Kansas State University
2005 Physics Department Newsletter

Editor's Notes
Michael O'Shea


Mick O'Shea

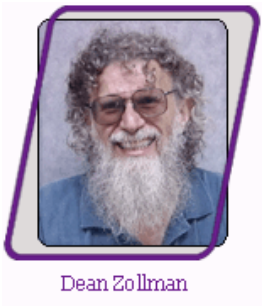
Greetings from Cardwell Hall. Semester is just ending here and the quiet of Christmas break is descending on campus as students are finishing their finals and leaving for home.

Our campus landscape continues to change slowly. Denison Hall was demolished early this year and there is now a beautiful commons area, 'Coffman Commons' named after the former Provost, to the south of the library. A grain science complex consisting of two buildings was completed off Kimball Avenue earlier this year and ground has been broken for a third building. Construction is also beginning on a Biosecurity Research Institute with completion anticipated in mid-2006. This institute will be located north of the Veterinary Medicine complex.

Duane Nellis joins Kansas State as the new Provost. He comes to us from West Virginia University where he was Dean of the College of Arts and Sciences. He is, however, well known on campus since he served as the department head of Geography at KSU and associate Dean of Arts and Sciences before going to West Virginia University. Brice Hobrock has retired from the position of Dean of Libraries after 22 year. Lori A. Goetsch was selected to fill this post and began work at K-State August 16.

According to a survey by the Princeton Review of public and private campuses, Kansas State is ranked 15th in the top 25 most connected campuses in the nation. This is a result of the 31 technology classrooms on campus, the fact that all student learning spaces will be wireless by the end of the academic year, K-State Online (a learning management system) and other information systems either operating or being implemented.

Department Head's Corner
Dean Zollman


Dean Zollman

Our Department continues with transitions and recognition while building for a strong future. This past year was notable for a number of state-wide and national awards as well as the addition of new faculty and staff. At the same time a couple of long-time staff members decided to start enjoying their retirement. So, we continue to do well and to make changes.

During the first two months of 2004 both Bob Geering and Dea Richard retired. Dea had been the Administrative Assistant for the Macdonald Lab for over twenty years. She kept things in order for the Lab (and particularly for its faculty) during 7 or 8 Department of Energy reviews and even held the Lab together when it went through a major upgrade in the 1980s. Bob had been on the staff of our machine shop for twenty years. During that time many of us came to depend on both the quality of his work and his advice in designing and building some very unique devices. Some pictures of Bob's retirement affair in the Department are available at http://web.phys.ksu.edu/Retirements/ Geering/index.htm. At that site you can see photos of a very rare

event – Bob Geering wearing a coat and tie. Bob and Dea are still in the Manhattan area so we have the pleasure of seeing and talking to them from time to time.

When Dea retired, Treva Singleton, who had been the Main Office receptionist, moved down the hall to become the Administrative Assistant for the Macdonald Lab. She was replaced by Gisselle Wilson-Rivera, who now must help students figure out who their physics instructor is.

This was the year that Pat Richard stepped down as Director of the Macdonald Lab. Pat remains on the faculty and is enjoying research and teaching without a major administrative load. Lew Cocke is now Lab Director. I think that he is still enjoying research and teaching and is providing us and the Department of Energy with a major service by directing the Lab.

Two new faculty joined us this year. In January Igor Litvinyuk became an Assistant Professor with a research specialty in atomic, molecular and optical physics. Prior to coming to KSU Igor was a researcher at the Steacie Institute for Molecular Sciences which is part of the National Research Council of Canada in Ottawa. He received his Ph.D. in 1997 from Florida State. Glenn Horton-Smith came here as an Assistant Professor in August. Glenn joined the High Energy Physics Group and is specializing in neutrino physics. Glenn's Ph.D. is from Cal. Tech. and he completed post-doctoral research work in Japan and at Cal. Tech. Both Glenn and Igor have started well at KSU.

Glenn Horton-Smith Igor Litvinyuk


We also recognized faculty who have been serving well in our Department. Zenghu Chang, Associate Professor, earned tenure while Bharat Ratra was promoted to Professor.

We had a slight decrease in the number of graduates during this past year. Four undergrads received BS degrees while we granted five MS and seven Ph.Ds. Three of the undergrads went on to graduate school – three in physics and one in finance. One MS student is now enrolled in a Ph.D. program where she expects to complete her dissertation with Nobel Laureate Carl Wieman. See "This Year's Graduates" in this newsletter to see who these graduates are and what they are doing now.

Mindy Koehler Matt Berg


The most satisfying events of the year were the state, national and international recognitions which were received by our students and faculty. Most gratifying is that the majority of these awards went to students and young faculty. Mindy Koehler, a junior physics student, received a Claire Booth Luce Scholarship. This program "promotes the advancement of American women through higher education in the sciences, engineering, and mathematics" (http://www.hluce.org/3cblfm.html). Mindy's scholarship provides substantial funds for her last two years as an undergraduate. At the graduate level Matthew Berg received a NASA/Goddard Graduate Student Fellowship. This Fellowship provides one year of funding and access to some research facilities at NASA. Matt is working with Chris Sorensen and Amit Chakrabarti.

Two Assistant Professors received very significant awards this year. Most recently, Eckhard von Toerne was awarded the Sophia Kovalevskaja Prize, which is funded by the Federal Ministry of Education and Research of Germany. "The aim is to give award-winners an opportunity to concentrate on high-level, innovative research work of their own choice…". Eckhard will receive a stipend of 900,000 Euros to be spent over the next four years. Unfortunately (for us) he needs to be in Germany to collect the prize. Eckhard will be taking a leave-of-absence from KSU while he conducts high energy physics research in Bonn. We are already looking forward to his return.

Sanjay Rebello received the Presidential Early Award for Scientists and Engineers. The awardees are nominated by Federal agencies which fund science and engineering. The White House then makes the final selection. This year the awards were presented by John H. Marburger III, Science Advisor to the President at a ceremony in the Eisenhower Executive Office Building.

Kristan Corwin received an EPSCoR First Award. These highly competitive grants are available only to new faculty who are just starting their independent research careers. Kristan is a second-year faculty member and is using this award to establish her research lab in Ultrafast Metrology and Optical Spectroscopy.

Lew Cocke became the third member of our faculty to receive the Olin Petefish Award for research achievement in the basic sciences. This award is part of the Higuchi Awards which are open to all faculty members at Regents' institutions in Kansas. Lew's life-long work in atomic, molecular and optical physics was recognized by this award.

The final award, a National Science Foundation Director's Award for Distinguished Teaching Scholars went to me. This award recognizes … who exemplify the ability to integrate their research and educational activities." It is described in more detail elsewhere in this newsletter.

