The Clemson University Physics and Astronomy Newsletter

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Physics and Astronomy Students Honored for Academic Success

The College of Engineering and Science Honors and Awards ceremony and banquet was held Saturday, April 6, 2013 at the Madren Center on Clemson’s campus. Four outstanding Physics and Astronomy students were honored by CoES for their work in the Department. Congratulations to all these great students for their contributions to the Department. They all show tremendous promise for success in each of their respective careers.

Outstanding Graduate Research Assistant went to Zhe Zhang, student of Dr. Emil Alexov.

Outstanding Graduate Teaching Assistant was presented to Shannon Stefl, also Dr. Alexov’s student.

Benjamin Schroeder received recognition for being the Outstanding Senior in Science and Andrew Hanson was nominated for Outstanding Junior in Science.

The Physics and Astronomy departmental awards ceremony was held on the previous day, Friday, April 5 in Kinard Lab. Profiles of those winners follow on page 3.

Dr. Mark Leising, Department Chair and Andrew Hanson, L.D. Huff Junior Award winner

Celebrating a special day (left to right) Amber Porter, Courtney McGahee, Shannon Stefel and friend.
A Message from the Chair

Spring is one of the best and worst times at a University. We see most clearly the great successes of our faculty and students in awards ceremonies and graduation, but we watch so many students and friends move on to other adventures. Our physics majors are graduating with honors and attending some of the top universities in the country for graduate and medical school. In many cases, we just get to know the parents when the students are on their way out. Our students, as you can see inside, were dominant in the College of Engineering and Science Awards this year. More recently announced, Junior Brenden Roberts is a Goldwater Scholarship Honorable Mention and a winner of the Astronaut Scholarship. Zhe Zhang earned, simultaneously, doctorates in Physics from Clemson and Life Sciences from the University of Paris Diderot. Our alumni and friends are making even more scholarships and fellowships possible for our students, ensuring that the future is even brighter.

In January, I moved from Interim to just plain Chair. While this was not an appointment I expected to accept, it is important right now to maintain stability and continuity within the department. By fall we will have a new Dean, a new Provost, and a new President. Our contributions to the corporate memory will be essential in maintaining our department's forward momentum through this transition period. It might not be clear to everyone what roles a department chair plays; it wasn't to me before I encountered them first hand. At Clemson, the chair is the department's advocate with all levels of administration. The search for resources such as positions, research and education infrastructure, and space is continuous. The chair is responsible for all faculty and staff personnel matters, including evaluations and hiring, which is one of the trickiest and most rewarding. Poor behavior and its aftermath -- cheating, complaints, both well-founded and unfounded, and begging for grades -- often finds its way to the chair to resolve or sort out. Probably best of all, the chair shares in a small way in celebrating all the successes of students, faculty, and alumni. Please share those with us at every opportunity.

Dr. Mark D. Leising, Chair
Department of Physics and Astronomy
Voice: (864) 656-3416/email: lmark@clemson.edu

Giving to Clemson Physics & Astronomy

You can create a lasting legacy through your donation to the Clemson University Physics and Astronomy Department Foundation. Gifts to Clemson assure the best faculty, the brightest students and the most creative research projects. A substantial endowment can transform a good university into a great one. As a non-profit organization, the Foundation is exempt from federal income tax under Section 501(c)(3) of the1986 Internal Revenue Code, as amended. The Foundation has been classified by the IRS as a public charity operated for the benefit of a state university as defined in the Internal Revenue Code of 1986 Section 170(b)(1)(A)(iv). Contributions to the University through the Foundation by individuals, corporations, organizations and other foundations qualify as tax deductions. There are several ways to donate. You may use the enclosed envelope or send a check to the Clemson University Foundation, P.O. Box 1889, Clemson, SC 29633. Checks should be made payable to the Clemson University Foundation with Physics and Astronomy specified on the memo line. Alternately, you may visit the Clemson website: http://www.clemson.edu/giving/how/ and make a secure electronic donation. Again, please specify that the donation go the Physics & Astronomy Department and indicate to which project you would like to donate. Thank you, as always, for your continued support of the Department. You may contact the Annual Giving Office at (864) 656-5896, should you have any questions regarding your donations. If you have other questions you may contact the Department directly at (864) 656-3416.
Pooja Puneet (Graduate Research Assistant of the Year) - Pooja resides in Clemson with her husband, Ramakrishna Podila, Ph.D. Pooja joined the Dept. of Physics and Astronomy in 2009 and will complete her Ph.D. this year. Pooja is a dedicated and self-motivated member of Dr. Terry Tritt’s MS&E Condensed Matter Group. Dr. Tritt offers this perspective on his student. “Pooja was very persistent about joining my group a few years ago. I was not taking new students at the time, but she would not be deterred. I am glad I finally said yes. She was a real winner...she has worked on several projects, publishing three papers in the span of about four months last fall. Most recently, she was working on a project jointly with my group and Dr. Apparao Rao’s group that resulted in a paper in Advanced Materials.”

