



# RESONANCES

NEWS OF INTEREST TO FLORIDA STATE UNIVERSITY PHYSICS ALUMNI

Spring 2009



FSU past Physics Department Chairs (photo taken April 10, 2008) From left to right: Drs. Robert Kromhout 1960–62, Steve Edwards 1973–79, Don Robson 1985–91, Jeff Owens 1991–97, Kirby Kemper 1997–2003, David Van Winkle 2003–07, and Mark Riley 2007–present

## A special message from our chair

Welcome to the Department of Physics newsletter Resonances for Spring '09! Our intent is to update you on recent news and events pertaining to our department over the past year. As usual a great deal of activity has taken place and it was a tough job to select a few highlights to tell you about here.

In the photo above you can see a historic gathering of past chairs of the department. This was taken at last year's awards ceremony. (More photos from this special event are available on our webpage.) It neatly captures something that we have always known throughout the decades—FSU is a happy and fun place to do great physics! As you can see, each past chair is holding a commemorative plaque with an engraving of the Keen Building (and fountain) along with a clock and the period they were chair. The previous chair, David Van Winkle, was presented with his in 2007, and this gave me the idea that all previous chairs should be awarded with this wonderful gift, so brilliantly designed and built in our workshop. I don't have one because I have not earned it yet!

We hope you enjoy reading the newsletter and please don't forget you are always welcome to login to our remodeled webpage, [www.physics.fsu.edu](http://www.physics.fsu.edu), to find out the latest news about the department. Please don't hesitate to drop us a line, we always love to hear from you.

Finally, I would like to thank Drs Yang, Cao and Bonesteel for working on the newsletter and to Scott Baxter and Ken Ford for putting it so beautifully together.

Very best regards!

MARK RILEY

# A pioneer in physics: Philip J. Wyatt

BAYARD STERN

SPECIAL TO RESONANCES

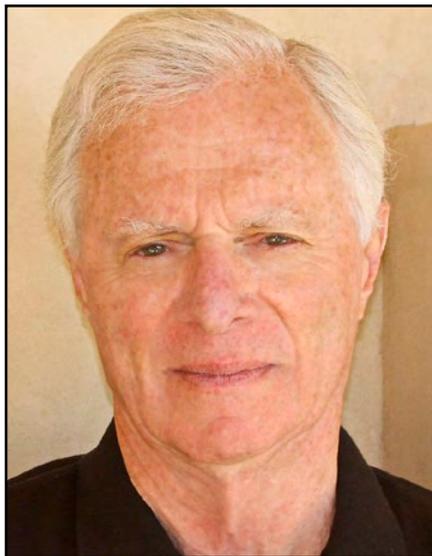
In 1959, when Philip J. Wyatt was a promising young new doctoral student in The Florida State University Department of Physics, he witnessed the installation of its famous EN Tandem Van de Graaff nuclear accelerator. Now, at 76, Wyatt is a highly regarded physicist and a pioneer in the field of laser light scattering and particle size measurement, a technology that turned out to be quite similar to his nuclear physics scattering work at Florida State.

Wyatt's career has largely been dedicated to developing the methods and instruments used to decipher the unknown physical properties of molecules that make up, well, just about everything. Some of his early support came from a company that cared deeply about its closely-guarded ingredients.

"Believe it or not, some of our early funding came from the Coca-Cola Company," Wyatt said. "I sent a paper into the Applied Optics journal concerning a comparison of the scattering properties of various cola drinks. They were very interested to see if we were discovering their secret formula."

Wyatt's productive career and innovative research was recently highlighted when he was awarded the 2009 Prize for Industrial Application of Physics by the American Physical Society. The prestigious honor was established to recognize excellence in the industrial application of physics and came with a \$10,000 award. His citation read, "For pioneering developments in the physics of the inverse scattering problem: new applications of laser light scattering and the successful sustained commercialization of new related analytical methods and instrumentation."

"Essentially, we want to measure how light scatters from some unknown object," Wyatt said about his specialty. "Trying to determine the physical properties of



Philip J. Wyatt

that object, just from scattered information alone, is called the "inverse scattering problem"—the solution of which we hope to deduce. This ability has tremendous applications in many different fields."

Before coming to Florida State and earning a doctoral degree in physics, Wyatt earned a bachelor's degree from the University of Chicago, a master's Degree from the University of Illinois, and studied at the University of Cambridge.

Wyatt remembers Florida State's first three students to earn doctorates in physics: Kiuck Lee, Prakash Sood and N.V.V.J. Swamy. Wyatt became the fourth. All were students of notable Florida State physicist Alex E.S. Green.

Wyatt said two other professors he interacted with while at Florida State also were an important part of his education.

"It was a young, rapidly growing physics department," he said. "It was an exciting time, and I had some great professors, including Mike Kasha (Distinguished University Research Professor, Molecular Biophysics) and Ray Sheline (Professor Emeritus, Department of Chemistry and Biochemistry). They were a very wonderful and famous group. We also started the

Florida State Chapter of Sigma Pi Sigma, a physics honorary society."

