PURDUE UNIVERSITY

Physics INTERACTIONS

A NEWSLETTER HIGHLIGHTING THE DEPARTMENT OF PHYSICS AT PURDUE UNIVERSITY

2008

The LHC Revolution

A new era in particle physics

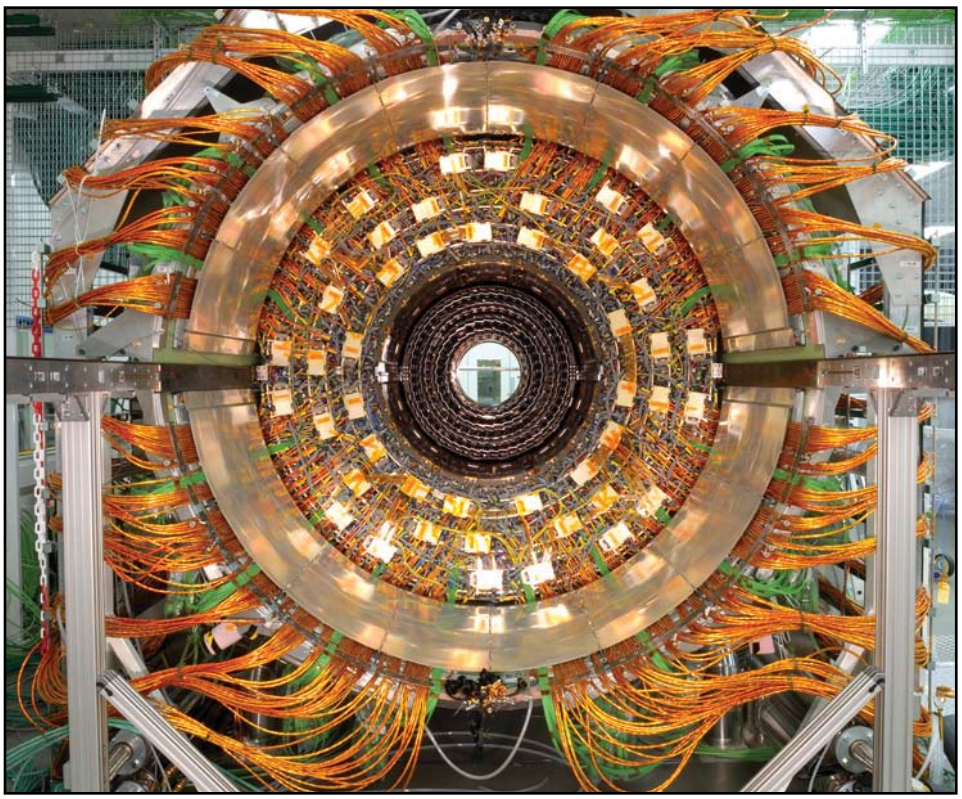

Photo by Maximilien Brice, © CERN

View of the CMS (Compact Muon Solenoid) experiment Tracker Outer Barrel (TOB). This is one of two general-purpose LHC experiments designed to explore the physics of the Terascale, the energy region where physicists believe they will find answers to the central questions at the heart of 21st-century particle physics.

(page 8)

Inside

From the Head

As you read this new issue of ***Physics Interactions***, you'll see that much has happened in the Department over the past year. The University and College of Science have both adopted new strategic plans during the past few months, and we are now finalizing a new Department strategic plan. In constructing our plan, we have engaged the entire department to set priorities and goals, and decide on strategies. An important part of this process was the external review of the Department, which was conducted in April of this year. At that time, a committee of physicists from outside the University spent two days meeting with faculty, students, and staff. While the review committee had much good advice, they also strongly endorsed our plans for the future.

It is thus appropriate that this issue of ***Physics Interactions*** is focused squarely on the future. One key to the future is the recruitment of new faculty, and we are very pleased to report that four new faculty members are joining our Department this year (see page 3). All are experimental physicists, with two working in the area of biological physics and two in condensed matter physics. These new additions join an already large and strong core of young faculty who have joined us in the past several years.

Important support and contributions to our future have also come from friends of the Department. We were very grateful for the donation of a new graduate fellowship by Patricia Schreiner (page 10). This new fellowship will support deserving graduate students and be of great help in recruiting outstanding students to the Department. We are also excited to announce a new campaign to create an endowed faculty position in Physics (see page 13). Once it is fully funded, this endowment will help us recruit and retain top faculty. A number of our retired faculty already made generous commitments to this campaign, demonstrating their deep commitment to our Physics "family".

With our strong group of faculty, students, and staff, along with the support of our many friends, the future of the Department is very bright.

-Nicholas J. Giordano ('73)
Hubert James Distinguished Professor of Physics and Department Head

Credits

This newsletter is published annually by the Department of Physics at Purdue University. Please address any questions to our department at the phone number below.

