Greetings from the physics department at Marquette University! On behalf of the physics department, I’d like to congratulate you on your academic achievements, and encourage you to consider pursuing a Physics degree at Marquette University.

What can you do with a degree in Physics? The opportunities are endless. More than half of the graduates of the Marquette physics program continue into graduate programs at various universities, including Princeton University, the Medical College of Wisconsin, the University of Notre Dame, the University of Wisconsin, and Purdue University.

Graduates also have gone directly into the workplace at Ford Motor Company, Motorola, Proctor and Gamble, NASA Jet Propulsion Lab, Scripts Institute of Oceanography, the U.S. Defense Department, IBM, and Rockwell International. Recently, one graduate went to law school, and another entered into the US Navy pilot training program. Graduates have also proceeded to teach in high schools and in the Peace Corps.

Our alumni have a wide range of accomplishments, which are featured in this issue, and they all began as physics majors at Marquette. Our outstanding physics program provides exciting research opportunities alongside faculty, fellowship in student organizations, and a stimulating curriculum to launch your career in science.

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**Spotlight on Women in Physics**

Student organization Women in Physics works to foster camaraderie among women physics majors and those with interest in physics at Marquette, largely through hosting women speakers in physics.

This year Women in Physics welcomed Dr. Elizabeth Simmons, who spoke about the lack of women studying physics and how to promote greater diversity in science. They also hosted Dr. Megan Pickett, who discussed her research simulating conditions of the early solar system to study giant planet formation, and to better understand our own solar system.

On April 24, 2013, they will be hosting Dr. Evalyn Gates, who is currently the CEO of the Cleveland Museum of Natural History.

The Women in Physics group is also planning a day of outreach with a local Daisy troop to help them earn a petal on their way to becoming Brownies.

This active group of women works hard and plays hard, too. Earlier this year, they had a blast bowling at The Annex on campus!
“The opportunity to be a TA as an undergraduate was unique—it is something I really valued about my Physics education at Marquette.”

- Chris Langlo

Dr. Benjamin Brown studies positron interaction with atoms and molecules at low energies, using a beam of “antimatter” particles. He also collaborates with ETH in Zurich, Switzerland, on precision atomic measurements with exotic atoms.

Dr. Andrew Kunz is working on an NSF-funded project with student Kyle Kimminau, studying the effects of tiny defects on magnetic domain wall motion and new dynamical behavior in ultrathin nanowires. He is also investigating multiple nanowire systems with student Jesse Vogeler-Wunsch, part of another NSF-funded project.

Dr. Christopher Stockdale is engaged in a multi-wavelength study of core collapse supernovae. He observes the radio emission from these events and their surroundings using a variety of instruments, but primarily the Very Large Array in Socorro, New Mexico.

Dr. Michael Politano models populations of interacting binary stars with emphasis on model populations of cataclysmic variable stars, such as novae.

Dr. Zbigniew Sorbjan models turbulence, diffusion and clouds in the atmospheric boundary layer, the lowest mile of the atmosphere.

Dr. John Karkheck develops and analyzes statistical models of fluids in order to better understand their transport processes and irreversible behavior. He is collaborating with student Kelsey Meinerz, modeling the mechanism by which bacteria move.

Dr. Joseph Collins studies biological liquid crystals with particular interest in self-assembly behavior as a function of temperature and chemical environment.

Andrew Nencka (MU 2004) is now an assistant professor of Biophysics at the Medical College of Wisconsin after receiving his PhD from there in 2009. He teaches an introductory MRI course to biophysics graduate students, and also is involved in researching innovative MRI techniques. Chris Langlo (MU 2010) is pursuing both his MD and PhD at the Medical College of Wisconsin. This fall he is working with a group that does optical imaging of the human retina. He is also working on developing new imaging technology, and studying the changes in photoreceptors in disorders such as color blindness.

