

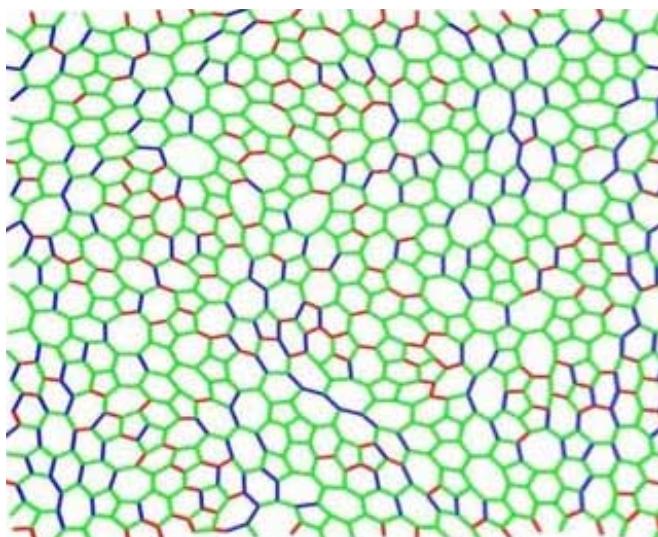
# Physics & Astronomy

NEWSLETTER

## Condensed Matter Theory at Ohio University

Condensed Matter Physics emerged from what was called Solid State Physics and, in general, refers to dense matter (solids or fluids) where many particles governed by either classical mechanics or quantum mechanics are interacting moderately strongly via the electromagnetic interaction. Historically, the systems requiring a quantum mechanical description were described by non-relativistic quantum mechanics, but increasingly it is necessary to include relativistic effects. Both microscopic phenomena and macroscopic phenomena are of interest, but due to the complexity of the many body system, the interpretation of experiment, particularly of emergent properties, requires extensive theoretical constructs or models. Thus, as in many areas of physics and astronomy,

there are investigators who concentrate on theory. They construct models of various phenomena, test the models for simple cases, compare their predictions to experiment and in many cases pose questions or predictions which experimentalists try to answer or check. Many different theoretical approaches, based on classical mechanics or quantum mechanics, are needed in condensed matter physics. With recent advances in material preparation, particularly at the nanoscale, there is increased interest in more detailed microscopic theory embedded in the surrounding continuum. In the following sections, faculty in condensed matter theory (**Horacio Castillo, David Drabold, Alexander Govorov, Nancy Sandler and Sergio Ulloa**) will report briefly on the theoretical approaches they use and on some interesting problems under investigation by their research group. The research of many of these faculty is partially supported by Ohio University's Biomimetic Nanoscience and NanoTechnology (BNNT) initiative. *Please look at the departmental website for more information on these faculty members.*



An 800-atom model of amorphous graphene. Drabold along with Kapko and Thorpe (of Arizona State) recently published this model and an analysis of its electronic structure. The crystal consists only of six-fold rings; this network has a distribution of ring sizes (from 5-7 sides, a feature reported in experiments by Geim, who recently received the 2010 Nobel Prize in Physics). Long bonds are illustrated in blue, short in red and "typical" in green. Such "ring disorder" has a dramatic effect on the electronic structure.

**Horacio Castillo** and his group perform theoretical calculations and numerical simulations to study equilibrium and non-equilibrium structural relaxation in glasses, and in particular, the presence of nanometer-scale dynamical heterogeneities in glassy and granular materials. If a liquid is cooled fast enough to avoid crystallization, it becomes a system in metastable equilibrium, a *supercooled liquid*. If this liquid is cooled further, its viscosity increases greatly at a gradual rate. Indeed, viscosity typically can increase by more than ten orders of magnitude in the supercooled regime. The increase in viscosity is accompanied by a corresponding decrease in the diffusivity of the system: the long-distance motion of molecules progressively becomes slower. Also, the relaxation time, i.e. the typical time it takes for local density fluctuations to decay, becomes much longer. When the relaxation time becomes longer than the experimental time, the material *falls out of thermodynamic equilibrium* and we say that it has become a glass. A glass behaves in many ways like a solid since the diffusion of individual molecules is extremely slow, i.e. the molecules are



frozen in place, and the system displays a nonzero shear modulus.

The fact that glasses are out of equilibrium gives rise to the appearance of *physical aging*: the results of experiments depend on the time that has passed since the material has entered the glass regime. The glass transition is usually accompanied by the presence of strong fluctuations (*dynamical heterogeneities*) spanning regions of size of the order of a few times the individual molecule size (or a few particle diameters for the case of colloidal glasses). One possible way of describing these fluctuations is that regions of the system relax in a correlated way, or in other words, in some regions in the system molecules rearrange much more slowly than in other regions. These fluctuations are believed to be responsible for some puzzling behaviors long observed in supercooled liquids: their non-exponential relaxation and the strong failure of the Stokes-Einstein relation that indicates that in a liquid the product of the viscosity and the diffusion coefficient should be proportional to the absolute temperature. In recent years, dynamical heterogeneity has been increasingly observed in a direct way by experiments probing nanoscale regions, such as atomic force microscopy for glassy polymer films, dynamic light scattering or confocal microscopy for colloidal glasses, and even by video imaging of fluidized granular systems, (where the *molecules* can be as big as 1cm!).

Castillo and his group use analytical approaches including path-integral methods and Renormalization Group techniques to characterize the behavior of solutions and stochastic differential equations to describe the time evolution of models of glasses. In this context, the stochasticity corresponds to the thermal fluctuations in the system. In numerical simulations, the time evolution of systems containing thousands of particles is followed, by using either Molecular Dynamics or dynamical Monte Carlo techniques. The use of simplified atomistic models of particles interacting via classical potentials allows acquisition of information over several decades in the time domain. The data obtained in this way are comparable to the experimental data that have been obtained in recent particle tracking experiments. Then one can perform statistical analysis of both our numerical data and of experimental data, to obtain probability distributions and correlation functions, which can be used to test theoretical predictions for the behavior of fluctuations. This active interplay between our theoretical efforts and our work on analyzing numerical and experimental data has resulted in the emergence of new approaches in both areas.

Castillo joined the department in 2002 as an Assistant Professor and was promoted to Associate Professor and awarded tenure in 2009. He has many international collaborators. His research has been supported by grants from the Ohio Supercomputer Center and from the US Department of Energy.

**David Drabold** and his group work primarily on the physics of disordered systems. Examples of such materials include all glasses, amorphous materials and polymers. The research is both theoretical and computational, and is probably best known for work on the nature of electronic states in these materials. Because the positions of the atoms are unknown for these materials (and impossible to obtain experimentally), the first challenge in the area is to make realistic computer models that are consistent with available experiments. With such models available, it becomes possible to explore both material specific questions and sometimes general questions about broad classes of amorphous materials. For example, Drabold and his students have recently shown the optical absorption edges in disordered systems may arise from connected sub-networks of long and short bonds (in materials like a-Si) or analogous structures in oxide and chalcogenide glasses. In collaboration with colleagues at Oxford and Cambridge in the UK, Drabold has developed a new scheme to invert diffraction data to create highly realistic structural models as recently reported in *Phys. Rev. Letters* and highlighted in a special Viewpoint article. Drabold and Research Assistant Professor **M. Zhang** have recently published and submitted papers on a unified treatment of transport for amorphous materials, realistically including effects of disorder, electron localization and quantization of the lattice modes (phonons). The goal is to compute the temperature and frequency dependence of conductivity and Hall mobility from current *ab initio* codes for systems with structural and thermal disorder, using a method more flexible than the well known Kubo formalism. At an earlier stage of Drabold's career, including his first several years at Ohio University, he also contributed significantly to the methodology of first principles simulations, including basic work on Wannier functions, the analytic properties of the density matrix in condensed matter systems, and efficient order-N methods to compute electronic structure. More detail is given at: <http://www.phy.ohiou.edu/~drabold/Research.html>

