NSF Awards $1.6 Million Grant to Clemson Researcher to Study Ion Beamlines

With a unique “ion beamline”, Dr. Chad Sosolik will literally make star stuff in his Clemson University lab.

Funded by a just-announced $1.6 million National Science Foundation grant in collaboration with Sean Brittain, Rod Harrell, Jian Luo, and Pete McNulty, the device will allow scientists to strip atoms of all their electrons, producing highly charged ions that in nature are created only in the bellies of stars.

“It’s really a puddle of stellar matter,” said Dr. Sosolik, an associate professor of physics and principal investigator on the project. “If we inject iron atoms into this instrument, we will create highly-charged ions that are at an extremely high temperature -- on the order of 10 million Kelvin -- like the inside of a star.”

“Such highly charged ions don’t exist on earth outside of a lab environment. They fly through space, hit the atmosphere and immediately pick up electrons,” he said. “So this is a rare opportunity for us to be able to observe them and actually use them in ways that weren’t possible before.”

At the heart of this new laboratory will be an Electron Beam Ion Trap, or EBIT, which takes stars one step further, by allowing scientists to trap the highly charged ions in an electromagnetic field and then release them down a vacuum tube - the beamline - where they are focused on tiny targets for research projects that range from new semiconductor materials and cancer-fighting particle beams to more basic science in astrophysics and the properties that govern the quantum mechanical tunneling of electrons.

Scientists have been making ions controllably for over a century, typically removing a few electrons from an atom, leaving behind a slightly positive ion. The EBIT, though, can strip all the electrons from an atom, leaving a huge reservoir of energy that the ion can unleash on the matter that it contacts.

“A single highly charged ion can deliver more energy -- on a precise scale -- than the biggest laser that exists, but it can be maintained easier than a laser and is easily reproducible,” Sosolik said. “What can you do with it -- we literally don’t know. Pretty much anything we try is going to be new.”

(continued on page 3)
A Message from the Department Chair

One expects the Chair’s letter to speak to the accomplishments of our faculty and students — perhaps the profile of an alumnus, and to outline future projects and department planning. However, I start this letter on a sad note. The spring semester brought tragedy to our Physics and Astronomy family. In April, just ten days before the start of final exams, one of our very young freshmen, Patrick Johnson, learned that his father perished in a house fire. Patrick lost both his father and his home. Patrick travelled home to Nevis in May, and, upon his return to Clemson, Professor Chad Sosolik arranged housing and a summer job for him. Patrick’s financial needs, however, remain substantial, owing to limited financial resources.

Graduation was the usual joyful occasion with fifteen graduates, seven of whom are Calhoun Honors College Fellows. Amongst their number, Samantha Cawthorne was one of the brightest. She was an outstanding student, active as a Dixon Fellow and president of the Society of Physics Students. The Calhoun Honors College Awards occurred on Thursday followed by graduation on Friday. On Sunday, Samantha was relaxing in the South Carolina Botanical Gardens, rollerblading, when she fell and hit her head. She died from her injuries a few hours after the accident. Samantha was to have started work at NIST in June, then on to graduate school. She had the potential to make major contributions. Dean Esin Gulari has initiated a memorial scholarship in Samantha’s memory. Faculty have made generous contributions to this Physics and Astronomy fund. If you wish to contribute, please make checks to the Clemson University Foundation, noting that it is for the Samantha Erin Cawthorne Memorial Scholarship. Such a sad letter should end with some good news. Kemper Talley, a junior, won the prestigious Barry M. Goldwater Award, one of the highest awards an undergraduate can receive. Kemper is the sixth physics major to win this award in the past nine years.

Wishing you a good summer,

Peter A. Barnes, Professor and Chair
Department of Physics and Astronomy
Clemson University, Clemson SC 29654-0978
Voice: (864)656-3416/e-mail: peterb@clemson.edu

Creating a Legacy — Giving to Clemson Physics & Astronomy

You can create a lasting legacy through your donation to the Clemson University Physics and Astronomy Department Foundation. Endowments 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 the 1986 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. The Internal Revenue Service identification number assigned to the Clemson University Foundation is 57-0426335.

