UNIVERSITY OF PITTSBURGH

The DIETRICH School of Arts & Sciences

FALL 2012
VOLUME 9, ISSUE 2

THE PITT PRIDE

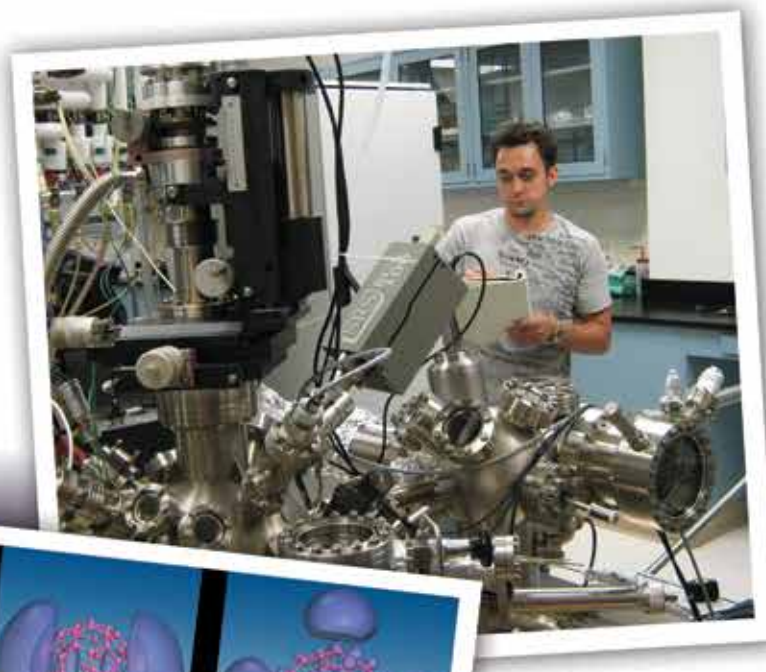
DEPARTMENT OF PHYSICS AND ASTRONOMY:

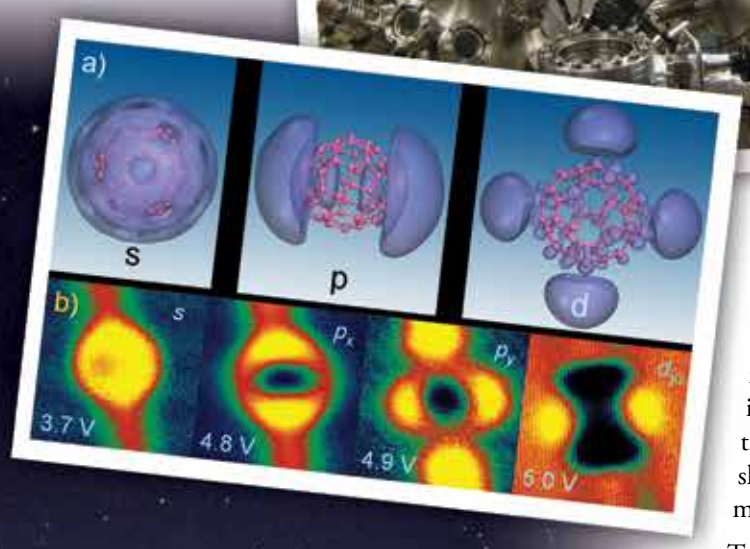
Pioneer in Research

The University of Pittsburgh's internationally recognized Department of Physics and Astronomy continues to be an important leader at the frontier of science. With recent discoveries in astrophysics and quantum computing, the department upholds its tradition of excellence and innovation with breakthroughs that promise an ever-deepening understanding of the universe.

The physics and astronomy major provides an extraordinary opportunity for undergraduate students to explore the sciences, universe, solar systems, and galaxies alongside some of the top scientists in the field. Students benefit from small class sizes that allow for interactive learning and direct access to dedicated faculty members who are on the forefront of major discoveries in their disciplines.

