This article was prepared by Associate Professor Julie Roche who joined the faculty at Ohio University in September of 2006.

One of the biggest achievements of twentieth-century science is the establishment of the Standard Model of Particle Physics. The model describes the universe being made up of twelve elementary particles bound together by three fundamental forces: strong, weak and electromagnetic. Since the early 70’s when the model was developed, physicists have used it to explain and calculate a vast variety of particle interactions and quantum phenomena. So far, eight Nobel Prizes in Physics have been awarded for discoveries that strengthen this model. Despite its incredible success, the Standard Model is known to be incomplete. For example, the Standard Model does not include the effect of gravity, no explanations are given for the small differences seen in the properties of matter and anti-matter or for the nature of dark matter and dark energy. In that sense, the quest for “Physics beyond the Standard Model” presses deeper into our imperfect understanding of the fundamental forces that make up our universe. This question is the larger context of the work of the group lead by Associate Professor Julie Roche and Assistant Research Professor Paul King (see Figure 1). Ph.D. students R. Beminivaththa and B. Waidyawansa recently graduated with data from the QWEAK experiment and postdoctoral fellow J.H. Lee and six Ohio University undergraduates also took part in that project. A first article describing early QWEAK results (D. Androic, R. Beminivaththa, J.H. Lee, P.M. King, J. Roche, B. Waidyawansa et al. (Qweak Collaboration) “First Determination of the Weak Charge of the Proton”, Phys. Rev. Lett. 111, 141803 (2013) has been published by Physical Review Letters in October 2013.

The direct method to reveal Physics beyond the Standard Model is to produce never-before observed particles using more and more powerful accelerators, for example the Large Hadron Collider (LHC) recently commissioned at the CERN facility (France-Switzerland). This facility will ultimately accelerate protons to energies as high as 7 TeV, about ten times higher than has been done before. The energy carried by the protons of the beam could be transformed to mass (as described by E=mc²) producing never-before-seen particles, such as the Higgs particle, the last particle predicted within the Standard Model to be observed (http://www.exploratorium.edu/origins/cern/ideas/higgs.html). However, another avenue is to explore the low energy regime with experiments of extreme precision whose results can be reliably predicted within the Standard Model. For example, to date, the ultra-precise measurement of the anomalous magnetic moment of the muon is the first particle physics observable to deviate from the predictions of the Standard Model (G.W. Bennett et al. (Muon g-2 Collaboration), “Measurement of the negative muon anomalous magnetic moment to 0.7 ppm,” Phys. Rev. Lett. 92, 161802 (2004), (hep-ex/0401008)). The QWEAK experiment, the project on which the Ohio University group worked, is one such low-energy high-precision experiment. The completion of this experiment (and others of this kind) is part of the “New Standard Model Initiative” promoted in the 2007 Long-Range Plan of the Nuclear Science Advisory Committee (The Frontiers of Nuclear Science, Nuclear Science Advisory Committee’s December 2007 Long Range Plan http://science.energy.gov/np/nsac).

The observable measured by the QWEAK collaboration is the weak charge of the proton. It is to the weak force what the electric charge is to the electromagnetic force.
The weak charge of the proton is a suppressed quantity which makes it an ideal quantity to reveal physics not yet known. It is completely defined by the Weinberg angle ($\theta_W$) which is a key parameter of the Standard Model. Indeed this angle describes the amount of mixing of the electromagnetic and weak interaction, a tenet of the model. The value of the Weinberg angle does vary as the momentum transfer involved in the reaction varies. This “running” is a firm quantitative prediction of the Standard Model and it has been confirmed with relatively “poor” precision. Agreement between an ultra-precise measurement and the prediction of the Standard Model will exclude the existence of new particles not part of the Standard Model up to a certain mass, while any disagreement between the model and the measurement would display the effect of these new particles at the mass scale probed by the experiment. QWEAK will be sensitive to new particles of mass up to about 2.2 TeV.

Parity Violation

The tool used by the Ohio University group and their collaborators is the well-grounded Parity Violating Electron Scattering (PVES) technique. The birth of PVES was marked by the famous 1978 Prescott experiment at SLAC. Prescott and his collaborators measured $\sin^2\theta_W$ to 15% of its value, while QWEAK proposed measuring it to 0.3%. Out of the fifteen or so parity-violating electron scattering experiments performed or planned world-wide since the Prescott’s experiment, half of them have used the electron beam at Jefferson Lab (www.jlab.org) in Newport News in Virginia. Jefferson Lab is a national facility funded by the US Department of Energy. It features a polarized electron beam delivering electrons of energy ranging from 1 to 12 GeV. The beam is accelerated by superconducting radiofrequency technology which makes it ideal to study the internal structure of proton and neutrons (governed by QCD), the structure of light nuclei, as well as to perform low energy tests of the Standard Model. In a PVES experiment like QWEAK, one measures the fractional difference, AFV, of the scattered flux from an unpolarized target for an incident beam of polarized electron whose spins are aligned along or against the beam momentum. Each spin configuration is the mirror image of the other under parity transformation. The electron spin is flipped about a thousand times each second. The success of the experiment relied on the Jefferson Lab’s world-renowned “parity quality” beam properties. That is the similarity of the beam properties whichever spin orientation. The fractional difference $A_{PV}$ is tiny (about 200 part per billion) so the whole dedicated experimental apparatus is designed to maximize the number of recorded interactions (see Figure 2). The QWEAK collaboration carrying out this measurement consists of more than 100 scientists from 50 institutions. The collaboration took 10 years to design the experiment, seek funding and scientific approval, and build the apparatus. To achieve the proposed precision, the electron beam was pushed to new limits of intensity. The world highest power liquid hydrogen target (1.7 kW) was built. Many interleaved low noise beam diagnostic systems were used to monitor the beam properties. The experiment took data from the spring of 2010 to the spring of 2012. In preparation for the experiment, the Ohio University group designed and setup the data acquisition and the large scale C++ analysis software. During the data taking, they served 24/7 on call duties and performed the long term maintenance of the DAQ and software. Thanks to their work, roughly 120 TB of data were accumulated, saved on disk, and automatically replayed by their standard analyzer. They also defined run plans as needed by the experiment and analyzed the data.