There are several ways to donate. You may use the enclosed envelope or you may send a check to the Clemson University Foundation, P.O. Box 1889, Clemson, SC 29633. Checks should be made payable to Clemson University Foundation with Physics and Astronomy Foundation written in the memo line. Or donations can be made in person at the Foundation Office, located in Tiger Park at 155 Old Greenville Hwy., Suite 105, Clemson, SC 29631.

Alternately, you may visit the Clemson website http://www.clemson.edu/alumni/giving/ways/index.html 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. You may contact the Department directly at (864) 656-3416, should you have any questions regarding your donations. Thank you, as always, for your continued support of the Department.
The Clemson beamline, which will take two years to build and make fully operational, will be just the third EBIT-based beamline of its kind in the United States and one of only 17 EBITs on earth. Even before the machine has been constructed, other universities and research centers are working with Sosolik to establish collaborative arrangements that will bring exceptionally varied -- and high-level -- research to Clemson.

"This is exceptional technology that opens vast new opportunities for scientific research," said Dr. Esin Gulari, dean of Clemson's College of Engineering and Science. "It's possible to see wide new avenues of collaboration across academic disciplines and among universities in putting this technology to work. But what is most exciting about it is the opportunities we can't yet imagine." Sosolik sees an immediate impact in research on new industrial materials, such as radiation-hardened electronics destined for the space program. "If you're sending materials into space, you want to know if it will continue to operate when bombarded by highly charged ions which form a component of the solar wind. We can simulate the solar wind on the ground and see if the material is impervious to radiation," Sosolik said. "This is really important if you consider how we keep shrinking the size of our electronics. In space-bound equipment, with all your electronics packed into a very small area, you could lose it all with one ion impact." He also has plans to make it available to scientists in other areas, including biomedical science and nuclear fusion.

The first EBITs for creating highly charged ions emerged more than 20 years ago, but only in the past few years have they moved beyond the frontiers of basic science research in major national labs. The reason: cost. EBITs use superconducting magnets that must be kept very, very cold to operate, and the designs were cooled by liquid helium, which can cost a researcher thousands of dollars a day to operate. "The Helium Monster, they call it. You couldn't afford to do research like that," Sosolik said.

But a breakthrough in cooling technology a few years ago opened the concept to researchers beyond national labs. The newest generation of EBITs put the coolant in a closed cycle, much like your air conditioner or refrigerator -- just with super-cold liquid helium instead. That made the process a lot cheaper. "Until now, most of this kind of research has been devoted purely to atomic physics," Sosolik said. "We're more interested in the surface physics, the materials, and the product that might be used by the engineers." The highly charged ions may find a use in medicine as well as engineering. "People have shown that it's possible to send highly charged ions down a glass capillary, a fiber optic cable. Biomedical researchers are proposing using these on a tumor -- particle radiobiology -- directed through these capillaries," Sosolik said. "The applications keep growing by leaps and bounds."

In addition to faculty and graduate-level research, Sosolik's grant proposal reserves a significant amount of the beamline's resources for undergraduate students, included "beam-time" for students in Creative Inquiry projects that "promote the combined teaching of atomic/nuclear physics, electronic materials and fusion energy." A collaborative effort with South Carolina State University, as well as Clemson's own WISE and PEER programs, has been proposed to ensure diverse participation in the device's application.

The project also makes room for research into what Sosolik terms "laboratory astrophysics" -- simulating the evolution of dust and ice in the cosmos. "X-ray astrophysics, such as x-ray emission from comets, can be reproduced making ice targets in the lab and dropping in front of the ion beam," he said. "You can't exactly make a comet in the lab, but that's essentially what's going on."

