PHYSICS & ENGINEERING (PHEN) ALUMNI NEWSLETTER

JUNE 2011

PHEN DEPARTMENT NEWS

Muskingum University's Physics and Engineering Department Offers Physics Education Major

The Physics and Engineering Department offers a Physics Education major. The physics education curriculum is designed for students seeking adolescent to young adult (grades 7—12) teaching licensure in physics. Students are exposed to the spectrum of topics that are typically taught at the secondary level: classical and modern physics with some elements of engineering. Additionally, students will design a physics education research project and implement it during the senior capstone and student teaching experience.

"Our task must be to free ourselves by widening our circle of compassion to embrace all living creatures and the whole of nature and its beauty."
Albert Einstein

(From left to right) Andrea Richard (‘11), Ben Pasley (‘12), Andrew Pelfrey (‘13), and Bryan Sayre (‘14) were honored during Scholarship Recognition Day for receiving the Robert Ellis Smith Scholarship in Physics and Engineering.

Physics Students Present Posters at the Fall Colloquium

Camelia Petre (‘11) completed a summer internship at the University of Pittsburgh in the Department of Mechanical Engineering. Her work was titled "Applications of galloping instabilities for micro-energy harvesting: an overview and analysis".

Derek Simonette (‘11 - on right) has held an internship with Metallurg Vanadium Corporation in Cambridge for a couple of years. His work was titled "Identification of Unknown Metallic Materials Determined by X-Ray Fluorescence".

Physics Students Win Award

Ben Pasley and Derek Simonette won first place for their poster in the poster session during Undergraduate Research and Scholarship Week in April, 2011. Their senior project was titled "Volume of Oxygen Uptake Sensory System (VOUSS)"
William (Bill) Martin, 1959
A short summary of Bill’s career:

- Received MS in Physics from University of Illinois in 1961.
- Worked in Military Electronics for 37 years. Primarily Radar related.
- 6 year at Goodyear Aerospace Corp in Akron, Ohio (1961-1967)
- 5 years at General Dynamics Electronics Division in San Diego, California (1967-1972).
- 26 years at Motorola Government Electronics Division in Scottsdale, Arizona (1972-1998).
- Retired in late 1998.
- No future career plans.

Bill is very happily retired and living in Paradise Valley, Arizona. He is doing volunteer income tax work and traveling as much as possible.

Stephen Johnson, 2007
Stephen is a Physics and Mathematics teacher at Tri-Valley High School in Dresden, Ohio.

Charles Miller, 2007
Charles graduated with a Masters Degree in Material Science from the University of Texas at Dallas. He is now a Semiconductor Process Engineer for Texas Instruments.

Ronald Szewczyk, 2007
Ronald completed the binary engineering program: he earned a physics degree from Muskingum and a mechanical engineering degree from the University of Dayton.

Amy Miller, 2010
Amy is pursuing teacher licensure at Muskingum University and working as a substitute teacher at Buckeye Trail High School.

Hannah Kerr, 2011
Hannah is taking a year off. She plans on pursuing graduate work in human computer interactions.

Camelia Petre, 2011
Camelia is going to France to either work as a translator or go to graduate school for architecture.

Andrea Richard, 2011
Andrea is pursuing a Ph.D. in Physics at Ohio University.

Jason Scibona, 2011
Jason is seeking employment as a high school physics teacher.

Derek Simonette, 2011
Derek is working at Basic Systems Inc. in Cambridge, Ohio. He will learn CAD and a few PLC languages and be working both in the field and doing drafting. Derek found the job through an engineering staffing agency called General Employment out of Columbus.

Zane State College, a two year community college in Zanesville, OH, actively seeks masters-prepared professionals to teach as adjunct faculty in its Biology and Anatomy and Physiology classes. This satisfying experience offers an opportunity to build professional credentials while making a real contribution to this community. For more information, please contact Pam Kirst, Coordinator of Adjunct Services: 740-588-1250; pkirst@zanestate.edu
PHEN Students Participate in Undergraduate Research and Science Week

Two PHEN students presented their research findings at a Poster Session as a part of the annual Undergraduate Research and Scholarship Week which is held every spring.

