Schrödinger’s Otter

The Keyhole Nebula, NGC 3372. Astrophoto by Otterbein college, student Kelly Hanlin.

Inside this issue:

Starry Mondays at Otterbein
Metro Parks Observing
Student Research: Lawrence Berkeley Lab
Student Research: CERN, Switzerland
Astro-Imaging at the Télescope Maun Observatories
OSAPS Meetings for 2008-09
Scheduled Events for 2008-09

Physics and Astronomy New Faculty Member

New to the Otterbein physics department this year is Dr. Nathaniel Tagg, an experimental physicist specializing in astroparticle physics. Originally hailing from Canada, he has degrees from the University of Lethbridge and from Guelph University. Since getting his Ph.D, he has spent the last eight years doing research and teaching at Oxford University in England and Tufts University near Boston.

Dr. Tagg’s research involves the study of the neutrino, a fundamental particle with unusual properties that are notably difficult to measure. Neutrinos are abundantly created in the Sun, in nuclear reactors and in dedicated particle physics beams but are very difficult to detect, requiring deep-underground instruments with masses of kilotons or more. He is currently participating at two experiments, MINOS and MINERvA, based at the Fermi National Laboratory. These experiments are designed to measure both fundamental and incidental properties of neutrinos created with a powerful beam. The MINOS project in particular shoots this beam underground 735 kilometers to a detector located in an inactive iron mine in northern Minnesota.

Dr. Tagg lives in Westerville with his wife, Dr. Bonnie Ward (a neuroscientist), and one-year-old son Benjamin (a future neuroscientist or physicist, depending on which parent wins).

Professor Louis Arnold to Retire

Professor Lou Arnold will retire at the end of December 2008, after 25 years of dedicated service to Otterbein. Lou came to Otterbein after 13 years as a Research Professor at OSU; he did his Ph.D at the University of Kentucky, spending a year as a Fellow of Caius College, Cambridge, UK. At Otterbein he served as department Chair from 1993 to 2005. In that time he guided the department through a number of difficult transitions, and it was largely due to his leadership that the department emerged from this period not only intact but considerably strengthened.

Lou is widely appreciated for his skill at mentoring both students and junior faculty. He is also something of a legend in the classroom, well known for his wit, clarity and amusing anecdotes. Those involving Ann Margaret and fraternity life at Northwestern University are especially popular.

Lou’s research interests are in nuclear physics, and he established a number of important results on relativistic models of nuclear structure. Some of his papers from the early 1980s still receive citations today. Since coming to Otterbein his interests have turned towards biophysics and scaling laws. He is also an avid ham radio enthusiast, and was a founding member of the Otterbein Radio Club. His antenna was one of the last things to come down from the old science building before the renovation began.

Lou has been a tremendous asset to the Department and to the College, and we hope to see him regularly at Physics Coffee or teaching the occasional section of Energy, Science and Society. Please take a moment and join us in congratulating Lou on his retirement! He can be reached at LArnold@otterbein.edu or (614) 823-1316.

Physics Coffee Hour

Each week the Physics Dept. gathers to promote physics knowledge at OC through informal discussions and presentations from guest speakers.

Join us Wednesdays 3:30 p.m. Room 205, Science Bldg.
Astro-Imaging for The “Tzec Maun Foundation” offers any Otterbein students enrolled in any Physics course the opportunity to try their hand at astro-imaging. This type of photography uses high-tech cameras, very long exposure times, and elaborate image processing techniques to capture images of spectacular astronomical subjects, such as planets, galaxies and nebulae. Astro-imaging differs from common photography in that its subjects tend to be extraordinarily dim and frequently invisible to the unaided eye.

Instruments at two observatories located in dark sky areas are available. “New Mexico Skies” in Cloudcroft, New Mexico offers 4 different camera/telescope combinations at its 8000 foot altitude northern hemisphere site, while Pingelly, Australia provides a southern hemisphere location that is offset by 12 hours from New Mexico. Of course.

The Pleiades, M45 Newborn stars
Astrophoto by Otterbein College student Charity Wallace

In June 2008, Dr. Brian Sell and sophomore Justin Young travelled to Berkeley, California to collaborate with Dr. Charles Fadley, Professor of Physics at the University of California, Davis and Professor of Materials Science at the Lawrence Berkeley National Laboratory (LBL). Research to investigate the surface interactions between multiple layers of different magnetic materials was conducted at LBL’s Advanced Light Source. Using the unique experimental apparatus, the Multi-Techniques Spectrometer/Diffraactometer, and using a technique of generating x-ray standing waves below the surface and throughout the material, Professors Sell and Fadley and others were able to investigate the interior interfaces between Huesler alloys and semiconducting materials. As the generated x-ray standing wave is located at different spots on the top surface of the material, its intensity can vary and from this variation information can be derived about the nanoscale structure of the interfaces between the different magnetic materials. The results of this experiment will lead to a better understanding of the interfaces between materials that have potentially very useful applications in next-generation electronics and computing equipment.