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New Faculty

Oana Malis, Assistant Professor of Physics, specializes in experimental condensed matter physics. Prof. Malis has research interests in the area of semiconductor physics with an emphasis on the science and technology of optoelectronic materials. In particular she is exploring the properties of complex semiconductor nano-structures for mid-infrared light emission and detection. Her work involves semiconductor growth, materials characterization, device fabrication, and device testing. She also has an active interest in new light emitting mechanisms and novel semiconductor materials. Prof. Malis comes to Purdue from SUNY-Binghamton and holds a M.Sc. from the University of Bucharest and a Ph.D. from Boston University.

Michael Manfra, Associate Professor of Physics, is an experimental condensed matter physicist whose research is focused on using molecular beam epitaxy to understand the physics of interacting electrons in lower dimensional semiconductor systems and nanostructures. Key areas of his research include quantum computation with topologically protected solid-state qubits, ultra-high mobility carbon-doped hole systems, nanostructures in GaN semiconductors, and large area epitaxial graphene growth. Prof. Manfra comes to Purdue from Alcatel-Lucent and holds an A.B. from Harvard University and a M.A. and Ph.D. from Boston University.

Yulia Pushkar, Assistant Professor of Physics, is an experimental biophysicist. Her primary research interests are applying spectroscopic techniques to study biological and synthetic systems capable of converting visible light into chemically stored energy and using high resolution (micro to nano) X-ray imaging for simultaneous detection of metals (such as Fe, Cu, Mn, Zn) in neuron cell cultures and brain tissues. Prof. Pushkar received a M.S. from Moscow State University and a Ph.D. from Free University Berlin.

Brian Todd, Assistant Professor of Physics, is an experimental biophysicist who specializes in 1) measuring the constitutive properties of single molecules, using atomic force microscopy (AFM), optical tweezers, and magnetic tweezers, 2) development of constitutive equations to connect molecular scale properties with biological function in health and disease, and 3) inverse problems in imaging and measurement including the measurement of DNA packaging forces by magnetic tweezers, and the determination of cartilage proteoglycan catabolic state using atomic force microscopy. Prof. Todd holds a BChE from the Georgia Institute of Technology and a Ph.D. from Case Western Reserve University.

Retired Faculty

David Elmore
Years of Service:
1989 – 2007

Roberto Colella
Years of Service:
1971 – 2008

Faculty Honors

Professor **Daniela Bortoletto** was appointed to the Advisory Committee for the NSF Directorate of Math & Physical Sciences and to the DOE/NSF Particle Physics Project Prioritization Panel (P5) Subpanel.

Professor **Lynn Bryan** was promoted to Full Professor.

Professor **Martin Kruczenski** received the Ruth and Joel Spira Award for Excellence in Graduate Teaching.

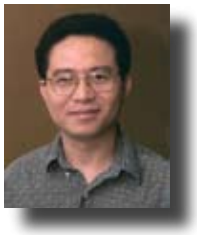
Professor **Yuli Lyanda-Geller** was awarded the Department of Navy Edison Patent Award.

Professor **Norbert Neumeister** received the Ruth and Joel Spira Award for Excellence in Undergraduate Teaching.

Professor **Ken Ritchie**, already an Associate Professor, was granted tenure.

Professor **Sergei Savikhin** was promoted to Associate Professor with tenure.

Professor **Fuqiang Wang** was appointed a University Faculty Scholar.



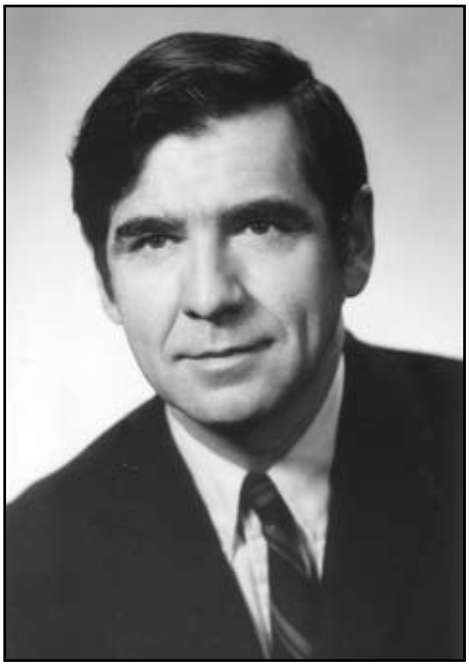
Staff Honors

Martha Delaney received the Professional Achievement Award from the College of Science.

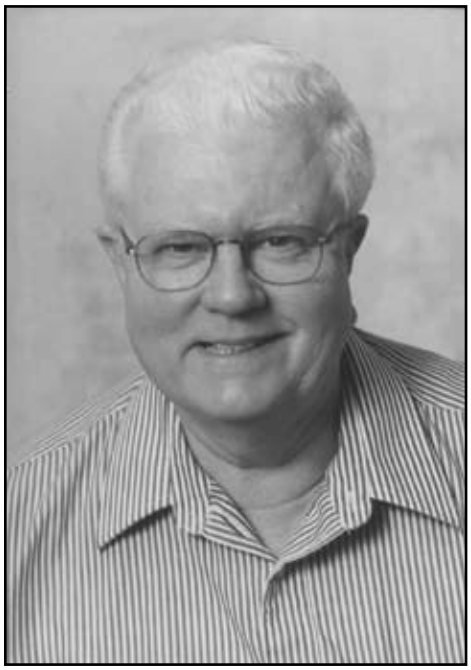
In addition to being a valued member of the department, Professor **Andy Hirsch** is also president of the Wabash River Cycling Club.