The department is in the process of completely redesigning and expanding the major, which includes plans to add a certificate in nanoscience. "It is extremely important for the department to revaluate our major and look at how we can improve the student experience," says James Mueller, the department's director of undergraduate studies. "We are very excited about revising the curriculum, particularly the addition of the education track that is geared toward teaching science in high school. We are looking to expand the entire program, provide students with more flexibility in choosing electives, and continue to offer a rigorous but well-rounded introduction to physics and astronomy."





All undergraduate students in the Department of Physics and Astronomy have access to various in-house departmental research labs and facilities. These facilities, updated regularly, acquaint students with new devices and concepts. As students follow the sequence of introductory, intermediate, and advanced laboratories, they progress from equipment designed primarily for teaching purposes to equipment designed primarily for use in research. These include cutting-edge condensed matter physics, nanoscience, and biological physics labs; labs dedicated to particle physics research; and labs dedicated to astrophysics/cosmology research. In addition, there is an honors-level laboratory equipped with special instrumentation designed to acquaint students with modern techniques of making many types of physical measurements.

Students also have the ability to conduct research using telescopes at the Allegheny Observatory, located eight miles from the Pitt campus.

Because research is a vital and essential aspect of the department's curriculum, students are encouraged to contact faculty members about research projects as early as possible in their academic careers. "Our faculty are looking for bright, motivated students to assist with their cutting-edge research," says Mueller. "We encourage students to show initiative and communicate with faculty members about their interests and abilities. Once students form mentorships with faculty, they are more likely to be productive members of the professor's research project."

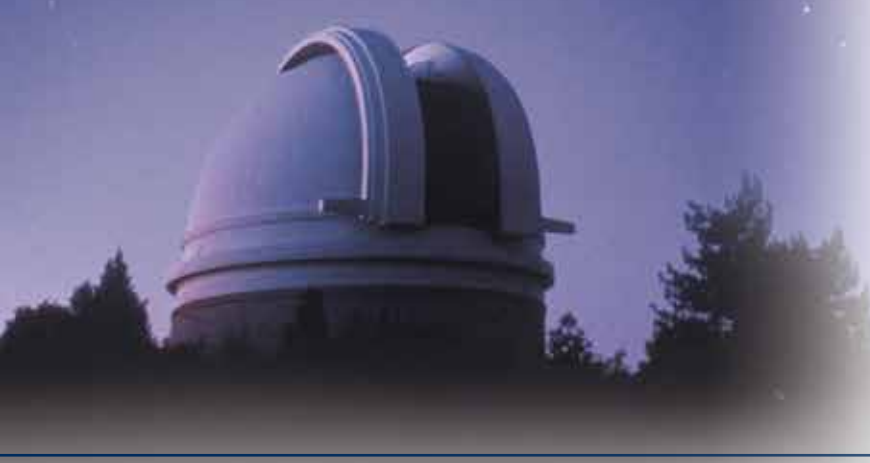
To promote undergraduate involvement in research, faculty members often grant a number of research assistantships. The paid assistants work closely with faculty members, postdoctoral research associates, and graduate students. "Our student researchers are vital members of the research team. We treat our undergraduates as colleagues, and many of them have been named as coauthors or first authors on faculty research," says Mueller. "In fact, some of our highly advanced students have traveled to international facilities, located in Japan and Switzerland, to participate in particle physics research."

In addition to research assistantships, students can apply for numerous awards, scholarships, and internships that recognize outstanding academic achievement and excellence in undergraduate research and writing, including the Thomas-Lain Fund Scholarship and the Halliday Award for Excellence in Undergraduate Research. "We are proud that each year the department rewards the extraordinary achievements of our undergraduate students with several prestigious scholarships, and we highly encourage all of our students to apply for these departmental and national awards," says Mueller. To view a full list of available scholarships, visit **www.physicsandastronomy.pitt.edu/about/academic_awards**.

For more information on the Department of Physics and Astronomy, visit **www.physicsandastronomy.pitt.edu**.

DID YOU KNOW?

- In August 2012, the Department of Physics and Astronomy celebrated the 100th anniversary of the dedication of the Allegheny Observatory.
- Students and faculty have access to the Pittsburgh Supercomputing Center, which provides researchers with access to several of the most powerful systems for high-performance computing, communications, and data handling available to scientists nationwide for unclassified research.
- Since 2002, six undergraduate students from the department have received a prestigious Barry M. Goldwater Scholarship or Marshall Scholarship.