Wyatt founded his company, Wyatt Technology Inc., 26 years ago and is its chief executive officer. It develops, manufactures and sells analytical instruments that are described as "absolute light-scattering spectrometers. In 2008, his company was voted one of the best places to work for scientists by " the journals *The Scientist* and *Chemical and Engineering News*.

"You can bring your dog to work," he said. "We cannot be successful in fulfilling our commitment to our customers unless our staff is fully supportive of one another. It's a very interesting company, and I'm having a ball."

Wyatt's two sons have followed him into the business, and now they help lead it. Geoffrey Wyatt is the president of the company and Clifford Wyatt is the executive vice president.

"Our instruments are used in 53 countries around the world," Philip Wyatt said from Santa Barbara, Calif., where the company is based. "At present, many of our customers are in the biotechnology, chemical, petrochemical, pharmaceutical and government arenas. Of course, many academic institutions use them, including FSU's Department of Chemistry and Biochemistry."

Wyatt has written more than 50 published articles, co-written three textbooks, and was a finalist for the nation's first Apollo scientist-astronaut selection program in 1965. As a fellow of the American Physical Society and the Optical Society of America, he has had more than 30 foreign and domestic patents issued relating to laser light scattering. He is a member of the executive committee of the Forum on Industrial and Applied Physics of the American Physical Society.

"My sons asked me when I'm going to retire," Wyatt said. "I said maybe when I'm 95."

# National physics scholarship awarded to FSU senior

JONATHAN WALLACE  
SPECIAL TO RESONANCES

A Florida State University student majoring in physics is the 2008-2009 recipient of the Minority Undergraduate Physics Scholarship presented by the American Physical Society (APS). The scholarship is presented annually to 30 of the most deserving minority students in the United States majoring in physics.

Bernadette Cogswell, a senior in the FSU physics department will receive \$2,000 per year for educational materials and tuition.

"I was thrilled to receive the award," said Cogswell. "It was very validating to find out I had been selected as one of the recipients."

With the help of corporate and individual



Bernadette Cogswell

donors, the minority scholarship has offered students the opportunity to attend and complete their undergraduate course-work since

1980. Past scholars have received Ph.D.s in physics and have gone on to become professors at universities.

"The minority scholarship is encouraging students both financially and professionally to continue in physics who might otherwise change fields," said Cogswell.

After Cogswell finishes up her undergraduate degree, she plans to work toward a master's in fluid dynamics or the study of chaos theory, then pursue a doctorate in theoretical nuclear physics.

"Bernadette is hard-working, serious and talented, and indications are that she would be a very good graduate student," said physics Professor Winston Roberts.

# Physics student wins Undergraduate Research and Creative Endeavors Scholarship

Physics undergraduate major Kristen Collar has been conducting research with Dr. Stanley Tozer at the National High Magnetic Field Laboratory (Magnet Lab), on the growth of inorganic crystals and their characterization. At the end of her first year at FSU, she applied for an Undergraduate Research and Creative Endeavors (URACE) Scholarship and received the award of \$1000.

She also applied to join the Research Experience for Undergraduates (REU) program at the Magnet Lab at Los Alamos. She was accepted into the LANL program, and used the URACE award to help with her research at LANL.

While at LANL, she worked with Drs. Jason Cooley and Chuck Mielke.

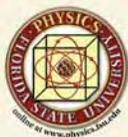
Ms. Collar recently presented a poster based on that work at the Undergraduate Research and Creative Activity Awards Symposium, and her picture appears in the article seen at <http://media.www.fsunews.com/media/storage/paper920/news/2008/10/02/News/Hard-Work.Rewards.Fsu.Researchers-3464292.shtml>

You can see a copy of her poster at <http://www.physics.fsu.edu/users/roberts/undergrad/upost.asp>. You can also see a copy of the article she has submitted for publication at

Dr. Winston Roberts (left) and Kristen Collar

[erts/undergrad/upubs.asp](http://www.physics.fsu.edu/users/roberts/undergrad/upubs.asp)

Ms. Collar continues to work with Dr. Tozer. She says that grad school is a possibility, but many other decisions have to be made before she can make that call.



