

Communiqué

Fall 2006

UNIVERSITY OF MISSOURI-COLUMBIA

DEPARTMENT OF PHYSICS & ASTRONOMY

3 Faculty, 3 Top Awards

UM President's Award honors Meera Chandrasekhar's outstanding teaching

President Elson Floyd of the University of Missouri System has honored Meera Chandrasekhar with a President's Award for Outstanding Teaching. The \$15,000 award recognizes a faculty member for longterm contributions to teaching. A systemwide faculty committee evaluates nominations submitted by the four chancellors.

Chandrasekhar is a Curators' Teaching Professor of physics. Since joining MU in 1973, she has taught undergraduate and graduate courses and advised doctoral students. In addition to her devotion to teaching, Chandrasekhar is an optical spectroscopist of international reputation with an outstanding research record. She won the prestigious Alfred P. Sloan Fellowship in 1985 and the Chancellor's Award for Outstanding Research and Creative Activity in the Physical and Mathematical Sciences in 1990. She is a Fellow of the American Physical Society.

Chandrasekhar's interest in expanding the pipeline for women entering the physical sciences motivated her to create programs for K-12 students. She has led the development of four programs, including Exploring Physics, that offer unique opportunities for students to experience the physical sciences through hands-on experiments. Chandrasekhar also works with Missouri science teachers to provide professional development during summer institutes.

She is the lead higher-education principal investigator for the A TIME for Physics First program, a \$3 mil-

lion, three-year grant from the Missouri Department of Elementary and Secondary Education, funded by the Mathematics and Science Partnerships program. The goal of this grant is to develop curriculum and to provide professional development to ninth-grade teachers so they can teach a year-long physics course at that level.

Chandrasekhar was the recipient of a Science Teachers of Missouri Distinguished Service Award, 2004; a Governor's Award for Excellence in Teaching, 1998; a Kemper Fellowship for Teaching Excellence, 1997; and a Purple Chalk Award for Excellence in Teaching, 1987, among many other honors. Nationally, she received the 1998 Presidential Award for Excellence in Science, Mathematics, Engineering and Mentoring, which is awarded in Washington, D.C.

Said one nomination letter: "Beyond any doubt, Meera Chandrasekhar has that rare gift of being able to teach well at all levels, and she has put it to most excellent use. As with all truly talented people, watching Meera work makes it look easy."



Meera Chandrasekhar receives a plaque to accompany her \$15,000 teaching award. University of Missouri President Elson Floyd makes the presentation.

Paul Miceli wins a Kemper Fellowship for Teaching Excellence

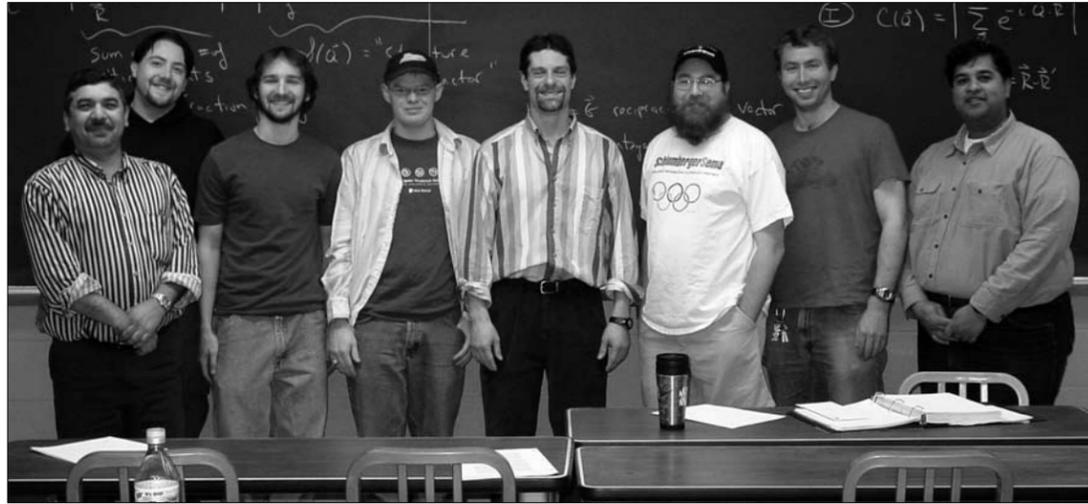
The knock on the door of Room 433 Physics interrupted Paul Miceli's physics 8101 class, but as it turned out, it was all worth it. Chancellor Brady Deaton had arrived to deliver, along with Chairman Jim Schatz of the local Commerce Bank branch, the first of five 2006 Kemper Fellowships for Teaching Excellence.

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(Faculty Awards, continued from Page 1)

The annual awards, named for William T. Kemper, a 1926 MU graduate, honor outstanding MU teachers each year and include a \$10,000 prize. Miceli says he is honored to receive an award for doing something that he enjoys. "It is certainly a privilege to work in a profession where I can teach young and enthusiastic minds while, at the same



Students of Paul Miceli, fifth from left, gather to celebrate his 2006 Kemper Fellowship for Teaching Excellence. From left are Jagat Lamsal, Michael Mayo, Michael Gramlich, Jacob Burruss, Miceli, Shawn Hayden, Ryan Meyer and Amitabh Mohan.

time, explore new ideas through research. The coupling of teaching and research at universities is a wonderfully effective system, and I greatly appreciate the Kemper Foundation's sponsorship of the award for teaching excellence on the MU campus."