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 earn 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 $3,500 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.as.pitt.edu/our.

May 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

Twinkle, twinkle, little star how I wonder what you are. Up above the world so high, like a diamond in the sky. Twinkle, twinkle, little star, how I wonder what you are.

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 tune on a variety of musical instruments. However, for fifth-year senior Olivia Telford, this nursery rhyme summarizes her inquisitiveness 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 those "diamonds" in the sky.

A native of Buffalo, N.Y., Telford came to the University of Pittsburgh on a full-tuition 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 two 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 Evolutionary Probe 2 (DEEP2) and DEEP3 Galaxy Redshift surveys. She 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 how they change 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, 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.

FACULTY PROFILE

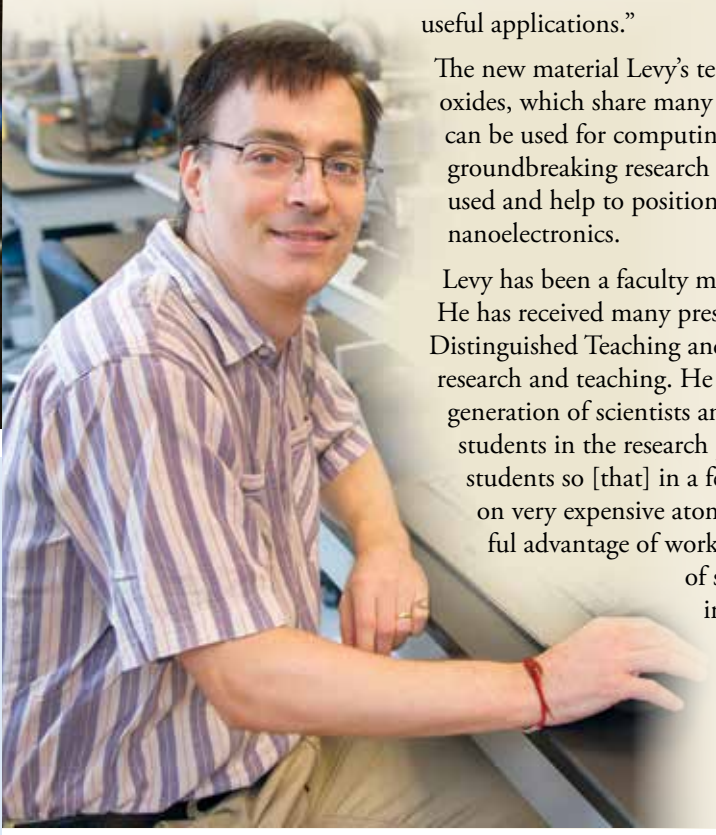
Groundbreaking Discoveries Transform Computer Technology

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 younger 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 infinitesimally 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 computation?" 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 truly is a launching pad for students to engage in groundbreaking research."

For more information on Levy's research, visit **www.levylab.org.**

ARC and OUR Host Ethics Workshop

This past summer, the Academic Resource Center (ARC) and the Office of Undergraduate Research, Scholarship, and Creative Activity (OUR) hosted the Ethics Workshop for the Dietrich School Summer Undergraduate Research Award winners. More than 25 students gathered to discuss ethics case studies along with Dietrich School faculty and staff members from the ARC and OUR. Each of the Summer Undergraduate Research Award winners conducted intensive independent research over the summer, and although their research topics were as varied as The Material Culture of the Medieval Pilgrimage Route to Santiago de Compostela to The Neurological Processes Underlying Schizophrenia, all warranted significant ethical consideration.

"I was amazed by the students all summer," says Patrick Mullen, director of OUR, "and their thoughts on serious ethical issues in research only deepened my admiration of their work." The students gathered in small groups to discuss ethics case studies ranging from the widely known Stanley Milgram obedience experiment to the Willowbrook hepatitis study. A Dietrich School faculty or staff member facilitated each small group discussion. While the students found differences in their cases, they also discussed the many similarities between them. "Ethical concerns are inherent in every kind of research," says Mullen. "The Ethics Workshop gave the students an opportunity to see connections not only between their assigned cases but also across disciplines."