More Precision Coming

As noted above, the first paper from the QWEAK experiment was recently published by Physical Review Letters. About 4% of the full data set was analyzed in this proof of concept work yielding the most precise measurement to date of parity violation in electron-proton scattering. As expected with this low statistic, the QWEAK result is in full agreement with the prediction of the Standard Model. But when this result is further combined with atomic parity violation measurement performed on the Cesium atom, significant constraints on the weak charges of the proton and the neutron are extracted. And new particles of mass smaller than 1.1 TeV, not part of the Standard Model, can be ruled out. The collaboration is working hard on the analysis of the full data that should yield results about five times more precise. Beyond their participation in the QWEAK experiment, the Ohio University group is starting to prepare the next generation of these types of experiment. While QWEAK measured parity violation in the semi-leptonic sector (electron scattering off the proton), the MOLLER experiment will measure parity violation in the pure leptonic sector (electron scattering off the electron) with a reach for particles beyond the Standard Model of mass scale up to 7.5 TeV (K. Kumar et al., “The MOLLER Experiment @ Jefferson Lab”, http://halaweb.jlab.org/12GeV/Moller).

Acknowledgements:

The work of the Ohio University group was funded by the National Science Foundation and the data discussed in this article were taken at Jefferson Lab, a facility operated currently by Jefferson Science Associates, LLC under U.S. DOE Contract No. DE-AC05-06OR23177.
Greetings to friends and alumni of the Department of Physics and Astronomy at Ohio University. We have survived our first year on semesters since 1967, and we remain an active and vital environment as we help students realize their potential and advance the frontiers of science. Our alumni are testimony to the past success of our program and an inspiration as we look to the future. We’re happy to share some updates from our program with this newsletter. Several developments have affected the composition of our faculty in the past year. Among our current faculty, Tom Statler continued as a temporary Program Officer in the Division of Astronomical Sciences at the National Science Foundation in Washington, D.C., and he will be on sabbatical at the University of Maryland this year. Ido Braslavsky has resigned to take a position at Hebrew University of Jerusalem and we wish Ido and his family well as they settle to life in Israel. Markus Böttcher has left us to become Chair of Astrophysics and Space Physics at North-West University, Potchefstroom, South Africa. Saw-Wai Hla still is a Group Leader for Electronic & Magnetic Materials & Devices in the Center for Nanoscale Materials at Argonne National Lab, but we expect him to return to us full time in the Fall of 2014. We have also been successful at recruiting some new faculty. By coincidence both are from Lawrence Berkeley National Laboratory (LBNL). Heath Crawford will join us in January. She is an experimental nuclear physicist. Hee-Jong Seo is an astrophysicist who will join us in Fall 2014. Both are delaying their start at Ohio University so they can complete current research projects. This means that we were able to retain for another year Matthias Dietrich and Ken Nollett and to add Michael Guenther for a total of three visiting assistant professors.

In other faculty news: Carl Brune was awarded the Arts and Sciences Outstanding Teacher Award, Gang Chen was promoted to Associate Professor with tenure, and Sasha Govorov was elected a Fellow of the American Physical Society. The highlight of our year was Keith Hawkins being awarded a Marshall Scholarship. He has been accepted University of Cambridge’s Institute of Astronomy where he has begun his graduate studies.

In following up on our commitment to provide a research experience for our undergraduates, this year 14 undergraduates worked with 10 different faculty members from across the department. In addition, three undergraduates were able to work elsewhere this summer: UC Davis, Heidelberg, Germany, and NOAA in Colorado.

We greatly value the support we receive from our friends and alumni in helping our department in the pursuit of its mission. We always appreciate visits by our alumni, as a means to educate our students about possible career paths and to help our department remain connected to a larger community. We also express our sincere thanks to those who have contributed financially to our program, as listed elsewhere in this newsletter. In particular we would like to call out the generosity of Emeriti Professors Ernst Breitenberger and Louis Wright who have established a graduate-student scholarship fund to be used for many different purposes including, but not limited to, supporting graduate-student travel, providing graduate students with equipment (or software) needed to pursue their research, special awards to outstanding students, and assistance in cases of particular need. We need at least another $10,000 to fully endow this fund. I hope those of you in particular who have benefitted from these dedicated faculty will help us reach the $25,000 threshold and thus benefit future graduate students.

Finally, as I prepare to turn over responsibility for the newsletter to the new editor, Professor Ken Hicks, I would like to make a plea to alumni and friends to continue their support of departmental activities. Many of you have helped create and support endowed funds for various departmental activities which I hope you will continue. This includes the new Breitenberger/Wright Graduate Endowment Fund mentioned in the Chair’s Report. A list of our various endowed funds is given near the end of the newsletter.
Department News

Spring 2013 Meeting of the Ohio Section of the American Physical Society (OSAPS)

The Department hosted the Spring 2013 Ohio-Region Section of the American Physical Society (OSAPS) meeting on March 29 and 30 in Walter Hall on the Athens campus of Ohio University. The theme of the meeting was “From Quarks to Superclusters: Physics of the very big and the very small.” The keynote speaker was Wick Haxton of the University of California (Berkeley) on the topic of “Solar neutrinos as a probe of planetary formation.” Following the keynote address, speakers from Ohio State (David Weinberg) and Stanford Linear Accelerator (Stan Brodsky) spoke on the topics of cosmology and particle physics. After the plenary talks, a poster session was held with over 50 posters highlighting research in all areas of physics. The poster session was well attended and many energetic discussions took place. Also during the poster session, some tours of Ohio University laboratories took place, including the new helium liquefier facility, the accelerator lab, the surface science lab and the laser lab.

A banquet was held in the rotunda of Walter Hall Friday evening, with an after-dinner talk by Lawrence Weinstein, the author of a best-selling popular physics book titled “Guesstimation.” Larry showed how one can estimate just about anything using basic principles, from the amount of trash generated annually in the US to the amount of coal burned to generate electricity each day. This was an entertaining and informative talk, which evoked many interesting question at the end.