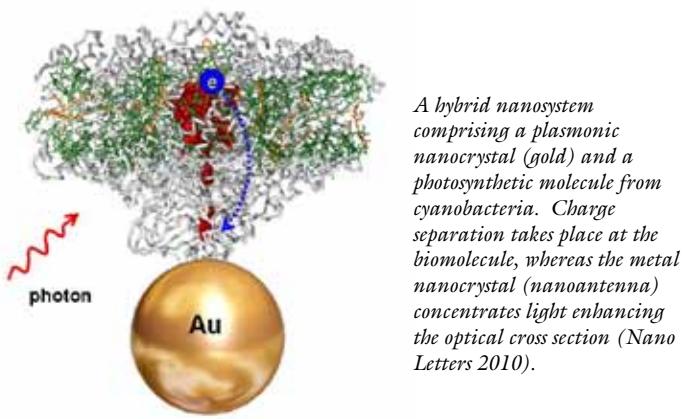


Drabold joined the faculty in 1993, was elected a Fellow of the APS (2003), the Institute of Physics (2005) and Ohio University Distinguished Professor (2005). His research has been supported since 1994 by the NSF Division of Materials Research: Materials Theory and he has had joint support with experimentalists continuously since 1996 from the NSF and/or Army Research Office. Drabold has held visiting positions in Barcelona, Los Alamos and Cambridge (where he has spent two sabbaticals as Leverhulme Professor of Chemistry and as a Fellow Commoner in Trinity College).

**Alexander (Sasha ) Govorov** studies optical phenomena in nanostructures such as quantum dots, quantum rings, colloidal nanocrystals, nanowires, etc. The focus of his research is on many-particle and light-matter interactions at the nanoscale. Among his recent discoveries - hybrid excitons in quantum dots coupled



with a Fermi sea (recent paper in *Nature Physics*), nonlinear Fano effect, optical chirality of molecules and plasmonic nanocrystals. In his theoretical studies, Sasha uses both analytical and numerical methods. Analytical methods include many-body Hamiltonians and the equation of motion of the density matrix for quantum states in nanostructures, Maxwell equations for electromagnetic radiation in metal and semiconductor media, the approaches of physical kinetics describing excited quantum states with strong dissipation. Along with purely fundamental studies, Sasha works on more applied problems such as biosensors and artificial light-harvesting systems. In recent years, he has filed several invention disclosures. This includes the development of the concept of a hybrid nanostructure comprising photosynthetic biomolecules and nanocrystals. Metal nanocrystals play a role of nanoantennae amplifying the intensity of incident light, whereas photosynthetic biomolecules first absorb light and then separate and store photo-induced charges. When a hybrid nanostructure incorporates semiconductor nanocrystals, the enhancement effect comes from the superior absorption efficiency of the semiconductor component. In the first step, photons are absorbed by the semiconductor nanocrystals. In the second step, the optical energy is transferred from nanocrystals to



biomolecules via non-radiative energy transfer. In this way, the light-harvesting efficiency of the natural photosynthetic system becomes strongly enhanced. These concepts have been already realized experimentally and published this year in *Nano Letters* and *Angewandte Chemie*. Govorov developed a theory and interpretation for these experiments. His primary experimental collaborators are at the University of Munich (Germany), University of Eindhoven (Holland), University of Tel

Aviv (Israel), NanoGUNE Institute in San Sebastian (Spain), and Dayton Air Force Research Labs, and in the Department of Chemistry at Ohio University.

Govorov joined the department as an Associate Professor in 2001, was tenured in 2008 and promoted to Professor in 2010. Within the U.S., the funding of Govorov's group is from NSF (two grants), Air Force Research Labs in Dayton, Air Force Research Office, NIH, and NIST. He also received support from the Volkswagen and Alexander von Humboldt Foundations in Germany.

The research carried out in **Nancy Sandler's** group is aimed at gaining a deeper understanding of condensed matter systems from a truly quantum scale. The knowledge thus obtained contains the seeds for potential applications and further development of new materials. Theoreticians working on condensed matter systems face the challenge of describing an amazing diversity of phenomena and the investigation of such systems have become a fertile source of new paradigms for describing nature. The need is to describe properties of systems with many particles, with models that include effects such as disorder, confinement, interactions among the various particles, applied voltages and/or magnetic fields and conditions in or out of equilibrium. Furthermore, phenomena such as phase transitions or discoveries of new states of matter require descriptions at the level of quantum mechanics. Nancy's research effort includes collaborations with colleagues in the department such as her work on GaN materials with Art Smith or the project on magnetic impurities with Sergio Ulloa, as well as researchers at other US and international institutions.

A good example of Sandler's research interests is given by the work on a particular carbon material, graphene, carried out in collaboration with postdoctoral research associate Mahdi Zarea, and graduate students Greg Petersen and Tejinder Kaur. Carbon materials are present in every aspect of our lives, from the filter in water faucets that uses activated carbon, to the lithium-ion cells in the rechargeable batteries of cell phones or laptops. In its pure state, carbon appears under quite different crystalline guises that range from the very soft and slippery graphite to the hardest natural substance known in nature, diamond. The difference between these two extreme forms originates in the way the individual atoms of carbon are bonded to each other. While in diamond the bonds lock the atoms in a three-dimensional, pyramid-like structure, in graphite the atoms are arranged in layers that are weakly interconnected. In each of these layers carbon atoms form a honeycomb or hexagonal lattice. The pure two-dimensional form of crystalline carbon is known as graphene. Thus, graphite can be thought of as a stack of graphene layers, similar to a deck of cards with individual layers that can slide off easily. From the



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## A Note from the Chair — Joe Shields

Greetings to friends and alumni of the Department of Physics and Astronomy at Ohio University. Despite ongoing economic and budget uncertainty, the past year has been a good one for our department. Our researchers continue to advance the bounds of knowledge, and our students and alumni continue to generate impressive achievements in their careers.

As detailed elsewhere in this issue, one remarkable success story was the announcement in October 2009 that alumnus **Venki Ramakrishnan** was chosen to share the 2009 Nobel Prize in Chemistry. This is a first for our department and for Ohio University as a whole, and we are immensely proud that one of our former students would achieve such recognition.



Another indicator of the vitality of our program is the continued growth in external grant funding, which reached a record \$4.7 million for the twelve months up to June 30, 2010. Beyond the dollar amount, it is noteworthy that significant funding is now being generated by all the research sectors in our department, and in fact all of our tenure-track and tenured faculty have current federal support. Of course, the money is just a means to an end; the increased funding has enabled us to expand our graduate program to a current enrollment of 80, and bring in an increasing number of postdoctoral researchers who enrich the intellectual vitality of the department.

The success of our faculty is additionally reflected in their professional advancement. During the past year **Carl Brune** and **Alexander (Sasha) Govorov** were promoted to Professor, in recognition of their excellent performance in teaching, research and service. The composition of our faculty remains unchanged from a year ago.

In late-breaking news, we recently learned the outcome of our department's rankings in the National Research Council Assessment of Research-Doctorate Programs. The last time such a survey was carried out was in 1995, at which time Ohio University's physics Ph.D. program was ranked 82nd out of 146 programs surveyed. The present survey, based on a snapshot of data from 2005, gives results in terms of 90% confidence intervals rather than a simple ranking; in addition, the results are presented with two weightings of variables, based in one case on the reputation of programs among faculty peers and in the second case on performance-based variables (publications, citations, placement of graduates, etc.). Our results this time were 49-130 for the reputation ranking and 36-98 for the performance-based ranking, out of 160 programs surveyed (smaller numbers are better). The offset between these two results can be interpreted as evidence that our program continues to improve in its performance, while our reputation has not yet caught up. Among Ohio University doctoral programs, physics had the highest relative ranking of any discipline. Among physics Ph.D. programs in Ohio, our program stands second only behind Ohio State in the performance-based ranking.