*Courtesy of Clemson University Newsroom/Media Relations*
Dr. Terry Tritt Visits New King Abdullah University of Science and Technology (KAUST) as Guest Lecturer

In January, Dr. Terry Tritt of Physics & Astronomy attended a two-day workshop on thermoelectric materials at the new King Abdullah University of Science and Technology (KAUST) at Thuwal, along the Red Sea Coast in Saudi Arabia. The University hosted a Winter Enrichment Program (WEP) that lasted four weeks, presenting new speakers and topics each week. Dr. Tritt was one of ten speakers who gave talks during the week for which he was invited. KAUST researchers are very interested in alternative energy technologies, one of Dr. Tritt’s specialty research areas.

The construction of KAUST was funded and begun in 2007 by King Abdullah of Saudi Arabia, with the intention of the university becoming an international, graduate-level research facility, dedicated to inspiring a new age of scientific achievement in the Kingdom.

The hope is that its research facilities will scientifically benefit the region, the world, and create an international community of scholars dedicated to advanced science. KAUST will pursue its research agenda through four strategic academic thrusts that focus on areas of science and technology and are important to Saudi Arabia, the region, and the world: resources, energy and environment; biosciences and bioengineering; materials science and engineering; and, applied mathematics and computational science. Additionally, the KAUST research centers will focus on catalysis; computational bioscience; geometric modeling; scientific visualization; membranes; plant stress genomics and technology, solar and alternative energy science engineering; Red Sea marine science, clean combustion; and, water desalination and reuse. Dr. Tritt was very impressed with the scope and sophistication of the KAUST facilities. “The entire campus is self-contained and all the faculty and students live in houses, or apartments, on campus. The campus has been built in two years and is to be the shining star among Saudia Arabia’s universities. It is the first that admits both men and women. It is supposed to lead in securing Saudia Arabia’s technological future in the next few decades. They are investigating alternative energy sources, such as solar energy, and have programs on things such as desalination of water. One can see how both of these are important future needs. One thing that stood out to me was that everything was top-notch and that money was no object. The best equipment was being purchased and the best facilities were being developed. They desire to be a top-tier university in the next ten years, and they are doing everything they can to accomplish that.” Dr. Tritt looks forward to many future collaborations with the researchers at KAUST and thoroughly enjoyed his time in Saudi Arabia.
Remembering Samantha Cawthorne

Samantha Erin Cawthorne of North Augusta, S.C., died Sunday, May 9, after a rollerblading accident in the South Carolina Botanical Garden on Clemson’s campus. Samantha had just graduated with a Bachelor of Science in Physics, Magna Cum Laude and was a member of the Calhoun Honors College, as well as a Dixon Fellow. She was inducted into Phi Beta Kappa in 2009 and was president of the Society of Physics Students.

“Not only is this a huge loss to her family — I can’t imagine what they’re going through right now — but it is a huge loss to America,” said Physics Department Chairman, Peter Barnes. She was going to work for the National Institute for Standards and Technology, which rarely hires bachelor’s degree graduates. She had an inner beauty; you just liked her as soon as you met her,” said Barnes.

“She was curious about the world, enthusiastic about learning and a very, very kind young woman,” said Ricki Shine, associate director of Calhoun Honors College. “She had enormous potential and it’s a cruel twist of fate that her life should end so abruptly and so soon after graduation. She will be sorely missed.”

Survivors include her parents, John and Janine Cawthorne; a brother, Zachary William Cawthorne; a sister, Rebecca Anne Cawthorne, all of North Augusta; paternal grandparents, Judith Carter and Emily Hill and John and Bonnie Cawthorne, all of Maryland; maternal grandmother, Susan Glavach, Myrtle Beach, SC; and several aunts and uncles. The University has established a scholarship in Samantha’s honor. Donations may be sent to: Clemson University Foundation, P.O. Box 1889, Clemson, SC 29633, or made in person at the Foundation office, located in Tiger Park at 155 Old Greenville Hwy., Ste. 105 in Clemson. Please be sure to include the Samantha Cawthorne Memorial Scholarship on the memo line of your check.