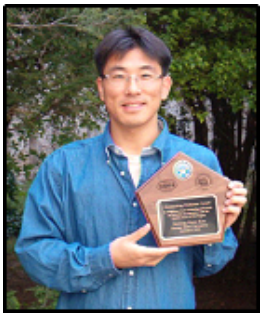
While we old folks always feel good when we are recognized beyond the University, the most gratifying awards are those to the young faculty. When we hire new faculty, we always hope that they will be so good that they make us look bad. It seems like our young faculty are doing that well.

I cannot write one of these messages without discussing funding of the Department. The State's contribution to the KSU budget continues to decline. For the past few years the State appropriation has been essentially constant, not corrected for inflation. Thus, the State's contribution in real dollars continues to decline. In 1988 Kansas provided 42% of KSU's total budget; today it contributes 27%. To make up for this decline in public funding, the University has increased tuition substantially in the past few years and is likely to continue to do so in the near future.

The Department's finances are similar to the University's. We have a total annual budget of over $10 million. Of that amount about $3 million comes from the University sources. Most University money pays the staff and the 9-month salary of the faculty. Essentially all research funding comes from Federal grants. Of course, the dollars available for research outside the fields related to health research are also declining. Our faculty has been competing very well for those dollars and our research funding has continued to increase slowly.

One of the most difficult types of funding to raise is money for undergraduate scholarships. Such funding usually comes from contributions by alumni. We rely on you to help us and in recent years you have been generous. Thanks!!

Physics Students in the Spotlight



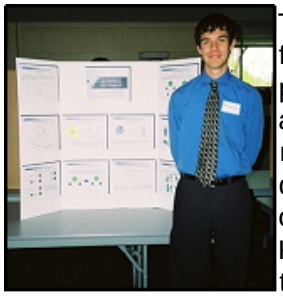
Kyoung Hoon Kim received the "Outstanding Performer Award," from The Department of Defense in recognition of his outstanding performance and dedication as a contractor under the DARPA/MTO SUVOs program. Kyoung is a graduate student with the semiconductor group of Dr. Hongxing Jiang and Dr. Jinyu Lin.

Matt Berg received a fellowship from NASA Graduate Student Research Program (GSRP) for graduate studies leading to a masters or doctoral degree in the fields of science, mathematics and engineering related to NASA research and development. The award was given based on academic transcripts, research proposal, Faculty Research Adviser's recommendation and the proposed utilization of the NASA Center or university research facilities. Matt is a graduate student working with Dr. Chris Sorensen. His proposal was entitled, "Light Scattering by Nonspherical Particles." Matt's was one of six fellowships awarded out of approximately 70 proposals submitted. The fellowship provides Matt with a stipend, tuition and book allowance, and travel funds. Part of the travel includes visiting and working with Dr. Michael Mishchenko at NASA Goddard in New York City. Dr. Mishchenko is an expert in light scattering theory. Contingent upon satisfactory progress, Matt will be eligible for two additional years of support. The fact that Matt was one of the students funded is a truly a mark of distinction. To read more about the NASA GSRP see http://fellowships/hq.nasa.gov/gsrp/program/.

Mindy Koehler, a senior physics major, received the Clare Boothe Luce scholarship. Selection for the scholarship was based on the applicant's grade point average, honors and awards, membership in honor and professional societies, leadership roles, letters of recommendation, two essays and personal interviews. This scholarship encourages women in engineering and sciences. Mindy will receive $18,000 per year for two years.

Undergraduate Student Studies Single and Double Ionization of Water

The Developing Scholars Program is in its fifth year on campus. DSP is an undergraduate research opportunity program targeting underrepresented populations (students of color and first generation college students). DSP matches selected students with faculty research mentors who provide an early introduction to a student's field of study as well as providing academic, social, and financial support. In this way, DSP hopes to open many opportunities for students and help prepare them for graduate work and professional schools. Students can be in the program up to three years during which time they are paid a stipend. Summers are free so they can participate in other programs such as McNair Scholars and Pathways, among others.



The aim of DSP is to foster students' active participation, alongside a faculty mentor, in the discovery and creation of new knowledge at KSU and to increase the pool of bright, well-prepared students from underrepresented backgrounds for graduate studies. **Matt Leonard**, junior in physics and undergraduate assistant of Dr. Itzik Ben-Itzhak, is in his final year of eligibility with the Developing Scholars Program. Matt's work has been on the *Isotopic Dependence of Bond-Rearrangement in Single and Double Ionization of Water.*

The Kansas NSF EPSCoR Summer Research Program coordinates with the McNair Scholars programs in Kansas. Six students from groups underrepresented in the sciences are supported for a summer research internship at K-State, KU, or Wichita State University. Last summer, Matt was one of three EPSCoR undergraduate researchers at K-State. As an EPSCoR participant, Matt also received instruction in preparation for the GRE, wrote a report of his research, conducted under the guidance of Dr. Itzik Ben Itzhak and Dr. Kevin Carnes, and presented that research at the Heartland McNair Research Conference in Kansas City last September.

The McNair Scholars Program at K-State, now in its tenth year, is designed to prepare students for doctoral study. This fall, Matt began participation in the McNair Scholars Program at K-State. Initially, McNair participants attend a Colloquium on Research and Graduate Education. For each subsequent semester of the two-year McNair Scholars Program, participants attend a weekly McNair Seminar class. They also receive support to attend research conferences and to visit graduate programs of interest to them. Participants in the McNair Scholars Program are K-State students either from families with limited incomes and where neither parent has a four-year college degree or are members of groups that are underrepresented in graduate education.

A major component is the McNair Summer Research Internship where participants will conduct research under the guidance of a faculty mentor. Next summer, Matt will again be able to conduct research in Physics and continue extending his knowledge and developing his expertise in the field that he finds fascinating.

This Year's Graduates

Bachelor of Science Degrees

- Scott Allen – National Guard, Pilot
- Trent Coen – Graduate School, KSU
- Jared Suppasansathorn - Employment
- Chris Wyant – MS at KU, Financial Engineering

Masters of Science Degrees

- Corey Gerving – Instructor, West Point
- Kara Gray - Ph.D., Univ. of Colorado-Boulder
- Arifa Habib – returned to Pakistan
- Shama Jabeen - England
- Darryl Ozimek - Physics Instructor, Duquesne University in Pittsburgh, PA

Doctorate Degrees

- Habib Aliabadi - Postdoc, Rice University
- Radu Andrescu - Postdoc, Laboratory of Applied Physics, Virginia
- Gang Chen - Postdoc, University of Hawaii
- Zdeslav Hrepic - Fort Hays State University (tenure-track faculty position)
- KyoungHoon Kim – employed by "Seoul Semiconductor," Seoul, Korea
- Ki-Bum Nam - Postdoc with Dr. Jiang and Dr. Lin, KSU
- Jagat Shakya – Postdoc, Cornell University, Ithaca, NY

John Crawford Presents Nichols Lecture

Dr. John Crawford who received his PhD from K-State presented the Ernest Fox Nichols Lecture near the end of 2003. John's talk, "A Physics Career At Sandia National Laboratories," focused on the variety of different roles a research physicist can have during a long and distinguished career. John's closing thoughts communicate well some of many of our thoughts about the value of an education in physics. He stated:

- A physics education is great preparation for a technical career.
- A PhD opens doors and presents opportunities, it does not guarantee success.
- The greatest impact occurs when technical skills are augmented with communication skills and interpersonal skills.
- There are a lot of smart people out there, great things happen when they work together.