I have enjoyed meeting with a number of alumni who visited campus during the past year (see separate news items for more information). Their reflections on their Ohio University experience and its role in their subsequent activities is an inspiration to our faculty, reminding us of the ability we have to influence young people and help them to grow in their lives and careers. Our current students have also responded very positively to visiting alumni, who provide a welcome perspective on the diverse career paths open to individuals with a physics background. If you have an opportunity to visit Athens and share your story with our students and faculty, I would urge you to do so; please send me an email ([shields@phy.ohio.edu](mailto:shields@phy.ohio.edu)) and we will be happy to set up a schedule for your visit.

I would like to reiterate my thanks on behalf of the department to those individuals who have contributed financially to our program. In these challenging economic times, support from donors is increasingly important for allowing us to provide opportunities for our students and scholarships to assist them in meeting the costs of an education. I would particularly like to thank those of you who have regularly donated over the years. Our supporters include alumni, faculty, and other friends outside the university. A sterling example is my predecessor as chair, **Prof. Louis Wright**, and his wife **Karin**, whose annual donations over the past decade now total \$25,000 in support of the Physics & Astronomy Endowment. A full list of donors for the past year can be found elsewhere in this issue. If your circumstances allow, I hope you will consider joining these individuals in providing support that will enable future generations of students to realize their potential, and their dreams.

## A Note from the Editor — Louis E. Wright

As I prepare the fourth edition of the Newsletter as Editor, I continue to be amazed at the great success of the faculty, staff, students and alumni of our department. Despite somewhat difficult economic times, the department continues to thrive and we greatly appreciate the loyalty and support from our friends and alumni.

As noted in the Chair's Report, fiscal year 2010 (July 1, 2009-June 30, 2010) was a record year for research grants awarded to faculty in the Department of Physics and Astronomy. Research dollars awarded in FY 2010 amounted to \$4.738 million dollars while previous records were \$3.900 million in FY 2006 and \$3.549 million in FY 2004. The fact that all Group I (tenured and tenure-track) faculty in the department have active externally supported research accounts speaks well to the strengths of the department's research programs and to the hard work of the faculty, research personnel and students. During FY 2010, the department had 27 Group I faculty so that awards per faculty amounted to over \$175K which compares very well with highly ranked departments nationally.



The department was fortunate to have a visit by R. Joseph Anderson who works at the American Institute of Physics as Director of the Niels Bohr Library and Archives, and Associate Director of the Center for History of Physics. He presented the departmental colloquium *Industrial R&D: Physicists in Transition* on April 23, 2010. Joe is an Ohio University alumnus with two history degrees (BA 1968 and MA 1973). My wife Karin (MA 1978 in history) and I hosted a party for Joe at our house after the Colloquium. We all had an enjoyable time discussing Ohio University back in the 60's and 70's and discussing with Joe the work of the Center for History of Physics. In fact, Joe Shields has just received an inquiry from the Center seeking help in identifying physics entrepreneurs who have gone on to found or co-founded their own companies. In any of you have done so, please let us know about it.

## Donors to the Department

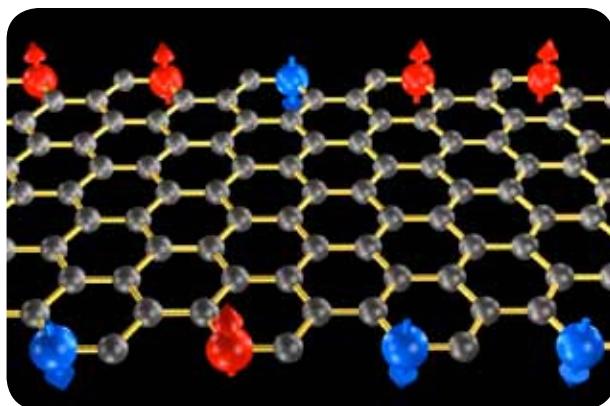
During the past academic year the department received contributions from many alumni, friends and members of the faculty and staff. We are very thankful to all of our donors.

Donors between July 1, 2009 and June 30, 2010 are listed below: (We apologize if we have overlooked any contributions made during this period.)

Karen Adams	Charles Fulton	Jacobo & Irma Rapaport
Arnold Aronson	Alexander Govorov	Roger & Betty Rollins
Clyde & Karen Baker	Steven Grimes	Donald Roth
Bryan Barmore	Elaine Sanford Hayes	Nancy Sandler
Donald & Kathryn Bertzyk	Kenneth Hicks & Terry Murphy	Joan Sanford
Scott Bertzyk	Saw Hla	Scott Savage
Markus Böttcher	Peter & Betty Hoffmann-Pinther	Daniel & Donna Sayre
John Bowdle	Marie Huwe	Andreas Schiller
Ido Braslavsky	David Ingram	Teresa Sexton
Carl Brune	Peter Jung	Joseph Shields & Ann Fidler
Horacio Castillo	Martin Kordesch	Sudie Shipman
Michael Cervenak	Megan Krejny	Arthur Smith
Gang Chen	Karil Kuntz	Eric Stinaff
Philip Chute	David Larch & Deborah Roudebush	Folden & Margaret Stumpf
Richard Cleavenger	John Morrison	Chi & Laura Tang
Dorothy & John Cruise	Richard Moyer	David Tees
Bruce Danner	Robert Mueller	Sergio Ulloa
Berry Dilley	Alexander Neiman	Tomomi Watanabe
Kelsey Edwards	Herbert Petitjean	Richard Waters
Thomas & Patricia Fox	Daniel Phillips	Jerry Wilson
Justin Frantz	Paul & Geri Ploutz	Louis & Karin Wright

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point of view of applications, graphene is considered to be the natural successor for silicon, the semiconductor material making 99% of all current electronic chips. Due to its electronic properties graphene can be used to make transistors where electrons can travel without suffering any scattering. From a more academic point of view, graphene possesses a remarkable property that makes it particularly special among all possible two-dimensional materials: the electrons move with a velocity that is independent of their energy, appearing as having no rest mass. That is, electrons behave in graphene as if they were light waves (or photons). In experiments and potential device applications, graphene samples



*Different electron spins moving along the edges of a graphene ribbon under the influence of an electric field perpendicular to the plane.*

have finite sizes and irregular shapes. A natural question arising under these circumstances is the influence that these factors have on the measured quantities and the behavior of physical properties. Sandler's group investigates these issues with techniques that combine computational and analytic approaches. Her research has shown that graphene ribbons become insulators when interactions among electrons are considered and that electric fields applied perpendicular to the ribbon could produce spin polarized currents.

Sandler joined the department as a part-time Research Assistant Professor in 2002 and became a tenure-track Assistant Professor in 2005. Her research is supported by BNNT and by research grants from the National Science Foundation.

**Sergio Ulloa** and his group work on identifying, understanding and possibly controlling quantum mechanical signatures in the experimental behavior of nanometer scale systems. One typically thinks of quantum mechanics as applying or manifesting only at small length scales or under very special environments.