Her family asks that you keep her memory in your hearts, as they will. They are requesting that donations be made to disaster relief in Haiti through the Episcopal Diocese of Upper South Carolina: http://www.edusc.org/Haiti.

Department Asks for Help for Patrick Johnson

On April 10, Clemson undergraduate Patrick Johnson lost his father in a house fire on the Caribbean island of Nevis. In the wake of this tragedy, the Department is trying to secure assistance for Patrick in whatever way possible, to help him through this emotionally and financially difficult time.

Patrick has had a stellar academic career at Clemson, entering as a freshman in 2008. He recently was a co-recipient of the 2009-2010 L.D. Huff Award for Outstanding Sophomore Physics Major. He shares that award with Kevin Cooke. Over the past year, he has been working with Dr. Chad Sosolik on a project to automate the the Sosolik lab’s ion beam system, in order to make it observable and operable by lay users and accessible by the web.

Patrick’s family is originally from South Carolina, and his father, Jim Johnson, was a Clemson alumnus. Regrettably, Patrick’s ability to continue at Clemson is in jeopardy, due to limited financial resources. The Department has stepped forward to assist him in obtaining temporary housing and in defraying some of his expenses; however, his financial needs remain significant.

If you would like to assist in helping Patrick continue his education at Clemson, please contact Dr. Peter Barnes at: peterb@clemson.edu, or call (864) 656-3416.
Dr. Jens Oberheide Joins Faculty from the University of Wuppertal

Dr. Jens Oberheide joined the Department of Physics and Astronomy in March 2010 as its newest member at the rank of Associate Professor. Jens received his Masters Degree in Physics in 1996 from the University of Hanover in atomic and molecular physics. He completed his Ph.D. in 2000 at the University of Wuppertal, specializing in atmospheric physics and working on the University's satellite instrument, CRISTA, that was employed on the Space Shuttle in both 1994 and 1997. From 2001 to 2003, after completing his Ph.D., he spent two years in a post-doctoral position at the National Center for Atmospheric Research in Boulder, Colorado. After returning from Colorado, he held the positions of Research and, later, Associate Professor in atmospheric physics at Wuppertal from to the present. His research interests include coupling processes in the atmosphere, from the troposphere to the ionosphere, particularly through tides and planetary waves. He is Associate Editor of the Journal of Geo-Physical Research-Atmospheres and Task Leader for the international research program "Climate and Weather of the Sun-Earth System" (CAWSES-II), investigating the topic: what is the geospace response to variable inputs from the lower atmosphere?

The Department extends a warm welcome to Jens and is happy to have him on board.

Dr. Apparao Rao Becomes Second Robert Adger Bowen Endowed Chair for Physics

Clemson University honored Dr. Apparao Rao with the Robert Adger Bowen Endowed Chair for Physics in January. Dr. Rao becomes the second Physics and Astronomy professor to receive this chair, after Dr. Murray Daw. The Chair provides supplemental funds to Dr. Rao, for travel, supplies, and equipment, to facilitate his own research and that of his students. Its goal is to enhance the overall quality of the education offered by the Physics and Astronomy Department, in addition to the work of Dr. Rao.

Professor Rao’s laboratory is dedicated to understanding the atomic, magnetic, electrical, and optical properties of micro- and nano structured materials. His research topics include the characterization and applications of carbon nanotubes, semiconducting nanobelts, nanowires, and thermoelectric materials.

The Bowen Chair is named in honor of Robert Adger Bowen, a South Carolina writer and philanthropist. Bowen was the third son of O. A. and Clarissa Adger Bowen and was born in Charleston in 1868. During the Civil War, his parents lived at Ashtabula, located on Highway 88 in Pendleton. He was educated at the College of Charleston, Washington and Lee, and Cornell universities. Between 1894 and 1916, he worked as an editor and translator for D. Appleton Publishers in New York City. For
many years he worked as a free-lance writer, poet and editor. His writings include multiple volumes of poetry that focus on Upstate themes, as well as an opera.