In Memorium

Prof. Earle Fowler
10 June 1921 - 01 March 2008
Years of Service: 1972-1980



Prof. Frank Loeffler
05 September 1928 - 27 July 2008
Years of Service: 1958-1997



Prof. Robert Mieher
10 October 1932 - 04 December 2007
Years of Service: 1965-2002

Prof. Donald Tendam
28 May 1916 - 17 February 2008
Years of Service: 1940-1982

Particles of Information ~ Graduate Research

Detection of Explosives Using Neutron Elemental Analysis

Eric Sword*

Neutron elemental analysis provides a non-intrusive, non-destructive, rapid, and safe way to observe the elemental composition of a material inside a sealed container. This method can be used at a security checkpoint to scan an unknown sample and determine if it is a hazardous material, such as an explosive or chemical warfare agent, without physically sampling the material. This technique has proven its ability to detect chemical warfare agents in a successful series of double-blind tests conducted at Edgewood Chemical and Biological Center using live chemical warfare agents. My work focuses on using neutron elemental analysis to detect explosive materials.

Most explosive materials are composed of carbon, hydrogen, oxygen, and nitrogen. Because carbon, hydrogen, and oxygen are ubiquitous in common materials, the detection of nitrogen as an initial trigger for explosives is essential to reduce false-alarms. This is done using the (n, γ) neutron capture reaction, which produces a 10.8 MeV gamma-ray.

Figure 1: Prototype neutron interrogation system optimized for the detection of explosive materials.

The system makes use of a compact linear accelerator, which produces 14 MeV neutrons using a deuterium-tritium fusion reaction. Because the neutron capture reaction is maximized for low-energy neutrons, the 14 MeV neutrons from the generator must lose energy before they are useful. Monte Carlo statistical simulations were used to optimize the moderating components of the system, which include a depleted uranium neutron reflector and a paraffin wax neutron guide. The neutron reflector uses neutrons from the generator to induce fission on ^{238}U, producing additional neutrons at lower energy traveling toward the scanned sample. The neutron guide uses elastic scattering with hydrogen to reduce neutron energy, and redirect neutrons toward the sample. The computer model was used to construct a prototype scanning system, shown in Figure 1.

The system is capable of determining the elemental composition of an unknown material based on neutron capture signal ratios observed by the system. The example of determining the elemental ratio of nitrogen to hydrogen is given by the equation

$$\frac{[N]}{[H]} = \frac{S_N}{S_H}\left(\frac{\sigma_N\,\varepsilon(E_N)}{\sigma_H\,\varepsilon(E_H)}\right)^{-1}$$

where S refers to the signal observed, E to the energy of the observed gamma-ray, σ is the thermal neutron cross-section for the radiative capture reaction leading to the observed gamma-ray, and ε is the efficiency of the gamma-ray detector as a function of energy. This behavior has been experimentally confirmed by measuring the elemental ratio of nitrogen to hydrogen, and comparing it to the expected value based on the contents of the sample, shown in Figure 2.

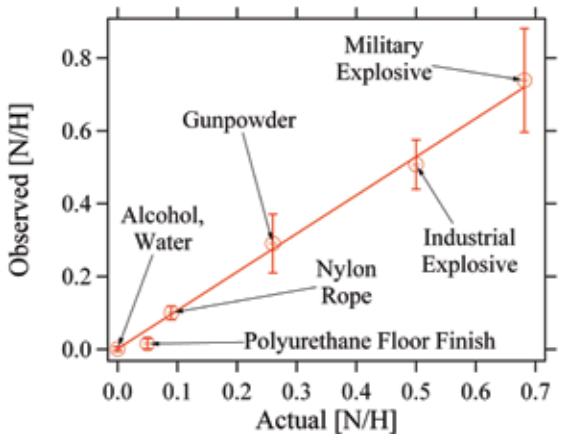


Figure 2: Comparison of expected elemental ratios to those observed using neutron elemental analysis.

This result shows that the techniques of neutron elemental analysis are not only capable of detecting the elemental components in a hazardous material, but also able to use this information to determine the elemental content of the sample. In this way, a scanner using neutron interrogation is able to separate benign and hazardous materials based on the elements observed, and their relative quantities.

* Eric Sword is a graduate student with Professor David Koltick and was supported in this work by an industrial fellowship with 2K Corporation.

Visitors & Speakers

16th Hubert James Lecture

Professor Roger Blandford, Director of the Kavli Institute of Particle Astrophysics and Cosmology at Stanford University, delivered the 16th Hubert James Lecture on 10 April 2008. Blandford's talk was entitled "Black Holes: The End of Time or a New Beginning?"