Saturday of the meeting was devoted to a series of parallel talks, with several sessions devoted to nuclear physics, condensed matter/surface science and astrophysics. There was also a session on educational aspects of physics, where new methods of instructions were presented.

The meeting was organized by Justin Frantz and Ken Hicks, along with a large amount of help from the departmental staff. The final attendance number was about 175 participants, one of the largest in recent years. Ohio University looks forward to hosting another Ohio Section meeting in the future.

2013 Outstanding Staff Award

Mechanical Systems Tech Doug Shafer received the 2013 Outstanding Staff Award for his excellent precision and skill in the Physics Machine Shop. Several faculty members cite Doug’s ability to fix, design or assist with the research equipment allowing groups to do high quality research with limited resources.

As Professor Martin Kordesch stated, “Doug Shafer is a problem solver. I have taken crazy ideas and impossible things to him to build and he says ‘I can do that’ or ‘I’ve built one of those before.’ I can go to Doug with a design that has 15 parts and takes a day to make, and he can come up with a design that has 5 parts and takes 15 minutes to build. He is a natural talent, even genius, when it comes to technical designs and their mechanical implementation. He knows a lot about anything even remotely related to mechanical infrastructure: we have discussed how to make small screws for watches, the purpose of thorium in welding rods, and the purpose of a ‘hot gas bypass valve’. If there is a limit to his knowledge on practical tools and mechanical machines I haven’t found it.”

From China to Athens to Prestigious Post-Doc in Germany

Jean Andrews

Doctoral student Yinyun Li, PhD 2013, is the current holder of the department’s Y.-C. Chang Graduate Fellowship. Li has accepted a postdoctoral position in Germany at the Georg-August University Göttingen.

According to the department’s Graduate Chair, Daniel Phillips, “Yinyun has an outstanding record of academic achievement in our PhD program, with an overall GPA of 3.87. She has also done groundbreaking research under Professor (Peter) Jung’s supervision: one of her papers is already published in the prestigious Journal of Neuroscience, and she has several more publications in preparation. The Graduate Committee felt that Yinyun’s excellence in coursework and research made her an ideal candidate for the fellowship.”

The fellowship was established by Ohio University alumna Ying-Chien Chang, MS 1973, a retired Federal Hocking High School mathematics teacher. In addition to receiving a Master’s degree in Mathematics from Ohio University, Ms. Chiang has a bachelor’s degree in physics, received in Taiwan.
Li attributes her interest in science to encouragement she received as a young child. Growing up in the rural village of Dongguchen in Hebei Province, Li was inspired by a teacher in her primary school to study mathematics and science. Later as a graduate student at Beijing Normal University in China, Li received a prestigious four-year scholarship from the Chinese government to study abroad. Two other students from the same school received the scholarship that year. One student chose to study in Germany, the other travelled to France, while Yinyun chose Ohio University. It was a rarity that all three students were women, all three studied physics, and all three shared the same dorm room.

By the time she was ready to leave China, Li had developed a keen interest in medical science. When it came time to choose a university abroad to apply to, she was drawn to the work of Ohio University’s Distinguished Professor of Physics Peter Jung, whose areas of expertise include non-linear dynamics, theoretical and computational biophysics. Li flew directly from Beijing to Athens, Ohio, in 2008 and began her graduate program; later developing a focus on the human nervous system function and nerve disorders.

At Ohio University, Li has been mentored by Dr. Jung, “in logical thinking and to pay strict attention to details especially in programming the code. Dr. Jung trained me to ask the relevant biophysical questions, how to simplify these questions and articulate the problems, and how to efficiently solve the problems,” she said.

This past September, Li moved to Georg-August-University Göttingen, in central Germany, to study with Professor Floretin Wörgötter, a respected computational neuroscientist in the fields of experimental and theoretical sensor research. “Göttingen is a fantastic place to start my career. To date, forty-five Nobel Prize laureates have studied, taught or made contributions there. Most of these prizes were given in the first half of the 20th century, which became known as the “Göttingen Nobel prize wonder,” Li said.

As the first-generation college student in her family, Li has come a long way academically and geographically. “She is deeply grateful to her parents for their steadfast moral support. “My father is a self-employed driver and my mother is a homemaker and wheat farmer. They are high school graduates and they offered me the best education possible.”

As she leaves Ohio University with a PhD, Li reflects about her time in the Department of Physics and Astronomy. “One of my favorite memories I’ll take with me is sitting in the TA’s office with other physics graduate students, discussing homework and enjoying each other’s company. Here the faculty members are knowledgeable and kind. It seems like a hometown to me; some of my classmates are like my brothers and sisters.”

The Emeriti Faculty members were encouraged to attend the Spring 2013 Departmental Awards Ceremony. Following the ceremony, a departmental group photo was taken (see page 14). Out-of-town Emeriti faculty members not in attendance were Jerry Barry (Gainesville, Florida), Ron Cappelletti (Montgomery Village, Maryland), Jack Rapaport (Venice, Florida), Tomo Tanaka (Tokyo, Japan) and Seung Yun (California). Many of the Emeriti faculty members volunteer for service and/or part-time teaching in the department.

Meetings and Presentations by Members of the Department

The 2013 Stewardship Science Academic Programs Annual Review Symposium was held June 27-28 in Albuquerque, New Mexico. Carl Brune, Sushil Dhakal, Cody Parker, Anthony Ramirez, and Youngshin Byun attended from Ohio University. This program supports research and graduate education in several areas, including low-energy nuclear science. Carl Brune presented a talk which summarized the research funded by this program at Ohio University. Sushil Dhakal, Cody Parker, Anthony Ramirez, and Youngshin Byun each presented a poster describing their research project. Cody Parker’s poster was judged to be the best in the area of low-energy nuclear science (out of 18 posters).

Cody received a certificate and a photograph of Cody and the program manager will be appearing in the DOE magazine. Cody’s doctoral research is being directed by Carl Brune.
The photo below shows current and former Ohio University people who attended the American Astronomical Society meeting in Long Beach in January 2013.