Bowen later served as director of the Bureau of Translations for the U.S. Justice Department and accepted an appointment as a special agent for the FBI. In 1929 he retired to Greenville, where he lived until 1972, except for a few years spent in Macon, Georgia. During retirement, he wrote poetry, letters to the editor, had a regular column in the Greenville News, carried on a wide correspondence, and supported the efforts of the newly founded Pendleton Historic Foundation, until his death in May, 1972 at the age of 103.

In addition to his professional accomplishments and emphasis on education, Bowen’s generosity was responsible for a significant portion of the collections that the Pendleton Historic Foundation currently owns. This includes many books and antiques that belonged to his family in Pendleton and Charleston, both before and after the Civil War.

Ashtabula and Woodburn historic homes are open for tours through the Pendleton Historic Foundation. For more information please visit: http://pendletonhistoricfoundation.org/ Or call (864) 646-7249.

Visitor Profile:

Clemson Collaborator Dr. Yuko Motizuki Has Her Own Asteroid!

It is quite a rarity for a Clemson academic visitor to have an astronomical body named after him or her. Dr. Yuko Motizuki holds such a unique distinction. Dr. Motizuki is an associate professor at Saitama University in Tokyo, specializing in the theoretical study of nucleosynthesis, supernovae and neutron stars. She has often collaborated with Clemson astrophysicists and visited the university this spring to work with Dr. Brad Meyer. The main belt asteroid that bears her name was discovered on January 9, 1997 by Japanese amateur astronomer, T. Kobayashi, working with the Oizumi telescope in Japan.

Subsequent to discovering this small astronomical body, Mr. Kobayashi attended a lecture given by Dr. Motizuki. He was so impressed by the quality of her lecture, he asked if he could have the honor of naming the newly discovered asteroid after her. Dr. Motizuki was very flattered by the offer and agreed to the naming.

For information on yukomotizuki and other small body planets and asteroids, please visit NASA’s small body database at: http://ssd.jpl.nasa.gov/sbdb.cgi#top.
Theoretically, One Estonian is 1 PPM *

By Dr. Pu-Chun Ke

The Estonians and the Finns are similar in many aspects - language, facial features, reserved characters, and their fondness for nature. Both Finland and Estonia have been ruled by foreign powers - the Swedish and the Russian Empires, among others. But Estonia perhaps has suffered more, as every family in Estonia has a sad story of the past to tell. In these long and dreadful winters, it is hope that has defined this nation’s identity and nurtured the Estonian black sense of humor.

“We biologists don’t talk to those physicists across the hallway. We collaborate with people from far distances”, Monika

Old Town of Tallinn, established 1217

whispered, gasping in air with a sound “hja” that is distinctive in the Estonian language.

I traveled back to the medieval times on this trip and captured these pictures of Tallinn. I didn’t get to taste the typical blood sausages but sampled sprat (fish) on leib (black bread), the Estonian delicacy at Anne’s renovated stylish flat. In the snow-sullied Hell Hunt pub, I chatted with Anne and her students on Fengshui and toxicology, and at Bonaparte we laughed out loudly at the stereotypes of the Nordic people, the Russians, and the Chinese. “Winter has finally arrived!” Villem sounded excited coming out of the pub, spreading his palms to collect snowflakes falling from the gray sky.

I have left my heart in Tallinn, and need time to recover from this emotional jetlag that had the miseries of biting cold air, a seminar salvaged from my crashing laptop, and the enchantments of scientific and cultural exchanges. On the way flying back to Clemson I digested every word in the booklets on Tallinn and read two-thirds of “My Estonia” - a novel written by an Italian-American who married an Estonian woman named Epp. I became brainwashed into a voluntary Estonian at the end of my 5,000 miles of journey across the Atlantic.