Miceli's goal as an educator is two-fold: to relate physics to humanity and to tease the intellect of students from two audiences, both physics and non-physics majors. Students say he not only achieves this goal, but he also attains it in a refreshing manner. He is known for demystifying the physical world for non-majors and assisting physics majors in becoming independent researchers who are able to scientifically stand on their own feet.

At MU, Miceli involves undergraduates, graduates and doctoral candidates in physics research, most notably in projects that require x-ray and neutron-scattering techniques he teaches in class. In the community, he dedicates time to educating elementary and high school students through physics seminars and demonstrations.

Many students describe Miceli's passion for physics as genuine, and his colleagues believe he fosters a can-do attitude in students by keeping lectures energetic.

Giovanni Vignale is named Curators' Professor

Professor Giovanni Vignale was recently named a Curators' Professor by a unanimous vote of the University of Missouri Board of Curators. The prestigious professorship comes with an annual award of \$10,000.

Vignale, a condensed matter theorist, is a pioneer in the field of the current density functional theory. He specializes in applying the theory to electronic systems in magnetic fields, and in studies of the elasticity theory for quantum Hall liquids.

Vignale's theoretical predictions on the Spin Coulomb drag were verified recently by experimental observations. Vignale and a former student published a series of papers in 2000 that predicted a novel effect in spin transport, which they called "Spin Coulomb drag."

They identified this phenomenon as the friction between electrons of opposite spin orientations traveling at different velocities. They predicted that the effect would cause a strong reduction in the spin diffusion constant. The theoretical work was initially received with skepticism, but an experiment published in *Nature* in October 2005 confirmed in quantitative detail their original prediction.

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The department appreciates hearing from alumni and friends. Send announcements or milestones to the address listed above. Website at www.physics.missouri.edu.

Chair's Note

By H.R. "Chandra" Chandrasekhar, Department Chair

We begin the 2006-07 academic year on a high note. The department is growing with the addition of new faculty, students and research associates. We welcome Owen P. Vajk and his wife, Judy Morita; Maikel Rheinstadter, his wife, Andrea, and their two children, Helena and Hannah, to the faculty family. We also are proud to have M. Frederick Hawthorne, co-director of the International Institute for Nano and Molecular Medicine and a member of the National Academy of Sciences, as a joint faculty member. We look forward to new heights of excellence in research, teaching and outreach activities.

Our faculty, students and alumni have received numerous awards and accolades celebrating their achievements. Meera Chandrasekhar received the 2006 University of Missouri President's Award for Outstanding Teaching; Paul Miceli won a 2006 Kemper Fellowship for teaching excellence; Giovanni Vignale was named a Curators' Professor by UM System President Elson Floyd and the Board of Curators. Our distinguished alumnus James L. Fergason, inventor of the liquid crystal display, received the prestigious Lemelson-MIT award. Another alumnus, Craig Tracy, was elected to the American Academy of Arts and Sciences. Details of these and other accomplishments can be found elsewhere in this newsletter.

This year marks a milestone in the history of the College of Arts and Science. Michael J. O'Brien was appointed new dean of the College following the retirement of Dean Richard Schwartz. Dean O'Brien is no stranger to the department or the College. As an associate dean for many years, he has overseen growth in this department and has been intimately involved in our success by hiring a substantial number of our faculty. I look



In good company with Albert Einstein and H.R. Chandrasekhar, alumna Linda Godwin visits the department to interact with students and faculty.

forward to working with him and share his vision of an excellent department and College, which is central to the academic mission of the University at large.

We were delighted to have our favorite alumna, Linda Godwin, PhD '80, visit campus on two occasions. She received the 2005 Faculty-Alumni Award from the MU Alumni Association in October 2005 and served as commencement speaker for the May 2006 graduation ceremony of the College of Arts and Science.

I conclude with a note of hearty congratulations and best wishes to our graduates at the bachelor's, master's and doctorate levels. We miss them but are happy to see them go forward as alumni, armed with the knowledge gained here, into a world full of hope and promise.

(Faculty Awards, continued from Page 2)

The Spin Coulomb drag effect is important not only as a probe of subtle quantum mechanical correlations between electrons but also from a practical point of view because it slows down the spreading of optically induced spin packets in semiconductors. It also affects quantitatively the magnetoresistance of spin-valve devices.