Undergraduate Research Opportunities Summer 2013

In the last few years the number of our majors participating in research projects and internships has been increasing. For 2013 these include the following students listed with their advisor(s) and the title or description of the research activity:

**Burket, Matt** (Clowe), “Near infrared imaging of galaxy cluster cores”.

**Camp, Max** (Hicks), “Neutron resonate states via (K⁰, A) channel from gamma deuteron collisions”.

**Cornell, Henry** (Brune/Grimes), studied nuclear physics constraints that can be applied to the $^{18}$F(p, α) reaction rate in nova explosions.

**Cothrel, Helen** (Stinaff), NOAA Hollings Scholarship 2-year award “Optical studies of nanostructured materials”.

**Coy, Tyler** (Roche), Event generator for a new experiment project at Jefferson Lab (Virginia).

**Dewald, Andrew** (Frantz), Writing code in ROOT, a data analysis software developed by CERN, to generate histograms of particle data from simulated particle collisions. Additionally, Andrew’s poster entitled “Studies of Energy Deposition by High-Energy Particles and Applications to High-Energy Cosmic Ray Collisions.” won the Ohio Space Grant Consortium (OSGC) Junior Award.

**Detty, Harlee** (Brune/Grimes), Harlee used COMSOL, a multiphysics package, to simulate the optics of one the beam lines on the accelerator.

**Grueser, Taylor** (Kordesch), “The Haynes Shockley experiment”.

**Hunneshagen, Justin** (Roche), Refurbishing of detectors in preparation to the upcoming Hall A DVCS experiment at Jefferson Lab (Virginia).

**Jadhav, Yashashree** (Max Planck Institute Summer Internship in Germany), The Search for Cataclysmic Variables using Pan-STARRS.

**Klco, Natalie**, Honors Tutorial College and Council on Research, Scholarship & Creative Activity funding to attend the Zeltsman Marimba Festival 2013.

**Miller, Derek** (Tees), “Development of an Optical Stretcher system for characterizing deformability and deformation rheology of cancer stem cells”.

**Ray, Jared** (Brune/Grimes), Ray worked on two projects: the wiring of a detector system for charged-particle measurements and the production of lithium and deuterium targets.


**Savage, Alan** (Smith), Assisting in operation of low-temperature spin-polarized scanning tunneling microscope and construction of molecular beam epitaxy system components.

**Snyder, Alex** (Stinaff), “Electrospinning quantum dot embedded nanowires”.

**Thrush, Samantha** (REU in Astrophysics at UC Davis), National Science Foundation Summer Research Internship “Simulating water emission spectra of the gas disk of a T. Tauri star”.

**Way, Austin** (Kordesch), NOAA (National Oceanic and Atmospheric Administration) Hollings Scholarship, A two-year appointment working on an undergraduate honors thesis about solar cell efficiency.

Awards and Recognition

Many of our students and faculty have been recognized for outstanding achievement over the past year and in many cases their successes have been reported on Ohio University websites and the departmental webpages have links to many of these sources. Below, we highlight some of these successes and encourage you to follow up for more details at our department’s Facebook page and the College of Arts & Sciences Forum.

**NQPI Outstanding Dissertation Award:** Ginetom Diniz, directed by Sergio Ulloa.

**Ohio U Administrative Service Awards:** Don Carter (40 years) and Julie Goettge (15 years).

**Natalie Klco** was one of eight Ohio University undergraduate students selected for the Ohio Fellows program.

Graduate student Shloka Chandavar, working with Ken Hicks, received a $12,000 fellowship from Jefferson Science Associate past summer.

**Arts and Sciences Outstanding TA (L to R): Thushan Wickramasinghe, along with Tyler Danley and Amal Miranda (receiving Honorable Mention).**
Student Research and Creativity Expo 2013: Both graduate and undergraduate students were active participants in the annual Student Research and Creative Fair sponsored by the Graduate College. First place awards were received by Rami Amro, Azamat Orabayev, Dilupama Divaratne, Chandrasiri Ihalawela, Sean Krupa, and Keith Hawkins. Second place awards were received by Harsha Attanayake, Andrea Richard, Sneha Pandya, Ameneh Mohammadali, and David Riethmiller.

Winning Presentation at Jefferson Lab

In May 2013, Buddhini Waidyawansa, working on QWEAK with Julie Roche and collaborators, presented a poster reporting their work at the annual User’s Group. Her presentation won first place (she was competing against approximately 300 other people.) Her photograph along with the winning poster was uploaded to the Department’s Facebook page and has received the distinction of receiving 2,756 “views”—by far the most views of any post this year.

Physics Major Scholarships

We are very fortunate to have many outstanding majors who hold academic scholarships which partially support them. Please see the list of departmental scholarships later in the Newsletter. We are grateful for your previous support of these scholarship funds and we would encourage you to be as generous as you can in providing continuing contributions. Holders of Edwards Scholarships for 2013-2014 include: Andrew Dewald, Taylor Grueser, Yashashree Jadhav, Natalie Klco, Samantha Thrush, and Austin Wood. Holders of the Ewers, Gecsy and Singh Scholarships are Henry Cornell, Harrison Kitts, Justin Hunneshagen, Shenaya Schubert, and Austin Way, respectively. Maxwell Camp, Thomas Riley, and Timothy Bagwell hold Stocker Scholarships while Sara Sand, Miles Lindquist, Michael Macuga, Noah Sweet, Peter Andrews, Michele Brand, and Yonry Shu hold Shipman Scholarships. The Toomey and Dohaney Scholarship Funds provide partial support for Yashashree Jadhav and Sara Sand, respectively. The Distinguished Professor Scholarships provide complete tuition and for 2013-2014 are held by Matthew Burket and Danielle Witt. We congratulate all of the students and wish them success. The current Chair of the Scholarship Committee is Madappa Prakash.
Chuck says, “The bottom line is that my education at Ohio University in physics provided me with an excellent foundation for my subsequent career changes from physics to electrical engineering.” Chuck said he was saddened to hear of the passing of Professors Findlay and Chen. Dick Koshel was Chuck’s advisor while he was a student at Ohio University.