Sigma Xi Distinguished Lecture

The Physics Department hosted Robert M. Hazen, Senior Staff Scientist at the Carnegie Institution's Geophysical Laboratory and Clarence Robinson Professor of Earth Science at George Mason University, for the Sigma Xi Distinguished Lecture on 11 September 2008. Professor Hazen's lecture was "Right and Left: Mineral Surfaces, Molecular Selection, and the Origin of Life's Homochirality."

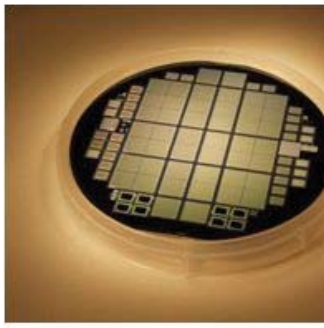
College of Science Distinguished Lecture

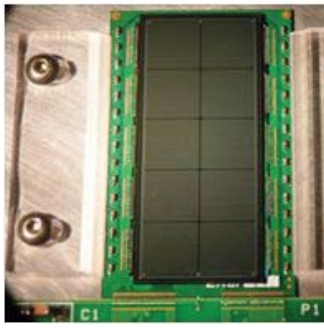
On February 7, the Physics Department hosted Professor Mildred Dresselhaus, a professor at the Massachusetts Institute of Technology, for the College of Science's Centennial Distinguished Lecture Series, held in celebration of the 100th anniversary. Prof. Dresselhaus' talk was entitled "The Potential of Nanostructured Materials to Address the Challenge of a Sustainable Energy Resource."

2008 Nobel Laureate **Yoichiro Nambu** collaborated closely with Purdue physics faculty during the 1960s, publishing papers with Professors **Peter Rosen**, **San Fu Tuan**, **Masao Sugawara**, and **Solomon Gartenhaus**. In a case of "what might have been" Prof. Rosen actively recruited Prof. Nambu to join the Physics Department in 1966. Unfortunately for us, Prof. Nambu decided to stay at the University of Chicago.

The LHC Revolution

The LHC (Large Hadron Collider) is expected to open a new era in particle physics.



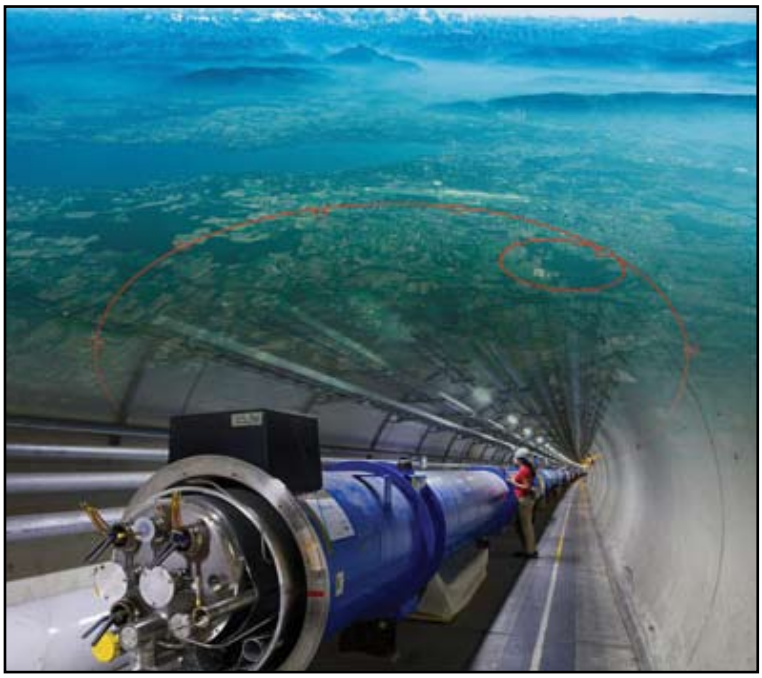


Top left: The

ASICs r

By Prof. Daniela Bortoletto

The Large Hadron Collider (LHC) is expected to open a new era in particle physics. The accelerator was built by the European Organization for Nuclear Research (CERN) a scientific organization of twenty European member states. The USA, Canada, Japan, India and Russia are observer states that have contributed significant resources to the completion of the LHC. In a 27-km underground tunnel located between the Jura Mountains and the Alps in the countryside near Geneva, Switzerland, protons and heavy ions will be accelerated at a velocity close to the speed of light. The beam is steered by superconducting magnets operating at cryogenic temperatures using superfluid helium at 1.9 K. The head-on collisions will reach 14 trillion electron volts (TeV), the highest energy ever achieved on earth. The experimental program of the LHC will open the exploration of a new energy frontier and promises to revolutionize particle physics. The main goals include the search for the Higgs boson and new particles predicted by supersymmetry or theories predicting extra dimensions of space-time.