Vignale is the co-inventor of unipolar spin diodes and transistors and holds three patents. In 2005 he co-wrote the authoritative treatise "Quantum Theory of the Electron Fluid," which has been published by the Cambridge University Press and has received rave reviews. He has written more



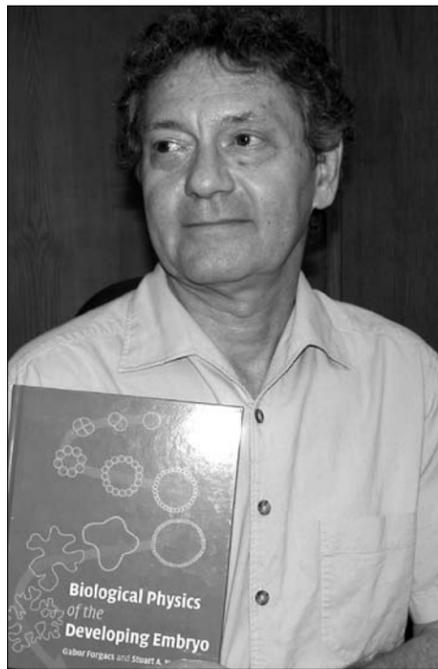
Giovanni Vignale is noted for his theoretical predictions on the Spin Coulomb drag.

than 120 research papers. His collaborators include students and post doctoral associates as well as scientists from the United States and abroad. He is the divisional associate editor of *Physical Review Letters*, a premier journal in physics. He has organized various international schools and workshops, including the prestigious International School of Physics Enrico Fermi in Varenna, Italy, in 2003.

Vignale is a fellow of the American Physical Society. The National Science Foundation has continuously funded his research since 1991.

Faculty Kudos

When **Gabor Forgacs**, George H. Vineyard Professor of Physics, began teaching a course in cell biology, he realized there was no textbook that covered the material he wanted to teach. He remedied the problem by co-writing *Biological Physics of the Developing Embryo* with colleague Stuart Newman of New York Medical College. During development, cells and tissues undergo changes in pattern and form that employ a wider range of physical mechanisms than at any other time in an organism's life. The book, which demonstrates how physics can be used to analyze those biological phenomena, covers issues that are important to biologists and physicists. Published by Cambridge University Press in December 2005, the book has been adopted by several physics and bioengineering departments nationally.



To teach cell biology, Gabor Forgacs co-wrote a textbook that is in use at several universities.

Suchi Guha's research group has used light scattering techniques to unravel key structure-property relationships in a class of blue-emitting polymers, namely, polyfluorenes. Published in *Physical Review Letters*, the work is co-written by graduate student Mohammad Arif and undergraduate student Christopher Volz. Volz was instrumental in theoretical modeling of the vibrational spectra of polyfluorenes. Such studies are an important step toward developing a universal picture of structure-property relationships in conducting polymers, which mainly derive from chain morphology at nanometer-length scales. From the device aspect, this research work has led to successful fabrication of efficient polyfluorene-based, blue light-emitting diodes by Arif. Guha presented the work at an invited lecture at the Materials Research Society meeting in San Francisco.

Recently promoted to resident associate professor, **Dorina Kosztin** is a co-principal investigator on the A TIME for Physics First grant from the Missouri Department of Elementary and Secondary Education.

A project based on discoveries by Professor **Peter Pfeifer** and Jerry Atwood, Curators' Professor of Chemistry, centers on the development of low-pressure, high-capacity storage technologies for natural gas (NG, methane) and hydrogen as alternative fuels for advanced transportation. Pfeifer's and Atwood's research involves nanoporous carbons criss-crossed by a nearly space-filling network of channels a few molecular diameters wide and organic solids (calixarenes) with interstitial voids. The team has baked corncobs into carbon briquettes that can trap natural gas in fractal pore spaces. The briquettes hold 163 times their own volume in natural gas at lower-than-normal pressures, so the team has been able to

design a low-pressure, high-capacity, natural-gas tank. Testing on the prototype tank is slated to begin in a natural gas vehicle that has a working distance of 50 miles.

Lou Ross, adjunct instructor and senior electron-microscope specialist at the Electron Microscopy Core Facility, was elected to a three-year term as a Local Affiliated Societies Director of the Microscopy Society of America. He is working with the Central States Microscopy and Microanalysis Society to hold a regional meeting in Indianapolis in 2007. Ross also serves as membership chair for the Microbeam Analysis Society. In June he organized the fourth annual Computer-Assisted Image Analysis and Measurement Short Course at MU, and he plans to host it again in 2007. He also introduced a new topics course, Introduction to Image Processing and Analysis, and intends to make it a permanent part of the physics curriculum.

Mercator Award for Satpathy

Professor Sashi Satpathy received the prestigious Mercator Professorship, sponsored by the German National Science Foundation (Deutsche Forschungsgemeinschaft). About a dozen awards are presented annually in the discipline of natural sciences to academics internationally, and they represent the highest rank at a German university.



Sashi Satpathy

Satpathy will spend six months at the University of Saarland, Germany, in the next several years to assist in the development of a research program in the area of photonic band structure. He will work in collaboration with Professor Michael Springborg's theory group as well as with other experimental groups, in addition to teaching a course for advanced students.