# RESONANCES

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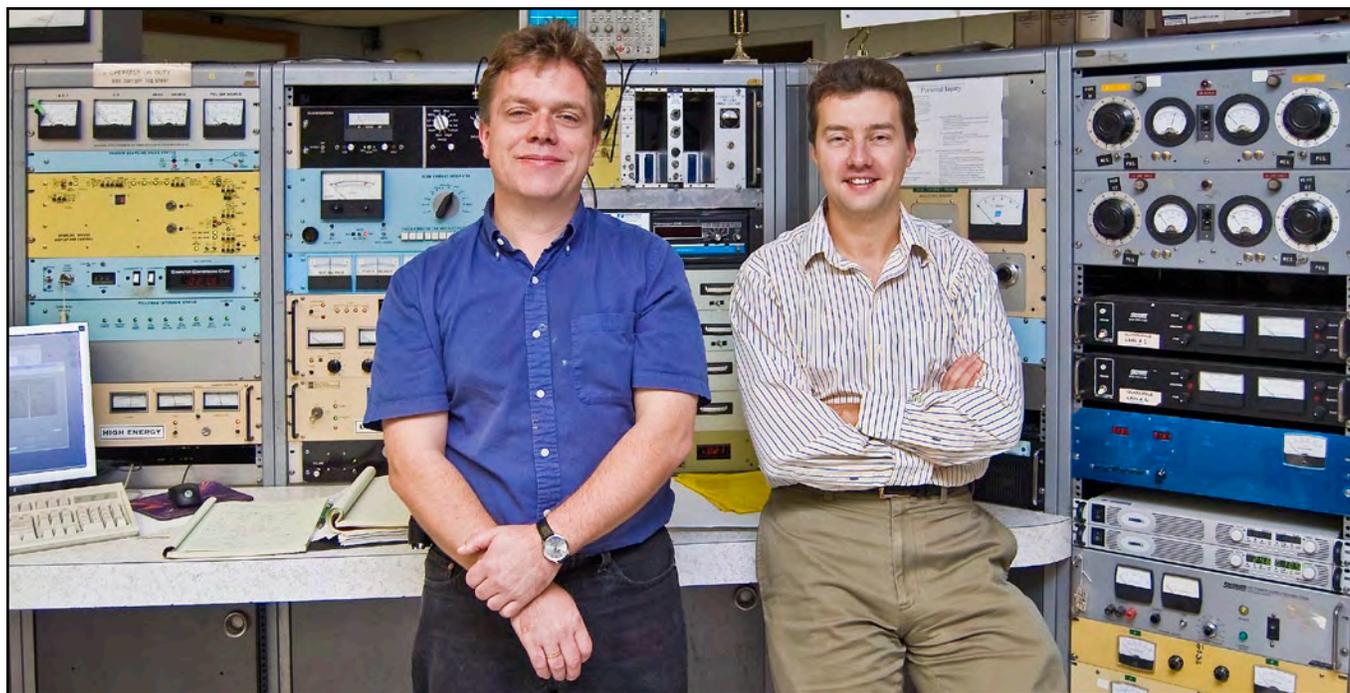
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**Resonances IS AVAILABLE IN ALTERNATIVE FORMAT UPON REQUEST.**



Ingo Wiedenhoefer (left) and Grigory Rogachev

## Taking a closer look at exotic nuclei

JEFFERY SEAY

SPECIAL TO RESONANCES

On the heels of a \$4.4 million National Science Foundation grant to study nuclear reactions and structure, the Florida State University Department of Physics, along with Louisiana State University, has received a highly competitive \$720,000 Major Research Instrumentation grant from the National Science Foundation to build a device that will create, detect and allow for the study of exotic nuclei.

In fact, the FSU-LSU Array for Nuclear Astrophysics Studies with Exotic Nuclei (ANASEN) will give researchers insight into how often exotic nuclei occur to better understand exactly how elements that are heavier than oxygen are cooked unless you have an accurate measure of the probability of the specific reactions."

Within an X-ray binary star system, an energy-generating sequence of nuclear reactions takes place. This is known as the "hot CNO cycle," in which carbon gets cooked into nitrogen, nitrogen gets cooked into oxygen and oxygen gets cooked back into carbon at tens of millions of degrees. However, this cycle sometimes goes

awry to produce exotic nuclei, thereby altering the nuclear reaction and enabling the creation of heavy elements, according to FSU physics Assistant Professor Grigory Rogachev, one of three researchers who received the grant.

Beyond the basic capability to create and observe this process, the array also will be able to perform a wide range of experiments.

"Complicated chains of nuclear reactions during stellar explosions lead to the formation of heavy elements in stars," Rogachev said. "In studying the details of the stellar explosive processes, you cannot understand exactly how elements that are heavier than oxygen are cooked unless you have an accurate measure of the probability of the specific reactions."

"This is perfect for graduate students because this kind of detector has so many kinds of particle detection techniques built into it," Rogachev said. "They will be able to get incredible experience working on this type of experimental stuff."

Rogachev's fellow researchers are FSU physics Associate Professor Ingo Wiedenhoefer and Jeff Blackmon, an associate professor of physics at LSU.

"ANASEN will bring exciting new capabilities to nuclear astrophysical studies carried out using exotic beams at the John D. Fox Superconducting Laboratory here at Florida State," said physics chairman Mark Riley, the Raymond K. Sheline Professor of Physics at FSU. "Drs. Rogachev and Wiedenhoefer, along with Dr. Blackmon from partner institution LSU, are to be commended for their scientific vision in designing this extremely powerful detector array and for putting together such an impressive MRI proposal to the NSF. We all look forward to the significant discoveries that this world class device will enable in the years to come."