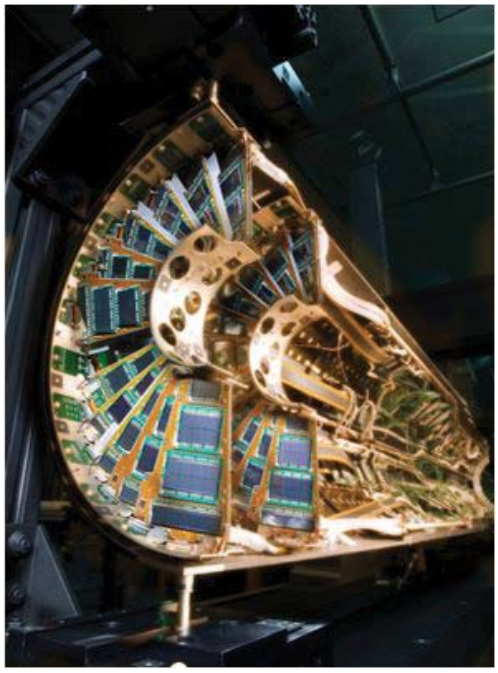
A photo of the LHC dipole magnets inside the tunnel over an aerial image of the LHC near Lake Geneva. Photographed by Fabienne Marcastel, © Cern

The Standard Model of particles and interactions summarizes our current knowledge of particle physics. The theoretical foundation of the Standard Model is confirmed at the per mille level by experiments at the Large Electron-Positron Collider that operated in the same tunnel now used by the LHC until 2000 and by the Tevatron, a proton-antiproton collider still operating just outside Chicago. Nonetheless there are many signs that the Standard Model is far from complete.

For example we need an explanation for the very different masses of elementary particles. The photon is massless while the electron mass is about 1/1836th that of the proton mass and the mass of the top quark is about 172 times larger than the proton mass. The key to explain mass in the standard model is the yet-to-be-discovered Higgs boson. The LHC is expected to discover the Higgs, if it exists, even if it weighs 1 TeV.

We also know from astrophysical observations that Standard Model particles only describe about 4% of the universe. The remaining 21% and 75% are described by dark matter and dark energy, respectively. Supersymmetry (SUSY), a theory that postulates a new symmetry between elementary particles of one spin with another particle that differs by a half-unit of spin, provides an excellent candidate for dark matter, the neutralino. To understand the true nature of dark matter particles we need to produce them at accelerators such as the LHC.

Finally, by colliding particles at very high energies we can start probing why gravity is so feeble. A novel

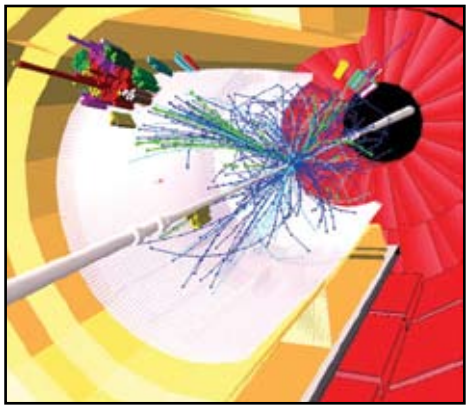


silicon pixel wafers designed by the Purdue team for FPix. Bottom left: A photo of plaquette containing 10 electronic eadingout 41,600 pixels. Right: A Photo of 2 half FPix disks

explanation is that gravity, uniquely among the forces, acts in extra dimensions and therefore its effect is much weaker in our three dimensions of space and one of time. If the fundamental scale of the gravitational interaction is a few TeV, gravitational effects could become comparable to electroweak effects and gravitons could be produced copiously at the LHC. Some of the gravitons might escape into extra dimensions giving rise to a missing energy signature in the LHC detectors. Higher energies can also recreate conditions that existed a fraction of a second after the Big Bang. This will allow us to probe the origins of matter and possibly understand why there are different types of matter particles in the universe.

What is Purdue's Role in the LHC?

The Purdue Particle Physics group which includes professors Virgil Barnes, Daniela Bortoletto, Art Garfinkel, Laszlo Gutay, Matthew Jones, David Miller, Norbert Neumeister and Ian Shipsey, as well as postdoctoral research personnel, engineers, graduate students and undergraduate students is a member of the Compact Muon Solenoid (CMS) Experiment being conducted at the LHC. The CMS collaboration involves 3600 people from 183 institutes in 38 countries, spanning Europe, Asia, the Americas and Australasia. To record the Universe's tiniest constituents the collaboration has built one of the largest scientific instruments. The 12,500-tonne CMS detector records a variety of detailed measurements to sieve out the events of interest. CMS's method of construction was unique, with "slices" of detector weighing as much as 2000 tonnes being fully constructed on the surface then lowered 100 meters into the cavern. The main features of CMS are a high-field solenoid housing a full silicon-based inner tracking system (pixels and strips), a fully active, scintillating crystal electromagnetic calorimeter, and a compact scintillator/brass hadronic calorimeter. Outside the solenoid, there is a hadronic 'tail-catcher' in the central region, and an iron-core muon spectrometer sitting in the return field of the powerful solenoid, with tracking chambers and trigger chambers.



Simulation of the creation of superpartner particles at the LHC, as seen in the CMS detector at CERN.

