

Pursuit of attosecond dynamics captures lasting results



For more than 40 years, C. Lewis "Lew" Cocke has been blowing apart atoms at Kansas State University.

Cocke, who added the word emeritus to the title of university distinguished professor in spring 2011, researched destruction on a molecular level in an effort to better understand matter. He spearheaded new directions for physicists around the world, ushering in research on ion-atom collisions, heavy charged ions

and attosecond physics.

Seen by his colleagues as a leader in the field of atomic, molecular and optical (AMO) physics, Cocke helped propel the K-State AMO program and James R. Macdonald Laboratory to an internationally recognized level, and one that is ranked 13th in the nation by U.S. News and World Report.

In April colleagues organized the symposium "Chasing Attosecond Dynamics of Atoms and Molecules with Electrons, Ions and Lasers — the Last Forty Years," which celebrated Cocke's prolific research and included physicists from around the world.

"It's hard to think about my work outside of the context that it was just the science that I thought was interesting and that hadn't been done yet," Cocke said. "I made many friends and worked with many great colleagues."

Though retired, Cocke continues his attosecond research.

New faculty members join physics department



Ellie Sayre

When Ellie Sayre was an undergraduate student, she couldn't decide on her major: theater or physics.

"I reasoned that it was easier to do theater as a physics major than it was to do physics as a theater major," she said. "In grad school, I discovered that I love figuring out how minds work, so I started doing research in physics learning."

Sayre is a new assistant professor of physics at Kansas State University. She earned her bachelor's degree in physics from Grinnell College, and she received her master's of science teaching and doctorate in physics from the University of Maine. Before coming to K-State, Sayre was a visiting assistant professor at Wabash College in Crawfordsville, Ind.

Her research interests include how undergraduates learn physics and how physics students become physicists. Sayre collects data from thousands of introductory students every year to study when and if they learn physics and how quickly they forget what they've learned.

"I'm really curious about how physics students grow to join the professional community of physicists," she said.

View video profiles of our new faculty at www.phys.k-state.edu/



Jeremy Schmit

Jeremy Schmit's research is laying the foundation to learn more about diseases like Alzheimer's.

He is a new assistant professor of physics at Kansas State University. Schmit worked in the pharmaceutical chemistry department at the University of California, San Francisco, where he started researching protein aggregation, which

might be responsible for some degenerative diseases.

"I am trying to figure out how and why the molecules aggregate: What are the forces that cause them to attract, and how do the aggregates change with time?" he said. "It is up to the biologists to determine how these aggregates result in diseases."

Proteins aggregate in many ways, and Schmit analyzes three types of aggregation; amyloid fibrils, crystals, and amorphous aggregates, all of which have different applications in medicine.

Schmit's research could help in the design of nanoscale devices.

"Nobody really knows what these will be used for, but miniaturization always opens doors and some of the potential applications are straight out of science fiction," he said.

Schmit earned his bachelor's degree from Northwestern University and received his doctorate from the University of California, Santa Barbara.

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Briefs

by Jennifer Tidball



Bethany Jochim, doctoral student in physics from Pierre, S.D., received the LeRoy Apker Award, the top undergraduate honor awarded by the American Physical

Society. The award recognizes outstanding achievements in physics and provides \$5,000 to the recipient, a travel allowance to the American Physical Society meeting where the award will be presented and \$5,000 to the recipient's undergraduate institution.

Jochim is a 2011 bachelor's graduate of Augustana College in Sioux Falls, S.D., where she had a successful career as an undergraduate researcher. Some of this research work was conducted at Kansas State University. As a graduate student, Jochim received a research assistantship and the Timothy Donoghue Fellowship. Most recently, she has worked on understanding how ultrashort laser pulses can interact with and control individual molecules. This research, which is funded by the National Science Foundation and the U.S. Department of Energy, might one day lead to new ways of controlling chemical reactions, limiting by-products and creating new materials.



Brett Esry was one of five Kansas State University faculty members named as 2011 university distinguished professors, a lifetime title that is the highest

honor the university can bestow its faculty.

Esry, the Ernest K. and Lillian E. Chapin Professor of Physics, is a third-generation Kansas State University alumnus and studies ultracold three-body collisions and intense laser-matter interactions. He performs his intense laser research in the James R. Macdonald Laboratory as a member of the 13th-ranked atomic, molecular and optical physics program in the country. Esry's research has appeared in more than 120 publications and he has given more than 75 talks and seminars. He has been awarded 16 grants to support his research and his funding amounts to more than \$28 million in collaborative projects and \$1.5 million in individual grants.



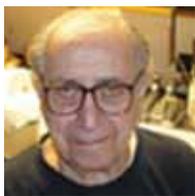
Dean Zollman, after 10 years as the head of the department of physics, stepped down in June and began phased retirement. He continues to maintain an active presence in

the department.

Zollman, a university distinguished professor of physics, came to the university in 1970 and has received multiple awards for his teaching excellence. 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.

Zollman is a member of many professional organizations including the American Physical Society, the American Association of Physics Teachers and the National Association for Research in Science Teaching.

"His leadership fostered trust and transparency and cultivated excellence," said Kristan Corwin, associate professor of physics.



Robert Katz, former Kansas State University professor of physics, died at his home March 12, 2011, from a brief illness. While at the university, Katz received the

Distinguished Graduate Faculty Award for 1962-63 as an outstanding lecturer and researcher. He developed soft X-ray techniques for assessing insect infestations and researched methods for testing grain density. He co-authored a popular text called "Physics" in 1962 and wrote "An Introduction to the Special Theory of Relativity" in 1964.