ANASEN is a multi-component "active target" detector, so named because one medium, such as helium, simultaneously serves as the target of the experiment and the active volume in which the experiment will be conducted. Because exotic nuclei only exist for milliseconds, the device must be highly efficient to observe them. What's more, ANASEN will provide unique capabilities for state-of-the-art experiments with FSU's new radioactive nuclear beam facility, known as RESOLUT, the REsonator SOLenoid with Upscale Transmission.

# Bernd Berg earns prestigious Humboldt Award

**BARRY RAY**

**SPECIAL TO RESONANCES**

A Florida State University researcher who has spent three decades investigating the mysteries of particle physics through computer simulations has achieved one of academia's top distinctions. Bernd Berg, the Dirac Professor of Physics at FSU, has been chosen to receive Germany's Humboldt Research Award, given to outstanding academics who are at the peak of their careers.

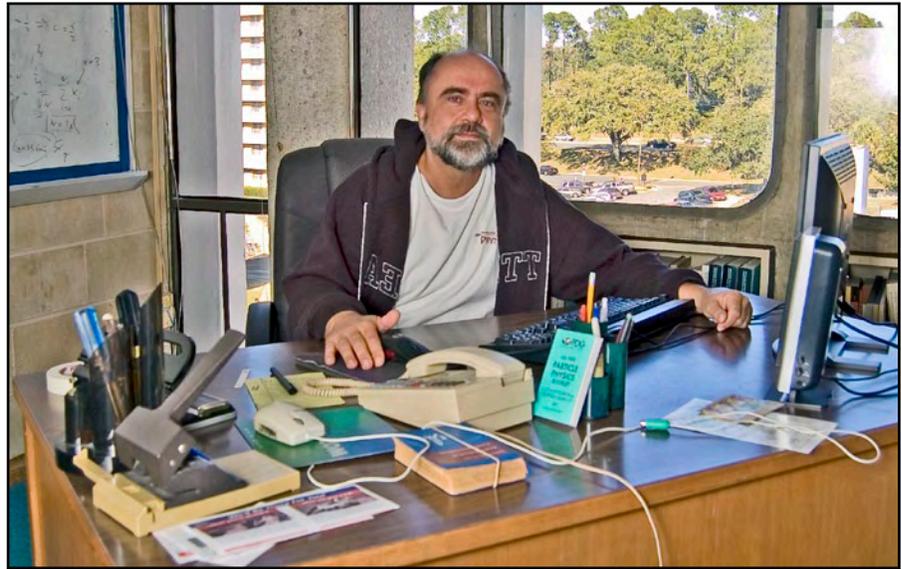
"I am very happy to be honored in this way by my home country," said Berg, who has dual citizenship in the United States and Germany. "My research that led to this award would not have been possible without the continuous support of FSU, in particular the physics department, which allowed me sufficient time for research away from administrative and teaching duties."

The Humboldt Research Award is presented to outstanding scientists and scholars from all disciplines whose fundamental discoveries, new theories or insights have had a significant impact on their own discipline and who are expected to continue producing cutting-edge achievements in the future. Award winners are invited to spend a period of six to 12 months on academic collaboration with colleagues in their field in Germany. The award is valued at 60,000 euros, or approximately 88,000 U.S. dollars.

"This is a well-deserved honor for Dr. Berg that also brings increased stature and international recognition to our department and university," said Mark Riley, chairman of the FSU Department of Physics.

"This award reflects the outstanding contributions Dr. Berg has made to physics and to computational science," added Max Gunzburger, director of FSU's School of Computational Science, where Berg also serves on the faculty.

Berg's research is within an area of



**Bernd Berg**

physics known as quantum field theory, which arose in the 20th century as a way of answering some of the most fundamental questions of matter.

For example, "We learn in school that the nucleus of an atom is made up of positively charged particles called protons, and we also learn that positive particles repel each other," Berg said. "So the question is: Why does the nucleus not fall apart?"

Studying the behavior of the smallest particles of matter requires the use of some of the world's most powerful computers. It was one such computer, housed in what was then known as the Supercomputer Computations Research Institute at FSU, that first attracted Berg to the university in the mid-1980s. In the two decades since, he has pioneered the use of computers to perform complex simulations, developing methods that often cross the boundaries between fields of science. For instance, his "multicanonical" approach is popular in structural biology. Berg's computer-based research also led him to take on a second faculty position within the School of Computational Science.

Berg earned his Ph.D. in 1977 at the Free University of Berlin. He became assistant

professor at Hamburg University in 1978, a position he held until 1984. During that time he was awarded a CERN fellowship and spent two years at CERN, the European particle physics lab on the French/Swiss border at Geneva. He became an associate professor at FSU in 1985 and was promoted to full professor in 1988. While he has kept his position at FSU since then, he also has kept close contact with many overseas research institutions through extended stays in Germany, France, Austria and Japan.