Each student presented their research in the form of a poster, and those presentations were then judged on a variety of criteria.

VOUSS (VOLUME OF OXYGEN UPTAKE SENSORY SYSTEM)

Benjamin A. Pasley and Derek Simonette
Advisors: Dr. Richard Taylor and Dr. Emri Selvi
Department of Physics and Engineering

In the field of exercise physiology the measurement of an athlete’s maximal oxygen uptake or \( \text{VO}_2 \) is an essential component of determining their aerobic fitness, and helps determine long term training plans for athletes and coaches. VOCUSS is an apparatus designed, constructed, and tested at Muskingum University that provides an accessible and affordable alternative to professional testing facilities found in the industry. Using a system of Vernier sensors combined with a custom hardware and software interface, VOCUSS will be able to provide live \( \text{VO}_2 \) data. Expired air is collected using a non-rebreather mask and sent through a series of respiratory tubes to a flow meter, which measures the tidal volume of each expired breath. This air then passes into a customized reservoir where the concentrations of \( \text{CO}_2 \) and \( \text{O}_2 \) are measured overtime to determine the athlete’s \( \text{O}_2 \) consumption rate. The evolution of the design will be discussed and data from a stationary subject will be presented.

DESIGN OF A PORTABLE DESK EXTENSION

Carson Thomas, Cody Hammond, and Yixin Cui
Department of Physics and Engineering

Chairs in college lecture halls have very small desk areas. Students find it difficult to place any more than a piece of paper or book on top of their desks. Often, students are required to take exams in lecture halls and need to use sheets of notes, books, calculators, pencils or pens. The small desk area is not appropriate and can cause distraction, discomfort, and stress during exams. The purpose of this work is to design a portable desk extension to enlarge the desk area in college lecture halls which is easy to use and easy to transport by any student. Measurements and analysis of existing desks were performed and design objectives were identified. The designed desk extension will be easy to attach to the existing desk. Shape and attaching mechanism were determined conceptually by evaluating the possible solutions. Strength analysis of the selected solution was performed to determine the dimensions of the final product. A prototype is being produced using wood to test the feasibility of the design. The portable desk extension will provide students with a smooth surface to write that is significantly larger than the existing one.

“\The important thing in science is not so much to obtain new facts as to discover new ways of thinking about them.\”

-Sir William Bragg
Physics and Engineering Club

Activities:
- Performed physics activities for a local church’s youth group.
- Assisted with the WOW program.
- Hosted external speakers.
- Built a hovercraft.
- Gave out liquid nitrogen cooled marshmallows and hovercraft rides to children.
- Visited COSI in Columbus, Ohio.
- Clocked the speed of baseball throws during the Activities Fair.

Off-Campus Internships and Research Experiences
Recent examples include:
- Annotation of the Genome of Physarum Polycephalum - Biophysics Research at the Department of Physics at Ohio State University
- Image Analysis of a Carbon Composite 747 Brake Pad - Engineering Internship at the Goodrich Corporation in Akron, Ohio.
- Electrical and Chemical Characterization of Proton Conducting Ceramic Materials - Condensed Matter Physics Research at the Department of Physics at Montana State University.
- Explicit Vapor Pressure Prediction from the PRSV Equation of State - Engineering Research at the Department of Engineering at Hope College.

On-Campus Design and Research Projects
Recent examples include:
- Developing Physics Demonstrations with Limited Materials – Senior Capstone Project
- Simulating the Hidden Markov Model with LabVIEW – Senior Capstone Project
- Assembling a Vibrating Sample Magnetometer (VSM) - Muskingum University Summer Fellows Program
- Observing and Characterizing Gravity Waves via Airglow Imaging – Senior Capstone Project
- An Acoustical Study of a Road Cone and the Soprano Saxophone: Testing the On-Axis Pressure and Phase Dependencies – Senior Capstone Project
- Restoration of a Vacuum System for Deposition of Ferromagnetic Materials – Senior Capstone Project
- Designing a Total Home Protection System.