Estonia has a mere population of 1.3 million, among those 69% are Estonian and 26% are Russian. The culture of Estonia is complex and heterogeneous, with a strong feel of the Scandinavian blended with German and Russian flavors. “Theoretically, one Estonian is 1 ppm; everyone counts,” according to a friend.

*PPM: chemistry jargon, denoting concentration

**Dr. Anne Kahru, Chair of Estonian Toxicology Society; Head of Molecular Genetics Laboratory at the National Institute of Chemical Physics and Biophysics
Thinking Big

**Sijie Lin**, a graduate student in the Ke lab the past five years, received his Ph.D. degree in materials science from Clemson this May. With a publication record of ten journal papers, two book chapters and successful on-site interviews, Sijie has been offered postdoctoral positions from research groups at UC Berkeley (cell biology), the Georgia Institute of Technology (physical chemistry), UNC-Chapel Hill (physiology), UCLA (environmental biology), and Stanford University (biophysics).

Coming from China with a background in polymer science from Tongji University, Sijie was first supported as a Teaching Assistant in the Department of Physics and Astronomy and then a Research Assistant in the Ke lab. Sijie’s graduate work was focused on understanding the interactions between engineered and biological systems, and was highlighted by the National Science Foundation Annual Reports and by the prestigious media sources of *ScienceDaily*, *Live Science*, and *Nanowerk Spotlight*. Sijie has accepted a postdoctoral fellow at the Center for Environmental Implications of Nanotechnology (CEIN) at UCLA, under the guidance of world-renowned scientist Professor Andre Nel. “I will miss the close-knit environment here. I feel my training received at Clemson was as good as I could get anywhere,” Sijie claimed. Another success of the Ke Lab is **Matthew Stone**, who graduated this spring and will attend the biophysics graduate program at the University of Michigan Ann Arbor, one of the best in the country. The Department wishes both Sijie and Matthew much success in their future academic endeavors.

Annual Student Awards Luncheon

Physics and Astronomy held its annual luncheon to recognize exceptional students within the Department on Saturday, April 10th in Kinard Hall. The event was attended by student winners, parents and other family members, their advising faculty member(s), as well as Department Chair, Peter Barnes.

Two students won the *L. D. Huff Sophomore Award* : **Patrick Johnson** and **Kevin Cooke**. The *L. D. Huff Junior Award* was given to **John Spear**. The *Sigma Pi Sigma Award* was given to **Samantha Cawthorne**. **Kemper Talley** (featured in previous newsletters) was recognized for his award of this year’s Goldwater Fellowship. Congratulations go out to all these super students!
March 2010 - Spring has finally arrived in Clemson. Was this an unusually wet and cold winter? Clemson atmospheric physicist, Dr. Gerald Lehmacher, looked at January climate data and temperature anomalies for Greenville, SC. 2010: temperature -2.7 °F below normal, 2009: +1.3 °F above normal, 2008: +1.2 °F above normal, 2007: +4.2 °F above normal. For February the anomalies are −5.6 °F for 2010 (that’s cold!), +1.6 °F, +3.4 °F, -1.5 °F, for the past years.

There is an explanation for this cold, snowy winter. Moderate El Niño conditions in the Pacific bring more humidity to the southeastern US, while a weak Icelandic low pressure system lets cold Canadian air travel far south. According to NOAA’s Climate Prediction Center, El Niño conditions are predicted to influence our weather for even longer and keep us cooler than normal through April.

But El Niño occurs about only every 5-8 years. Do you remember the El Niño of 1998? Or the super storm of 1993? With so much year-to-year variability, it is difficult for us to have a feeling for long-term temperature trends. We often face the question, since it’s so cold, is the global warming trend over? The answer from climate scientists is: most certainly not. Therefore, they study longer data series, longer than the past 10, 20 or 30 years that we vaguely remember. Therefore, they assess global averages of temperature, and not just the local thermometer on the windowsill. Therefore, they measure the temperature trend of the land and ocean surfaces, in the troposphere, in the stratosphere and mesosphere.