Berg has written 150 scientific papers, of which the 46 most well known have more than 3,000 citations. He also recently published a computational physics textbook, "Markov Chain Monte Carlo Simulations and Their Statistical Analysis." Among other honors, Berg was elected a Fellow of the American Physical Society in 2004, was awarded the Leibniz Professorship of Leipzig University in 2005, and became the Dirac Professor of Physics at FSU in 2006.

For more information about the Alexander von Humboldt Foundation, which distributes the Humboldt Research Award, visit [www.humboldt-foundation.de/en/stiftung/stiftung.htm](http://www.humboldt-foundation.de/en/stiftung/stiftung.htm).

## FSU's Pat Thomas Planetarium receives major upgrades

The Pat Thomas Planetarium first opened its doors in 1982, and has been in continuous service ever since.

The planetarium has two major purposes: first, it enhances undergraduate courses in Astronomy and Physics; second, the planetarium is extended as a resource to other departments in the University, local public and private schools, and the general public. Recently, the planetarium installed major upgrades to improve its systems, resulting in improved projections and a wider array of modern shows, making it more capable and vital than ever.

The upgraded planetarium now boasts a digital system with high-definition projectors, powerful computers and advanced software. It can project full-dome images of stunning beauty and fidelity. Visitors will be immersed in and enthralled by the experience. The planetarium software, Stellarium, allows the rendering of a realistic sky in real time, displays constellations and coordinate systems, planets, nebulae and other astronomical phenomena such as seasons and the midnight sun, eclipses, the solar system and more. It also has an extensive show repertoire ranging from astronomy and cosmology to the Hubble story and the history of space exploration, which can help to satisfy the new Florida state educational standards. The shows are suitable for a wide audience. An updated list of available shows with summaries, suggested age ranges, and previews, is available here: <http://www.physics.fsu.edu/outreach/planetarium.html>.

The Pat Thomas Planetarium is a free service to the community.



Planetarium deputy director Mark Cartagine (at left), with staff members Tiffany Davis and Chris Bradley

## FSU's von Molnár and Zhou join ranks of AAAS fellows

Two researchers from the FSU Physics Department have been elevated to the rank of fellow by the American Association for the Advancement of Science (AAAS).

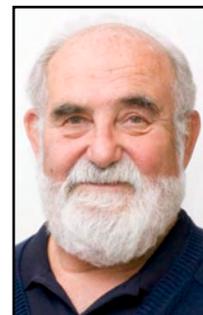
Stephan von Molnár was elevated "for seminal research on magnetic polarons, the metal-insulator transition, dilute magnetic semiconductors and magnetic nanoparticles."

Huan-Xiang Zhou was similarly honored "for distinguished contributions to the field of computational and theoretical chemistry, particularly the theoretical modeling of diffusion-controlled reactions and other processes in biomolecular systems."

"It is always nice to have our tal-

ented Florida State researchers recognized by their peers as being among the best in their fields," said Larry Abele, the university's provost and executive vice-president for Academic Affairs. "This is just one more indicator of our strength in the area of scientific research."

Von Molnar came to FSU in 1994 to accept positions as a professor of physics and as director of the university's Center for Materials Research and Technology (MARTECH). Though he recently stepped down as MARTECH director, he continues to conduct research at the multidisciplinary center, which works to produce and investigate new materials with novel structural, chemical,



Huan-Xiang Zhou (at left) and Stephan von Molnár

magnetic and/or optical properties.

Zhou, a member of the Florida State University faculty since 2002, describes his research as geared toward developing a greater understanding of the properties of protein molecules.

## NSF awards department \$4.4 million for nuclear research



Florida State University's internationally renowned nuclear physics program will expand its experimental capabilities with a new \$4.4-million grant from the National Science Foundation.

FSU's Department of Physics (<http://www.physics.fsu.edu/>) has just received a three-year grant from the NSF to fund a research project titled "Studies of Nuclear Reactions and Structure." The project will support fundamental research in experimental nuclear physics and the training of doctoral students for service to the nation in scientific research, education and national security, as well as the enhancement of economic competitiveness.

"This grant expresses a great vote of confidence in our laboratory by the NSF," said Samuel L. Tabor, the Norman P. Heydenburg Professor of Physics at FSU and director of the university's John D. Fox Superconducting Accelerator Laboratory. "We are excited about the opportunities it will provide for developing forefront research and for training students."

Within Tabor's laboratory, the NSF

*This award is a most  
significant vote of  
confidence by our peers*

—DR. MARK RILEY

grant will increase the capabilities of the new RESOLUT rare ion facility, which enables researchers to fire a beam of atomic particles through a steel tube at speeds approaching 60 million miles per hour—roughly one-tenth the speed of light—and then to observe the nuclear reactions that occur. Knowledge of such reactions is critical to the field of astrophysics and the interpretation of observations made by new astronomical observatories around the world.