As summer award winners, the students represent the intellectual curiosity inherent to the larger, more diverse student body of the Dietrich School. The passion of the students, faculty, and staff present at the Ethics Workshop produced a meaningful opportunity to reflect on the kinds of ethical concerns that will guide young scholars far into the future.

FYI

COPING SKILLS FOR INCOMING STUDENTS

by Mary Koch Ruiz, University Counseling Center

The transition from high school to college can be a time of heightened anxiety for incoming students. Changes, fears, and expectations accompany the transition and, coupled with homesickness, can be very overwhelming for many students. Some incoming students feel overly optimistic and confident in their abilities to manage the challenges they will encounter in college; others feel anxious, under-prepared, and frightened. It is extremely important for all students to be realistic about their academic, social, and personal expectations in order to make a successful transition. It also is important for parents and students to talk together about those expectations to clarify any romanticized or inaccurate reflections of college life. This will help to better prepare students for challenges that may present themselves after they arrive at school.

Some common struggles students may encounter when starting college include:

- initial feeling of disappointment regarding their choice of school;
- sudden, dramatic change in lifestyle;
- challenges making new friends;
- unmet expectations of roommate, classes, and/or social situations;
- academic workload; and
- additional stressors, such as a recent divorce or death in the family or the termination of a high school relationship.

The following are healthy suggestions to help students cope with the transition:

- Acknowledge and express their feelings of homesickness, anxiety, and sadness—all of which are normal feelings.
- Keep in touch with family and high school friends via phone calls, e-mails, and text messages.
- Become involved in campus activities to meet other students. Becoming part of a social group helps incoming students feel connected to their new environment and has a positive impact on attitude.
- Maintain a healthy eating and sleeping schedule; this helps to stabilize mood.
- Explore the campus. More familiarity with new surroundings helps to enhance a sense of control.
- Talk with someone on campus, like a resident assistant or a counselor in the University Counseling Center.
- Keep an open mind. Open mindedness fosters learning, self-development, and more opportunities to meet others.

RESOURCES

University Counseling Center
334 William Pitt Union
412-648-7930
www.counseling.pitt.edu

Student Organization Resource Center
833 William Pitt Union
412-648-7836
www.sorc.pitt.edu

CALENDAR OF EVENTS

October

26 Fall term deadline for students to submit Monitored Withdrawal forms to the dean's office; last day to resign from all classes with the Student Appeals Office and receive a partial refund

26–28 Family Weekend

29 Spring term enrollment appointments begin

November

9 Deadline to apply for April 2013 graduation; last day for spring term enrollment appointments

10 Spring term open enrollment period begins

21–25 Thanksgiving recess for students (no classes)

22–23 Thanksgiving recess for faculty and staff (University closed)

December

3 Last day to withdraw from all classes in the dean's office

7 Last day for undergraduate day classes; spring term deadline for continuing students to register without a penalty fee

8 Reading day

8–15 College of General Studies classes, all graduate classes, and evening classes will continue to meet during this period; final examinations should be held during the last scheduled class meeting.

10–15 Final examination period for undergraduate day classes

15 Fall term ends; official date for degrees awarded in fall term

16 Residence halls close

16–January 6, 2013 Winter recess for students (no classes)

19 Fall term grades must be approved by instructors

20 Fall term grades available online

24 –January 1, 2013 Winter recess for faculty and staff

For the online academic calendar, go to www.provost.pitt.edu/information-on/calendar.html.

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Carl Kurlander

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.

IMPORTANT CONTACTS

Advising Center 412-624-6444

Academic Resource Center 412-648-7920

Office of the Associate Dean for Undergraduate Studies 412-624-6480

Office of Undergraduate Research, Scholarship, and Creative Activity 412-624-6828

Office of Freshman Programs 412-624-6844

Office of Student Records 412-624-6776

www.as.pitt.edu/undergraduate

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