In addition to his MS and PhD in Physicsfrom KSU, Dr. Crawford holds a B.A. in Physics/Math from Phillips University. Dr. Crawford recently retired as Executive Vice President and Deputy Laboratory Director at Sandia National Laboratories where he was responsible for all of Sandia's programs, operations, staff and facilities.

Previously, as Director of Weapon Development, Crawford was responsible for all nuclear weapon system development activities in New Mexico. Crawford joined Sandia in 1962 and conducted research programs in explosively driven high magnetic field generators and intense pulsed plasma experiments. He was responsible for the design, development and production of electrical and shock-activated sources of neutrons. In addition, specialized neutron sources were developed for medical applications, minerals exploration and nuclear materials detection.

John was recently appointed to serve as a member of a Federal Advisory Committee for the End-to-End Review of the U.S. Nuclear Command and Control System. At present he serves on the Strategic Advisory Group for U.S. Strategic Command.

The Ernest Fox Nichols lecture is named for an 1888 KSU graduate who had a distinguished career in physics research and academic administration. He was the sole author on the first paper published in Physical Review and was president of MIT and Dartmouth as well as Director of the GE Research Laboratories.

Bill Porter Presents Spring Commencement Address

William Porter who received an MS from our Department in the 1950s was the Arts & Sciences commencement speaker in May. Bill talked to the Spring College graduates about changes that he has seen during his career much of which has focused on the application of technology and changes that they might expect in the coming years. He and his wife, Joan, also met with our graduating seniors, some of our undergraduates and faculty during their visit to the campus.

Bill graduated from Adams State College in Colorado. He then came to K-State where he earned a master's in physics. He has been the creative genius behind more than 20 products and services, which include many electronic devices and products, and he holds 14 patents. One of his patents is for the first shoulder-mounted backpack broadcast color TV camera; others include the first electronic diesel-electric locomotive checkout system; the first infrared horizon sensor for satellite stabilization and several other breakthroughs that are still used today.

In 1982, he founded an electronic brokerage service for stockbrokers where the world's first online trading took place. Ten years later he realized he could compete with major brokerage houses and launched a subsidiary of Trade Plus now known as E*Trade – the leader in online investing. He most recently launched the International Securities Exchange (ISE) — the United States' first entirely electronic options market.

Jackie Spears: A New Path

Jackie Spears (BS in Physics 1969, MS 1972) leads Faculty Senate through what she feels will be a busy year. Jackie Spears said she took an unusual path to her current position as associate professor of secondary education at K-State, but it's certainly helped her in another position she holds -- president of Faculty Senate.

Spears has seen nearly all sides of the education process through her previous positions -- she's worked as a high school physics teacher, taught physics to education majors, co-authored a physics textbook, worked on a team to develop a telecourse in rural sociology, taught gender courses in the K-State College of Education, directed the K-State women's studies program and served as an institutional planner for a small college in Salina -- Marymount.

"It pays off in Faculty Senate that I've worked all over," Spears said. "My background is different and that's been helpful."

Spears took over in June as president of Faculty Senate. She has been on senate for five years. Spears said she feels, with the model of shared governance the university follows, that everyone has a responsibility to participate at some level.

"My time on Faculty Senate has been enjoyable," she said. That said, Spears knows there are a lot of projects she'd like to take on during her time as president and there are also a lot of challenges that await her.

"Our primary goal continues to be salaries, benefits and tuition waivers for faculty and unclassified staff," she said. Spears said last year Faculty Senate was able to introduce salary enhancements for some faculty members, but that it would still "remain a focus" this year.

"This is critical to enabling us to get good faculty and keep them," she said.

The second issue she plans to focus on is looking at the way teaching is evaluated across campus. Spears said some departments only use student feedback for evaluations. Although Spears said she feels student feedback is important, it is not the only way to indicate performance. She said they will examine the process this year and suggest a more balanced approach.

She said they also hope to streamline some of the processes in Faculty Senate to make the most of the senators' time, and she is in talks with the president of Student Senate now to tackle the issue of plagiarism on campus. In addition, Spears plans to have the academic affairs

committee look at the issue of the general education program, which she says is currently too bureaucratic. These are only some of the challenges she sees on the horizon. But she also knows she will enjoy this year.

"My colleagues in Faculty Senate are great to work with, as is the central administration," Spears said.

Bill Spencer Recognized by IEEE

William Spencer who received a Ph.D. form our Department in the 1960s has been Recognized by the IEEE for exceptional achievements. Bill is the recipient of the 2003 IEEE Ernst Weber Engineering Leadership Recognition Award with the following citation:

"For engineering leadership in raising performance in semiconductor manufacturing and fostering cooperative work towards international standards."

The IEEE Web site states, "[The] Ernst Weber Engineering Leadership Recognition was established in1985. It is presented for exceptional managerial leadership in the fields of interest to the IEEE.

The leadership may be reflected in an executive role by attaining preeminent stature in the eyes of the engineering community as an individual whose inspirational, creative, and professional contributions have been extraordinarily successful, exemplary, and persuasive in pursuing the theory, planning implementation, and direction of outstanding achievements, contributions, or service in the field of electrotechnology."

Bill Spencer was named Chairman Emeritus of the International SEMATECH Board in November 2000 after serving as Chairman of SEMATECH and International SEMATECH Boards since July 1996. He came to SEMATECH in October 1990 as President and Chief Executive Officer. He continued to serve as President until January 1997 and CEO until November 1997. During this time, SEMATECH became totally privately funded and expanded to include non-US members. Many gave SEMATECH part of the credit for the US semiconductor turnaround in the 90's.

Bill has held key research positions at Xerox Corporation, Bell Laboratories and Sandia National Laboratories. Before joining SEMATECH in October 1990, he was Group Vice President and Senior Technical Officer at Xerox Corporation in Stamford, Connecticut from 1986 to 1990.

Other awards include the Regents Meritorious Service Medal from the University of New Mexico in 1981; the C. B. Sawyer Award for contribution to "The Theory and Development of Piezoelectric Devices" in 1972; and a Citation for Achievement from William Jewell College in 1969, where he also received an Doctor of Science degree in 1990.