"Using RESOLUT, we are able to study how the most fundamental property of nuclear structure, the shells, changes with increasing imbalance in the proportion of neutrons to protons," Tabor said. "The accelerator laboratory also is an ideal hands-on training ground for Ph.D. students. We look forward to being able to provide even more students with these unique research opportunities."

Nineteen students currently are pursuing doctoral research in experimental nuclear physics at FSU. They come from as close as Florida and as far away as India, drawn to FSU by research opportunities unavailable at all but a handful of U.S. universities. More information about the laboratory is available at <[www.physics.fsu.edu/nuclear](http://www.physics.fsu.edu/nuclear)>.

The past two years have been a period of substantial growth for FSU's nuclear physics program. In addition to the development of RESOLUT, a nuclear theorist, Professor Winston Roberts, has joined the physics faculty. And in 2007, the physics department was chosen as the host site for the National Nuclear Physics Summer School—a significant honor typically accorded to the top nuclear physics programs at U.S. universities. "As a member of the experimental nuclear group myself, I am obviously very pleased with this wonderful news—but as the chair of the department, I am doubly pleased," said Mark Riley, the Raymond K. Sheline Professor of Physics at FSU. "This renewal award is a most significant vote of confidence by our peers and the NSF of the continued vitality and impact of the research carried out by the outstanding nuclear faculty and students at FSU."

## Tabor selected as APS fellow from Florida State

A member of Florida State's Physics Department faculty has been selected as one of three APS fellows from the university for 2008.

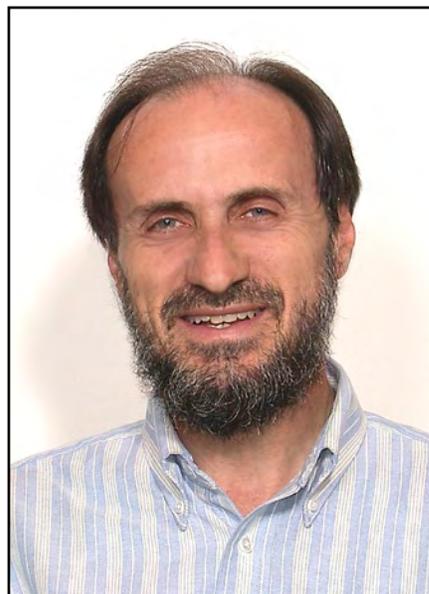
Samuel L. Tabor, Norman P. Heydenburg Professor of Physics and Director, John D. Fox Superconducting Accelerator Laboratory, was selected "for pioneering and sustained contributions to the understanding of the structure of f-p-g shell nuclei and pioneering measurements elucidating the effects of neutron excess on nuclear shell structure near N=16."

"Congratulations on being elected APS fellows," Kirby Kemper, Florida State's vice president for Research, wrote. "This ... excellent research shows that not only are you carrying out world-class work, but that The Florida State University is developing

the broad depth needed to carry us forward in important areas of science."

Tabor joined the Florida State faculty in 1979. During his tenure, he has conducted research that has helped to unravel some of the mysteries of the way protons and neutrons combine to form nuclei, the hearts of atoms. In particular, Tabor has focused on the changes caused by large imbalances in the numbers of protons and neutrons, which play a crucial role in the way elements are formed in astrophysical processes.

"My election as a fellow of the American Physical Society is an honor for me and for Florida State University," he said. "It provides national recognition both of my work and that of our nuclear physics group at FSU, which has been ranked eighth in the nation among public institutions."



Sam Tabor

## Physics faculty member is director of WIMSE

The Women in Math, Science and Engineering (WIMSE) Living-Learning Community is housed in Cawthon Hall. WIMSE seeks to increase the retention of women in the sciences, mathematics, and engineering by promoting a supportive environment, encouraging participation beyond the classroom, providing increased exposure to these fields, and developing skills necessary to be successful.

Beginning in their freshman year and continuing throughout their academic career, WIMSE students participate in many activities sponsored by the program: the Research Experience Program, a colloquium series, leadership opportunities (including participation in the FSU LeaderShape program), the Student Advisory Committee, and various social activities.

The Physics Department's Dr. Susan Blessing has been director of the program



Susan Blessing

for several years, and has been instrumental in the success of the program— especially in increasing the number of stu-

dents involved in research to more than twenty-five during the 2008–2009 academic year.

# FSU re-tools physics instruction with new technology

MIKE GENTINE & BARRY RAY

SPECIAL TO RESONANCES

If you step into one physics classroom on Florida State University's campus, you may not recognize it. Making use of state-of-the-art technology, Professor Simon Capstick is helping his students get a more hands-on, collaborative educational experience—and actually learn more in the process.

Capstick's "General Physics A Studio" course, which focuses on the physics of motion, is unique in that it is taught in a classroom that was specifically built with just such an innovative approach in mind. Located in FSU's new Classroom Building, the classroom enables students to work in small teams, utilize computers to arrive at answers to scientific problems, and easily share their results with the rest of the class.