Paul L. Beach, MS 1964, PhD 1966, is retiring from the practice of law in Kennebunk, Maine. Following two years of post-doctoral research at the Van de Graaff at Ohio State University, Paul joined the physics faculty at Capital University in Columbus, Ohio. During his tenure there for over a decade, he graduated from the Capital University Law School, teaching physics by day and attending law classes in the evening program. Following a few years of additional teaching and law practice in Columbus, Paul moved to Kennebunk, Maine in 1983 to practice law. During the years of maintaining a general law practice, he held several adjunct positions teaching physics at The University of New England and The University of Southern Maine, and has been involved in other teaching and education-related activities. He retired from law practice in the summer of 2011 and has since been teaching math in a nearby adult education program and at The New School, an alternative high school in Kennebunk. This year he is having a ball teaching a course which he developed called “Physics and the Mind”, which is an exploration of scientific method and the concepts of how scientists can have knowledge about things which cannot be directly observed by human senses. Paul enjoys being involved with art, music and frequent travel adventures. Paul’s doctoral research in experimental nuclear physics was directed by Roger Finlay.

Lawrence Crum, PhD 1967, was awarded the Acoustical Society of America (ASA) highest citation, the Gold Medal for 2013 at the ASA’s meeting in Montreal, Canada. In honoring him, Society members “recognize his exceptional contributions to the science and technology of acoustics, his leadership in the ASA and international scientific community, his vision and commitment to important translational research, and the profound impact he has had on the lives of countless students and colleagues.” Larry’s doctoral research was directed by Burt Stumpf who he credits with developing his passion for acoustics. A more detailed description of Professor Crum’s career and accomplishments can be found in the College of Arts and Sciences Forum article, “Humble Beginnings: From Selling Golf Balls to Making Breakthroughs in Science”.

Roger Richards, MS 1968, lives in Mystic, Rhode Island. He works at the Naval Undersea Warfare Center in Newport, Rhode Island. Seung Yun led his master’s research in physics at the State University of New York at Albany. Following retirement from Knolls in 2004, Chuck was offered the position of Principal Scientist at Applied Physical Sciences Corporation of Groton, CT, where he provides consulting services to various customers on the acoustics of naval machinery.

Charles (Chuck) Slack, BS 1964, MS 1967, reports that following graduation with an MS degree, he accepted a position at the Knolls Atomic Power Laboratory, in Schenectady NY, and remained there, in many different positions, for 38 years, retiring as an Advisory Engineer in Electric Machinery in 2004. Knolls designs and builds nuclear power plants for US Navy submarines. While working at Knolls full time Chuck earned a PhD degree in physics at the State University of New York at Albany. Following retirement from Knolls in 2004, Chuck was offered the position of Principal Scientist at Applied Physical Sciences Corporation of Groton, CT, where he provides consulting services to various customers on the acoustics of naval machinery.

Chuck began his career at the Knolls Lab as a member of the nuclear physics group, the same group that Harold Knox, a fellow Ohio University classmate of his joined in 1989. He spent the past 25 years of his career designing, building and testing electric machinery and solving their acoustic problems for submarine application for the navy. Chuck says that this last sentence should give Professor Stumpf a chuckle as he had him for some of his undergraduate work. He said that it was good to see him in the 2011 newsletter as well as Professor Breitenberger, who he also had for a number of courses. Chuck also developed and taught graduate level courses in electric machinery at Rensselaer Polytechnic Institute in Troy, NY and the Union Graduate School in Schenectady, NY.
Nuclear Studies in Saclay, France. He had also taught at the University of Jodhpur in India for four years before coming to Ohio University. His research interests have been in the fission barrier studies of the heavy- and superheavy nuclei.

Brahm has taken retirement and lives with his wife, Nirmala, in Jodhpur, Rajasthan, India. They have a daughter, Leena, who was born at the O’Bleness Memorial Hospital in Athens, OH. She did her Masters in Industrial Psychology and teaches at a business school in Vadodara, India, where she lives with her husband and their two children.

Barry Wyerman, BS 1971, is Head of a Research and Development Group at Janesville Acoustics and lives with his family in Novi, MI. Barry also has a PhD in acoustics from Penn State.

Kallarakal N. Thomas, PhD 1972, retired from Baring Christian College and lives in Kottayam, Kerala, India. His research in experimental acoustics was with Burt Stumpf.

Wai-Ching Ho, MS 1973, sent his greetings and announced that he has just retired from Noble Energy in Sugarland, TX.

Bob Beeken, MS 1974, received a PhD in physics from the University of Iowa in 1977. He reports that the bulk of his career (1980-2010) was spent at the University of Wisconsin-Stevens Point where he taught physics and astronomy and conducted research in experimental solid state physics. He served as Associate Vice Chancellor for Personnel and Budget from 1996-2001 and as Chair of Physics and Astronomy from 2001-2008. In addition he enjoyed an assortment of temporary teaching and research assignments in Malaysia, England, and Poland during his tenure at Stevens Point. In December 2010, Bob retired from UW-Stevens Point and relocated to western Colorado. He continues a part-time academic career teach mathematics at Colorado Mesa University.

Claudio Soto Vargas, PhD 1977, reports that he is now retired from his Professor position at the Universidad de Costa Rica. He now spends most of his time at home in San Jose and then, on weekends, goes with his wife and two daughters to the Pacific beach where he has another house. Claudio enjoys reading the Newsletter. He did his doctoral research in nuclear theory under the direction of Louis Wright.

1980-1989

Shailendra Shukla, PhD 1981, is a medical physicist at the VA Hospital and the University of Florida in Gainesville. Seung Yun led his doctoral research in experimental acoustics.

Rajendra G. Kurup, PhD 1983, was at a conference in Columbus and on the spur of the moment decided to visit the Edwards Accelerator lab in August of this year. He talked with Ken Hicks and reported that he is Chief Physicist in Radiation Oncology for the Kansas City Medical Center. It had been 30 years since leaving Athens and he was excited to see where his old office was and to see the picture of Roger Finlay, his PhD advisor, in the Conference room.