Purdue Physicists working on LHC

Professors:
Virgil Barnes
Daniela Bortoletto
Art Garfinkel
Laszlo Gutay
Matthew Jones
David Miller
Norbert Neumeister
Ian Shipsey

The Purdue Particle Physics group made extensive contributions to the CMS experiment during the past decade. We had a leading role in the design and fabrication of the 60 million channel silicon pixel detector. We developed, fabricated and installed a sophisticated radioactive source system to calibrate the CMS calorimeters. We contributed to the design and fabrication of the massive muon end cap detectors. Finally, Purdue is also one of the seven centers in the USA operating a world wide grid computing system to analyze the 100 megabytes/second data produced by the LHC. The pixel detector was installed in CMS on July 31 just before the CMS detector was closed in preparation for data taking. The first beams were seen by CMS at the beginning of September. Unfortunately a short between two magnets on September 19 caused serious mechanical damage to 24 dipole magnets and 5 of the quadrupole magnets when the liquid helium enclosure between two of the magnets ruptured. The damaged section of the LHC will be repaired during a scheduled winter shutdown and we expect to see circulating beam in May 2009. After working on CMS for over ten years we were disappointed by the delay but we are confident and excited about the LHC and the ground breaking discoveries it will allow.

Student Awards

Undergraduate

Richard W. King Award
Outstanding Physics Junior and Senior
Katherine Wooley (Sr.)
Joseph Clampitt (Jr.)

Lijuan Wang Award
Women in Physics
Zohar Aliya

Spira Award for Summer Research
Jhan Harp
Zachary Sylvan

College of Science Outstanding Student Award
John Doyle
John Wright
Alan Meert
Katherine Wooley

David G. Seiler Physics Scholarship
Emily Grace

Kenneth S. and Paula D. Krane Physics Scholarship
Joseph Clampitt
Jacob Thomas
Robert Gustafson
William Watterson
Jhan Harp
Joshua Phillips

Shalim and Paul Sargis Memorial Scholarship
Timothy Klamo
William Vogel

Margie and Don Bottorff Undergraduate Physics Scholarship
Charles Lee Coates

Physics Department Awards the First Gary L. Wright Fellowship

From left to right - Physics Department Head Nick Giordano, 2008 Wright Fellow Alyssa Garrelts, and Patricia Schreiner

Alyssa Garrelts received the Gary L. Wright Fellowship in Physics at the Department of Physics Annual Awards Ceremony on April 24, 2008. Garrelts is a graduate student in the area of biophysics working under the direction of Professor Ken Ritchie. The Wright Fellowship was established by Mrs. Patricia Schreiner of West Lafayette in honor of her husband, who began his studies at Purdue as a physics major. The Wright Fellowship was announced by Purdue University on April 9, 2008, as part of Purdue's Access and Success Campaign.

Graduate Awards

H.Y. Fan Award for Outstanding Research in Condensed Matter
Sunanda Koduvayur

Lijuan Wang Award
Women in Physics
Laura Biedermann
Yu Zhen

Karl Lark-Horovitz Award for Outstanding Research
Yongquan Xue

George W. Tautfest Award
Outstanding student in high energy physics
Jason Ulery
Terence Tarnowsky

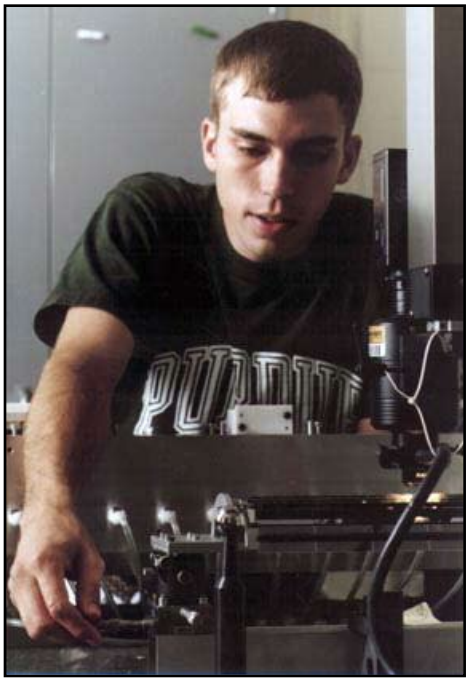
- **Elizabeth Proctor** (BS 08) was selected as a Student Responder at the May 2008 commencement ceremony.

- **Katherine Wooley** (BS 08) was awarded a National Science Foundation Graduate Research Fellowship to begin her graduate studies at Harvard University.

Alumni News

Where Are They Now?

Derek Tournear became a Boilermaker in 1995. He came to the physics department from the US Navy nuclear power program. He was determined to switch to engineering after one year of physics. Thankfully he did not follow that path.



Derek Tournear working in the CLEO III assembly lab at Purdue 1997

During his time at Purdue Derek worked on the CLEO III silicon vertex detector with Professor Ian Shipsey and Kirk Arndt. Derek was involved early on in the project and helped with designs and construction of the detector. "Unfortunately I moved on to graduate school months before final assembly and shipping of the detector to Cornell." Derek recalls.