The Mercator award recognizes Satpathy's pioneering work on the photonic band-structure problem that he began in the early 1990s at Mizzou with then-graduate students Mohammad Salehpour, now an associate professor at M.D. Anderson Cancer Center in Houston, and Ze Zhang, now an associate professor at Coker College in South Carolina. The team solved the photonic band-structure problem, which describes the propagation of light in periodic dielectric structures. It has become a well-developed, major area of research with diverse technological applications.

Angela Speck and a team of international scientists have discovered that the stardust that forms the building blocks of planets and life in the universe does not behave as expected. Results from their study of presolar, meteoritic, silicon carbide grains suggest that a star initially produces relatively large grains and that the grains become progressively smaller as the star dies. The result is the opposite of what the investigators thought to be true. As the gas becomes denser the grains get smaller, Speck says. The team's paper on "Massive-star supernovae as major dust factories" appeared in the June 8, 2006, issue of *Science* (express edition).

Hak Taub spoke at the National Workshop on Nanotechnology, Viña del Mar, Chile, in May 2006. He also gave an invited colloquium at the Universitaet des Saarlandes, Saarbruecken, Germany, where he was a visiting professor of physics for July 2006. Taub has chaired the Condensed Matter Scattering Review Panel at the Advanced Photon Source, Argonne National Laboratory for the past two years.

The Neutron Interferometry and Coherence Symposium was held in Sydney, Australia, in December 2005, to honor **Professor Samuel A. Werner** and commemorate 30 years of his pioneering, experimental work in conjunction with colleagues, students and international collaborators.

Carlos Wexler, promoted to associate professor, has recently given several plenary talks: "Extended Universality in Statistical Mechanics," at the XXIX International Workshop on Condensed Matter Theories (CMT29), in Kyoto, Japan; "An Extended Concept of Universality in Statistical Mechanics," at the 13th International Conference on Recent Progress in Many-Body Theories QMBT13, in Buenos Aires, Argentina; and "Active Learning Strategies in Large-Enrollment Courses," on educational issues related to elementary physics at the MacGraw-Hill College Physics Symposium, in Austin, Texas. Wexler will be a visiting research professor at the Institute of Solid State Physics at the University of Tokyo in fall 2006.

Shufeng Zhang was elected a fellow of the American Physical Society in 2006 for his pioneering theoretical models and analysis of spin transport in magnetic systems.

POSTDOCTORAL ACHIEVEMENT

Sunder Balasubramanian, a postdoctoral fellow working with Ping Yu, won a first-place plaque and \$750 for his poster entered in the research competition of MU's 2006 Life Sciences Week. "Designing a Frequency Domain Heterodyne System for 3D Diffused Photon Fluorescence Imaging" competed successfully in the Systems, Biology, Modeling, Technology Development Category. Balasubramanian has a joint appointment at Mizzou and at Lincoln University in Jefferson City, Mo.

New Faculty in Neutron Scattering

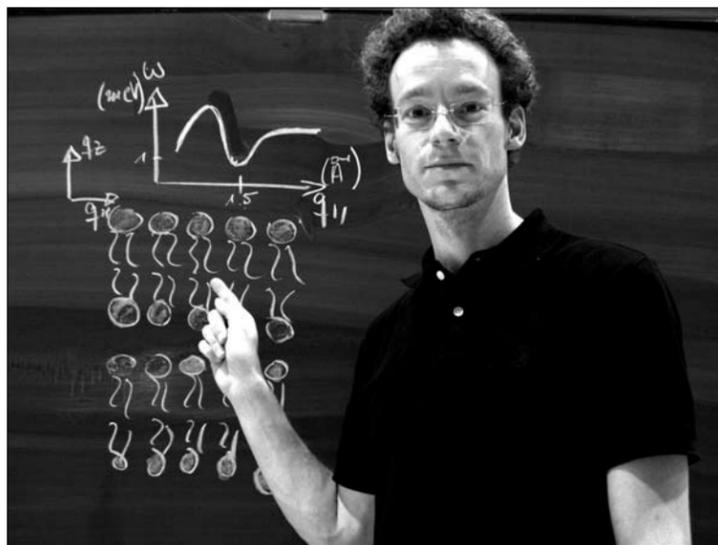
Maikel Rheinstädter and Owen Vajk joined the department in fall 2006 as assistant professors. Both newcomers use neutron scattering methods and expect to significantly benefit from the five neutron scattering instruments at the University of Missouri Research Reactor (MURR).

The startup costs for the new hires are shared by MURR and the College of Arts and Science, as well as through a grant from a U.S. Department of Energy program — Innovations in Nuclear Infrastructure and Education (INIE) — which supports infrastructure at university-based research reactors.

Rheinstädter's main research interest is the study of biological membranes using inelastic neutron scattering. He began his research in biophysics as a postdoctoral researcher in 2002 at the Institut Laue-Langevin in Grenoble, France. Because neutron scattering can probe the dynamical fluctuations of membranes on the intermolecular scale, his experiments are expected to reveal important new insight into biological membranes.