Cocke Recognized with Research Award from KU

C. Lewis Cocke, a K-State distinguished professor of physics, was honored with the Olin Petefish Award in basic sciences from the University of Kansas for his internationally recognized work in ion-atom collisions and intense short laser pulses. Cocke received the honor in October at a reception at KU.

The Olin Petefish Research Award is given in recognition of research achievement in the basic sciences that has had substantial impact and national and/or international interest. The Petefish award is one of four Higuchi/Endowment Research Achievement Awards established in 1981

by the late Takeru Higuchi, KU distinguished professor of chemistry, along with his wife, Aya. They stipulated that faculty members at all Kansas regents institutions be eligible.

von Toerne Receives Sofja Kovaleskaja Prize

Eckhard von Toerne, an assistant professor of physics at Kansas State University, has been recognized as one of the top young scientists in the world with the Sofja Kovalevskaja Prize from Germany's Alexander von Humboldt Foundation.

Von Toerne accepted the honor in Berlin, Germany, on Thanksgiving Day.

The prize, which includes a stipend of 900,000 euros or $1.2 million, will allow von Toerne to travel to Germany to concentrate mainly on his research for the next two to four years.

Funded by Germany's Federal Ministry of Education and Research, the award brings top young researchers in various disciplines across the world to Germany to carry out their research at German institutions and helps them build up their own groups of early-stage researchers.

von Toerne is part of K-State's high energy physics group and studies heavy quarks. His research is based on experiments in particle accelerators in which the fundamental structure of matter is decoded.

He participates in accelerator experiments at the Fermi National Accelerator Laboratory near Chicago, IL, and at CERN, the European Organization for Nuclear Research, in Geneva, Switzerland.

"The Sofja Kovalevskaja Prize is one of the largest-endowed science prizes in Germany and has only been awarded once before: at its inception in 2002," said Jon Wefald, K-State president. "Professor von Toerne's selection not only speaks highly of his work but also indicates the world-class level of research being conducted by K-State's high energy physics group."

von Toerne joined K-State in 2002 and teaches mid- to upper-level courses in physics. He has published many articles and has made several presentations about his work in the United States and internationally.

His research specializes in the study of the heaviest quarks, which make up protons and neutrons in the atomic nuclei. Heavy quarks disintegrate immediately after their production, flying fractions of millimeters at almost the speed of light. To reconstruct the quarks, von Toerne must use special particle detectors to find quark production and to study their characteristics.

"Heavy quarks are one of the final products of the mysterious Higgs particle, which is supposed to be responsible for the generation of masses of all elementary particles," von Toerne said.

Scientists hope to discover the Higgs particle with the use of the LHC collider in Switzerland and the use of the special particle detectors.

von Toerne plans to take leave from K-State at the end of the spring 2005 semester to set up his laboratory at Germany's Bonn University, where he received his master's and doctoral degrees. He also will collaborate with Norbert Wermes, a professor at the Institute of Physics in Bonn.

He said he was looking forward to being closer to the Switzerland collider for his work but that he would miss K-State.

"This award will allow me to double my research efficiency, but I will look forward

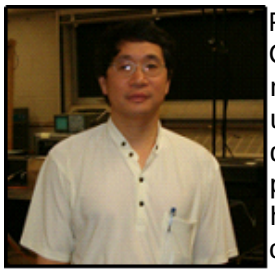
to returning to K-State to continue my teaching," von Toerne said. "K-State physics students are very good."

"While we will miss having Dr. von Toerne on campus full time over the next few years, we realize that the research opportunity will enable him to enhance his stature as an international leader in high energy physics," said Dean Zollman, university distinguished professor of physics and head of the K-State department of physics. "When he returns to K-State, he will be able to bring these experiences to both his research and to his teaching."

von Toerne is among the 11 recipients of the 2004 Sofja Kovalevskaja Prize.

Jiang Recognized as University Distinguished Professor

Six top faculty members have been selected as university distinguished professors in recognition of their outstanding contributions to teaching, research and service in science and the humanities. They also have made major contributions to their professions and communities. Each recipient will receive a $10,000 salary supplement.



Provost James R. Coffman said the newly named university distinguished professors were honored at fall 2004 commencement ceremonies in December. Among the recipients was Honxging Jiang. Jiang leads the K-State Semiconductor Research Group in the department of physics. His laboratory is regarded as one of the best for wide bandgap semiconductor material epitaxial growth and micro- and nano-fabrication of photonic and electronic devices. His group has pioneered the fabrication of micro- and nano-photonic structures and devices based on III-nitride wide bandgap semiconductors, which emit ultraviolet, blue and green light.

Jiang's research group at K-State has long been a leader in basic research on wide bandgap semiconductors and the application of this research to the development of light emitting and other electronic devices. In the past few years the group's efforts have continued to receive international acclaim. At present, the group can create materials that provide light emitting sources well into the ultraviolet region. These materials are likely to become parts of solutions of a wide variety of problems ranging from improved efficient lighting for energy savings, detection of biological agents, to optical communications. Jiang has brought more than $12 million in grant funds to K-State. He holds several patents, with others pending, and is the author of books, book chapters, and more than 200 articles in professional journals.

A K-State faculty member since 1988, he was a visiting scientist at Sandia National Lab in 1999. He earned his bachelor's degree at Fudan University in China, his master's and his doctorate at Syracuse (N.Y.) University.

Rebello Receives Presidential Award

Soon the nation will find out about Sanjay Rebello what K-State already knows: Rebello is a shining example to future generations of researchers. Rebello, an assistant professor of physics, was

presented with the Presidential Early Career Award for Scientists and Engineers at a White House ceremony May 4,2004. President Bush named and honored 57 of the nation's most promising young scientists and engineers with the awards. The award honors and supports the extraordinary achievements of young professionals at the outset of their independent research careers in the fields of science and technology.

“This award is given to very few young scientists and engineers,” said Dean Zollman, head of the K-State physics department. “To have a member of our faculty invited to the White House to be honored in this way is a very strong indicator of the strength of his research. Our department has known for some time that Sanjay is an outstanding young scientist. This award shows that this opinion is also held by very high-level officials in the United States government.”

"Sanjay is also an outstanding teacher. He is truly a valuable asset to K-State." Rebello was previously awarded a $436,000 CAREER award in 2002 from the National Science Foundation for research that focuses on learning by college students and involves developing physics curricula for future elementary teachers. CAREER awards were presented to about 300 researchers. Of the 2,900 CAREER awards made since the program began in 1996, only 140 have received presidential recognition.