Derek received his B.S. in December 1998, but continued at Purdue as a graduate student until August of 1999 during which time he taught introductory physics labs along with working on the CLEO III detector. In September of 1999, he enrolled at Stanford University where he received a Ph.D. in physics in 2003.

While at Stanford, Derek studied high-energy astrophysics at SLAC. He worked on the GLAST (now Fermi) space telescope hardware and the Unconventional Stellar Aspect (USA) X-ray space experiment data analysis. Derek's hands-on experience at Purdue helped with interfaces to engineers working on space experiments under construction. He recalled, "Stanford was the first place I saw a major difference between the way physicists and engineers thought. At Purdue the scientists shared a practical view similar to engineers; at Stanford the viewpoints could be further separated. The ability to see both sides helped on more than one occasion."

Following graduation, the newly inducted Dr. Tournear took a postdoctoral position and eventually a staff scientist position with the space and atmospheric sciences group at Los Alamos National Laboratory. At LANL Derek worked on gamma-ray optics based on channeling and was the LANL PI on the DARPA X-ray Navigation (XNAV) program. As the XNAV PI, he was responsible for design, fabrication and test of an X-ray sensor to allow autonomous navigation in space.

Derek and Jaime Tournear at the DARPA 50th anniversary celebration 2008.

After leading XNAV through a successful Phase 1, Derek moved to the Washington DC area to join DARPA as a program manager in 2007. He describes life at DARPA, "DARPA is an exciting and unique place to work. Everyone is on a fast track to push out as much cutting edge R&D as they can in their tenure here. You get exposed to a tremendous amount of fascinating ideas from academia, industry and national labs. DARPA is truly a place where one can impact R&D, and in the end deliver technology that can greatly benefit our Nation's security."

Dr. Tournear currently lives with his wife Jaime and daughter Savannah in Catlett, VA.

Where Are YOU Now?

Send us a note at interactions@physics.purdue.edu and tell us about it!

Alumni News

2008 Distinguished Science Alumni Award

Lowell Wenger

- BS '71, Purdue University
- MS '73, Purdue University
- PhD '75, Purdue University

(advised by Prof. Pieter Keesom)

Lowell Wenger is the dean of the School of Natural Sciences and Mathematics at The University of Alabama at Birmingham (UAB) where he is responsible for more than 90 faculty and 1,700 students. He has led the NSM faculty through major curricular changes to improve student learning in mathematics and to enhance research and honors opportunities for undergraduates. Before joining UAB, Lowell was a member of the physics faculty at Wayne State University in Detroit, Michigan, and held administrative positions of chair in the Department of Physics and associate dean in the College of Science. As a researcher, he has authored over 120 journal articles and presented his work at numerous national and international conferences. His work focuses on the calorimetric and magnetic properties of spin-glass, superparamagnetic, and other magnetic materials. In addition, he has studied the paramagnetic Meissner and Josephson effects in both conventional and high temperature superconducting materials. He is presently serving as a co-PI on an National Science Foundation-funded project titled "UAB ADVANCE Institutional Transformation Award," whose objective is to increase the number of female faculty in the science and engineering disciplines. Lowell is a member of the American Physical Society, Materials Research Society, and Sigma Xi, and of the Sigma Pi Sigma, and Phi Kappa Phi honorary societies. He was awarded a Fulbright-Hays Research Fellowship in 1982, Alfred P. Sloan Research Fellowship in 1978, was a recipient of a Board of Governors Faculty Recognition Award, and an inaugural Career Development Award while at Wayne State.

Lowell is originally from Middlebury, Indiana, and is a 1967 graduate of Middlebury High School. He and his wife, Andrea (MS '76, Consumer and Family Sciences), reside in the Riverchase area of Birmingham, Alabama.

Career Highlights

2003 - present	Dean, School of Natural Science and Mathematics, University of Alabama at Birmingham
1998-2003	Chair, Department of Physics, Wayne State University
1996	Became an associate dean, College of Science, Wayne State University
1982	Named a Fulbright-Hays Senior Research Fellow, Kamerlingh Onnes Laboratorium, Leiden University, The Netherlands

Physics Outstanding Alumni Award 2008

The Physics Department honored its 2008 Outstanding Alumnus on October 31, 2008. Nitin Samarth was selected for his exceptional leadership in the physics community. Samarth, of State College, Pennsylvania, is a professor and associate head of the physics department at Pennsylvania State University. He completed his undergraduate education in physics at the Indian Institute of Technology in Mumbai, India, in 1980 and earned his PhD from Purdue University in 1986. As a grad student, Samarth worked under Professor Jacek Furdyna on studies of electron paramagnetic resonance in CdMnTe, CdMnSe, and CdMnS. At Penn State, his research focus is on electronic spin phenomena in semiconductor nanostructures for potential applications in spin electronics ("spintronics") and quantum computation. Samarth was named a Fellow of the American Physical Society in 2003, won the George W. Atherton Award for Excellence in Teaching at Penn State in 2007, and the Faculty Scholar Medal in physical sciences from Penn Sate in 2008.