Rheinstädter received a doctorate from the Universität des Saarlandes, in Saarbrücken, Germany, where he studied phase transitions in low-dimensional magnetic systems, under the direction of Professor Klaus Knorr. In 2003 he received the Young Scientist Award of the European Neutron Scattering Association for his contribution to inelastic neutron scattering in biological model membranes, and in 2005 he organized the International Neutron Spin-Echo Workshop in Grenoble, France.

Vajk's research uses neutron scattering to study transition metal



Maikel Rheinstädter's main research interest is the study of biological membranes using inelastic neutron scattering.

oxides, which exhibit many interesting phenomena, including high-temperature superconductivity, colossal magnetoresistance and multiferroic behavior. In 2003 as a postdoctoral researcher at the NIST Center for Neutron Research, Vajk began neutron scattering studies of a novel multiferroic material that exhibits a strong coupling between ferroelectric and magnetic order.

Vajk received a doctorate from Stanford University in 2003, where he studied

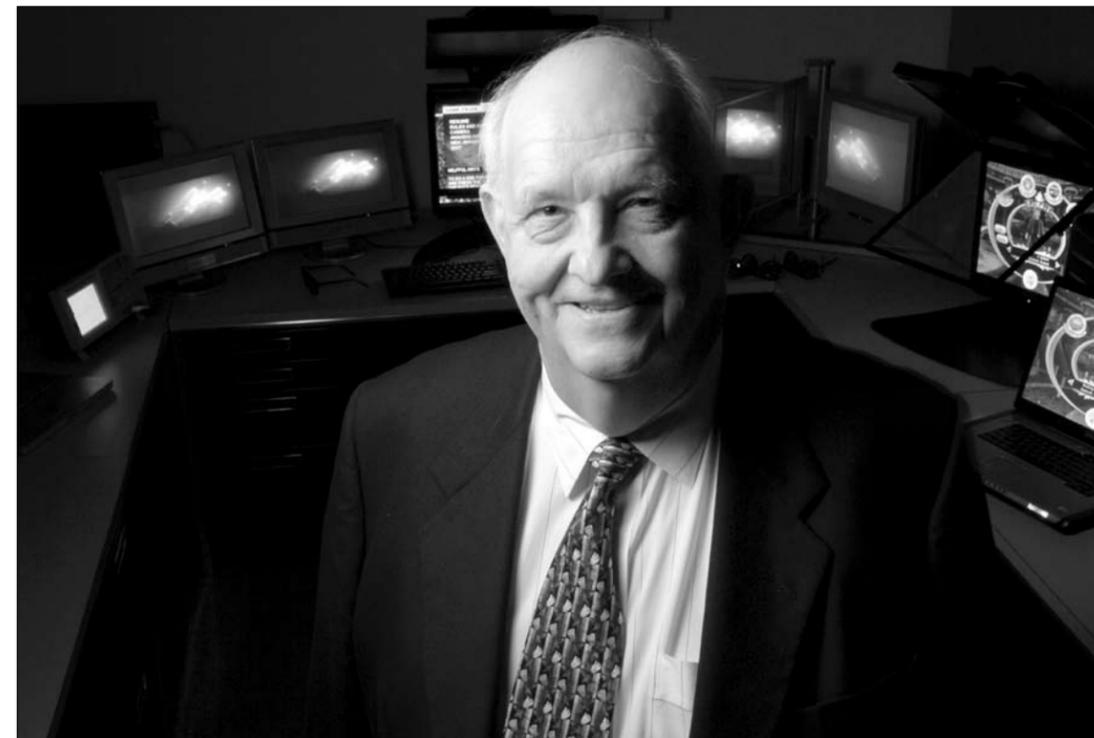
dilute two-dimensional antiferromagnets that are closely related to the high-temperature superconducting oxides.

Vajk is perhaps the only researcher in the world who has been able to grow single crystals at high-dilution concentrations suitable for the study of the physics of disordered quantum phase transitions. His crystal-growth success enabled him to investigate the square-lattice quantum percolation problem through detailed magnetometry measurements at Stanford and neutron scattering experiments at the Stanford Neutron Research Center. His research has set the stage for future measurements of the full spin dynamics at the Spallation Neutron Source.

Vajk gave invited talks at American Physical Society (APS) meetings in 2003, 2004 and 2006. In 2004 he received the Outstanding Dissertation in Magnetism Award of the American Physical Society and the Outstanding Student Research Award from the Neutron Scattering Society of America. His appointment at NIST was through the prestigious National Research Council Postdoctoral Fellowship.



Owen Vajk's research on transition metal oxides uses neutron scattering. He says he inherited his love for teaching from his father, who also teaches physics.



Alumnus Jim Ferguson gave the physics department a significant portion of his recent \$500,000 prize for invention, the Lemelson-MIT Award. Department Chair H.R. Chandrasekhar and former Dean Richard Schwartz represented the department and the College of Arts and Science at the presentation ceremony in Chicago.

Inventor, Innovator

Over the years, James Ferguson has amassed an impressive collection of mood rings as joke gifts from friends. He gets the joke. Ferguson, BS '56 physics, DS '01, is known as the pioneer of the modern liquid crystal display, which is the technology behind the color-changing properties of those mood rings.