Presidential Early Career Awards for Scientists and Engineers nominees are annually selected from among the most meritorious new CAREER awardees that show exceptional potential for leadership. This Presidential Award is the highest honor bestowed by the United States government on scientists and engineers beginning their independent careers. Twenty CAREER awardees -- slightly more than 5 percent of all CAREER awards made in 2002 -- are selected to receive the prestigious presidential award. Each was honored at a White House ceremony in the Eisenhower Executive Office Building.

Rebello's research essentially involves discovering how students construct their own understanding about everyday objects, as well as what kind of mental resources and cognitive processes they use to construct this understanding. "We are trying to gain some insights into how students think and how they learn," Rebello said. "The contexts that we are looking at include everyday objects."

Rebello and co-workers in the K-State Physics Education Group conduct interviews, teaching experiments and surveys to collect data on how students reason through problems and their explanations or "mental models" of how objects work. "We investigate students' ideas and how they change as students go through the introductory physics course," he said. "We find that students may not discard these mental models, but incorporate them with the concepts they learn in class."

Zollman Receives NSF Distinguished Scholars Award

Dean Zollman, a Kansas State University distinguished professor of physics, is one of eight scientists who received the National Science Foundation Director's Award for Distinguished Teaching Scholars. Zollman was honored along with the other recipients at a ceremony June 2, 2004, at the National Academy of Sciences in Washington, D.C.

The National Science Foundation Director's Award for Distinguished Teaching Scholars recognizes and rewards individuals who have contributed significantly to the scholarship of their discipline and to the education of students in science, technology, engineering, or mathematics, as well as those who exemplify the ability

to engage productively in both research and education. This award is part of the National Science Foundation's efforts to promote an academic culture that values a scholarly approach to both research and education.

"Dean Zollman is the ultimate teaching scholar," said K-State provost James Coffman. "He has taken this area of work to new levels and K-State is right there with him."

Zollman has spent his career searching for new and exciting ways to teach physics in the classroom. He is being recognized for his integrating teaching and research. In addition he received a $300,000 grant to do more teaching-related activities.

Zollman aims to conduct research on the reasoning and models that student's use as they transfer basic physics knowledge to the application of physics in contemporary medicine. He plans to use the results of this research to develop active engagement teaching-learning materials to help students learn about the applications of 20th and 21st Century physics to contemporary medical diagnosis procedures.

While Zollman has taught a full range of courses from graduate-level quantum field theory to conceptual physics for non-science students, his primary focus is on non-physics majors and future teachers. He was director of the Visual Quantum Mechanics project aimed at creating instructional materials for high school students, non-science college students, biology majors and physics majors.

Zollman has used a variety of methods and practical applications to interest students, including using videos and CD-ROMs, as well as applying physics to situations students understand. He also has concentrated on providing materials to physics teachers, particularly those teachers whose background does not include a significant amount of physics.

In addition, Zollman implemented a teaching assistant orientation program providing new teaching assistants with information about contemporary research on the teaching and learning of physics. He was also an instructor in the early stages of the Developing Scholars Program, which attempts to retain students from underrepresented groups by involving them in scholarly activities early in their academic careers.

The Director's Award is the highest honor bestowed by the foundation for excellence in both teaching and research. Past winners of the award include a Nobel Laureate. Recipients of this award were selected in a national competition based on their outstanding accomplishments as scientists and engineers and as educators. In addition, each awardee submitted a proposal focusing on efforts to improve undergraduate education and/or the education of K-12 teachers and students that shows promise of impact beyond the awardee's institution.

Zollman has been recognized with many awards. In 1995, Zollman received the Robert A. Millikan medal from the American Association of Physics Teachers for his notable and creative contributions to teaching physics. In 1996, he was recognized by the Carnegie Foundation for the Advancement of Teaching, as the Professor of the Year - Research and Doctoral Universities - from the Council for Advancement and Support of Education. He was named K-State's 1996 Coffman University Distinguished Teaching Scholar Chair for his innovation and excellence in undergraduate teaching. In 1998, he was a Fulbright Fellow at the Institute for Science Education at the University in Kiel, Germany, where he investigated student understanding of quantum physics.

Zollman received his bachelor's degree in 1964 and master's degree in 1965, both in physics from Indiana University, and his doctorate in 1970 from the University of

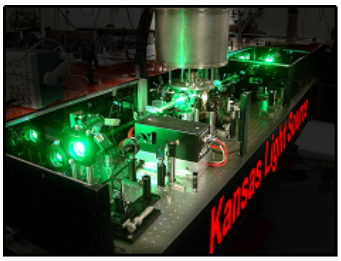
Maryland in theoretical nuclear physics. He has been at K-State since 1970. He was named a University Distinguished Professor in 2001.

James R. Macdonald Laboratory (JRML) Lew Cocke

February 13, 2004 - Retirement reception for Dr. Richard. (Patrick Richard (left) and President Jon Wefeld (right). See more pictures here.

This has been a year of major transitions and events. After leading the James R. Macdonald laboratory as Principal Investigator and/or director for nearly three decades and guiding it through a major upgrade in the late eighties and early nineties, Pat Richard stepped down as director in February. Do not think of this as a "retirement" however. Pat remains a very active member of the James R. Macdonald group, doing research on nanotubes using the new Kansas Light Source in the James R. Macdonald Laboratory. The directorship and PI duties have fallen to yours truly, who has a very hard act to follow. The Department of Energy three year grant' "Structure and Dynamics of Atoms, Molecules and Surfaces", was renewed at $2.5M per year in February of 2004, through February of 2007.

The evolution of the laboratory from pure accelerator-based dynamics to laser-based work continues. The target rooms which were served by the Tandem Van de Graaff accelerator have now been entirely converted for laser-related work. The old "long room" houses the Kansas Light Source (KLS) which is the central Ti:Sapphire laser system of the laboratory. This facility, built and operated by Zenghu Chang and Bing Shan, delivers up to 4 mJ / 35 fs pulses of 800 nm radiation at 1 to 2 kHz, and feeds five experimental areas outside the KLS as well as numerous experiments inside. It runs nearly 24 hours a day and often seven days a week, serving typically two to three users in parallel. With the recent addition of two fiber installations, it can deliver pulse lengths as short as 8 fs.



Also in the "long room" area is the MOTRIMS (Magneto Optical Trap Recoil Ion Momentum Spectroscopy) setup of Brett DePaola. Brett is using a MOT (Magneto Optical Trap) as a very cold target for studying both collisions and for using the collisions to follow the time evolution of the MOT. The old "square room" now houses a COLTRIMS (Cold Target Recoil Ion Momentum Spectroscopy) chamber with which Igor Litvinyuk and I are studying the dynamics of small molecules exposed to intense laser pulses from the KLS. It also houses the new LUMOS (Lasers for Ultrafast Metrology and Optical Spectroscopy) laboratory of Kristan Corwin. Kristan is doing laser-metrology, using a laser "clock" to determine frequency references which are of use to, for example, the communications industry. This effort will be strengthened by the addition in the fall of 2005 of a new faculty member in this area, Brian Washburn. Brian received his Ph.D. degree from Georgia Tech and has been working as a post doc on fiber lasers at NIST in Boulder, Colorado.