Physics Department Head Nick Giordano presents Dr. Nitin Samarth with the 2008 Physics Outstanding Alumni Award

Announcing the Centennial Physics Professorship

Thanks to the generous contributions of faculty, faculty emeritus, and alumni, the Purdue University Physics Department is proud to announce its new venture to endow the recently established Centennial Physics Professorship. Special thanks in particular go to Mrs. H.Y. (Manya) Fan, Prof. Andrew Hirsch, Prof. Everett Klontz, Robert S. Vickers and Prof. Nicholas J. Giordano for their contributions. As an endowment, the Centennial Physics Professorship will last in perpetuity and act as a key component in allowing the Physics Department to attract and secure the best and brightest scientific leaders to the department. Through the enormous potential this professorship holds, we have the opportunity to expand and enhance our faculty base to an immeasurable extent.

The Centennial Physics Professorship will be recognized both internally and externally, nationally and internationally, within the scientific and academic communities. The professorship will lend further credence to a faculty member's research, to the Physics Department and to the University. The recipient of this professorship will also improve the quality of student learning by enriching classroom instruction through novel approaches and by serving as a role model, mentor and visionary. The prestige, recognition and honor that a named professorship carries is invaluable.

We are already a third of the way to our goal of $1.5M, the Physics Department invites you to invest in this professorship, enabling us to recruit and retain extraordinary faculty members who will push the boundaries of discovery at Purdue.

Alumni News

Celeste Bottorff (BS 1975) received the 2008 Lettie Pate Whitehead Evans Award from the Board of Directors Network, Inc.

Patricio A. Perez (PhD 1984) is a professor at Universidad de Santiago. On June 25, 2007, 23 years after his graduation from Purdue, he visited campus and met some of his former professors in Physics. He also gave a seminar in the School of Health Sciences about his research on models for air pollution forecasting.

Edward S. Michlovich (PhD, 1994) of the Center for Naval Analyses was awarded the Military Operations Research Society's 2007 David Rist Prize for his study "Countering Radio Controlled Improvised Explosive Devices."

Mario Paniccia (PhD 1994) was named *R&D Magazine's* 2008 Scientist of the Year.

Matthew G. Lyons (BS 1997) and Chanda M. Robertson (LA 1998) welcomed a daughter on May 7, 2007

Have news to share? Send it to us! Have a question?

Contact Javier Magallanes, Director of Development, at 765.494.0669 or jmagalla@purdue.edu

From the Director of Development

Greetings from the Purdue Physics Department!

Since its inception in 1904, Purdue Physics has been recognized as one of the top physics programs in the nation. Such preeminence has only been possible because of the achievements and support from dedicated alumni and friends like yourself. Thanks for representing your alma mater so well!

This spring, President France Cordova announced her Access & Success campaign with the goal of $304 million over the course of seven years to support programs and scholarships at Purdue. Scholarships will be offered to more students than ever, including out-of-state, international, and middle-income students. Students in a variety of disciplines and from a broad spectrum of backgrounds will not only be able to attend Purdue, but also be able to graduate with fewer financial obligations. It is only through your continued and generous gifts that we are able to provide scholarships, enhance our program, and attract world-class faculty to the Physics Department.

Please know that you are always welcome to visit the Physics Department. It would be great to personally meet you and hear about the many things that have happened since you left campus. Please contact me if you have questions or need any assistance regarding your philanthropy to our physics department.

Hail Purdue!

Javier Magallanes
Director of Development
765.494.0669
jmagalla@purdue.edu

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December 2007

Bachelor of Science
Kozak, Brian
Balsley, Mikel
Davis, James
Heidrich, Joseph

Master of Science
Kihara, Shigeharu

Ph.D.
Aquino, Fredy
Bove, Angelo
Chen, Gang
Dhayal, Babita
Ulery, Jason

May 2008

Bachelor of Science
Ayodele, David
Brown, Tyler
Carter, Jeffrey
Cerbus, Rory
Crouch, Zachary
Fink, Michael
Francisquez, Tamanaco
Griffin, Jessica
Haney, Trevor
Harter, Andrew
Hezzelwood, Spencer
Hugenberg, Daniel
Jasinski, Jonathan
Kozak, Brian
Lewis, Brian
O'Brien, Kevin
Proctor, Elizabeth
Robinson, Eric
Sims, Christopher
Steinhiser, James
Stull, Nicholas
Troyer, Justin
Wooley, Katherine
Yan, Allen
Zeller, Daniel

Master of Science
Altaf, Adeel
Chauvet, Adrien
Kramer, Andrew
Qiu, Bo
Woodruff, Thomas

Ph.D.
Hsiao, Ya-Yun
Ippolito, Nicole
Lu, Xiangshun
Maroussov, Vassili
Mustata, Gina
Tarnowsky, Terence
Wang, Liang
Xue, Yongquan

August 2008

Bachelor of Science
Stull, Nicholas

Master of Science
Antypas, Dionysios
Dudley, Peter

Ph.D.
Cara, Mihai
Dautermann, Thomas
Gecse, Zoltan
Millis, John
Pszota, Gabor

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