The Department of Physics and Astronomy at the University of Pittsburgh is committed to excellence and innovation. The department offers a range of programs in physics and astronomy, including an undergraduate major that is designed to provide students with a strong foundation in their field. The curriculum includes cutting-edge courses in condensed matter physics, nanoscience, and biological physics, as well as advanced laboratories that provide students with hands-on experience.

The department is proud to have a number of highly advanced students who have traveled to international facilities, located in Japan and Switzerland, to participate in particle physics research. These students are vital members of the research team and are encouraged to collaborate with faculty members to pursue their interests and abilities. Once students form mentorships with faculty, they are more likely to be productive members of the professor’s research project.

To promote undergraduate involvement in research, faculty members offer a number of research assistantships, which are open to both undergraduate and graduate students. The department also offers students the opportunity to engage in international research, which can be a valuable experience for those interested in pursuing a career in research.

The University of Pittsburgh is committed to excellence in research and education, and the Department of Physics and Astronomy is proud to be a part of this tradition. We encourage all students to consider majoring in physics or astronomy, and we look forward to seeing the next generation of physicists and astronomers contribute to our understanding of the universe.
MESSAGE FROM THE ASSOCIATE DEAN

On the Forefront of Research

Welcome home to the University of Pittsburgh. The Kenneth P. Dietrich School of Arts and Sciences is proud of the legacy it has built as an internationally respected center for pioneering research and scholarship in the natural sciences, humanities, and social sciences. Pitt faculty members are leading the way in groundbreaking research in a wide range of fields across the disciplinary spectrum.

A large part of a liberal arts education is the outstanding opportunity it offers students to enrich their academic experience by participating in undergraduate research alongside scholars who are distinguished leaders in their disciplines. I am pleased to report that the Dietrich School’s Office of Undergraduate Research, Scholarship, and Creative Activity (OUR) works extensively to promote and expand opportunities for students to learn credits outside the classroom by engaging in research activities that are directly tied to current course work. As early as the second term of their freshman year, students can participate in First Experiences in Research. This program provides freshman and sophomore students with an exceptional opportunity to work side by side with a faculty mentor on his or her research.

While First Experiences in Research provides an initial entry into research, Continuing Experiences in Research allows students to delve deeper into their disciplinary areas and become more familiar with the traditions of their disciplines. Launched this fall by OUR, Continuing Experiences in Research is a forum in which students continue working with faculty mentors on their First Experiences in Research projects. This initiative bridges the gap between students’ first foray into research with the more expansive independent research students often take on as upperclassmen.

We encourage juniors and seniors to apply for OUR’s Summer Undergraduate Research Awards to gain practical experience by participating in critical inquiry of their own design. In 2011, we enhanced and revitalized the summer awards program and it surpassed all expectations. This past summer, 30 juniors and seniors received a $5,500 stipend to conduct independent research on such topics as Internet Memes and Popular Culture and The Mirror and the Mind: Medieval Literary Mirrors and the Neuroscience of the Mirror Response.

Numerous research opportunities also exist at the departmental level, and we encourage all students to initiate conversations with faculty members about their research interests. Ultimately, our goal at the Dietrich School is to provide students with access to research opportunities, skills, and methodologies that enhance their education and inspire intellectual curiosity and creativity. For more information on research programs offered through OUR, visit www.us.our.pitt.edu/our.

Mary you have a wonderful academic year, and we look forward to seeing you during Family Weekend, October 26–28.

John A. Twyning
Associate Dean for Undergraduate Studies

FUTURE LEADERS LEARN TODAY

Unlocking the Mysteries of the Stars

This favorite English lullaby is interwoven into the lives of families around the world. Parents use this song to soothe their babies to sleep, toddlers learn specific hand motions to act out the text, and elementary students perform this classic through finger play and musical instruments. However, for fifth-year senior Olivia Telford, this nursery rhyme summarizes her curiosity about those bright lights in the sky. From a very young age, Telford has had an innate desire to learn more about the evolution and formation of stars and what lies beyond them.