Peter Bolgert (MU 2012) made the Men’s Track and Field/Cross Country Academic All-District team for 2012. Peter is now enrolled in the Ph.D. physics program at Princeton University, where he is studying plasma and fusion physics.

Remarkably, all recent graduates pursuing advanced degrees have been awarded full tuition, plus a substantial salary to support their studies!
Physics students travel...

The 2012 Quadrennial Physics Congress (PhysCon) was held on November 8-10, in Orlando, FL! Six Marquette physics students, along with Dr. Ben Brown, attended the conference.

PhysCon draws more than 800 students, alumni, and faculty to discuss relevant issues in physics. It features workshops and talks given by distinguished scientists. This year PhysCon also offered a tour of the Kennedy Space Center!

Two students participated in the poster presentation session. Sophomore Michael Nichols discussed his “Positron Collider” and Senior Kyle Kimminau presented on “The Effects of Magnetic Defects on Domain Wall Motion in Ferromagnetic Nanowires.”

A favorite speaker was Dr. Jocelyn Bell Burnell (above), who debunked myths regarding the alleged “end of the world” in December of 2012. It was a worthwhile trip, and was greatly enjoyed by all who attended!

Physics students are involved...

Another active student organization is the Society of Physics Students. The Society of Physics Students provides a forum for the discussion of pertinent facts and discoveries in all branches of physics, allows students the opportunity to engage in activities related to physics, and generates public interest in the physical sciences.

In the spring, they plan on tutoring middle school students in the 4-H pre-college STEM program. They will travel to their schools on the south side of Milwaukee to teach them physics!

The Society of Physics Students also plans to start a “Journal Club,” where a relevant journal article is selected by a student and will be a topic of discussion at their next meeting.

Another fun event the club will hold is “Stargazing After Dark” on the roof of the physics building. Dr. Stockdale will teach students how to use a telescope and correctly measure angles to map out constellations and other objects in space.

The Society of Physics Students also organizes social events, including movie nights! A “Welcome Back to Campus” party is also in the works after Winter break.

Physics students succeed...

Junior Kelsey Meinerz took 2nd place in the 2012 Great Midwestern Space Grant Regional Meeting! After placing in the top 4 at the Wisconsin Space Grant Consortium in August, Kelsey was invited to present her work titled “A Simplified Model for Flagellar Motion” at the regional meeting.

Sigma Pi Sigma is the Physics Honor Society. It exists to honor outstanding scholarship in physics; to encourage interest in physics among students at all levels; to promote an attitude of service of its members toward their fellow students, colleagues, and the public; to provide a fellowship of persons who have excelled in physics. The Marquette University Chapter of Sigma Pi Sigma was initially installed in 1947, and about 330 members have been inducted.

Congratulations to the 2012 inductees: Benjamin Calvopina, Timothy Gee, Kyle Kimminau, Preston Koch, Jeffrey Maltas, Abigail Searfoss, Sihui Yang, and Professor William Hirsch.
Our Mission Statement

The Physics Department is committed to excellence in undergraduate physics education and embraces the Ignation ideal of *cura personalis*, or “care for the whole person.” The Department is a community of faculty, staff and students. Faculty advance the frontiers of physics in both research and education. Staff contribute their expertise in facilitating all endeavors of the department. Students participate in learning and scholarship with the guidance of the faculty.

Visit us at www.marquette.edu/physics

About Marquette University

*Marquette University* is a Catholic, Jesuit university dedicated to serving God by serving our students and contributing to the advancement of knowledge.

**Our mission**, therefore, is the search for truth, the discovery and sharing of knowledge, the fostering of personal and professional excellence, the promotion of a life of faith, and the development of leadership expressed in service to others. All this we pursue for the greater glory of God and the common benefit of the human community.

**Our vision** is to provide a Catholic, Jesuit education that is genuinely transformational, so that our students graduate not simply better educated but better people, and to do so with such excellence that when asked to name the three or four best Catholic universities in America, people will include Marquette as a matter of course.