"This is certainly a departure from the way physics has been taught for decades," Capstick said. "But what we're finding is that this sort of technology enables students to move beyond all of the measurements and calculations that tend to bog down the learning process and really focus on the underlying concepts."

Walking into Room 308 of the Classroom Building, it is immediately apparent that this isn't your grandfather's physics class. There are eight round tables, each with three computers, three dry-erase boards and nine chairs. Large video screens line the front and side walls of the room.

"The idea is to promote a team approach to learning," Capstick said. "In the real world, science is about far more than simply knowing a lot of facts. One has to be able to work collaboratively with others to debate ideas and arrive at an agreed-upon conclusion. One also has to be able to communicate one's findings to others and argue effectively as to why they are correct. This course allows for all of that."

At the beginning of the semester, students are divided into three-person teams



Simon Capstick

and assigned to share a computer and dry-erase board. In discussing physics assignments, they are able to use the computer and then write their calculations on the board. Afterward, groups are called up one by one to the front of the class, where their calculations are projected onto the classroom's video screens. All students in the class then are encouraged to discuss and debate the team's findings.

Team members are switched around several times during the semester to ensure that all students are given an equal opportunity to succeed.

The course also has a weekly lab assignment in the same classroom that utilizes technology in creative ways. Thanks to an Innovative Instruction Grant from FSU's Center for Teaching and Learning ([www.learningforlife.fsu.edu/ctl](http://www.learningforlife.fsu.edu/ctl)) and additional funding from the College of Arts and Sciences ([www.fsu.edu/~fsuas](http://www.fsu.edu/~fsuas)), Capstick has purchased motion-sensing equipment and electronic interfaces that his students can plug in to computers to conduct high-tech experiments—and, according to Capstick, see their results instantly.

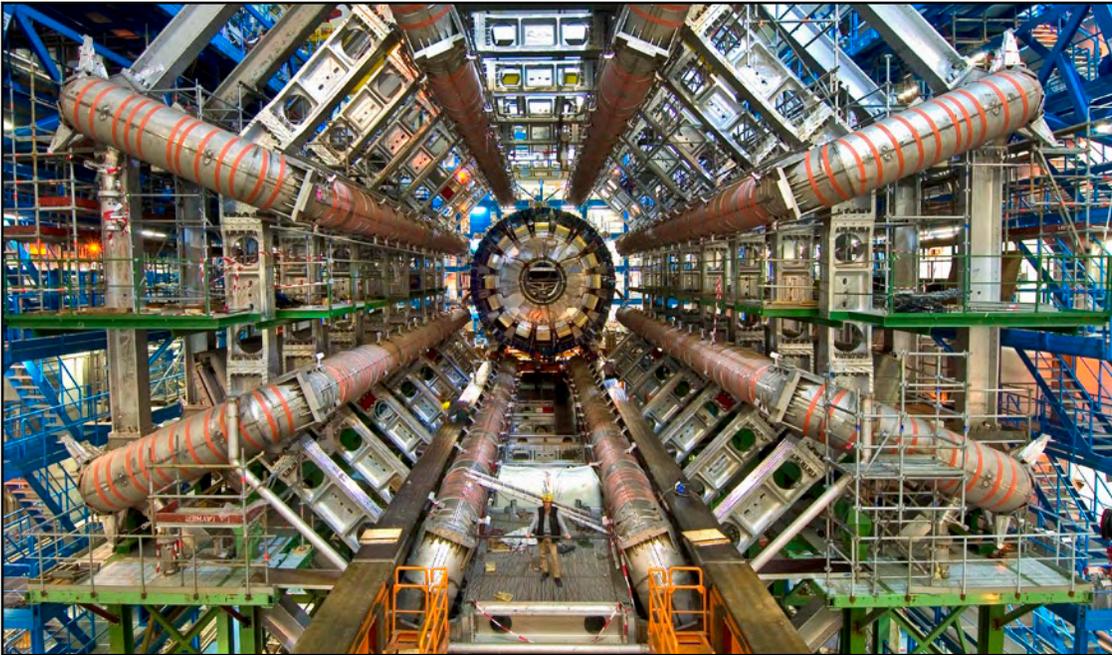
"The way that we used to do physics experiments, you might have an object moving and pulling a tape behind it, with a spark timer leaving marks on the tape,"

Capstick said. "It might be half an hour after you saw the motion before you understood it in terms of velocity, position and acceleration. But with this technology, it's fairly immediate for you to get information about the motion that you're seeing. And part of the reason for these labs being designed the way they are is to make collection and interpretation of the data relatively straightforward."

So, compared to the same lecture about kinetic and potential energy in a traditional physics course, what's the benefit of bouncing a ball and measuring it with an electronic sensor, as students do in Capstick's lab? He says the more modern approach contributes to an increase in how much students learn—at least as measured during the spring 2008 semester, when the technology-supported version of "General Physics with Calculus" was first offered at FSU.