While at the university, Katz developed a theoretical model correlating images of cosmic ray tracks with the effects of cancer radiation treatment on human cells. Katz left the university in 1966 to work at the University of Nebraska.

The James R. Macdonald Laboratory is undergoing a significant upgrade to its state-of-the-art ultrafast laser facilities. The laboratory is getting a new laser system which is a high-repetition-rate, high-power,



CE phase-locked laser. The \$1 million laser system and attosecond physics laboratory is funded by the U.S. Department of Energy. Kansas State University provided the funds to upgrade the laboratory space so it would meet the stringent environmental conditions for the laser system and related research projects. Construction should be completed in early 2012.

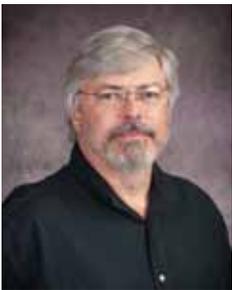


Yurii Maravin, associate professor of physics, has received a two-year appointment to the physics leadership team of the CMS experiment at the

CERN Large Hadron Collider, or the LHC, near Geneva, Switzerland. A large international team of scientists, including a strong Kansas State University contingent, studies the products of collisions at the LHC to search for clues about the nature of forces under the conditions present after the Big Bang.

Maravin co-leads a diverse team of international physicists charged with ensuring that the CMS detector and its complex reconstruction software programs provide the best possible measurements of photons, electrons and positrons. The CMS experiment engages more than 3,000 scientists from 183 institutions in 38 countries. Other university faculty involved include Tim Bolton, professor of physics, and Andrew Ivanov, assistant professor of physics.

Brett DePaola: Answering the call to serve



Professor Brett DePaola got his inspiration to apply for a Jefferson Science Fellowship from the top: President Obama.

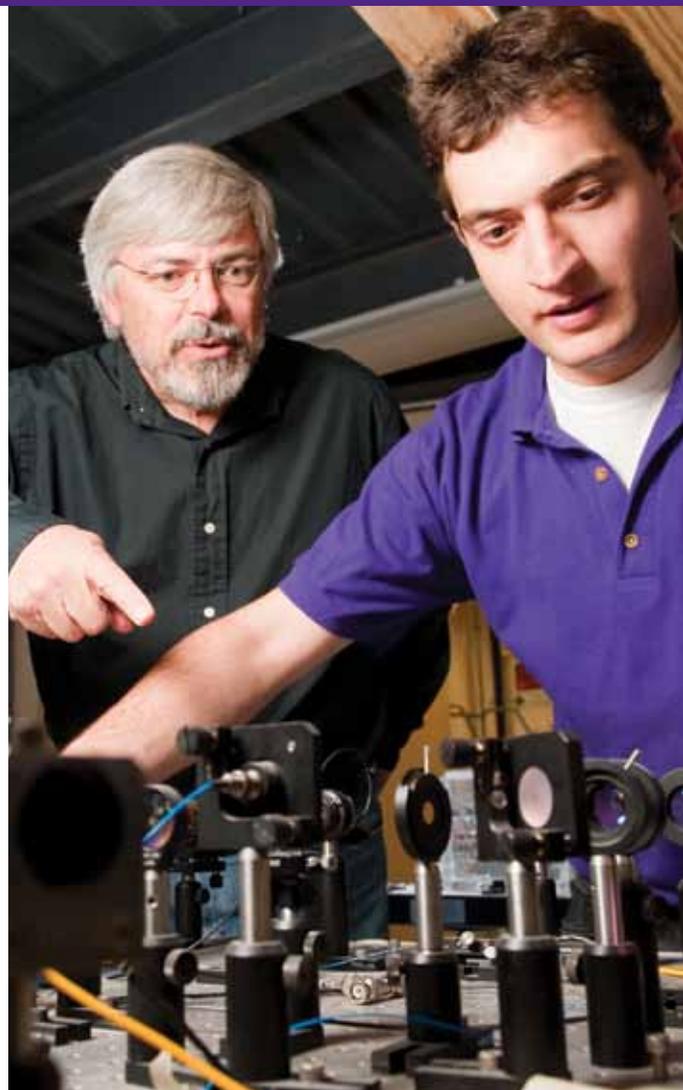
“I applied for this program because I was inspired by President Obama’s call for all of us to volunteer whatever we had to offer for the good of the country,” DePaola said. “As a teacher, I feel I’m already making a contribution. However, as a science adviser to the U.S. Department of State, I had the opportunity to contribute even more.”

DePaola is the first K-State faculty member to be selected for the elite fellowship, which is available to tenured academic scientists and engineers from U.S. institutions of higher learning. Fellows spend a year at the State Department or the U.S. Agency for International Development for an on-site assignment in Washington, D.C., that may also involve extended stays at U.S. foreign embassies and/or missions.

DePaola served his fellowship during the 2010-2011 school year, during which time he was supported by Kansas State University. He was assigned to the State Department’s Office of Economic Analysis in the Bureau of Intelligence and Research.

Although he is back teaching at K-State now, DePaola remains available to the State Department for short-term projects through 2016.

A K-State faculty member since 1986, DePaola earned bachelor’s and master’s degrees in physics from Miami University in Ohio and a doctorate in physics from the University of Texas at Dallas.



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