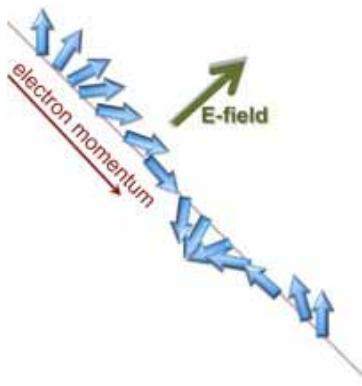
However, the amazing control of new and more precise experimental probes, the synthesis of tailored condensed matter systems, and the careful design of experiments



result often in surprising results that demand a full quantum mechanical description.. This fascinating area of research is not only intrinsically interesting, as it may shed light on fundamental questions of quantum mechanics, but it has potential for applications as tantalizing as quantum computation and spintronics. Ulloa's group is currently engaged in studying the behavior of magnetic molecules when deposited on metallic surfaces (in collaboration with the experimental STM group of **Saw Hla**), the quantum control of optical excitations in coupled quantum dots (inspired by experiments in **Eric Stinnett's** group), and the effectively magnetic phenomena in quantum dots where the electronic charge is controlled by external voltage probes. Collaborations with **Sandler's** group, as well as colleagues at other institutions, motivate new projects and interesting physics questions. This research is supported by grants from the National Science Foundation.

As a recent example of this work, **Anh Ngo**, a graduate student in the group, has studied the ability to control the *spin* orientation of electronic currents using purely electrical fields. This advance, in collaboration with the experimental group of Prof. Phillippe Debray at the University of Cincinnati, opens interesting new possibilities for *spintronics*, where the spin of the electron plays an essential role (instead of being irrelevant, as in current electronic devices). Anh's modeling was instrumental in understanding the surprising experimental results in Debray's lab, which resulted in a publication in *Nature Nanotechnology* in late 2009. Most interestingly, the spin control resulted from a weak but crucial relativistic effect: the appearance of an effective magnetic field which makes spins precess as they move in the presence of an electric field. This *spin-orbit* effect promises to be a great experimental knob to tune for control of spin orientation of currents.

Ulloa, a Fellow of the APS and a member of the Mexican Academy of Sciences, joined the department in 1986 and was promoted to Professor in 1995. He has held an Alexander von Humboldt Fellowship in Germany and maintains extensive international collaborations. His research is supported by BNNT and grants from the US Department of Energy and the NSF.



*Electronic spin precessing due to spin-orbit effect in the presence of an electric field.*

# Department News

## Recognition of Physics Majors

Our majors have achieved many successes during the past year. Below we include some of the more significant achievements:

**Honorary Societies:** The following students were inducted into the Physics Honorary Society Sigma Pi Sigma ( $\Sigma\pi\Sigma$ ): **Daniel Bergman, Ryan Braid, Chris Diltz, Kayla Fultz, Brian Helbig, Bob Meholif, Vince Roberts, James Ralston, Kyle Uckert and Peng Zhao**, while **Chris Diltz and SooHyun Hwang** were inducted into Phi Beta Kappa ( $\Phi BK$ ).



New  $\Phi BK$  inductees Chris Diltz and SooHyun Hwang with  $\Phi BK$  members in our department: Mark Lucas, Steve Grimes, and Joe Shields.

**Undergraduate Research:** During the past few years under the leadership of Ken Hicks, we have been increasing the number of our majors engaged in summer research with faculty. For the summer of 2010 these include the following undergraduates listed with their research mentors: **Tyler Barton** (Braslavsky), **David Bauer** (Brune/Grimes), **Dan Bergman** (Drabold), **Gary Cantor** (Brune/Grimes), **Tianjiao Chen** (Smith), **Johnathan Clark** (Hicks), **Chris Diltz** (Clowe), **Alicia Gooding** (Stinaff), **Courtney Gusbar** (Mager), **Robert Harrington** (Tees), **Bob Hatton** (Kordesch), **Ben Hivick** (Clowe), **Josh Kaisen** (Roche/King), **Anna Opitz** (Tees), **James Ralston** (Brune/Grimes), **Vincent Roberts** (Hla), **Alan Savage** (Stinaff), **John Stahl** (Shields), **Kevin Sweeney** (Böttcher), **Nathan Turner** (Sandler/Ulloa), **Kyle Uckert** (Kordesch), **Joe Zeallear** (Frantz), and **Peng Zhao** (Jung).

Often, summer research projects lead to results. SPS advisor **Gang Chen** reported on the 2nd Undergraduate Physics Research Conference that was held on Saturday, April 24, 2010. There were seven presentations given by our undergraduates who conducted research with faculty in Physics and Astronomy in the summer of 2009. All the faculty who attended this event have been highly impressed by the students' excellent work as well as their extraordinary presentation skills. The judges (Associate Dean Howard Dewald and Gang Chen) selected Kyle Uckert to receive

the "Best Paper Award" for the 2010 conference, which also comes with a monetary prize. The title of Kyle's talk is *High Temperature Resistivity and Hall Effect Measurements of Scandium Oxide*. We also had three honorable mentions: Ryan Braid, Chris Diltz, and Kevin Sweeny

**Roger Rollins** (Professor Emeritus) was awarded the Howard Maxwell Award for Distinguished Service by the Ohio Section of the American Physical Society at the Fall Meeting of OS/APS held at Ohio Wesleyan University on October 9-10, 2009. The Ohio Section is one of nine regional sections of the American Physical Society and includes members from Ohio, Michigan, Pennsylvania and Indiana. OS/APS holds a two-day Spring and Fall Meeting every year hosted by various colleges and universities in the region. Professor Rollins served as Treasurer of the OS/APS for many years and also managed the OS/APS website. In addition, he was a tireless advocate of faculty and students in our department attending OS/APS meetings and presenting papers there. Ohio University will be hosting the Spring 2013 OS/APS meeting with **Ken Hicks** being the local chair.



Roger Rollins (in green) along with members of the department Gina Mavimbela, David Ruiz, Louis Wright, Shura Neiman, Joe Shields, Azita Parsaeian, and Karina Avila-Coronado at the OS/APS meeting.

## Transitions

**Peter McQuade**, a former staff member in the Departmental Machine Shop (1989-1996), died of complications from cancer in May of 2010. Before joining Ohio University, Peter was a partner in T&M Machine Shop in Nelsonville. He was a valued member of the department during his tenure in the machine shop.

# Physics PhD Alumnus Wins 2009 Nobel Prize in Chemistry



Nobel Prize awarded to Venki by his majesty King Carl XVI of Sweden. (Nobel Foundation 2009 Photo by Frida Westholm)

The department is very proud that one of our alumni, **Venkatraman (Venki) Ramakrishnan**, PhD 1976, was one of three scientists awarded the 2009 Nobel Prize in Chemistry for his work on the structure of the ribosome. He is currently a staff member at the MRC Laboratory of Molecular Biology in Cambridge, England, and a Fellow of Trinity College at the University of Cambridge. Venki was featured in the 2008 Newsletter as a winner of the Outstanding Alumni Award in Arts and Sciences and we enjoyed his colloquium and visit to Athens and Ohio University two years ago. After receiving his PhD in condensed matter theory under the direction of Tomoyasu Tanaka, Venki shifted the direction of his research to emphasize biochemistry and molecular biology. We are hopeful that Venki can visit us again.