In summer 2006 the honors became serious when Ferguson received the nation's largest and arguably most prestigious prize for inventors, the Lemelson-MIT Award. Ferguson accepted the award — considered the Nobel Prize for inventors and innovators — and \$500,000 in a May ceremony at the Museum of Contemporary Art in Chicago.

Ferguson's extensive list of inventions, including more than 150 U.S. patents and 500 foreign patents, has generated other impressive recognition as well. In 1998 he was inducted into the National Inventors' Hall of Fame.

Although Ferguson didn't discover liquid crystals, he was the first to understand what they could do. Likewise, he invented their first practical uses, starting with digital watches, calculators and forehead thermometers, that paved the way toward innovative industrial devices and consumer electronics such as LCD televisions.

Ferguson continues to work as an independent inventor. His current projects in LCDs investigate improvements for flat-panel televisions, computer monitors, rear-projection television and presentation projectors.

As he accepted the Lemelson-MIT Award, Ferguson already had decided to use the monetary prize for philanthropy. He earmarked \$200,000 as an addition to the James L. and Dora D. Ferguson Fund for Excellence in Physics.

Student Accomplishments

Congratulations, Graduates!

Recent doctoral graduates and their advisers include the following: Christopher M. Martin, advised by H.R. Chandrasekhar; Zoia Kopeikin, advised by Shi-Jie Chen; Karoly Jakab, advised by Gabor Forgacs; Igor Vlasov, advised by Sergei Kopeikin; Cintia Mariela Lapilli, advised by Carlos Wexler; Subodha Mishra, advised by Sashi Satpathy; Brook Damon, advised by Gabor Forgacs; and Armand Diama, advised by Haskell Taub.

Master's graduates and their advisers are Robert Schott, advised by Peter Pfeifer; Mingzai Sun, advised by Gabor Forgacs; Vijayalakshmi Kattumuri, advised by Meera Chandrasekhar and Kattesh Katti; and Kyle DePew, advised by Angela Speck.



Cintia Lapilli began a post-doctoral appointment at the Pacific Northwest National Lab in Boston in September. Lapilli is the 2006 recipient of the Hammond Award, given annually to a graduate student who excels in teaching undergraduates. The award is named for former faculty member Harry E. Hammond.

Cintia Lapilli



Armand Diama, an advisee of Professor Hak Taub and the first student from Africa to obtain a doctorate in the department, will join the physics faculty at the National University of the Ivory Coast in Abidjan. He presented three posters and a manuscript (in press) on molecular diffusion in adsorbed films at the 8th International Conference on Quasi-Elastic Neutron Scattering held at Indiana University.

Armand Diama

Igor Vlasov, PhD '06, is a postdoctoral fellow in the physics department of the University of Guelph, Ontario, Canada. He is studying the motion of black holes in a tidal environment.

Karoly Jakab is a postdoctoral fellow in the Department of Cell Biology and the Morphogenesis and Regenerative Medicine Institute at the University of Virginia, Charlottesville.

Brook Damon will be working in the cell biology and anatomy department of the Cardiovascular



Josh Tartar, right, serenades Addie Dove, far left, and Professor Angela Speck at the International Astronomical Union 234 conference in Hawaii. Both students presented papers at the event.

Developmental Biology Center at the Medical University of South Carolina.

Kyle Depew is attending graduate school at the University of Iowa.

William Danchus, a member of Hak Taub's research group, was co-author of the poster "A Comparative Study of Normal and Branched Alkane Monolayer Films of Relevance to Nanolubrication: I. Structure." Danchus will receive a bachelor's degree in May 2007.

Adrienne Dove graduated in May with the Chancellor's Award for Excellence in Undergraduate Research and Creative Achievements for her poster "CLOUDY Modeling of Weird Far Infrared Emission in the Central Zone of the Helix Nebula." She started graduate school at the University of Colorado at Boulder in fall 2006.

Addie Dove and **Josh Tartar** presented papers at the International Astronomical Union 234 conference on Planetary Nebulae in our Galaxy and Beyond in Hawaii.

Grant Thompson co-wrote "Mythbusting in the Carbon star dust condensation sequences – anarchist C-Stars" with Adrian Corman, Angela Speck and Catharinus Dijkstra for the *Astrophysical Journal*, Vol 652, 2006 (in press). Thompson now is in graduate school at the University of Kentucky.

Hawthorne, Katti to Direct International Nano Institute

Fred Hawthorne and Kattesh Katti, joint professors of physics, will co-direct MU's new multimillion-dollar International Institute for Nano and Molecular Medicine. The institute will be located in a new building scheduled to open in November 2007.

Hawthorne, a world-renowned cancer researcher, joined MU in March 2006. A member of the National Academy of Sciences since 1973, he previously served more than 35 years on the faculty at the University of California, Los Angeles. Hawthorne says he was attracted to MU's multidisciplinary facilities and its culture of collaboration.

The focus of his research has been on the unique properties of boron and its potential for medical applications. Other research in Hawthorne's lab involves molecular

motors. When activated by electrons from light, chemicals or electrodes, motors could provide power to nanodevices.