Jeremy Capps (Graduate Teaching Assistant of the Year) - Jeremy is from Florence, South Carolina and received his undergraduate degree from Francis Marion University. He is a dedicated Teaching Assistant and course leader, and plays a key role in prepping all undergraduate physics labs. Jeremy is also a freelance tutor, and facilitates many departmental social activities. He is a classic car enthusiast, and part time musician. His advisor, Dr. Catalina Marinescu says of Jeremy: “For the past four years, Jeremy has been one of the most trustworthy TAs in our department. He has taught a large number of laboratories and tutored, upon the request of several instructors in the elementary calculus-based courses. His professional attitude, his grace and humor are appreciated by faculty and students, alike.”

John Farmer (L.D. Huff Sophomore Award) - John is from Chesterfield, South Carolina. He is a Dixon Fellow and member of the SPS (Society of Physics Students). He has studied music performance at the South Carolina Governor’s School of Arts & Humanities. John is a member of Clemson University Symphony Orchestra, and enjoys music composition and creative writing. He is currently involved in Dr. Chad Sosolik’s Creative Inquiry project. This summer he will take part in an internship with FERBILAB (Office of Science & Department of Energy).

Andrew Hanson (L.D. Huff Junior Award) - Andrew is from Knoxville, Tennessee. Andrew was last year’s L.D. Huff Sophomore Award winner. He is the grant proposer for the Society of Physics Students, and his other activities include membership in the Italian Club, Clemson University Tiger Band and Pep Band, as well as being the Board Secretary of the Residence Hall Association. His research experience has been with Oakridge National Labs, the EUREKA! Program and Dr. Chad Sosolik’s Creative Inquiry project.

Allison Setser (Samantha Erin Cawthorne 2010 Award) - Allison is from Cincinnati, Ohio. She is a second semester Junior in Physics and Astronomy with a Biophysics concentration. Allison is an avid soccer and basketball fan. She participates in many intramural sports on campus. She is a member of the Pre-Dental Club and Young Life @ CU volunteer. She has worked with Dr. Xiuping Jiang in the Microbiology Department, and her latest project was how to hinder the growth of E. Coli. bacteria.

Maximilian Hughes (A.L. Laskar Memorial Scholarship) - Max resides in Clemson with his family. He is the treasurer of the Society of Physics Students and is a member of the Clemson University trombone ensemble and marching band. He is currently working on Dr. Chad Sosolik’s creative inquiry project.