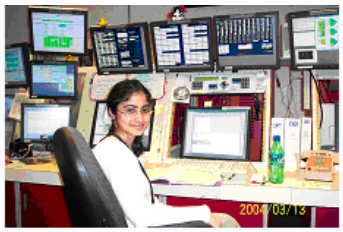
Stand-alone operation of the accelerators continues in the LINAC and EBIS areas. Steve Lundeen (Colorado State University) continues to use the EBIS regularly, and Theo Zouros (University of Crete) returns often to use the fast ion beams. The ECR ion source is being used by Itzik Ben-

Itzhak to study the ionization of small molecular ions by interaction with the intense laser pulses from the KLS, while Charles Fehrenbach is constructing a MOTRIMS setup on the EBIS whenever he is not taking care of the EBIS and the ECR. A new project, directed by Kevin Carnes, has just been initiated on the Tandem to use the KLS beams to generate picosecond pulses of energetic ion beams. This will serve as yet another tool with which to probe the real-time evolution of matter on a picosecond time scale.

The theoretical program has also continued to evolve over the past year, supporting and to a considerable extent driving the changes in the experimental program. Chii Dong Lin, Uwe Thumm, Brett Esry and Xiao-Min Tong are all working in various areas of intense laser work, often in close collaboration with the experimental programs. The productivity of the laboratory remains very high. During the past calendar year we have published about fifty articles in refereed journals, of which eleven were in Physical Review Letters. Some of these have been selected for special citing in Physics Today (Search and Discovery, September 2003), Physics Focus (http://focus.aps.org/story/v14/st12) the Advanced Light Source Newsletter (http://www.lbl.gov/Science-Articles/Archive/CSD-molecular-movement.html, http://www-als.lbl.gov/als/science/sci_archive/90electron_emission.html). The study of the dynamics of ions, atoms, molecules and clusters fills the air with both lasers and accelerators humming. It is an exciting time in the JRM laboratory.

High Energy Physics
Tim Bolton

K-State's HEP group has been as busy as ever over the last twelve months.



Grad student Mahsana Ahsan running the show as a D-Zero DAQ-shifter.

Graduate student Mansoora Shamim running checks on the D-Zero detector at Fermilab.

On the research front, our D-Zero experiment at Fermilab has now collected half an inverse femtobarn of proton-antiproton collision data at Fermilab's Tevatron accelerator, meaning that we could now in principle observe processes with cross sections as small as 10^{-39} cm^2! Impressive new measurements of the properties of top quarks, W and Z weak vector bosons, and searches for hints of undiscovered new physics such as supersymmetry are pouring out of the experiment. K-Staters form a big part of the large international team running the experiment. Post-doc Flera Rizatdinova leads a group measuring the top quark production cross section. Post-doc Kristian Harder is in charge of running the silicon microstrip tracker (SMT), a precision charged particle detector for which K-State, led by Ron Sidwell, Noel Stanton, and KSU Electronics Design Laboratory (EDL) engineer Russel Taylor designed and built several key components. Graduate students Mahsana Ahsan and Mansoora Shamim (working with Tim Bolton), and Mark Smith (working with Eckhard von Toerne) have found time to begin the analyses needed for their PhD theses. The students also spend three week periods as "DAQ shifters", wherein they directly operate and control the very complex and very

expensive D-Zero detector and boss around professors from all over the world. Mahsana and Mansoora have led teams responsible for three of the top ten data taking days on the experiment; and Mark will take his turn in a few months. An important new upgrade to the SMT called "Layer 0" will be installed in the experiment in fall, 2005. Ron and Russel produced major portions of the electronics for this device. Tim and technician Robin Sidwell ran an important series of tests of the radiation hardness of Layer 0 components. These tests were conducted using 10-14 MeV proton beams at the KSU J.R. Macdonald Lab with the expert assistance of Tom Gray, Kevin Carnes, and Al Rankin, and with the much appreciated support from Pat Richard and Lew Cocke. And finally, Eckhard is part of the team tackling the tough job of how to integrate this device into the experiment and get it working as smoothly as possible.

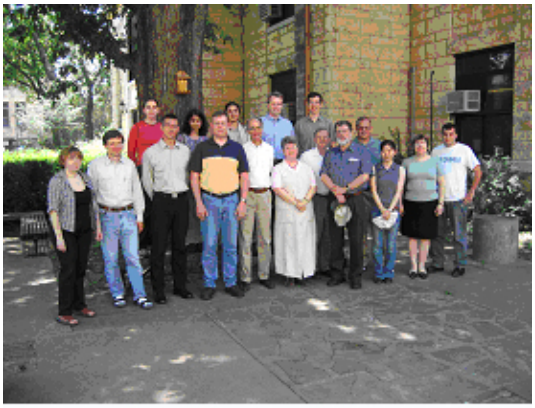
D-Zero is not the only story at K-State. New assistant professor Glenn Horton-Smith leads an initiative to fully characterize properties of the now well-established phenomenon of neutrino oscillation. Glenn brings to us from CalTech and Japan world-class expertise in using the antineutrinos produced copiously at nuclear reactors to perform these measurements using multi-ton liquid scintillator detectors placed in underground mineshafts. He continues work on the seminal KAMLAND experiment in Japan, and with Noel and Tim, is developing proposals for new experiments in France and the US. The new America-based experiment will be located in Braidwood, Illinois, but there was considerable early interest in using Kansas's Wolf Creek reactor in Burlington. Tim, Noel, and Dean Zollman held some interesting talks with the Wolf Creek management. Graduate student Jasmine Foster and undergraduate David Thompson are working with Tim on simulation studies of the Braidwood experiment. Undergraduates Jon Kaladimos and Chris Borjas work with Noel on measurements of properties of liquid scintillator in the High Bay.

Eckhard von Toerne and post-doc Dima Onoprienko performed a series of studies of charged particle tracking at a future electron-positron linear collider that have won KSU widespread admiration in this physics community. Eckhard has also led, with post-doc Bill Kahl, Kansas State's contributions to the future CMS experiment that will operate at the new 14 TeV proton-proton collider called the LHC, now under construction at CERN in Geneva Switzerland. As usual, K-State specializes in precision tracking with silicon trackers, in this case, the forward pixel detector system (FPIX). HEP and EDL personnel will test important components of the FPIX in our high bay clean room facility.