"We gave those students a test before the course started to assess their conceptual understanding," Capstick said. "We then gave them the identical test after the course was finished, and we looked at the percentage of those questions they answered wrong in the pre-test that they answered right in the post-test. What we found is that this number is about twice as high as it is for a traditional lecture/lab course."

# FSU physicists help make history at LHC



Interior of CERN's Large Hadron Collider. For a sense of scale, note the figure at bottom center.

**BARRY RAY**

**SPECIAL TO RESONANCES**

Several members of the FSU Department of Physics are preparing to take part in the largest science experiment in history. After 40 years of planning and construction, the Large Hadron Collider (LHC), the world's highest-energy particle accelerator, is poised to provide new insights into the mysteries of the universe. Created by some of the greatest minds in physics from all over the world, the LHC is expected to begin collecting data in late 2009.

Located at CERN, the European Laboratory for Particle Physics, in Geneva, Switzerland, the LHC cost \$10 billion to build, and its resulting data have the potential to explain why we and the universe exist. The collider will allow researchers to smash protons toward one another at speeds approaching the speed of light, trying to mimic what happened in the fraction of a second after the Big Bang.

"The word 'historic' is overused," said Harrison Prosper, a professor of physics at FSU, prior to the LHC's activation. "However, in the case of the start of the LHC, the

word is apt. This will be a historic milestone in the history of science. If things unfold as we hope, the start of this extraordinary science project could mark the dawn of another golden age of discovery in physics. We have been waiting for something like this for more than 30 years, and it is just thrilling that FSU is a part of this."

Several physicists of FSU's High Energy Physics group are members of the international collaboration that built and operates the CMS (Compact Muon Solenoid) detector, one of the two large general purpose detectors at the LHC that will record data about these high-energy proton-proton collisions. CMS was designed to provide the most efficient ways of finding evidence for the Higgs particle, dark matter and a host of new subatomic particles, such as supersymmetric partners of the standard family of elementary particles.

Permanent members of the CMS group from FSU include Harrison Prosper, Associate Professor Todd Adams, Staff Physicist Sharon Hagopian, Professor Emeritus Vasken Hagopian, Computer Research Specialist Kurtis Johnson and Professor Horst Wahl. Others from FSU taking part in the

experiment are postdoctoral fellows Jie Chen and Sezen Sekmen; Technical/Research Designer Maurizio M. Bertoldi and Assistant in Research Blake Sharin; and graduate students Brendan Diamond, Sergei Gleyzer, Jeff Haas and Venkatesh Veeraghaven.

"The discoveries possible at the LHC could revolutionize our understanding of nature in a way that has not happened during my career," said Associate Professor Adams. "It is a very exciting time to be working at CERN."

Mark Riley, chairman of the FSU Department of Physics, called it "an incredibly exciting time, not only in high-energy physics but for all of science. It is wonderful that physicists from FSU are deeply engaged in this momentous endeavor."

To learn more about CERN and the Large Hadron Collider, visit <<http://public.web.cern.ch/Public/Welcome.html>>. Go to <<http://cms.cern.ch>> for more details about the CMS facility.

See Large Hadron Collider (LHC) pictures at [http://www.boston.com/bigpicture/2008/08/the\\_large\\_hadron\\_collider.html](http://www.boston.com/bigpicture/2008/08/the_large_hadron_collider.html)

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## Physicist tapped to lead Electron Magnetic Resonance program

Longtime National High Magnetic Field Laboratory collaborator Stephen Hill has been named director of its Electron Magnetic Resonance (EMR) user program and a professor of physics at Florida State University. Hill most recently served as an associate professor of physics and a magnet lab affiliate at the University of Florida.

After earning his doctorate from the University of Oxford nearly 14 years ago, Hill's first stop in the United States was to conduct post-doctoral work at the magnet lab.

"I've been coming back ever since," Hill said. "I hope to be able to strengthen the connection between my own international base of collaborators and the magnet lab's established user community."

"Steve's got a great vision for the future of EMR, and we see his knowledge of the UF physics and chemistry departments



Stephen Hill

as an opportunity to further cement the collaborative relationship that's been growing for some time," said Gregory Boebinger, director of the magnet lab.

A search committee led by former EMR Interim Director Peter Fajer chose Hill as director.

"Steve was recognized by a committee of international experts as a leader in the physics of ultra-high field EMR," said Peter Fajer, who had served as the interim director of the EMR program during the search for a permanent director. "His expertise will allow us to perform experiments at the highest available magnetic fields of 45 tesla, and to develop the free electron laser, an ultra-bright light source that represents the future of microwave and infrared spectroscopy."

Boebinger expressed his gratitude for Fajer's leadership over the past two years.

"I give my heartfelt thanks to Peter for his service as interim director when we needed him most, during which time he and his colleagues returned the magnet lab's EMR program to prominence and great promise," he said.