Scott Lindauer (Sigma Pi Sigma Outstanding Senior Award) - Scott is from Apex, North Carolina. He is a graduating senior in Physics and Astronomy with a minor in Mathematical Sciences. He is the Vice-President of the Society of Physics Students and has worked with Dr. Murray Daw in quantum foundations. He has also worked with Drs. Chad Sosolik and Fang Deng. Scott has attended a recent American Physical Society conference, participated in the ELETTRA Surface Physics Program in Trieste, Italy, and has experience in presenting lectures in mathematics to local high school students.
The goal of MTeX is to answer the specific question: What is the contribution of wave-generated turbulence to energetics and mixing in the mesosphere and lower thermosphere in the presence of persistent regions of stability and instability? During recent Arctic winters, satellite observations have revealed significant transport of nitrogen oxides (produced by energetic particle precipitation) downward from the thermosphere into the mesosphere, stratosphere and ozone layer. These events have been associated with sudden stratospheric warming events where strong downward transport is observed in the recovery phase of the SSW. However, simulations with current coupled chemistry circulation models indicate that the observed transport cannot be explained by mean flow advection alone. Turbulence is both characterized and measured in terms of energy dissipation rates and eddy diffusion coefficients. Variability over several orders of magnitude has been reported in turbulence measurements due to both the variety of background conditions present and methods used. High-resolution fluid dynamic simulations continue to raise questions about the physical and statistical assumptions used in determining turbulent characteristics. The experiment will make repeated measurements of turbulence in the presence of a Mesospheric Inversion Layer (MIL) in January and February of 2015 at Poker Flat Research Range, Chatanika, Alaska. The investigation is designed to provide high-resolution (m resolution) in-situ measurements of turbulence fluctuations in the altitude regions of enhanced stability and instability, and ground-based measurements of the stability and instability environment and wave activity. The observations will be used to create simulation scenarios that will quantify the eddy dissipation rates and diffusivity associated with the wave-generated turbulence. MTeX supports the NASA Heliophysics strategic goal to understand the Sun and its effects on the Earth. This investigation addresses plasma and neutral interactions in the upper atmosphere and are directly relevant to NASA’s future Heliophysics Mission: Climate Impacts of Space Radiation. This investigation directly addresses the focused science topic of the Living With A Star program of the NASA Heliophysics science program and supports NASA contributions to U.S. national priorities in fundamental research, climate studies, workforce development, technology development, and national and international collaboration.
The discovery of a bingeing black hole that is expelling powerful beams of material has shed new light on some of the brightest X-ray sources seen in other galaxies, according to new research led by Durham University with contributions from Clemson researcher Dr. Dieter H. Hartmann. Hartmann’s role in this particular project was to assist by surveying the central regions of Messier 31 with two orbiting X-ray observatories, the XMM-Newton and Chandra. His contributions to this particular paper focused on discussions of the theory of accreting black holes and the production of relativistic jets in these systems. Using these orbiting X-ray telescopes, a large international team of astronomers watched as the X-ray emission from the black hole in our nearest neighboring galaxy, Andromeda – more than two million light years away – brightened and faded over the course of six months.

The study, published in the prestigious scientific journal Nature, shows what happens when black holes feast rapidly on the material stripped from a companion star. Astronomers have spent years debating whether these are black holes just a few times the mass of the Sun which are gorging themselves on gas from an orbiting star, or whether they are more massive black holes eating more sedately. Black holes in our own Milky Way galaxy are very rarely seen to binge, but when they do, they also launch very powerful beams of material called jets, which are blasted outwards at close to the speed of light, and can be tracked using sensitive radio telescopes.

The team saw an extremely bright radio wave emission that dropped by a half in just thirty minutes. Despite the large distance to Andromeda, the absence of dust and gas in that direction allows an unhindered view of the feast, giving scientists key new insights into how jets are produced by a binging black hole. Radio waves were discovered from the ultraluminous X-ray source, which shows that these are just normal, everyday black holes and that the region producing radio waves is extremely small in size, no further across than the distance between Jupiter and the Sun. For links to further reading on these findings please see Nature Magazine’s “Bright radio emission from an ultraluminous stellar-mass microquasar in M31” and the Durham University Press Release: “Astronomers discover missing link of black holes.”

(Adapted from http://blogs.clemson.edu/discovery/2013/01/14/clemson-researcher-helps-discover-%E2%80%9Cmissing-link%E2%80%9D-of-black-holes/)
An Internship at NIH: a Gateway to a Successful Scientific Career

The National Institutes of Health, also known as NIH, is the nation’s medical research agency—supporting scientific studies that turn discovery into health. As stated on NIH webpage, “NIH’s mission is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce the burdens of illness and disability.”

The National Institutes of Health traces its roots to 1887, when a one-room laboratory was created within the Marine Hospital Service, to become nowadays the largest medical research agency employing more than 6,000 researchers and investing over $30.9 billion annually in medical research for the American people. More than 80% of the NIH’s funding is awarded through almost 50,000 competitive grants to more than 300,000 researchers at more than 2,500 universities, medical schools, and other research institutions in every state and around the world. Among the institutions of NIH, the National Center of Biotechnology and Information (NCBI) and the National Library of Medicine (NLB), play a unique role within biomedical community by providing information on disease DNA variation, DNA and protein sequences and structures. In addition, NCBI is the largest source of web-based resources for analyzing data and carrying simulations, among which the absolute leader is the portal “Entrez.” It is almost impossible to imagine that biophysical community could function without the resources provided by NCBI.

