his daughter, Ellen A. Cherniavsky, nephews John and LeRoy Abelson, and two grandchildren.

Abelson grew up in Tacoma, Washington. He attended Washington State College, earning his master's degree in physics in 1935. During his time as a student, he met his wife, Neva, who graduated with a bachelor's degree in chemistry. Neva passed away in 2000.

After obtaining his doctorate from the University of California at Berkeley, Abelson went on to a notable and distinguished career in the sciences, obtaining numerous awards and honors along the way, as well as the respect and admiration of his peers.

His research with enriched uranium as a doctoral student is widely recognized as having contributed to the use of advanced weapons in World War II. His work is also accredited with the establishment of science policy. Abelson held office as president of the Carnegie Institution from 1971 to 1978, and acted as editor of *Science* magazine for 23 years. He was serving as editor emeritus at the time of his death. Abelson's financial contributions to WSU have also been prominent, allowing the establishments of eight graduate fellowships.

Among his many awards and recognitions, Abelson was the first to receive the WSU Distinguished Alumnus Award, and was also a recipient of the WSU Foundation Outstanding Service Award. He and his wife Neva were honored when WSU's Science Hall was renamed Abelson Hall in 2002. In October of 2003, a special Carnegie Institution symposium celebrated his 90th birthday. Other prestigious awards given to Abelson include the President's National Medal of Science, the Distinguished Public Service Award from the National Science Foundation, and the Science Achievement Award from the American Medical Association.

Art Evett ('51 Ph.D.) died June 2, 2005.

Michael A. Kilgore ('69 B.S.).

Len Porter, director of the Washington State University Radiation Safety Office since 1990, died October 29, 2004. Prior to his work at WSU, Len was professor and chair of physics and astronomy at the University of Montana.

Mildred Mae McFall Stephenson, widow of S. Towne Stephenson, passed away in Port Orchard, Washington, on March 3, 2005.

Good News from Around the Department

Michael Allen and Guy Worthey are working hard to help provide Pullman, Moscow, and the surrounding areas with a wide range of programs that focus on space science. Besides the frequent night-sky "Star Party" events held at WSU's Jewett Observatory, community groups now have an opportunity to share the wonder of the sky even during the day. With funds from the Bill & Melinda Gates Foundation and Foundation Northwest, The Palouse Discovery Science Center (PDSC), located in Pullman, purchased equipment and materials and constructed a portable planetarium dome and digital projector. The dome and projector are manufactured by Digitalis Education, a company located in Bremerton, Washington. The dome has capacity to hold up to 35 school-age children. The new generation digital projector allows the user to easily access the night sky, showing movies and photographs of just about anything that can be seen from space exploration. Images from the Hubble Space Telescope and video clips from NASA space missions are now readily accessible to the community. For information regarding the PDSC as well as professors Allen's and Worthey's involvement with Project ASTRO Appaloosa, please visit astro.wsu.edu/appaloosa/.

This fall, Doerte Blume directed a workshop at the University of Washington's Institute for Nuclear Theory (INT). The workshop, jointly sponsored by INT and Harvard's Institute for Atomic, Molecular, and Optical Physics, covered new developments in "few- and many-body physics of quantum gases and liquids." Several subtopics were collaboratively directed at "stimulating the interactions between the different communities active in this field." Following the four-week program, Doerte led a special three-day workshop that attracted many more participants.

Sukanta Bose was honored when the Laser Interferometer Gravitational-Wave Observatory, or LIGO, selected him to deliver a talk for its ninth annual Gravitational Wave Data Analysis Workshop held in Annecy, France, in December 2004. His talk, entitled "Bounding the Strength of a Stochastic Gravitational-Wave Data," addressed current efforts to establish "an upper limit on the strength of a gravitational-wave background from stochastic sources, such as cosmological and astrophysical origin." Subsequently, Sukanta spent part of his summer in Jena, Germany, giving another invited talk entitled "The detection and parameter estimation of binary black holes with the Laser Interferometer Space Antenna (LISA)" at Friedrich Schiller University.