Tim Vierheller, MS 1983, earned his PhD in Polymer Science at Akron in 1993. He is now on the faculty at the Orrville Campus of the University of Akron.

Carlos I. Calle, PhD 1984, a Senior Research Scientist at NASA at the Kennedy Space Center in Florida, writes that he enjoys the Newsletter as it allows him to keep informed on what current and former faculty and alumni are doing. Carlos’ doctoral research in nuclear theory was directed by Dick Koshel.

1990-1999

Henry Clark, BS 1988, PhD 1993, reports that his daughter Haley Clark is finishing her freshman year at Ohio University as a pre-professional/biology major with the hope of becoming a veterinarian some day and is doing well. Haley is a member of the Ohio University women’s swimming and diving team and competes in the sprint butterfly and freestyle events. She made the finals at the MAC Championships in the 50 free, 100 free and 100 butterfly. At the MAC Championships she also swam on five relays and was the butterfly leg of the winning 200 medley relay which broke the Ohio University school record and set a new pool record at NYU - Buffalo. So now Haley and Henry are both on the Ohio University record board over at the pool - pretty awesome.

Henry is still at the Texas A&M University as a project manager in the accelerator physics group at the Cyclotron Institute. It will be 20 years in November - how time flies by! They are very busy now that a second cyclotron is up and running. The second cyclotron, called the K150, is the recommissioned 88” cyclotron and has been outfitted with a new rf system, cryogenic vacuum system, ECR and H- ion sources, interlock/control system and new beam lines. The recommissioning project started in 2005 and cost ~$5.5M in capital improvements. This cyclotron is being used both for stable beam physics experiments and as a driver for radioactive beam beam physics experiments from the K500 cyclotron. In the stable beam mode experiments from both the K150 and K500 cyclotrons can be run simultaneously - which has its challenges on both the accelerator staff and shared experimental equipment. Two methods for making radioactive beams are being developed and the first method is nearly finished. They hope to have the first radioactive beam out of the K500 by the end of the summer and first experiment in the fall. Because of limited staff and budget, the project is –2 years late on completion but the scope of the project has not changed from the start in 2005. Henry did his doctoral research in experimental nuclear physics under the direction of Ken Hicks.

Morag Smith BS 1992 (HTC), says that she will be happy to receive the alumni newsletter by email, but Ohio University was overly efficient in updating the database a few years ago. While she is married to Jay Parkes, Morag has kept her maiden name of Smith. Morag continues as a scientist and program manager at Los Alamos with a focus on nonproliferation and arms control. While like all the national labs, hiring is difficult these days, the lab is always interested in good students who might like to spend some time here and are good postdoc candidates. Morag says, “Feel free to share my work email (mks@lanl.gov) with anyone who might be interested in learning more about LANL.”
2000-Present

Hamad Al Brithen, PhD 2004, works at King Saud University in the Physics and Astronomy, College of Science. He is also affiliated with the King Abdullah Institute for Nanotechnology at the same university located in Riyadh, Saudi Arabia. Hamad did his doctoral research with Art Smith.

Muhammad Baseer Haider, PhD 2005, after graduating, took a post-doctoral position at the University of Alberta and National Institute for Nanotechnology and stayed there until August 2009. Then he accepted an assistant professor position at King Fahd University of Petroleum and Minerals in Saudi Arabia. Baseer and his wife have a daughter Zarmeena and visited Ohio University last summer. Baseer did his doctoral research under the direction of Art Smith.

Ghanim Ullah, PhD 2006, has accepted a faculty position in the Department of Physics, University of South Florida in Tampa. Ghanim did his doctoral research with Peter Jung.

Rong Yang, PhD 2006, is working at the National Center for Nanoscience and Technology of China as an Associate Professor on nanomaterials and their applications. Rong’s doctoral dissertation research was directed by Art Smith.

Catalin Matei, PhD 2006, reports that he and his wife Violeta Iancu, PhD 2006 have moved to London although Violeta still commutes back to Belgium for two days a week working at the Katholieke Universiteit Leuven. Catalin is a research scientist at the National Physical Laboratory which is the UK’s national measurement institute. His primary work areas are thermal neutrons from a thermal pile and mono-energetic neutron sources. Catalin’s doctoral research in experimental nuclear physics was directed by Carl Brune while Violeta’s doctoral research in surface science was directed by Saw Ha.

Chris Bade, PhD 2006, remains a Meteorology and Oceanography Officer (Lieutenant) with the US Navy. His next assignment is Officer in Charge of Naval Oceanography Antisubmarine Warfare Detachment in Misawa, Japan for two years. His doctoral dissertation research was directed by Ken Hicks.

Serdar Kizilgul, PhD 2007, has taken a computer programming job at Maxim Integrated in San Jose, CA. More information about his work can be found here. Serdar received his PhD in experimental nuclear physics under the direction of Ken Hicks.

Daniel Hoy, BS 2008 (HTC), is currently working as a manufacturing engineer at Lake Shore Cryotronics. He is working on their Hall line of magnetic sensors making the instruments found in many labs, particularly cryogenic labs and those involving materials characterization.

Serdar Kizilgul, PhD 2008, and his wife Aysegul are happy to announce the birth of a beautiful baby girl named Eliz Dora. Serdar did his doctoral research under the direction of Ken Hicks.

Adremi Adekola, PhD 2009 and Babaunde (Moses) Oginni, PhD 2008 are both working for Canberra Industries, a nuclear and medical physics detector maker in Meriden, Connecticut and according to Remi’s former advisor Carl Brune they both are doing well. Moses’ research was directed by Steve Grimes.

Sergey Postnikov, PhD 2010 is now a post-doctoral Fellow at Indiana University working with Chuck Horowitz. He returned in Athens in July and presented a research seminar entitled, “Reconstruction of dark equation of state from SN-Ia and high redshift GRBs.” Sergey did his doctoral research with Prakash and then held a post-doctoral Fellowship at UNAM in Mexico.