NCBI hosts many highly respected researchers; among them is Dr. Anna Panchenko, a lead scientist at the Computational Biology Branch of NCBI. Dr. Panchenko and her group developed and contributed several resources, methods and scientific discoveries. Her group works on problems of biomolecular recognition, mechanisms of evolution of protein interactions and the role of these interactions in cellular regulatory mechanisms. In particular the group applies the methods of computational biophysics and bioinformatics to explore protein binding principles and to predict binding interfaces, interaction partners and the effects of disease mutations. A Ph.D. student from the Computational Biophysics and Bioinformatics Lab in Physics and Astronomy at Clemson, Marharyta Petukh, had the unique opportunity to work at Dr. Panchenko’s lab as an intern for three months. To the best of our knowledge, this is the first time a Clemson Ph.D. student has taken an internship at NIH. During her stay at Dr. Panchenko’s lab, Marharyta received training in bioinformatics and molecular dynamics simulations. Her ultimate goal is to develop an algorithm and computer package to predict the effect of amino acid mutations on the binding free energy of macromolecular complexes. Being an intern at NIH is not only about receiving training, but being exposed to numerous seminars and talks given by top scientists in the biomedical field. Currently, Marharyta is progressing very well toward obtaining a doctoral degree, and, with this internship, she is a step closer to become successful independent researcher.
The annual Biophysical Society meeting is the largest and most important event for every biophysicist and for Biophysical Society as whole. It should be mentioned that the Biophysical Society was founded in 1958 to encourage the development and dissemination of knowledge in biophysics. Currently the Society has over 9,000, working in academia, government and related industries throughout the world. Each year, the Society holds an annual meeting, which typically brings together over 6,000 scientists in the multidisciplinary fields, representing biophysics from almost all the countries in the world. The magnitude of the meeting can be illustrated by pointing out that typically it has more than 4,000 poster presentations, over 200 exhibits, and more than twenty symposia; indeed, the annual Biophysical Society meeting is the largest meeting of biophysicists in the world.

Not many people can define what biophysics is. Perhaps the shortest definition is that “Biophysics is a bridge between biology and physics.” The Biophysical Society webpage provides the following paragraph describing the interplay between physics and biology: “Biology studies life in its variety and complexity. It describes how organisms go about getting food, communicating, sensing the environment, and reproducing. On the other hand, physics looks for mathematical laws of nature and makes detailed predictions about the forces that drive idealized systems. Spanning the distance between the complexity of life and the simplicity of physical laws is the challenge of biophysics. Looking for the patterns in life and analyzing them with math and physics is a powerful way to gain insights.” Along these lines is the work in the Computational Biophysics and Bioinformatics Lab at the Department of Physics and Astronomy at Clemson University: to develop methods for modeling processes in molecular biophysics and to use these methods to predict measurable quantities, including effects of genetic defects on human health.

This year, lab members gave presentations at the 57th Annual Biophysical Society Meeting in Philadelphia. held from February 2 to the 6, 2013. Dr. Lin Li (Clemson postdoctoral researcher), presented “Modeling proteins and small molecules with inhomogeneous dielectric function: implementation in DelPhi.” The talk reported a recent development of Gaussian-based smooth dielectric function, which uses atomic coordinates of the atoms within macromolecule to deliver continuous density and converts the density into dielectric function implemented into Poisson-Boltzmann equation. This development is a particular example of applying physics-based principles to solve biologically relevant phenomena. Zhe Zhang (lab Ph.D. student) presented a talk on his recent work aimed at “Enhancing human spermine synthase activity by site directed mutations.” His interest in this enzyme is inspired by his Ph.D. research on human mental disorders, one of them being Snyder-Robinson Syndrome caused by defects in spermine synthase. The reported work is a collaboration with an experimental lab, the lab of Dr. Ikeguchi, Josai University, Japan and the results of in silico predictions were experimentally confirmed. Dr. Chuan Li (postdoctoral researcher in the lab) and Marharyta Petukh (Ph.D. student in the lab) presented their posters. Dr. Li presented a poster on “Multi-level and interleaved Poisson-Boltzmann (MLIPB) method for parallel compu-
ting of the electrostatics and its application in DelPhi.” This method allows to speed up the electrostatic calculations several folds and to reduce the computational time from a day to a half of hour on Palmetto cluster. It was used to predict the pathways of electron transfer within the mitochondria complex. Markharyta presented a posted on “Predicting non-specifically bound ions: application to BION webserver and Beryllium disease.” This is a further development of the method which Ms. Petukh was working on as a part of her Ph.D. thesis and was used to predict the positions of beryllium ions within a particular protein which malfunction is causing Beryllium disease.