Congratulations to Gary S. Collins who was awarded a $500,000 four-year grant by the National Science Foundation to study lattice locations of impurity atoms and diffusion of atoms in intermetallic compounds. This is his sixth consecutive single-investigator grant award from the NSF since coming to WSU, with total funding of over $2 million. He and his group study the local structure of solids through measurements of hyperfine interactions at nuclei of radioactive probe atoms. The principal method used is perturbed angular correlation of gamma rays, a specialized spectroscopy only actively applied in one other laboratory in the United States. Under previous grants he and his group studied the structure of small vacancy clusters, formation and migration energies of defects, production of point defects during plastic deformation, and interactions among defects, including trapping of hydrogen atoms in vacancies and annihilation of vacancies by mobile self-interstitial atoms.

Tom Dickinson has been elected to the rank of AAAS Fellow (American Association for the Advancement of Science). The award reads in part: "Each year the Council elects members whose 'efforts on behalf of the advancement of science or its applications are scientifically or socially distinguished.'" The honor of being elected a Fellow of AAAS began in 1874 and is acknowledged with a certificate and rosette.

As for his research activities, last summer Tom served as the plenary speaker at the European Science Foundation Workshop on Nanotribology on the Isle of Porquerolles, France. In early September Tom was an instructor at the NATO Advanced Study Institute on Photon-based Nanoscience and Technology in Orford-Magog, Quebec. His lectures were on laser interactions with inorganic materials with applications in nanobiotechnology.

While on sabbatical during the 2003–2004 academic year, Professor Susan Dexheimer visited the Department of Chemistry at the University of California at Berkeley and the Physical Biosciences and Materials Sciences Divisions of the Lawrence Berkeley National Laboratory. She carried out nonlinear femtosecond laser spectroscopic studies of dynamics in molecular and nanoscale materials in collaboration with Graham Fleming, distinguished professor of chemistry, deputy director of the Lawrence Berkeley National Laboratory, and a leading expert in this field. Her work included studies of fundamental excitations in carbon nanotubes, novel materials that have attracted considerable recent interest due both to their unusual physical properties and to their potential application as "quantum wires" in nanoscale circuitry. During her sabbatical, she also served on committees for both the 14th International Conference on Ultrafast Phenomena, Niigata, Japan, July 2004, the premiere international conference in this research field, and for the International Quantum Electronics Conference, San Francisco, May 2004, the premiere international conference in laser science and applications.

Kudos to Fred Gittes, who was recently promoted from physics instructor to clinical associate professor. Fred feverishly spent his summer "vacation" prepping for a new biophysics course he designed last spring. Biophysics 466/566 is a one-semester course on the physics of cells, and the mechanics of molecular machines within cells. Fred's focus is on the fundamental physical understanding of the biological systems themselves, built upon a framework of physics.

Mary Guenther has been promoted to serve as the department's recruitment specialist. She has been working tirelessly this past year to encourage and recruit high school students statewide. One of her first assignments in her new position was when, under the direction of Fred Gittes, Mary planned the special "Operation Pumpkin Drop" for Dad's Weekend. The falling bodies demonstration was so successful that it has been established as an annual Saturday morning Dad's Weekend campus event.

Mary's unique talents and accomplishments have not gone unnoticed outside of the department as well. During the College of Sciences Twelfth Annual Dean's Recognition Ceremony held in April, she was honored with the "Outstanding Classified Staff Award." Good work, Mary!

Tom G. Johnson has been very busy this year, as evidenced from the number of references we have made to him in this issue of *Physics Matters*. It is important to note that in February 2005 Tom was promoted to Scientific Instructional Technician Supervisor. Tom's promotion is well deserved.

The National Science Foundation awarded Mark Kuzyk a three-year grant worth $205,000 to investigate fundamental quantum limits of nonlinear susceptibilities and devices. In addition, he was recently informed that the College of Sciences will renew his grant for Boeing Distinguished Professorship in Math and Science Education through fiscal year 2006, totaling $10,000.

Kelvin Lynn was honored with the Westinghouse Distinguished Professorship in Material Science and Engineering for the three-year period of August 16, 2004, through August 15, 2007. This prestigious appointment was made in recognition of his continued contributions to the field of materials science and his reputation amongst his international peers. During the three-year period of this appointment, he will receive a supplemental support of $5,000 per year to be used for the development of research and instructional programs in his field of expertise.