## Department News Continued

### Visiting Faculty

We were fortunate in being awarded two Glidden Visiting Professors this year. **Maria Teresa Peña** is an Associate Professor at the Instituto Superior Técnico (IST) in Lisbon, Portugal and is a very successful researcher in nuclear and particle physics. She is the Editor-in-Chief of the Journal *Gazeta de Física* of the Portuguese Physical Society and a member of the Editorial Board of *European Physics News*, the Journal of the European Physical Society. During her Fall Quarter stay in our department, Professor Peña will be hosted by Charlotte Elster and will be working with the members of the Institute of Nuclear and Particle Physics (INPP). The second Glidden Visiting Professor, **Noboru Takeuchi**, will spend his sabbatical at Ohio University collaborating with the

faculty in the Nanoscale and Quantum Phenomena Institute (NQPI). He works on computational studies of nanoscale electronic systems, which are research areas of various CMSS and NQPI faculty. Professor Takeuchi is on the faculty of the Center for Nanosciences and Nanotechnology (CNyN) at the National University of Mexico (UNAM) in Ensenada, Baja California, Mexico, and has most recently focused his work on understanding chemical reactions between organic molecules and surfaces of metal and semiconducting materials. He is an expert on the use of *plane-wave codes* (Car-Parrinello methods) to elucidate the electronic properties of materials. In addition, **Ernesto Cota**, also in the faculty at the CNyN at UNAM, and a frequent visitor to Ohio University, will spend 6 months of his sabbatical this academic year, visiting with the groups of Sandler & Ulloa. He works on electronic transport properties of quantum dots and other nanostructures. A fourth distinguished visitor is **Fabio Marchesoni**, Professor of Physics at the University of Camerino in Italy, who will be in Athens from August through December working with Peter Jung. He is a Fellow of the American Physical Society, the Institute of Physics and the American Association for Advancement of Science. In addition, he has been named RIKEN Eminent Scientist, APS Outstanding Referee , and Honorary Professor at the University of Loughborough. In 2006 he won the Alexander von Humboldt prize (Germany) and in 2008 has been bestowed the title of Knight of the Order of Merits by the President of Italy for his scientific achievements. In his research he specializes in diverse topics of nonequilibrium statistical physics including stochastic processes, stochastic resonance, Brownian motors, self-organized criticality, and soliton statistics. We are also fortunate that two of our alumni, **Stephen Weppner** (PhD 1997) and **Hector Guerrero** (PhD 1998) will be spending their sabbatical in the department—see the entries under **Alumni News** for more details.

### Recent Postdoctoral Researchers

The increasing amount of research support from the federal government over the past decade has led to more Postdoctoral Research Associates in the department. **Postdocs** play an increasing role in research oriented departments yet their accomplishments often go unrecognized and their subsequent careers are largely unknown to members of the department. In this initial entry in the newsletter, we will report on the subsequent positions of some of our postdoctoral researchers of the past ten years. Former Postdocs working with the nuclear theory group (Elster, Phillips, Prakash and Wright) include the following: **Vladimir Pascalutsa** (2001-2003), is presently a Staff Member at the Institute of Nuclear Physics of the Johannes Gutenberg-Universität Mainz, Germany; **Anders Gardestig** (2003-2005), is presently a Lecturer in the Department of Physics at Whitworth College in Spokane, Washington; **Lucas Platter** (2005-2007) is about to assume a position as an Assistant Professor at Chalmers University of Technology in Gothenburg, Sweden (Lucas and his wife Noelia met in Athens. They had their first child, Hannah, in

May.); **Matthias Schindler** (2007-2009), presently a post-doc at George Washington University, will take up a job as an Assistant Professor at the University of South Carolina early next year; and **Prashanth Jaikukamar** (2006-2007) is an Assistant Professor at California State University Long Beach. Three Postdocs who worked with Art Smith include: **Haiqiang Yang** (2000-2002) who went on to a second Postdoc at Texas A&M; **Erdong Lu** (2003-2006) took a job at a thin film company in Cincinnati; and **Yinghao Liu** (2008-2010) has taken a second Postdoc at Los Alamos National Lab. Former Postdocs of David Drabold include: **Partha Biswas** (2002-2005) now Assistant Professor of Physics at the University of Southern Mississippi; **Jun Li** (2001-2003) now a Scientist at NANOEXA Inc (a company designing novel batteries); and **Uwe Stephan** (1997-2000) a Software Engineer at dSPACE in Paderborn, Germany. Peter Jung's postdoc **Jianwei Shuai** (2002-2005) went to UC Irvine after leaving Ohio and now is a Professor at Xiamen University in Fujian, China. Former Postdocs working with Nancy Sandler and Sergio Ulloa include: **Edson Vernek** (2007-2008), now on the faculty of the University of Uberlandia in Minas Gerais, Brazil, who reports the arrival of his son Yuri Vernek and **Luis Dias da Silva** (2004-2007) has just joined the faculty of the University of Campinas in Sao Paulo, Brazil.

## Staff

The retirement of **Ennice Sweigart** in June, 2010 as Assistant Department Administrator was an occasion that generated mixed emotions. We celebrated Ennice's retirement, but will greatly miss her friendly manner coupled with her success in keeping our graduate students and faculty on task. Ennice has been an invaluable asset since she joined the department in the Fall of 2002. We wish Ennice and her family all the best in retirement.

**Meg Van Patten** stepped into the Assistant Department Administrator position this summer. Meg has worked with some of our faculty previously in the role of budget manager for BNNT. **Mala Braslavsky** has served since summer of 2007 as NQPI's first Special Events & Outreach Coordinator. Her activities included development of the NQPI website, administering an international conference in 2008, and helping to launch the bi-annual newsletter. Mala left her position in June to return to Israel with her family. **Elizabeth "Liz" Stinaff** has been hired to step into the NQPI position. **Vicki Ball-Seiter** has joined the staff in the department on a permanent basis after a temporary appointment last year. Vicki is an Administrative Assistant working with the undergraduate teaching labs in Clippinger and assisting in secretarial duties at the Edwards Accelerator Laboratory.

## Physics Major Scholarships

**Kevin Sweeney** was awarded an Ohio Space Grant Consortium Scholarship. In addition, due to the generosity of alumni, faculty and friends, our majors have access to a number of scholarships which assist them in achieving their educational goals. We are very grateful to your previous support to these scholarship funds and we would encourage you to be as generous as you can in providing continuing contributions. Scholarship recipients for 2009-2010 and funding sources are: **Kyle Baldosser** (Shipman), **Daniel Bergman** (Shipman), **Ryan Braid** (Shipman), **Tianjiao Chen** (Dist. Prof./Huwe), **Chris Diltz** (Dist. Prof./Singh), **Alicia Gooding** (Stocker), **Courtner Gusbar** (Shipman), **Brian Helbig** (Edwards/Ewers), **SooHyun Hwang** (Stocker), **Robert Meholf** (Edwards), **James Ralston** (Edwards/Stocker), **Vincent Roberts** (Stocker), **Steven Rogers** (Gecsy), **Alan Savage** (Shipman), **Jacob Ticer** (Shipman), and **Kyle Uckert** (Adams). Ken Hicks chairs the departmental Scholarship Committee.



Ennice (on the left) is shown with departmental Administrative Assistant Tracy Inman.

### The Ralph Cade Machine Shop

The department is very fortunate to have a well equipped machine shop in the basement of Clippinger. The first machine shop, located in Super Hall, came into existence with the hiring of **Ralph Cade** in 1949. In recognition of the increased workload due to the addition of the doctoral program in 1959, **Paul Beasley** was hired and worked in the machine shop from 1962-1988. In the early years of the doctoral program, the largest user of the machine shop

was the experimental high energy physics group headed by **Bashir Munir** which needed many measurement machines for 70 mm film records from bubble chamber experiments. To keep up with the workload, **Roger Smith** joined the machine shop in 1963. Due to the need for additional space, the machine shop was moved from Super Hall (the site where the new Bentley addition is located) to the Old Wakefield Building which was on Richland Avenue (the site was destroyed when the river was moved to its current location). In addition, a fourth employee, **Kenny Davis** was added in 1963. With the construction of Clippinger Research Labs along with the planned relocation of the Hocking River, the machine shop was moved to its current location in the basement of Clippinger in 1967—just in time for the last major flood of the Hocking River in Athens in May of 1968. The machine shop entrances were sealed with rubber and pumps and were able to keep the flood waters out of the basement even though the flood waters were more than four feet higher than the floor of the machine shop. Shortly after this flood, the Hocking River was moved to its current location.