A native of Buffalo, N.Y., Telford came to the University of Pittsburgh on a full-summer scholarship through the Swanson School of Engineering and the University Honors College. After she enrolled in her first astronomy class with Jeffrey Newman, associate professor in the Department of Physics and Astronomy, Telford confirmed her career path when she decided to double major in bioengineering and physics and astronomy. “I was completely enthralled by Professor Newman’s class and the powerful research he was conducting on galaxy evolution,” says Telford. “While the physics and astronomy curriculum is extraordinary, Professor Newman’s class really confirmed my interest in nighttime astronomy.”

Through grants she received from the National Science Foundation’s Research Experience for Undergraduates program, Telford conducted research at the National Solar Observatory in New Mexico, examining why the corona (outer atmosphere) of the sun is so hot. She also received grants from the Pennsylvania Space Grant Consortium, a NASA-funded program, to develop interactive computer code to model light absorption in the Earth’s atmosphere, which enables scientists to accurately analyze the light from galaxies.

In her junior year, Telford wanted to delve deeper into astrophysics research, so she sought out Newman’s assistance. She worked extensively with Newman on studying the properties and evolution of galaxies through the Deep Extragalactic Legacy Survey (DEEP2), which uses the Keck Telescope to explore distant galaxies. Telford also assisted with CANDELS (Cosmic Assembly Near-infrared Deep Extragalactic Legacy Survey), a powerful imaging survey carried out with two cameras on board the Hubble Space Telescope. Working with the images taken from Hubble, Telford classified 200 galaxies per week according to their shapes, looking for patterns on how galaxies form and evolve over time.

“Assisting Dr. Newman on such cutting-edge research has given me an incredible opportunity to be on the forefront of new discoveries and to make a substantial contribution to the field,” explains Telford. “I am thrilled that the work I am doing will be part of research published in scientific journals.”

After graduating in 2013, Telford plans to attend graduate school and ultimately teach at the college level so that she can mentor other young researchers interested in unlocking the mysteries of the universe.

Pitt Alum Returns as Advising Center’s New Assistant Director

The Kenneth P. Dietrich School of Arts and Sciences recently announced the appointment of Derek Fischer as the new assistant director of the Advising Center. Fischer brings more than seven years of related academic and career advising and other educational experience to the University of Pittsburgh.

“It is extremely gratifying to be back at my alma mater and to be part of such a well-respected and prestigious institution,” says Fischer. “I am looking forward to working with Mary Beth Favorite, the director of the Advising Center, and as the new assistant director of the Advising Center, as well as all of the dedicated academic advisors and advising staff. Their level of commitment to student satisfaction and excellence is extraordinary.”

As Fischer begins to immerse himself in his new role, his immediate focus is to learn the structure of the Advising Center, become acclimated to the needs of Dietrich School students and advisors, and to assist them with any challenges that may arise. His long-term vision includes the further development of the Advising Center as a student-centered resource where students work in collaboration with advisors to receive personalized and timely information.

“One of the Advising Center’s goals is to help students explore their academic and personal interests,” says Fischer. “We want to encourage them to take full advantage of all resources and support systems offered on campus and to be engaged in the advising process. With our help, we hope that students are able to broaden their horizons and diversify their experiences.” Ultimately, Fischer says that if students are better able to define their interest areas and can discover areas in which they can excel, they will be much happier and more successful.

In addition, Fischer would like to expand the use of technology as part of the advising model. “Students are so technologically savvy that we need to keep pace with them and adapt to their changing needs. One of the immediate projects is to implement an online appointment calendar to make scheduling a meeting with an advisor more convenient for students. From there, we will continue to explore other ways to use new technology to reach our students.”