The KSU QuarkNet group in front of the D-Zero detector building at Fermilab.

The High Energy Physics group has responded to calls from national science leaders to engage more of the public in our research with two major projects. Our QuarkNet center brought 22 high school teachers from throughout the state to a three-week workshop in Manhattan over the summer on topics in high energy physics and education. The workshop also included strong contributions from Sanjay Rebello and the KSU Physics Education Research Group. It ended with a three-day "road trip" to Fermilab. Another High Energy Physics-led activity is the Kansas State University Targeted Excellence project called the Center for Understanding of Origins, which seeks to

improve scholarship, education, and outreach on topics like physical cosmology and biological evolution with an interdisciplinary group from seven science and humanities departments at Kansas State. "Origins" projects include a new undergraduate education course, "Origins: Humanity, Life, and the Universe", to be taught in fall, 2005; recruitment of new faculty members; and a series of prominent outside speakers. Program assistant Nidhi Mungali works on origins-related issues from her home-base in the HEP group.



The Kansas State High Energy Physics group, summer 2004.

To close with some people news: Graduate student Diptansu Das completed his MS degree with Ron Sidwell. Undergraduate researcher David Thompson has been nominated as a Goldwater Scholar. Former post-doc Todd Adams, now a faculty member at Florida State, will marry in March. New undergraduate assistant Aubrie Koester recently joined us to help our outstanding administrator Pamela Schremmer; Aubrie replaces Matt Brungardt, who graduated after ably assisting Pam for the past two years. Bill Reay continues to be active in physics education research and teaching during his "retirement" at Ohio State. Noel Stanton will begin a phased retirement, starting in fall, 2005; we'll see how much he slows down! Finally, the big announcement from our group is Eckhard receiving a 2004 Sofja Kovaleskaja prize, described elsewhere in this newsletter. Eckhard will begin a two-year leave of absence from us starting in fall, 2005. The university and department are helping us fill this hole by pushing up the faculty search to replace Noel to this spring.

Computational Nanoscience Group

The past two years have seen Rahman and co-workers engage in several new and interdisciplinary research projects. An exploratory grant from NSF (NER) in understanding novel properties of single molecule magnets has launched Marisol Alcantara-Ortigoza well into her PhD research in this timely system. Collaboration with visiting Professor R. Klemm has been a big help in this project. The award of a recent ITR grant to Rahman with Professors Wallentine and Hsu from Computer Science Department, and Professor Amar from Toledo as Co-PI's has provided avenues for integrating advances in information technology to ongoing research in the modeling of thin film growth on substrates, started four years back through a collaborative grant in Nanoscale Modeling from NSF with Co-PI's Einstein from Maryland, Evans from Iowa State, and Fichthorn from Penn. State. Rahman's group is also benefiting from ongoing collaborations in developing a framework for the design of nano-scale catalysts with experimentalists Professor Bartels at UC Riverside and Professors Heinz and O'Brien at Columbia University, through funding from a DOE initiative in the area. The bread-and-butter grants from NSF and DOE, have of course served as the catalysts for the ones through the new initiatives, for which we are grateful. We are also grateful to Kansas State University for an internal grant (Biomaterials by Design) in which we are part of a group of researchers from three Colleges.

International collaborations have facilitated the travel of graduate students Altaf Karim to the Fritz Haber Institute, Berlin, (Professor Ertl's laboratory) and

Faisal Mehmood and Sampyo Hong to Forschungszentrum Karlsruhe (Dr. Bohnen's group). Research Professor Kara has spent the past two summers in collaborative work with colleagues at the University of Zurich (Professor Osterwalder's laboratory) and CRMCN, Marseille (Dr. Henry's laboratory), and Rahman has spent summer months at institutes in Berlin, Helsinki, Leiden, and Marseille. We are also excited about our collaborative research with Dr. Trushin's group in Yaroslavl in multiscale modeling of surface phenomena, which has been greatly facilitated by the award of a CRDF grant. Dr. Trushin and graduate student Petr Vikulov have spent time with us at Kansas State and Dr. Kara spent a month working in Yaroslavl. Collaboration with Professor Durukanoglu at Istanbul Technical University on the dynamics and thermodynamics of nanostructured surfaces has proceeded through the fruitful visit of graduate student Handan Yildrim to Manhattan. Our contacts with scientists in Pakistan continue through the organization of workshops (Rahman was a co-organizer for one on Nanotechnology and Semiconductor Physics in April, 2004, in Islamabad) and the International Nathiagali Summer College which continues to be a highlight of Rahman's summer activities. Postdoctoral associate Dr. Al Rawi is also doing a great job in outreach activities by involving high school students in some aspects of our research projects. Of course, the group benefits greatly from the work and wisdom of Drs. Stolbov and Spangler. Rahman continues to be a member of the Executive Committee of the Division of Materials Physics of the American Physical Society. She has also been selected as a distinguished lecturer for the Sigma Xi society and enjoys traveling to places to give public lectures on some of her pet themes. Both she and Dr. Kara have helped organize several national and international meetings in the past two years.

Physics Education Research Group

We have had an exciting year during 2004 with our faculty members receiving well-deserved national recognition.

Dr. Sanjay Rebello received the Presidential Early Career Award for Scientists and Engineers at a White House Ceremony in May of this past year. President Bush named and honored 57 of the nation's most promising young scientists and engineers with the Early Career Awards in 2004. The award honors and supports the extraordinary achievements of young professionals at the outset of their independent research careers in the fields of science and technology.

Professor Zollman received the National Science Foundation Director's Award for Distinguished Teaching Scholars during a ceremony at the National Academy of Sciences in June of 2004. As part of this prestigious award, Dr. Zollman received a $300,000 grant for which he will complete a two stage effort involving both research on student learning and development of educational materials. During the first stage we will conduct research on the reasoning and models that students use as they transfer basic physics knowledge to the application of physics in contemporary medicine. The results of this research will then be used to develop active engagement teaching-learning materials to help students learn about the applications of 20th and 21st Century physics to contemporary medical diagnosis and procedures.

In the summer 2004 Hewlett Packard awarded Dr. Rebello a Technology for Teaching Grant. The grant provided K-State with 40 HP IPAQ Pocket PCs along with other computer software and hardware to be used in the classroom. Using a web-based interface the instructor poses questions to students who think,

discuss, utilize web-based resources to answer the question, and receive feedback based on their answer. The system is currently being used in a large enrollment lecture class with over 60 students. Initial feedback from students indicates that the students like the benefits afforded by the system toward their learning process.

In regard to group members, we have had quite a few changes. Paula Vetter Engelhardt left KSU for a tenure-track assistant professor position at Tennessee Technological University in Cookville, TN, after a two-year stint as Dr. Rebello's postdoctoral research associate. In August, Peter Fletcher joined the group as Dr. Rebello's new postdoctoral research associate. Peter received his Ph.D. in Physics from the University of Sydney. He had been teaching high school physics in Australia prior to his appointment at KSU.