When Kenny Davis left in 1972, **Gene Workman** worked part-time in the shop during the 70's. With the dissolution of the high energy group in the early 70's, other experimental groups created by the expansion of the department in the late 60's began making extensive use of the machine shop. Ralph Cade retired in 1979 and in recognition of his outstanding leadership of the machine shop, the shop was designated the Ralph Cade Machine Shop. Paul Beasely retired in 1988 and was replaced by **Peter McQuade** in 1989 (see the McQuade obituary below). When Peter McQuade left the machine shop for health reasons in 1996, he was replaced by **Randy Mulford** who served from 1997 until 2005. During his service, former faculty member **Larry Wilen** received a major equipment grant which allowed the shop to acquire two electronically controlled machines which permitted the creation of metal parts designed by computer programs. Roger Smith retired in 2005 after 42 years of outstanding service. The latest additions to the machine shop staff were **Doug Shafer** in 2005 and **Jeremy Dennison** in 2006. Doug was awarded the outstanding staff award in June of 2010.

Apart from the two computer controlled machines, much of the excellent equipment in the shop was acquired in the early days by Cade, Beasely, and Smith who scoured the region, particularly Columbus, for surplus machines, tools and metal. In addition, it should be noted that the machine shop and its staff have served many other faculty and students in other departments at Ohio University and certainly have been a critical factor in the tremendous success of the experimental programs in the Department of Physics and Astronomy. With 61 years of great success we look forward to continued excellence of the Ralph Cade Machine Shop. I want to thank Roger Smith for his help in preparing this entry in the newsletter. The initiator of the Ralph Cade Machine shop is living in Florida where he retired many years ago and Roger Smith lives in the Athens area and still drops by regularly.

# Alumni News

## Previous Graduates

Please let the Editor know what is happening in your career, with your family, or with any other item of interest to your fellow alumni and friends of the Department of Physics and Astronomy at Ohio University. Send information to wright@ohio.edu or use the enclosed form and envelope to let us know what is going on in your life. Doctoral graduates should check out our webpage entitled **Ph.D. Alumni: Where Are They Now?** found under **People** on the departmental website [www.phy.ohio.edu](http://www.phy.ohio.edu). Please send in corrections and/or updates.

### 1900-1969

**Arnold Aronson**, BS 1953, is celebrating his 50th year of service at Brookhaven National Laboratory. Arnie reports in an email to Joe Shields that at the present time there are only a very few employees of Brookhaven with a longer period of service. We enjoyed Arnie's visit to our department in October of 2007.

**Carl A Alexander**, MS 1956, returned to campus in September, 2010 to receive the Distinguished Alumnus Award from the College of Arts and Sciences. After earning his physics degree from Ohio University, Carl went on to complete a PhD from Ohio State University, and later taught at OSU as an adjunct professor. Carl is an expert in chemical thermodynamics, with application to nuclear materials at high temperatures and related topics. He has pursued a long and highly successful career at Battelle Memorial Institute in Columbus, rising to the position of Chief Scientist in the National Security Division. He has made major contributions in areas related to nuclear energy, power systems for the Pioneer and Voyager spacecraft, nuclear safety, and mitigation of threats linked to terrorism and weapons of mass destruction. During his visit to campus, the Institute of Nuclear and Particle Physics presented an interactive seminar with Carl to discuss current research projects at Ohio University.



*Carl Alexander (2nd from left), pictured with Physics & Astronomy faculty Carl Brune, Steve Grimes, Markus Böttcher, and Joe Shields, at the College of Arts & Sciences Alumni Awards Ceremony.*



John with Burt Stumpf and Joe Shields on the second floor of Clippinger (Photo by Jimmy Tong).

**John Bowdle**, BS 1966, visited the department in May to attend a public lecture given by **Daniel Phillips**. (Daniel's talk was part of the New Professor Lectures Series organized by the College of Arts and Sciences and available for viewing on the web at <http://streaming.cns.ohiou.edu/CAS/>.) John is retired after a career working as a physicist and computer specialist at the Department of Energy's uranium gaseous diffusion enrichment plant in Piketon, Ohio. While on campus John met with several of our faculty as well as emeritus professor **Jimmy Tong** from the Department of Chemistry and Biochemistry, and described his participation in 1960 in one of the Summer Science Workshops on the Ohio University campus which Jim Shipman helped to organize.

**Kenneth Peak**, BS 1967, is the founder and CEO of Contango Oil and Gas Company, which is based in Houston and specializes in oil and natural gas production in the Gulf of Mexico. Ken returned to campus in September, meeting with faculty and presenting a talk to students about his background and experience in business. Ken commented that his study of physics provided excellent problem-solving skills that he regularly uses in his work. He additionally draws on his MBA from Columbia University, experience as a Navy cryptographer, and several decades working in the finance and petroleum industries in his current position. Ken's leadership of Contango has been highly successful, despite the challenges of working in a commodity industry during a time of financial stress.

**Lawrence Crum**, PhD 1967, presented two papers at the Acoustical Society of America Meeting in Baltimore in April 2010. He was also elected President of the International Society for Therapeutic Acoustics (ISTU) which was formed in 2001 to serve this rapidly expanding medical discipline. In addition, Professor Crum was elected in November of 2009 to the Danish Academy of Natural Sciences. Larry did his doctoral research with Burt Stumpf and is currently at the Applied Research Laboratory at the University of Washington.

**James L Stone**, BS 1969, Professor of Physics and Director of Graduate Studies at Boston University and a Jefferson Science Fellow for 2009, visited the department in April of 2009 and

presented a colloquium, *The Role of Science and Technology in Foreign Affairs and International Diplomacy*. In his very interesting presentation he explained the role of the Jefferson Science Fellows in the US State Department.

## 1970-1979

**Kerry McCalla**, AB 1970, and his wife Lynne were on campus in June to participate in special 40th anniversary commencement ceremonies for the class of 1970, which missed out on commencement that year when the spring term at Ohio University was terminated early in response to campus unrest in Athens and elsewhere. Kerry went on to earn an M. Ed. in counseling from Ohio University and worked in community mental health before joining BellSouth, where he was employed for 27 years in project management. Kerry resides in Franklin, Tennessee and remains very active in retirement. He is currently involved with Habitat for Humanity, where he draws on his enthusiasm for teaching and woodworking while training people to supervise construction projects. As a student, Kerry worked in the Physics Department as a draftsman; some of his drawings remain in use today at the Edwards Accelerator Laboratory. This is very appropriate as Kerry was very appreciative of receiving a Distinguished Professor Scholarship from John Edwards.

**Clement Lane**, PhD 1970, retired from North Texas County College in Houston, Texas and lives with his wife in Spring, Texas. His research advisor was Burt Stumpf in experimental acoustics.

**Jerry Wilson**, PhD 1970, still lives in Greenwood, South Carolina where he retired from Lander University. The text, *An Introduction to Physical Science*, which he coauthored with Jim Shipman is in its 12th Edition. Jerry has authored or coauthored 9 textbooks. His research in experimental acoustics was directed by Seung Yun.

**Barry Wyerman**, BS 1971, is a product manager for Janesville Acoustics. He earned a PhD from Penn State in 1976. Barry was in the Ohio University Marching Band.

**Kallarakal N Thomas**, PhD 1972, has retired and now lives in Kottayam in Kerala, India. His son is a medical doctor living in Amarillo, Texas and his daughter does research at a Veteran's Center near Boston. Kallarakal did research in experimental acoustics with Burt Stumpf. His career was spent at Baring Union College in Batala, Punjab, India.

**Hadi Hadizadeh**, PhD 1978, a professor of nuclear physics at Ferdowsi University in Mashhad, Iran was quoted in the August, 2010 issue of *Physics Today* about the difficulty of doing basic nuclear physics research in Iran. In an email, Hadi reported that he and his wife Soraya have been visiting their daughter **Nastaran Hadizadeh Yazdi**, BS 2005, who is in the last stages of obtaining her PhD in biophysics at Northwestern.

**David A Resler**, BS 1979, PhD 1987, is a Senior Network Engineer in the Office of Information Technology at Ohio University. David earned his PhD in experimental nuclear physics under the direction of Ray Lane. After a successful career at Lawrence Livermore Laboratory, David and his family returned to Athens.