**Graduate Student, Alumni and Faculty News**

**Dr. Priyanka Bhattacharya**, a former graduate student of Dr. Pu-Chun Ke from 2008 to 2012 and currently a Linus Pauling Distinguished Postdoctoral Fellow at the Pacific Northwest National Laboratory (PNNL), has become a principal investigator of a three-year, large LDRD grant administered by the Department of Energy (DOE) and the National Nuclear Security Administration (NNSA) through national laboratories. Under this grant, Priyanka's research is centered on improving the performance of Li-air and Li-S batteries through the development of novel soft-condensed hybrid nanomaterials. This research is expected to ameliorate the fundamental challenges that are hindering the growth and commercialization of energy storage devices. Also notably, Priyanka has recently published a high-profile perspective review together with Dr. Ke and his other student Nicholas Geitner in the journal of Physical Chemistry Chemical Physics, which garnered the honor of being featured as a cover art for the journal.

**Drs. Ran Chen and Pengyu Chen**, both graduates from the Ke Lab in December 2012, have recently become postdoctoral fellows at Kansas State University and the University of Michigan, Ann Arbor respectively. At Kansas State Ran is working on the topic of nanoparticle-protein corona with Dr. Jim Riviere, the MacDonald Endowed Chair in Veterinary Medicine and the Director of the Institute of Computational Comparative Medicine. At Michigan Pengyu is working with Dr. Katsuo Kurabayashi on immune cellular phenotyping and surface plasmon resonance sensing of proteins, peptides, and protein-nanomaterial interactions.
Eugene Dumitrescu, graduate student of Dr. Sumanta Tewari, is involved in studies of topological systems in condensed matter and has already published two papers: one in the Physical Review Letters and one in Physical Review B. His research accomplishments include the demonstration of hole-doped semiconductors as suitable topological systems supporting a novel quantum particle called Majorana fermion and the calculation of anomalous Hall and thermal Hall effects in such systems. He is currently involved in the demonstration of fractional Josephson effect in topological systems. Dr. Tewari’s other two grad students, Evan Figg and Girish Sharma, are in their second and first years, respectively.

Students in Dr. Bradley S. Meyer’s group run computer simulations of element formation in stars. One of Dr. Meyer’s graduate students, Tianhong Yu, is studying element formation in exploding white dwarf stars for the purpose of understanding isotopic effects in CAIs (Calcium-Aluminum-rich Inclusions) found in primitive meteorites. CAIs give important clues to the mixing processes occurring in the earliest stages of planet formation. Tianhong’s work has been entirely theoretical and computational, but this semester he got the opportunity to try his hand at making measurements. He is accompanying Dr. Meyer, who is on a six month sabbatical at the Hawaii Institute of Geophysics and Planetology, and in late April had the chance to participate in measurements of magnesium isotopes on a CAI taken on the University of Hawaii’s Cameca 1280 ion probe. The findings will be presented at the 2013 Meteoritical Society meeting in Edmonton, Alberta. Tianhong is supported by a NASA Earth and Space Science Fellowship.

Dr. Joan Marler joined our faculty on May 1 as an Assistant Professor of Physics and Astronomy. She graduated from Wellesley College with a B.S. in physics and completed her doctorate in physics at the University of California, San Diego. There she studied the low energy interactions of antimatter with ordinary matter. After postdoctoral fellowships at Lawrence University and the University of Aarhus, she was a visiting scholar at Northwestern University, where she studied atoms and molecules at very low temperature. She has given presentations in seven countries and has more than twenty-five publications on her work. She will begin a new experimental project studying the physics and applications of trapped ultracold ions at Clemson. She enjoys teaching physics at all levels and is a strong advocate for women in science.

Dr. Sumanta Tewari has recently been promoted to Associate Professor. Dr. Tewari received his Master’s degree in physics from the Indian Institute of Technology, Kanpur in 1997 and a Ph.D. in physics from the University of California, Los Angeles in 2003. His research focus is on theoretical condensed matter physics and quantum computation. Specifically, his research has focused on finding ways to create quantum topological condensed matter systems that will be useful as platforms for future topological quantum computation applications.
Hidden Variables Hold Promise for Quantum Physics at the Big Bang