Happy Observing!

Observing at the Metro Parks
Escape the city lights to view the night sky at Prairie Oaks Metro Park.

This is a public and free event, and anyone interested is welcome.

Take I-70W. Shortly after exiting Franklin County, take the Route 142 exit (W Jefferson/Plainville) and turn right. After about a mile you will see Prairie Oaks on your right.

“Starry Mondays” Continue at Otterbein
Join Dr. Uwe Trittmann for “Starry Mondays,” held the first Monday of each month during academic terms. Lectures & observing (weather permitting) are free and open to everyone!

Topics so far this year have included Recent Advances in Astronomy and The Birth of Modern Astronomy. Your suggestions for future topics are welcome!

Join us at 7 p.m., in room 238 in the Science Building. See dates on back.

Sophomore Justin Young at Lawrence Berkeley National Lab
In June 2008, Dr. Brian Sell and sophomore Justin Young travelled to Berkeley, California to collaborate with Dr. Charles Fadley, Professor of Physics at the University of California, Davis and Professor of Materials Science at the Lawrence Berkeley National Laboratory (LBL). Research to investigate the surface interactions between multiple layers of different magnetic materials was conducted at LBL’s Advanced Light Source. Using the unique experimental apparatus, the Multi-Techniques Spectrometer/Diffraactometer, and using a technique of generating x-ray standing waves below the surface and throughout the material, Professors Sell and Fadley and others were able to investigate the interior interfaces between Huesler alloys and semiconducting materials. As the generated x-ray standing wave is located at different spots on the top surface of the material, its intensity can vary and from this variation information can be derived about the nanoscale structure of the interfaces between the different magnetic materials. The results of this experiment will lead to a better understanding of the interfaces between materials that have potentially very useful applications in next-generation electronics and computing equipment.

Happy Observing!
Senior Brandi McVety was accepted to the prestigious Research Experience for Undergraduates (REU) program at the University of Michigan and spent 10 weeks in Geneva this past summer working at CERN, the European laboratory for subatomic physics. While she was there the world’s largest particle accelerator, the Large Hadron Collider (LHC), was coming on line. Brandi worked with the LHCb collaboration on developing on-line status reporting systems for the detector, under the direction of Prof. Dirk Wiedner of CERN. The LHC and its detectors represent the most complex scientific endeavor ever undertaken and will probe the structure of matter at the deepest levels, looking for signs of "new physics" such as the Higgs boson or supersymmetry.

According to Brandi, her time at CERN was "An incredible educational experience. I have never learned so much so quickly or in such a hands-on manner. Working with physicists and students from around the world was very exciting and opened my eyes to how global the physics community really is. My time as a CERN "summie" has been my most difficult and stressful experience to date, but also one of the best." After her work was done she was able to travel extensively through Italy, France, and Germany.

The REU program is a National Science Foundation initiative that sponsors undergraduate research at major universities and laboratories. Opportunities are available throughout the US and at a number of international facilities. Interested students can contact any physics faculty member for more information or go to http://www.nsf.gov/crssprgm/reu/index.jsp.

Otterbein Students

when it’s daytime in the USA, it’s nighttime in Australia so this also allows almost “around-the-clock” imaging.

The equipment is accessed via a web-based interface, so that one may use it from any connected location. The Tzec Maun website provides beginner’s tutorials and basic astronomical image processing software, and then allows both the raw images and the finished, processed pictures to be downloaded to the user’s PC.

We’ve organized a group at Tzec Maun Observatories called the Otterbein Imaging Team and will register students who express an interest in trying this out. Please contact any Physics and Astronomy Dept faculty member if you’re interested and have the time and desire to tackle this challenge.
“Starry Mondays”
Astronomy Lecture Series
Mondays
October 6, 2008, 7pm
November 3, 2008, 7pm
January 5, 2009, 7pm
February 2, 2009, 7pm
March 2, 2009, 7pm
April 6, 2009, 8pm
May 4, 2009, 8pm
June 1, 2009, 8pm

Coffee Hour
Wednesdays, 3:30 p.m., Science Bldg. Room 205

Society of Physics Students
Dates TBA

Night Sky Observing
Prairie Oaks Metro Park
Fridays
July 11, 2008, 9:15pm
Sep 5, 2008, 8:30pm
Oct 3, 2008, 7:45pm
Jan 30, 2009, 7pm
March 6, 2009, 7:30pm
April 3, 2009, 9:00pm