**Paul Koehler**, BS 1979, PhD 1984, and his colleagues reported in August in Physics Review Letters (P.E. Koehler et al., Phys. Rev. Lett. **105**, 072502 (2010)) the results of an experiment at Oak Ridge Electron Linear Accelerator (ORELA) probing the nuclear structure of isotopes of platinum. As discussed in the online issue of Nature, their analysis did not find the expected chaotic movement of the nucleons in platinum predicted by random matrix theory. The resolution of the discrepancy could have practical applications, as random matrix theory is currently used to estimate the probability that escaping neutrons will collide with nuclei, and from this to calculate the amount of shielding needed in nuclear reactors and stockpiles. Paul did his doctoral research under the direction of Ray Lane.

## 1980-1989

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

**Majid Sawtarie**, PhD 1984, has moved from Bethany College in West Virginia to the position as Chair of the Science Department at Owens Community College in the Toledo area. Majid did his doctoral research in condensed matter theory with Tomo Tanaka.

**Charles (Chuck) Niederriter**, PhD 1985, is the new director (as of 2009) of the Nobel Conference at Gustavus Adolphus College held every Fall. This year's conference, Nobel Conference 46, is *Making Food Good* and will be held October 5&6, 2010 in St. Peter, Minnesota. The central purpose of the conference is to have conversation between the public and scientists about various issues. Chuck did his doctoral research in experimental condensed matter with Ron Cappelletti.

**Henry Clark**, BS 1988, PhD 1993, visited Ohio University and the department on August 19. Henry and his wife Shannon were accompanying their daughter who is considering attending Ohio U. Like her father and mother, she is an outstanding swimmer and is investigating the swim program at Ohio University along with the biological sciences program. Henry told us a bit about his career after earning his PhD in experimental nuclear physics under the direction of Ken Hicks. In the face of stiff competition, he won a postdoctoral appointment at Texas A&M. He currently holds a permanent staff position as the Manager of the Radiation Effects Facility at Texas A&M, a very

successful facility with over 120 staff doing basic and applied nuclear physics research.

## 1990-1999

**Frank X. Lee**, PhD 1993, has been promoted to Professor in the Department of Physics at the George Washington University. He lives in the Washington area with his wife Hong Zhang who has a PhD in Bio-Chemistry from Ohio University and works at NIH and their three children Hanna, Melody and Farland. Frank's current research is in lattice gauge theory which is a change from his dissertation research on theoretical pion photo-and electro-production under the direction of Louis Wright.



Frank (Xiaodong) Lee

**Jairo Sinova**, BS (HTC) 1994, has been promoted to Professor at Texas A&M. After his graduation from Ohio University in 1994, Jairo entered the graduate program at Indiana University and obtained his PhD in condensed matter theory in 1999. He held postdoctoral research appointments at the University of Tennessee and the University of Texas at Austin before joining the department at Texas A&M in 2003. Jairo's wife **Barbara (Adams) Sinova** is also a graduate of our department (BS 1994). Jairo travels a great deal giving talks and maintaining active collaborations with researchers in Prague (during the summer to avoid the Texas heat) and is member of an MRSEC at Ohio State. One of his major research interests is spintronics. He said he hopes to visit at some point what remains, completely objectively, one of the most beautiful campuses to spend undergraduate life. Jairo and Barbara send greetings to all members of the department who were here during their studies.



Jairo Sinova

**Chi Tang**, PhD 1995, joined Applied Sciences, Inc. working on vapor grown carbon fiber. In 2001 he moved to PPG Industries, Inc. as a research physicist working in Lexington, NC. In 2006 he took a new position within the company to manage their external research activities in the Asia/Pacific region. In 2007 PPG relocated Chi, his wife Laura, and children Michael and Katherine to Shanghai. Chi's main responsibility is to commercialize new products in joint ventures in the Asian/Pacific region. Laura serves as an editor for the Shanghai Expatriate Association's magazine and is active with the expats and local communities. Michael, aged 12, attends the Shanghai American School and Katherine, aged 8, attends YCIS (a British school). Chi sends his greetings and regards to all the professors who were here when he studied in the department. Chi received his Ph.D. in experimental physics under the direction of David Ingram in 1995.

## **Alumni News Continued**

**Kyungsik Kim**, PhD 1996, has been awarded tenure and the rank of Associate Professor at Sung Kyun Kwan University in Korea. Kyungsik did his dissertation research in theoretical nuclear physics with Louis Wright.

**Markus Löcher**, PhD 1997, reported that he and his wife, **Sita Rajan Löcher**, MS 1994, along with their children live in Princeton, New Jersey. After taking a Postdoc at Georgia Tech, Markus joined Siemens Research in Princeton and worked in their signal processing/applied math group for four years. He then formed his own consulting company in statistical data mining. In 2005, Markus decided to fill in some knowledge gaps by going back to school. He received a MS degree in statistics from Rutgers in 2006 and shortly after that joined his current company, Sense Networks where they are analyzing massive amounts of spatiotemporal data--all great fun. Markus reports that he loves statistics more and more and his avid reading of Phys. Rev. Letters has recently been replaced by Statistical Science. Markus said that one thing he likes in Statistics journals that he has not seen in Physics journals are discussion type comments and rejoinders for major papers. That is, a paper is followed by 3-5 detailed comments by authorities in the field, and finally followed by a rejoinder where the original authors address these comments/concerns. He comments that this makes for lively reading.

**Stephen Weppner**, PhD 1997, has been promoted to Professor of Physics at Eckerd College in St. Petersburg, Florida. Steve will be spending his sabbatical research year 2010-2011 at Ohio University collaborating with Charlotte Elster and other members of the nuclear theory group. We look forward to seeing and working with him. Steve's doctoral research was directed by Charlotte Elster.

**Jianjun Dong**, PhD 1998, a tenured Associate Professor at Auburn University published a very interesting paper in the Proceedings of the National Academy entitled *Lattice thermal conductivity of MgO at conditions of Earth's interior*. Jianjun did his dissertation research in condensed matter theory with David Drabold.

**Hector Guerrero**, PhD 1998, is on the faculty at the University of Nuevo Leon (UANL) in Monterrey, Mexico. Hector did his doctoral research in experimental condensed matter physics under the direction of Ron Cappelletti. He has just returned to Athens to spend his sabbatical year working with David Drabold.

## **2000-present**

**Andi Petculescu**, PhD 2002, coauthored two articles in *Acoustics Today*, July, 2009 on sound production and propagation on planets. Also, he was chair of a session and he presented two papers at the Acoustics Society of

America Meeting in Baltimore in April 2010. Andi is on the faculty at the University of Louisiana at Lafayette. His doctoral research in experimental acoustics was with Larry Wilen who now does research in industry. Andi's wife, **Gabriela Petculescu**, PhD 2002, is an assistant professor at the same University. Gabriela's doctoral research was also directed by Larry Wilen.

**Eric Mortenson**, MS 2002, is in the graduate program in Physical Oceanography at Florida State University. Eric spent five years in Japan (with his Japanese wife he met in Athens) learning Japanese and teaching English as a second language. He began studying in Tallahassee in August 2009 and his research is focusing on the Antarctic Circumpolar Current (ACC).

**Khayrullo Shoniyozov**, MS 2005, is now in the doctoral program at the University of Kentucky working in experimental nuclear physics. He is working on extraction of neutron polarizabilities from Elastic Compton Scattering on Deuterium near 100 MeV. He collected data in the MAX-Lab in Lund, Sweden and is also building a novel detector to measure neutron cross sections below 1 MeV. His master's research project was directed by Daniel Phillips.