Together with his postdoc Samuel Colin, Dr. Antony Valentini is studying how quantum physics can emerge from a deeper theory containing ‘hidden variables.’ This can happen if the hidden variables ‘relax’ to a certain equilibrium state with the same statistical properties as quantum mechanics. Previous studies, carried out by Valentini and collaborators, have shown that such relaxation occurs very rapidly for everyday systems. Given the age of the universe, there would then seem to be little prospect of ever finding evidence for a ‘nonequilibrium’ violation of quantum mechanics. However, new studies show that the rapid expansion of space in the early universe can suppress or retard relaxation. It is then conceivable that an early violation of quantum mechanics could survive until later times and leave traces that could be observed today. In their new studies, they have developed a detailed computer simulation of relaxation for a scalar field on expanding space. And have found that relaxation can be suppressed at long wavelengths. Their computer code may be used to carry out further studies of this nature, with a view to honing predictions of where a violation of quantum mechanics might be found in our universe today. It is noteworthy that recent results from the Planck satellite confirm the existence of a power deficit in the fluctuations of the Cosmic Microwave Background (see figure) at long wavelengths. Such fluctuations are widely believed to have a quantum origin, their seeds having been formed by quantum vacuum fluctuations during a very early period of ‘inflationary’ expansion. The Planck team have referred to the observed deficit as ‘our most puzzling finding’, and they have noted the absence of a good theoretical explanation for it. Dr. Valentini believes that they have found one. In their model, there is a natural mechanism for the suppression of quantum fluctuations at large wavelengths on expanding space. In June, he will be presenting this mechanism in an invited seminar at the Institut d’Astrophysique de Paris – one of the main centers where the Planck data are being analysed. This work is funded jointly by the John Templeton Foundation and by Clemson University. The John Templeton Foundation, located in West Conshohocken, Pennsylvania is a philanthropic foundation that supports research relating to the “Big Questions of human purpose and ultimate reality.” For more information, please see the foundation website at: www.templeton.org.

As an extension of this research, Dr. Valentini is currently completing a book for Cambridge University Press, *Hidden Variables in Modern Physics and Beyond*. The results of his research done on hidden variables support the central thesis of this work. The book elaborates on the idea that quantum physics is not fundamental but a mere effective description of an equilibrium state that the universe happens to currently occupy. Several chapters are devoted to cosmology. The remainder of the book discusses the new physics of quantum nonequilibrium in a variety of settings, including black holes, quantum gravity, and quantum computation.
**SPS Students Excite Middle and High School Students about the Sciences**

Members of Clemson’s Society of Physics Students facilitated demos for the South Carolina Life Education and Outreach program’s science careers expo and reception. This event takes place every spring, bringing middle and high school students from the low country of South Carolina to encourage them to get involved with the sciences. Additionally, Clemson hosted the 34th annual Biology Merit Exam. South Carolina Life, a Clemson initiative, supports research for college students as well as life sciences education for middle school and high school students and their teachers. Programs for teachers include workshops and graduate-level science courses, community-based research projects, classroom resources including virtual field trips, and loans of equipment footlockers. SC Life enrichment and research opportunities for students include the Biology Merit Exam, Summer Program for Research Interns, Undergraduate Research Program, and laboratory field trips to the South Carolina DNA Learning Center at Clemson University. SC Life is supported by $6.4 million in awards to Clemson University from the Howard Hughes Medical Institute through the Precollege and Undergraduate Science Education Program since 1998.

**Share Your Story with Us**

Gotten married? Added a new member to the family? Landed your dream job? If so, we’d love to share your good news in future issues. Visit physics.clemson.edu for contact information, or use the form below. Mail your completed form to: Department of Physics & Astronomy, Clemson University, 118 Kinard Laboratory, P.O. Box 340978, Clemson, South Carolina 29634-0978.

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**YOUR GOOD NEWS:**

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SPS students help in science education outreach.
Congratulations to Dr. Sumanta Tewari and his wife Chitr Rita Ghatak on the birth of their son, Suvom. In addition to the new baby, they have a six-year-old son Sohom.

Congratulations also go out to Song Zhu, graduate student of Dr. Terry Tritt. Song and his wife Meilan Zheng are the new parents to a baby girl, Chelsea.

Dr. Miguel Larsen will be on sabbatical in fall of 2013. He will spend two months each at Cornell University and the University of Alaska at Fairbanks to develop new experimental techniques in the study of atmospheric and ionospheric winds.

The Clemson University Electron Beam Ion Trap (CUEBIT) was delivered and installed by the German company DREBIT in April. The CUEBIT will serve as both a trap and source of high-charged ions for fundamental and applied studies. When the lowest vacuum is achieved, it should be able to produce ions up to krypton 36+.

If you have any suggestions for the newsletter, or any other constructive input, please email your thoughts to: vogt@clemson.edu. To subscribe or unsubscribe to Schrödinger’s Tiger, please go to our mail list at: https://mail.clemson.edu/mailman/listinfo/panda-newsletter