Congratulations to Philip Marston. The U.S. Navy will provide him with grant funds totaling $210,000 over the next three years. He also has received a two-year, $130,000 grant from the Office of Naval Research (ONR) to do collaborative work with the Coastal Research Station in Florida.

We tip our hat to Matt McCluskey, who was elected vice chair of the 2006 Gordon Research Conference on Defects and Semiconductors. He will also chair the conference in 2008. Matt will also co-PI, along with Leah Bergman of University of Idaho, for an $80,000 grant from the American Chemical Society Petroleum Research Fund (ACS-PRF). Their work will involve "Optical and Structural Properties of Wide Band Gap Semiconductors, Bulk and Nanocrystals, Under Extreme Conditions." The award includes a $40,000 subcontract from the ACS for a span of two years.

In addition, Matt has been granted leave from August 2005–May 2006 to perform optical studies of biological molecules at the University of California in Santa Barbara. He will also be working on developing a "near infrared optical tomography system for brain imaging of sleep cycles in humans at WSU."

Professor Michael D. Miller has been made a Fellow of the American Physical Society. This prestigious award was made in recognition of his continued contributions to the field of theoretical physics. His citation in part read, "For insightful contributions to the theoretical description and the interpretation of experimental data of quantum fluid mixtures and mixture films." Congratulations, Mike.

Steve Tomsovic has been awarded the Martin-Gutzwiller Fellowship of the Max Planck Institute for the Physics of Complex Systems (MPIPKS) for the academic year 2006–2007. The fellowship is given every year to a distinguished scientist with the goal of promoting fundamental research and international collaboration in the area of the theory of complex systems. Steve studies quantum chaos, the study of the underlying role of complex particle motions in the wave-like behavior found in the microscopic world. His work has covered quantum dots and point contacts, nuclear physics, ocean acoustics, and mathematical physics.

The fellowship provides a year's stipend to conduct research at the institute in Dresden, Germany. In addition, the fellowship also comes with funding for a postdoctoral visitor or doctoral student for the year. For the full story, go to WSU Today at www.wsutoday.wsu.edu/completestory.asp?StoryID=2056.

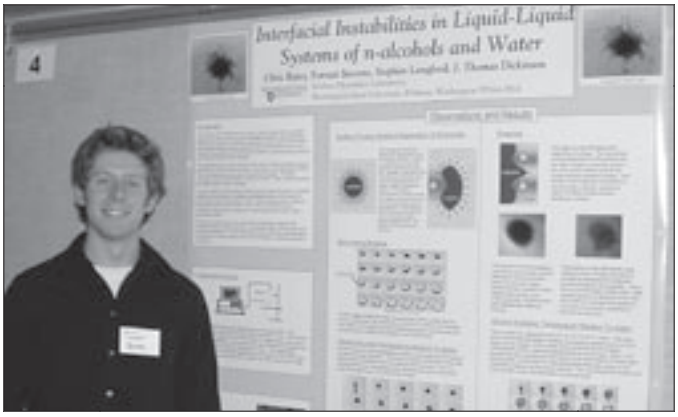
In other good news, Steve received $60,000 from the U.S. Navy for "Range Dependant Properties Due to the Ocean's Internal Waves in Deep Water Acoustics."

Lai-Sheng Wang was named a 2005 Fellow by the John Simon Guggenheim Memorial Foundation. Lai-Sheng won the award for his studies of atomic clusters and multiply charged anions. The Guggenheim Foundation awards grants to advanced professionals with "significant performance records." The purpose of the grant, according to the Foundation, is to "help provide Fellows with blocks of time in which they can work with as much creative freedom as possible; grants are made freely. No special conditions attach to them, and Fellows may spend their grant funds in any manner they deem necessary to their work." Lai-Sheng's award is for $37,000 and began in October 2005. For the full story, see WSU Today at www.wsutoday.wsu.edu/completestory.asp?StoryID=2078.