Kyle Uckert, BS 2010 (HTC), reports that he just received a Masters in Astronomy from New Mexico State University and has submitted his thesis proposal, “The Optimization of in situ Astrobiology Instrumentation and Spectral Analysis Techniques for Biosignature Identification on Planetary Surfaces”. He was just awarded a fellowship (the NASA Space Technology Research Fellowship) to complete his doctoral work. Kyle reports that he has written a couple of papers and is going through the submission/reviewer process for the first time.

Joel Vaughn, PhD 2010, reports that he and his wife Cheryl have a new son Simon Vaughn born October 5, 2012. Simon is healthy and all is great. Joel’s work at Diamond Innovations is going well with three or four more patent applications submitted. His doctoral research was directed by Marty Kordesch.

Dustin Keller, PhD 2010, now works at the University of Virginia with the solid polarized target group. He is part of Hall A, B, and C at Jefferson Laboratory. The target group concentrated on experiments that use spin degrees of freedom in electron-nucleon interactions. Dustin is also involved in a polarized Drell-Yan experiment at Fermilab with Los Alamos collaborators and on the HiFrost experiment to take place at Duke. Dustin’s doctoral research was done at Jefferson Lab under the direction of Ken Hicks.

Wenzhi Lin, PhD 2011, is working at Oak Ridge National Laboratory as a postdoctoral research associate. Wenzhi’s doctoral research in surface physics was directed by Art Smith.

Transitions

Kenneth R. Peak, BS 1967, passed away Friday, the 19th of April 2013, at age 67 after a courageous battle with brain cancer. Ken was the son of Harold Raymond “Dutch” and Mary Rose Peak, both of whom predeceased him. Ken was born the 17th of July 1945, in Cleves, Ohio, and grew up in nearby Frogtown. Ken was a 1963 graduate of Taylor High School and went on to earn a BS in Physics from Ohio University in 1967 and a MBA from Columbia University in 1972. Ken served as an Officer in the United States Navy from 1968 to 1971 where he worked as a Cryptologist. Ken was a man of many accomplishments in the business world. He founded Contango Oil & Gas Co. in September, 1999 and served as the President and Chief Executive Officer at Contango Ore Inc. Before Contango, Ken served as the President at Peak Enernomics Inc., a natural gas and oil-consulting firm that he formed in 1990.

Recent Graduates

Kyle Baldosser, BS 2012 in Physics, is enrolled in the Environmental Sciences graduate program at Ohio State University.

Candy Sherman, BA 2012 in Physics, worked as a nurse during her studies and plans to enter a Licensed Nursing program which requires an undergraduate degree.

Johnathan Clark, BS 2013 in Astrophysics, planned to move to Oregon, play in a band, and teach at a community college.

Keith Hawkins, BS 2013 in Astrophysics (HTC), is in the graduate program in Astronomy at Cambridge University in England.
Dan Lazarz, BS 2013 in Astrophysics, was planning to find temporary work, retake the GRE and apply to graduate school.

Derek Miller, BS 2013 in Physics, has entered the graduate program in physics at Ohio University.

Alan Savage, BS 2013 in Physics, who had worked with Art Smith has entered the graduate program in physics at Ohio State University.

Kevin Walsh, BS 2013 in Astrophysics, was enrolled in the Army ROTC program and is now serving in the military.

Shido Yoshida, BS 2013 in Physics, has returned to Japan for a job in industry.

Meenakshi Kohli, MS 2012, did her master’s thesis with Markus Böttcher.

Samar Alsolamy, MS 2013, did her master’s thesis with Eric Stinaff.

Sushil Dhakal, MS 2013, in experimental nuclear physics is continuing in our doctoral program.

Andrew Foley, MS 2013, did his master’s thesis with Art Smith and continues working in Art’s lab while enrolled in the graduate program of Electrical Engineering and Computer Science at Ohio University.

Mayur Sundarajan, MS 2013, did his master’s thesis with Gang Chen and continues to work in Gang’s lab.

Rakitha Beminiwattha, PhD 2013, has taken a postdoctoral position at Syracuse University. Rakitha’s doctoral research in experimental nuclear physics was supervised by Julie Roche.

Bijaya Acharya, MS 2013, did his project with Daniel Phillips and is now in the doctoral program in theoretical nuclear physics at Ohio University.

Shamim Akhtar, MS 2013, did a master’s project with Carl Brune and is now in the doctoral program in experimental nuclear physics at Ohio University.

Sneha Pandya, MS 2013, did a master’s project and is now in the doctoral program working with Marty Kordesch.

David Riethmiller, MS 2013, did a master’s project in Astronomy with Tom Statler and is working as a Scientific Software Developer with Wyle Systems, NASA Goddard Space Fight Center.

Meng Shi, MS 2013, did a master’s project wiith Art Smith. Her plans are not yet known.

Kevin Cooper, MS 2013, PhD 2013, is an Assistant Professor at Lincoln Memorial University in Harragate, Tennessee. His doctoral research in CMSS experimental physics was supervised by David Ingram.

Desiree Cotto-Figueroa, PhD 2013, has taken a postdoctoral position at the University of Arizona. Desiree’s doctoral research in astrophysics was supervised by Tom Statler.

Andrew DiLullo, PhD 2013, is a postdoctoral Fellow at Argonne National Lab. His doctoral research in CMSS experimental physics was directed by Saw Hla.

Tejinder Kaur, PhD 2013, has taken a position of Consultant at Advansoft International Inc. in Chicago. Her doctoral research in CMSS theory was supervised by Nancy Sandler.

Yinyun Li, PhD 2013, has taken a postdoctoral position at Göttinger University in Germany. Yinyun’s doctoral research in biophysics was directed by Peter Jung.

Geina Mavimbela, PhD 2012, is a Lecturer at the University of Swaziland. His doctoral research in CMSS theory was supervised by Horacio Castillo.

Azamat Orazbayev, PhD 2013, is a Teaching Fellow at University College, London. His doctoral research in nuclear theory was supervised by Charlotte Elster.