Peter has spent his first semester here settling in. He has begun working with graduate and undergraduate students on their research. He has also assisted in refurbishing the research facility of the group, which now has a new area for conducting clinical and teaching interviews with students. Peter has helped in the acquisition of new video taping equipment for the research project. He has also been providing useful input to Sanjay and Dean toward developing the research methodology and theoretical framework for the project. He will soon embark upon a focused research agenda this coming year under the auspices of the CAREER project with Sanjay, which investigates students' mental models of real-world devices, transfer of learning and curriculum development.

Kara Gray received her M.S. in Physics under the direction of Dr. Rebello. She has since gone on to the University of Colorado at Boulder to work on her Ph.D. in physics education under the guidance of Dr. Carl Wieman, Nobel laureate. The Graduate School has selected Kara Gray's MS Thesis to represent KSU for the 2005 Distinguished Thesis Award sponsored by the Midwestern Council of Graduate Schools.

Darryl Ozimek received his M.S. in Physics under the direction of Dr. Rebello. He is now teaching physics at Duquesne University.

Zdeslav Hrepic received his Ph.D. in Science Education under the guidance of Dr. Zollman. He accepted a tenure-track assistant professor position at Fort Hays State University.

We welcome the following new students to the PER group: Bijaya Aryal, Ma Aileen Corpuz, Spartak Kalita and Mojgan Matloob. In addition, Carina Poltera, an undergraduate student has been conducting research under the guidance of Dr. Sanjay Rebello. Bijaya received his BS in Physics (1992) from Trichandra College and his MS in Physics (1994) from Tribhuvan University. Aileen received her BS in Physics for Teachers (1991) from Philippine Normal University and her MS in Teaching Physics (1998) at De La Salle University. Spartak has a MS in Physics from Moscow University (1994). Mojgan received her B.S. in Physics (1990) from Shahid Beheshti University and her MSc. in Physics Education (2003) from the University of Glasgow.

Additional information about the group is available at http://web.phys.ksu.edu/.

Timothy Robert Donoghue

Timothy Robert Donoghue, 68, of Dublin, OH, died on September 26, 2004, after a long bout with leukemia. He was born in Milton (MA) to Timothy and Mary Lauretta (Laura) Donoghue, and is survived by Nancy, his precious wife of 40 years; daughter, Maura Kathleen of Seattle and son, Timothy (Kathryn) of Columbus; and granddaughter, Isabella Ona. He is also survived by four siblings, Mary Manley (William) Chatham, MA, Barbara MacKinnon, Westwood, MA, Marguerite

Gilfoil (George), S. Portland, ME and Laurence Donoghue (Karen), San Antonio, TX.

He graduated from Boston Latin School, Boston College (BS 1957) and the University of Notre Dame (Ph.D Physics 1963). In 1963, he joined the Physics Faculty at The Ohio State University, and served as both Professor of Physics and co-Director of the Van de Graaff Accelerator Laboratory until his retirement in 1988.

Professor Donoghue was an internationally recognized researcher in nuclear physics and nuclear astrophysics investigating fundamental nuclear interactions. One principal focus of his 32 year career in research was investigating esoteric nuclear phenomena especially sensitive to the complex orientation of the spinning protons and neutrons inside the nucleus, work for which he achieved international recognition. In nuclear astrophysics, his research focused on investigating stellar production rates for the nucleosynthesis of elements in reactions of vital importance in powering our sun and the stars.

His research involved extensive research collaborations with many distinguished scientists throughout the world, and he held a number of visiting faculty and senior scientist appointments at such leading institutions as the California Institute of Technology, Universitat Muenster (Germany), and Los Alamos Scientific Laboratory. In his career, he advised 24 doctoral and post-doctoral students, a role he treasured among his most significant professional accomplishments.

Professor Donoghue also served as the Associate Dean for Research in the Graduate School at Ohio State for a three year period, where he initiated the development of major new interdisciplinary research programs and core research instrumentation facilities that significantly enhanced the research capabilities across the university.

After his retirement from OSU, he was appointed the first Vice Provost for Research and Dean of the Graduate School at Kansas State University, a position he held until his retirement in 1998. He was highly recognized for his dynamic leadership in creating numerous interdisciplinary research initiatives campus-wide. Professor Donoghue was elected to membership in numerous national and international organizations in physics and science, and further recognized for excellence by induction into the Academies of Science in Ohio, New York and Kansas.

After his retirement, he returned to Ohio where he enjoyed traveling with his wife and spending time with friends, family and his beloved granddaughter Bella.
Memorial contributions may be made to: The Leukemia & Lymphoma Society, 2225 City Gate Drive, E, Columbus, OH 43219 or The James Cancer Hospital, 300 West Tenth Avenue, Suite 519, Columbus, OH 43210.

F. Dudley Williams

Dudley Williams, Regents' Professor of Physics from 1964 until 1982, died December 2 in Las Cruces, N.M.

At K-State Dr. Williams conducted research on infrared spectroscopy and was internationally known for this work. He also was the primary lecturer in Engineering Physics for most of his career here. His interest in teaching led him to write two textbooks for calculus-based physics. The co-author on the first book *Elements of Physics* was George Shortley. This book was published by Prentice-Hall and had three successful editions. Later Dudley teamed with KSU

Professor John Spangler to write *Physics for Science and Engineering*, which was published by Van Nostrand in 1981.

Prof. Williams came to KSU following a lengthy career that was highlighted by his participation on the team led by Robert Oppenheimer that developed the first atomic bomb.

He was part of the on-site team for the first test of the weapon at Los Alamos, N.M.; his responsibilities involved measuring thermal radiation during the July 1945 test. As such, he witnessed the first test of the bomb.

''I went outside in time to see the awesome but strangely beautiful cloud column rising above Ground Zero,'' he recalled years later of his experience at what became known as the Trinity test site.

''The surface around the hole was actually covered by a green glossy material formed when the original surface of the desert ground had been melted. The 90-foot steel tower on which the gadget (the bomb) had been mounted had been completely vaporized.''

Following completion of his work in what was known at the time as the ''Manhattan Project,'' Mr. Williams joined the faculty at Ohio State University. He worked for one year at North Carolina State before accepting an offer to become the Regents Professor of Physics at Kansas State.

He served a term as president of the Optical Society of America.

Known for his wit and insight as well as his scholarly knowledge, Mr. Williams lived in Manhattan from his 1982 retirement until a few years ago. A native of Oxford, Ga., he was a graduate of Emory University in Atlanta, which in 2000 awarded him its Alumni Medal for distinguished achievement.

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