Katti is the director of MU's Nanoparticles Production Core Facility (NPCF), one of the first on-campus facilities of its kind. NPCF produces metallic nanoparticles made especially for medical applications in a patented process. It laid the groundwork for a \$3.1 million grant to use nanomedicine to combat prostate cancer. The grant, from the National Cancer Institute, brought together a team of 12 researchers, including Professors of physics Suchi Guha and Meera Chandrasekhar.

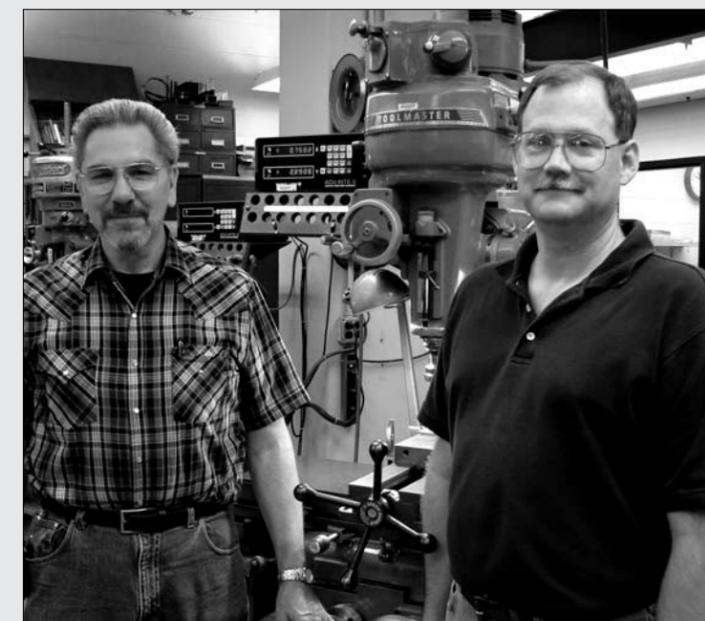
Katti is principal inventor on 14 patents in the chemical, biological, optical and nanotechnological aspects of cancer diagnostic and therapeutic agents and sensors. He was named the Gauss Professor by the Academy of Science in Göttingen, Germany, for 2005-06 and will spend two months at the University of Göttingen, where he will deliver lectures on cancer nanotechnology.

Thanks to Physics Machine Shop Staff

For nearly 59 years, the Physics Machine Shop has been a leader in the design and construction of instrumentation for physics research and has attained a worldwide reputation for the development of instrumentation for research in neutron scattering. In celebration, the department held a ceremony to recognize Machine Shop staff: Sammie L. Potts Jr., supervisor, and Roderic D. Schlotzhauer.

Potts and Schlotzhauer recently completed the design and construction of a radial collimator, a major component of a new, state-of-the-art spectrometer similar to equipment installed at the Spallation Neutron Source and nearing completion at Oak Ridge National Laboratory. The collimator is one of the largest of its kind and represents yet another example of technical expertise that has made the shop a world-renowned resource.

"Sam and Rod possess exceptional skill in their working relationships with department members," Professor Hak Taub said at the recognition ceremony. "Many of us in the department have had the wonderful experience of going to them with



The department has recognized supervisor Sam Potts, left, and Rod Schlotzhauer of the Physics Machine Shop staff for outstanding design and construction achievements.

a technical problem and immediately sensing that our problem had become their problem, a sharing of the effort until a solution has been found or a resolution achieved."

Alumni Corner

Please send alumni news to the department at hillsar@missouri.edu. We want to hear from you.

Ronald Boain, BS '65, MS '67, has 30 years of aerospace engineering experience at NASA's Jet Propulsion Laboratory. More recently his career emphasis has been mission design and system engineering of Earth-orbiting science missions, in particular Topex/Poseidon, Jason-1 and CloudSat. His unique contribution to CloudSat was an idea to fly the CloudSat spacecraft in a tight formation with Calipso. He was instrumental in every aspect of the mission design to implement the plan. As project system engineer, Boain must ensure that the formation flying objectives are met without undue risk and that the project system's technical performance meets the requirements.

Craig A. Tracy, BS '67, has been elected to the American Academy of Arts and Sciences for his discovery of a set of statistical principles found in a wide range of problems, from card shuffling to the design of wireless antennae. He is a mathematics professor at the University of California-Davis. Tracy earned a doctorate in physics from the State University of New York, Stony Brook. In the early 1990s, Tracy and colleague Harold Widom developed mathematical



Alumnus Craig Tracy's distinguished work results in another honor.

tools, now called the Tracy-Widom functions, for understanding dependent distributions. Since then, they and other mathematicians and scientists have found that the same principles apply in a variety of natural and artificial situations, such as climate, card-shuffling problems, statistical analysis of complex systems and wireless communications. In 2002 Tracy and Widom shared the \$20,000 George Polya Prize from the Society for Industrial and Applied Mathematics for their work.