During the College of Sciences Twelfth Annual Dean's Recognition Ceremony held last April, Lai-Sheng was honored with the "Distinguished Faculty Award" for his highly innovative and productive research activities at the Tri-Cities campus and at Pacific Northwest National Laboratories. The good news just keeps coming!

A hearty congratulations to Guy Worthey, who has received $406,089 for a five-year career grant from the National Science Foundation. Guy is studying "extragalactic stellar populations" with his research group. He was also awarded $51,665 from the Space Telescope Science Institute for a one-year period of research on "The Ancient Stars of M32."

One of Guy Worthey's many talents, pianist virtuoso, at the 2005 Physics and Astronomy picnic held at Sunnyside Park.



Undergraduate Christopher Bates presenting his poster during the second annual Undergraduate Research Poster Competition.

Physics and Astronomy Students Win Big in Poster Competition

Physics and astronomy undergraduates have once again demonstrated their unique and notable dedication to their research in physics. The second annual Undergraduate Research Poster Competition was held on March 25, 2005, in the CUB Ballroom, and we are proud to recognize winners from our department: Chris Bates, John Leraas, and Jonathan Hanni. The competition was held for students with a standing or intended major in the sciences. Students were invited to construct posters depicting their laboratory research. Students' posters were subject to a closed prejudging by a committee comprised of undergraduate coordinators, instructors, and dean's office personnel from the College of Sciences.

Following the judging, participants were able to display their posters and answer questions regarding their work during a public viewing. The formal program began in the evening, with a welcome and introduction by College of Sciences Dean Michael Griswold, followed by a speech delivered by Emeritus Professor of Chemistry and Molecular Biosciences Ralph Yount. The winners of the competition were then announced and presented with formal recognition and monetary awards. Among them, John Leraas, a junior physics major, won first prize for the Physical Sciences category under the mentorship of Tom Dickinson. Second prize went to Jonathan Hanni, a senor physics major, who was mentored by John Vienna of the Pacific Northwest National Laboratory. In the Interdisciplinary Category, Chris Bates, a junior physics major, shared third prize. Chris is also under the mentorship of Tom Dickinson, who described the event as "an excellent opportunity for all of our science students to see what kind of research their fellow students are doing. It is also an opportunity to expose our students to the format of a scientific meeting." Indeed, the competition results aptly demonstrate the enthusiasm and dedication of students from our department. Also receiving prizes were graduate students Sharon John, for the William R. Wiley Exposition, second place, $120; Krittika Kanjilal, for the Golding Family Award worth $1,200, and Aaron Rogan, who has received a NASA Grant worth $5,000. Aaron is currently working on "optimal detection strategies" for a space-based interferometer that NASA expects to launch in 2011.

Scholarship Recipients 2004–2005

Many of the gifts received from our alumni and friends support scholarships for the best and the brightest in the Department of Physics and Astronomy. For the 2004–2005 academic year, the following scholarship awards were given:

Physics Transfer Scholarship

Jonathan Hanni

Physics Textbook Scholarships

Joel Bale
Chris Bates
Chris Corkum
Jonathan Hanni
Knud Hendrickson
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Mark C. Kuzyk
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James Ruiz
Travis Tobey
Neil Trotman

The Claire May Band Scholarship in Physics for Women

Bobbie Riley, Cheney High School
Spokane, Washington
Julianna Simon, Cascaede High School
Leavenworth, Washington

Granted Degrees Fall 2004–August 2005

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Sam Thorkildsen
Travis Tobey

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Christopher Brooks
Kevin Mattern
Jalal Nawash
Aaron Rogan
Shawn Seader
Lai Wang
Wei Wei

MASTER OF SCIENCE

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Dirk Robinson
Shawn Seader
Lai Wang
Jeremy Young
Chengping Zhang

DOCTORATE

Khin Hla Nwe Kjelgaard
Wei Wei

Donor Roll 2004–2005

July 1, 2004, to June 30, 2005

On behalf of the students and faculty in the Department of Physics and Astronomy, we extend a thank you for your generous and thoughtful gifts. We want you to know that these gifts make several scholarships and special student programs possible. It is great to know you care.

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