Greg Petersen, PhD 2013, is a Senior Engineer with TSI, Inc. in Shoreview, MN. His doctoral research in CMSS theory was supervised by Nancy Sandler.

Binai Prasai, PhD 2013, has taken a postdoctoral position at Central Michigan University. Binai’s doctoral research in condensed matter was supervised by David Drabold.

Brett Ragozzine, PhD 2013, is working as a Security Data Analyst for Zions Bancorporation in Salt Lake City, Utah. His doctoral research in astrophysics was supervised by Doug Clowe.

Wei Tang, PhD 2012, is a postdoctoral researcher at Jefferson Lab in Virginia. His doctoral research was supervised by Ken Hicks.

Buddhini Waidyawansa, PhD 2013, has taken a postdoctoral position at Jefferson Lab in Virginia. Her doctoral research was supervised by Julie Roche.

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Stay Connected with Social Media

Join us on Facebook and check out our department’s YouTube channel!

Department of Physics and Astronomy Facebook
Ohio U Physics YouTube Channel

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The smallest ‘OU’ logo in the world! Fifty-one silver atoms on a silver surface, courtesy of Saw-Wai Hla.
Arduino Workshop for Teens

Professors Mark Lucas and Scann Dikkers (Department of Educational Studies, The Gladys W. and David H. Patton School of Education) along with Dr. Stephen Goss facilitated an ‘Arduino Workshop for Teens’ May 30th in Clippinger Labs. They were assisted by graduate student Rami Amro and undergrad major Keith Hawkins.

By the end of three evening sessions, the students left with a better understanding of how they can use Arduino microcontrollers to interact with the physical world through a variety of sensors and motors. Many members of the group continued to meet informally throughout the summer and may form the core of a future ‘Makerspace’ for teens in the Athens area.

NEW video clips help tell our stories

Some of this year’s YouTube movies feature stories from faculty and students about the night sky (‘Why We Study the Stars’), how physics can help explain biological functions (“Biophysics – with Peter Jung), phase change and flash memory (‘Physics of Disordered Materials’) and who encourages an inquiring mind (‘Star Rising – a profile of Keith Hawkins). Visit our department YouTube channel to learn more!

Gifts to Ohio University

Please consider designating the Department of Physics and Astronomy when you give your gift to Ohio University. The Department needs money for scholarships, books, travel funds for students, support of student research, and paying the expenses of visiting speakers. In this list, the greatest need is for undergraduate major scholarships. Our major endowment funds include:

- **Breitenberger/Wright Graduate Endowment**
  A new fund to support graduate education initiated by gifts from Professors Breitenberger and Wright. This Fund is seeking contributions to become endowed.

- **John Edwards Scholarship Fund**
  Distinguished Professor John Edwards left a bequest of approximately $300,000 to endow this scholarship fund. The Scholarships are given to majors who have financial need and have demonstrated some initial success at Ohio University.

- **Robert Gescy Scholarship Fund**
  Endowed by Jeanette Graselli-Brown in memory of her brother who was a physics student.

- **Darrell Huwe Scholarship Fund**—Endowed by family and friends in memory of Professor Darrell Huwe. The scholarship is preferentially given to students from a rural background with financial need.

- **James Shipman Scholarship Fund**—This fund was initiated by Professor Jim Shipman and Will Konneker (MS 1947) in the 1970s and has been supplemented greatly since then by Jim Shipman using money generated from his very successful physics textbook. It provides our primary support for incoming freshman majors.

- **Abhishek Singh Scholarship Endowment**
  This endowment has been launched with gifts from faculty, staff and students of the department along with contributions from friends of Abhishek to honor his memory.

- **Mark Grimes Memorial Fund**
  Created to honor Mark Grimes and his interest in the undergraduate physics program. The purpose is to provide enrichment of the undergraduate experience of physics majors.

- **Edward R Sanford Astronomy Fund**
  Created to honor Professor Sanford, the income from this endowed fund is used in support of the astronomy program in the department.

- **Department of Physics and Astronomy Fund**
  A general endowed fund with major contributions from Professors Wright and Rollins.

Please visit our [department YouTube channel](url) to learn more!
Open House 2013
“Come Saturday or Wait Two Years”

Every other year since the 2005 ‘World Year of Physics’, our department has hosted an Open House during the fall season. This year visitors came early and many stayed the entire day. Popular shows and demonstrations like ‘Fun with Liquid Nitrogen’, ‘What NOT to do with your Microwave’, ‘The Power of Air’, and ‘Sharks with Lasers on their Heads’, were well attended. Tours throughout the day attracted visitors of all ages and included stops at the Edwards Accelerator Lab, the Surface Science Lab, the helium liquefier facility, Laser ‘Tweezers’ Lab. New this year were additional interactive displays demonstrating a 3-D printer, infrared cameras, and a ‘tabletop nanolab’.

Event organizer Dr. Mark Lucas, was extremely pleased with the results. “We had a fantastic day with more than 900 visitors coming through our doors. The success of Open House is largely due to so many folks in our department and community volunteers who pitch in and enjoy sharing their enthusiasm for physics and astronomy with the public”, he said.

More Open House photos are in the ‘Open House 2013’ photo album on the department’s Facebook page. ‘Like’ us on Facebook!
I would like to make a contribution of ____________, to _________________________

Amount (Fund Name)

☐ I enclose a check made out to The Ohio University Foundation,    OR

Credit Card Authorization  I authorize $ ______________ to be charged to my ☐ Visa ☐ Mastercard ☐ AMEX

Credit Card Number ___________________________  Exp. Date ___________________________

Signature ___________________________ Date ___________________________

Printed Name ___________________________

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News from Alumni

We like to maintain contact with our alumni and friends and we would like to help you stay in contact as well. In particular, if there are any changes or new developments in your career or in your family that you wish to share, please let us know by email to our new editor Ken Hicks (hicks@ohio.edu), or a letter to the address above. Also, if you have information about other Department of Physics and Astronomy Alumni please include it. We would enjoy hearing from you.