**De Nyago Tafen**, PhD 2005, is now a Research Scientist at the National Energy Technology Lab/URS Corp. in Albany, Oregon. Tafen did his doctoral research in condensed matter theory with David Drabold.

**Deepshikha (Choudhury) Shukla**, PhD 2006, is now a postdoctoral researcher at the University of North Carolina. She and her husband, **Shaleen Shukla**, PhD 2008, moved to North Carolina in August 2009. Shaleen is teaching full-time at the University of North Carolina-Greensboro. Deepshikha did her doctoral research with Daniel Phillips while Shaleen worked with Steve Grimes.

**Justin Finke**, PhD 2007, has accepted a permanent research position at the Naval Research Lab in Washington D.C. beginning in September, 2010. He has also been successful in obtaining funding as the PI of a proposal to NASA's Fermi Guest Investigator Program. Justin's doctoral research was in astrophysics and was directed by Markus Böttcher.

**Tesfaye Abtew**, PhD 2007, has accepted a second postdoctoral position at SUNY Buffalo. Tesfaye did his doctoral research in theoretical condensed matter physics with David Drabold.

**Amanasvita Joshi**, PhD 2008, who is postdoctoral research associate at Boston University, has been successful as a PI of a proposal to the Fermi Guest Investigator program. Joshi did her doctoral research with Markus Böttcher.

# Recent Graduates

**Ryan Braid**, BS 2010 in Physics and Math, graduated with departmental honors and will be going to graduate school at the Colorado School of Mines.

**Jermaine Dashti**, BS 2010 in Astrophysics with a Math minor, will be entering the workforce.

**Chris Diltz**, BS 2010 in Astrophysics with Department Honors and a Math minor is an incoming graduate student in our department.

**Kayla Fultz**, BS 2010 in Astrophysics with minors in Math and History, graduated with departmental honors and will be entering the workforce in Florida.

**Brian Helbig**, BS 2010 in Physics and Math, is going to graduate school at Columbia University.

**Robert (Bob) Meholif**, BS 2010 in Applied Physics with a Math minor, is joining the workforce as a Systems Engineer with RoviSys. The department was treated to a presentation at our annual awards ceremony last Spring by Bob based on his senior project in Mechanical Engineering. The presentation entitled, *The Shooter: A Semi-Autonomous Wheelchair Attachment* reported on a very successful project to design and build an attachment to allow a disabled student to participate in wheel chair basketball. Bob and his collaborators are exploring commercial applications.

**Tyler Peery**, BS 2010 Astrophysics with minors in Math and History, graduated with Departmental Honors. He will be in the US Air Force in Florida (and marrying Kayla Fultz).

**Steven Rogers**, BS 2010 in Engineering Physics (HTC) and Mechanical Engineering with a Math minor will be biking across America. He will be applying to graduate programs upon completion.

**Kyle Uckert**, BS 2010 in Astrophysics (HTC), will be going to graduate school at New Mexico State University.

**Yang Liu**, MS 2010, wrote and defended an MS Thesis entitled **Calibration and Manipulation of Glass Fiber Microcantilevers** under the direction of David Tees. Yang is now a doctoral student in our department working with Tees.

**Yangzhong Qin**, MS2009, did his research project with Ido Braslavsky and is currently in the doctoral program at Ohio State University.

**Yeliz Celik**, PhD 2010, worked in experimental biophysics with Ido Braslavsky and is now living in Cleveland with her husband.

**Pedro Hernandes**, PhD 2010, is a Postdoctoral Researcher in the Department of Electrical and Electronics Engineering at Bilkent University in Turkey. Pedro came from UABC/Mexicali and did his dissertation research in condensed matter theory with Sasha Govorov.

**Mauricio Garrido**, PhD 2010, has accepted a Postdoctoral Research position in the Department of Astronomy and Astrophysics at Columbia University with Daniel Savin's group. Mauricio did his doctoral research in experimental laser physics under the direction of Eric Stinaff.

**Fakhar-ul Inam**, PhD 2010, is a Postdoctoral Fellow at the Abdus Salam International Center for Theoretical Physics (ICTP) in Trieste. He worked on the theory of electronic structure of disordered materials for his dissertation research under the direction of David Drabold.

**Azita Parsaeian**, PhD 2009, has accepted a Postdoctoral Research appointment at Northwestern University. Azita did her doctoral research in condensed matter theory under the direction of Horacio Castillo.

**Timur Skeini**, PhD 2010, worked in surface science with Saw-Wai Hla and is now a Postdoctoral Researcher at the Suzhou Institute of NanoTech and NanoBionics in Suzhou (near Shanghai).

**Divya Swaminathan**, PhD 2010, is now a Postdoctoral Researcher in the Department of Neurobiology and Behavior at UC Irvine. She performed her doctoral research in biophysics under the direction of Peter Jung.

**Joel Vaughn**, PhD 2010, is working as a signals processing engineer with Austal Engineering & Software in Athens. He lives in Columbus and is seeking employment in a more hands-on experimental physics position in the Columbus-Dayton area. Joel did his doctoral research in experimental surface science under the direction of Marty Kordesch.

**Chieh Jen (Jerry) Yang**, PhD 2010, has a post-doctoral appointment at the University of Arizona working with Professor Bruce Barrett. Jerry did his doctoral research in nuclear theory with Daniel Phillips.

# 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:

**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 Grasselli-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.

If you would like to make a contribution to one of the departmental funds, include the following information in a letter to *Newsletter-- Louis E. Wright, Department of Physics and Astronomy, Ohio University, Athens, OH 45701* or for on-line giving visit [www.ohio.edu/give/](http://www.ohio.edu/give/) and select Other on the pull-down menu and enter the fund you wish to contribute to. There is also a toll free phone number to the Ohio University Foundation (800-592-FUND) for making contributions.

<input type="checkbox"/> I would like to make a contribution of _____ to _____ Amount _____ (Fund Name)
<input type="checkbox"/> I enclose a check made out to The Ohio University Foundation, OR
Credit Card Authorization I authorize \$ _____ to be charged to my <input type="checkbox"/> Visa <input type="checkbox"/> Mastercard <input type="checkbox"/> AMEX
Credit Card Number _____ Exp.Date _____
Signature _____ Date _____
Printed Name _____

## Alumni News

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 [wright@ohiou.edu](mailto:wright@ohiou.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 are hoping to hear from you.

Louis E Wright  
Professor of Physics



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**Physics and Astronomy**  
**Clippinger Research Labs**  
**Athens OH 45701-2979**

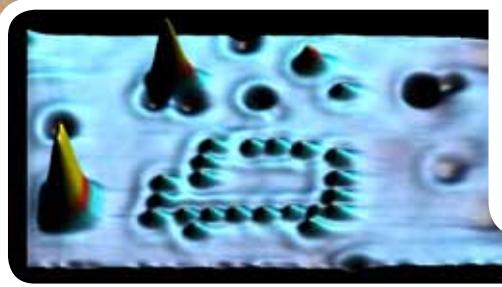
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*What Not to do with a Microwave.*



*Registration near the telescope display, beneath flags representing the 32 countries of origin for faculty and students in the department.*



*Moving single atoms on a surface in Hla's lab.*

## **Department of Physics and Astronomy Open House**

On a beautiful Saturday last Fall over 800 community members converged on Clippinger for our Biennial Department of Physics and Astronomy Open House. They were treated to a wide variety of shows, talks, hallway activities, and lab tours. People of all ages enjoyed such shows as *Fun with Liquid Nitrogen*, *What NOT to do with Your Microwave*, *Sharks with Lasers on their Heads*, and *The Power of Air*. Elementary school kids were given the opportunity to move single atoms in Saw Hla's Atom Manipulation Lab. Under the leadership of Mark Lucas, the department showed up in force with most of the faculty, staff, graduate students and many of the undergraduates helping the community gain a better appreciation for our work and the excitement of science.