A native of Cambridge Springs, Pa., Fischer previously worked as an academic advisor for the University of South Florida College of Arts and Sciences and as an academic and career advisor for Lake-Sumter Community College in Clermont, Fla. He received his master’s degree in education from Duquesne University and his bachelor’s degree in psychology from the University of Pittsburgh. An avid sports fan, Fischer is looking forward to cheering on all of the Pittsburgh sports teams this fall, particularly the Pitt Panthers.
As a child growing up in New York, N.Y., Jeremy Levy dreamed of an acting career. During his youth, he even appeared in several Hollywood studio movies. However, his first career came to an abrupt halt when his father, Academy Award-winning documentary filmmaker Edmond Levy, nixed the idea and strongly encouraged the young Levy to pursue other interests. Because mathematics and science also were childhood interests, Levy spent his teenage years in a laboratory instead of on a sound stage. Now, as a professor in the Department of Physics and Astronomy and director of the Center for Oxide-Semiconductor Materials for Quantum Computation, Levy is back in the spotlight, this time for his revolutionary work in the field of quantum computing.

Levy's research focuses on exploring the development of nanoscale (microscopic) electronic materials and devices to provide the physical foundation for future technologies, including quantum computing. "Because technology is forever evolving, we need to change our approach and identify new materials and properties if we are to stay on the forefront of advancement and discovery," says Levy. "Every time an experiment does not work, it becomes an opportunity to reevaluate our processes, reshape our thinking, and try something that may seem radically different."

Since 2006, Levy's research lab has been working on a process in which the ability to conduct electricity can be turned on and off on scales comparable to the distance between atoms. He invented a method of sketching tiny wires using the "stylus" of an atomic force microscope. Similar to an Etch A Sketch toy, these infinimally small wires also can be erased and rewritten. In 2011, Levy and his research team received a $1.8 million grant from the National Science Foundation to explore whether this approach could be used to replace conventional electronics made from silicon. Working in collaboration with physicists from the University of Wisconsin–Madison and Northwestern University, Levy is trying to overcome scientific challenges that, if addressed, could lead to revolutionary new technologies.

"The question is, once you've pushed silicon to its limit, is there going to be another system to do computations?" asks Levy. "We are trying to break down the major barriers that are potential show-stoppers and would otherwise make it difficult to turn these new types of devices into real, useful applications."

The new material Levy's team is working with is from the family of complex oxides, which share many of the semiconducting properties of silicon but also can be used for computing, storage, and light-sensing applications. Levy's groundbreaking research could completely transform the way computers are used and help to position the United States as a global leader in the area of nanoelectronics.

Levy has been a faculty member at the University of Pittsburgh since 1996. He has received many prestigious awards, including three Chancellor's Distinguished Teaching and Research awards for his innovative work in research and teaching. He is passionate about sharing his ideas with a new generation of scientists and continually looks for opportunities to involve students in the research process. "We treat undergraduates like graduate students so (that) in a few years, they will be publishing papers and working on very expensive atomic force microscopes," explains Levy. "The wonderful advantage of working at a research institution like Pitt is the reward of seeing students who never thought they had any interest in physics start to blossom and come alive. This trinity is a launching pad for students to engage in groundbreaking research."

For more information on Levy's research, visit www.levylab.org.
Dietrich School Announces Family Weekend Event

As part of the Family Weekend 2012 festivities, the Kenneth P. Dietrich School of Arts and Sciences invites all Dietrich School students and their families to attend a 5 p.m. screening of the acclaimed film The Shot Felt Round the World on Friday, October 26, in the Frick Fine Arts Auditorium. An hors d’oeuvre reception will follow the screening at 6:15 p.m. in the Frick Fine Arts cloister.

The documentary film, produced by Dietrich School faculty member Carl Kurlander, focuses on the research on and discovery of the polio vaccine by University of Pittsburgh scientists. The film, of special interest to students considering a career in research, complements the programming and theme of Welcome Home to Pittsburgh arranged through the Office of Freshman Programs. This film is part of the Fridays @ 5 Lectures and Films series that is free and open to all freshman students. For more information, visit www.as.pitt.edu/fp.

To register for the film and reception, e-mail freshmen@pitt.edu or call the Office of Freshman Programs at 412-624-6844 by Monday, October 22.