Robert E. Tribble, BS '69, professor of physics and director of Texas A&M University's Cyclotron Institute, has been invited by the United States Secretary of Energy and the director of the National Science Foundation to serve a three-year term as chair of the Department of Energy/National Science Foundation Nuclear Science Advisory Committee. In addition to his MU degree, Tribble received a doctorate from Princeton University. He joined the Texas A&M faculty in 1975 and was chair of the physics department there from 1979 to 1987. He has been an Alfred P. Sloan Foundation Fellow, a guest scientist at the Max Planck Institute fur Kernphysik and an Associated Western Universities Faculty Fellow at Los Alamos National Laboratory and Lawrence Livermore National Laboratory. Tribble is a fellow of the American Physical Society.

Gordon Gross, MA '49, tutors mathematics and physics at Longview College in Lee's Summit, Mo. He had served as head of the physics section at Midwest Research Institute in Kansas City from 1954 to 1974. He retired in 1987 as principal scientist at the Solar Energy Research Institute, now the National Renewable Energy Laboratory, in Golden, Colo.

Peterson Retires

Charles Peterson joined the faculty in 1978 and retired in summer 2006 after a career that spanned decades of commitment. He earned a bachelor's degree in physics from the University of Washington-Seattle and master's and doctoral degrees in astronomy from the University of California-Berkeley. Peterson is a member of the American Astronomical Society, International Astronomical Union and a life member of Sigma Xi.

In the early part of his career, Peterson's work included the study of the structure of the spatial distribution of stars in globular clusters, which provided

a tabulation of the structure properties that act as a foundation of understanding these objects today. His extensive observational work on globular clusters refined existing knowledge of the brightness distribution of these clusters.

His plans for the future include an update of previous works, "A History of the Department of Physics" and "An Informal History of Astronomy at MU," as well as continuing work on genealogies of his and his wife's families. He would also like to travel, learn the art of stained glass and complete some unfinished projects that have turned his basement into a warehouse.

How Philanthropy Links Past to Present

As they honor the achievements of exceptional students, named scholarships help the department preserve the memory of distinguished alumni and former faculty members. Following is the list of physics and astronomy scholarships and their recent recipients.

Paul E. Basye Undergraduate Scholarships: Nathaniel Hall, Daniel Rusk Hess, Grant Thompson, Mohammed Arif, Jeffrey Borgeson, Lance Garrison and William Danchus.

Newell S. Gingrich Graduate and Undergraduate Scholarships: Kane Baker, Adrienne Dove, Lance Garrison, Jennifer Ortega, Matthew Simpson, Shawn Hayden, Jiexuan He, Lorant Janosi, Tyler Litton and Sam Grinter.

Eli & Nola Haynes Scholarship: Vijaya Kattumurri, Cintia Lapilli, Harshani Wijewardane and Jennifer Ortega.

Eugene B. Hensley Scholarship: Bogdan Barz, Jacob Burress and Michael Gramlich.

Ernest W. Landen Undergraduate Scholarship: Adrienne Dove, Sam Grinter, Kevin Roberts, Matthew Simpson, Grant Thompson and Michael Forney.

Packwood Undergraduate Scholarship: Kane Baker, Anthony Smith and Stephen Messenger.

Guy Schupp Scholarships: John Gaddy and Lacy Hardcastle.

O. M. Stewart Scholarship: Basil Mchunu, Subodha Mishra, Mikael Wood and Zhaoyang Yang.

Clifford W. Tompson Scholarship: Michael Forney and Daniel Rusk Hess.

A Life Remembered

The Eugene B. Hensley Scholarships make one or more annual awards to full-time undergraduate or graduate students who plan to major in physics. Elizabeth Hensley, widow of Eugene, says Hensley loved research and that the scholarships may also be used to fund student research.

Hensley, MA '48, PhD '51, was born Jan. 6, 1918, in Augusta, W. Va., and married Elizabeth Selke in 1954. He was a staff member of the Research Laboratory for Electronics at the Massachusetts Institute of Technology from 1951-53.

Hensley joined the MU physics faculty in 1953, earned full professorship in 1963 and received emeritus status in 1985. His research focus was the study of color centers and the electronic structure of alkaline earth chalcogenides as well as the thermionic and photoelectric emission properties of oxide-coated cathodes. He directed many students through their master's and doctoral degrees and even in retirement remained active in the department. He died in Columbia, Mo., in 1992.



Gene Hensley surveys his present at his retirement party while Marian Schupp and Newell Gingrich enjoy the event.

If you would like to help a student by donating to any of these scholarship funds, please make out your checks to the University of Missouri-Columbia, with the name of the scholarship in the memo line, and mail to Department of Physics & Astronomy, ATTN Sherry Long, 223 Physics Building, Columbia, MO 65211. Phone Anne Weller at (573) 884-2632 to talk about creating your own named endowment.



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Ninth-grade teachers from 19 Missouri school districts attended the inaugural A TIME for Physics First summer academy in June. The 60 teachers will return for two more summers of innovative professional development activities. In the larger photo, they are conducting an experiment on accelerated motion using a wheel traveling on an inclined track. In the smaller photo, they are studying uniform motion through the use of bubble tubes.