In Fall 2010, the Department will offer a new course PHYS 245 Physics of Global Climate Change to all interested undergraduates. We will explore the basic physical processes determining our climate and climate change. Is the climate really changing?

What is the role of the polar ice sheets? How do we know about past climates? What global changes may we expect and how can we mitigate their effects? For more information, contact Dr. Gerald Lehmacher or Dr. John Merritwether, or see www.clemson.edu/~glehmac.

Janina Jager visited the Physics and Astronomy Department for several months this spring. She came from the University of Bremen, where she earned her Masters Degree in computer science in 2008. Janina has a particular interest in bioinformatics and has been working as a Research Assistant in the math department at Bremen. She was put in touch with Dr. Taufiquar Khan in Clemson’s mathematics department, to come to the campus this spring and work on a research project in molecular dynamics. The research proposed by Dr. Khan was to run computer simulations of a quantum molecular dynamics program. However, in addition to working on this, she also worked extensively for Dr. Chad Sosolik, running computer simulations of solid state physics experiments. These simulations mirror the effects of single-atom scattering experiments on a metal surface. While working on these joint programs, Janina made the physics department her home. We look forward to a visit from her again sometime in the future.
Dr. Ronald I. Miller, Clemson alumnus, recently shared information with us on his career with and retirement from the Defense Agency Missile and Space Intelligence Center (DIA/MSIC). In 2009, he retired as the Senior Intelligence Officer for Directed Energy for the DIA/MSIC at Redstone Arsenal, Alabama, where he had been part of the Directed Energy Weapons staff for thirty-two years. From 1980 to 2008, he also served on the Directed Energy Weapons Subcommittee in Washington, D.C., chairing the DEWS from 1990 through 1998. Prior to joining MSIC, he was employed by the Boeing Aerospace Company. He is a 1965 graduate of Austin Peay State University with degrees in mathematics and physics and he holds a M.S. degree in physics from Clemson University and a Doctor of Science degree in physics from Southeastern Institute of Technology. Dr. Miller has taught physics on a part-time basis at four southern universities and has served as a consultant to MSIC through Science Applications International Corporation. He is the author of more than sixty scientific journal articles and government reports in the fields of liquid state physics, low temperature physics, electromagnetic field theory, and laser science/systems engineering. He is a member of the American Physical Society (among others) and has received numerous honors from the NASA Intelligence Community and the Department of Defense. He and his wife Jan have two grown daughters and two grandsons. Many thanks to Dr. Miller for sharing his story with the Department.

Alumnus Profile: Dr. Ronald Miller Retired from the Department of Defense

Dr. Ronald I. Miller

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.

NAME: ________________________________

CLASS: ______________________________

E-MAIL ADDRESS OR PHONE NUMBER: _______________________________________

YOUR GOOD NEWS:
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
Joe Johnson graduated this spring with a Ph.D. in computational nuclear astrophysics. He has been offered and has accepted an instructor’s position with Southeast Kentucky Community and Technical College in Middlesboro, Kentucky, beginning in the fall. Best wishes for Joe and his family, as they embark on this new stage of their lives.

Matthew Troutman earned his Ph.D. this spring and has accepted a post-doc with Dr. Erika Gibb at the University of Missouri at St. Louis. His doctoral research under Dr. Sean Brittain examined the evolution of the distribution of gas in planet-forming disks around young stars. For his post-doc he will work on measuring the chemical composition of organic molecules in planet-forming disks. Best of luck to Matt!

Graduate student, Christa Labadorf, is engaged and will marry Matthew Speights on July 10, 2010 at the Mount Calvary Baptist Church in Greenville. Christa is working with Dr. Sean Brittain for her graduate studies. Congratulations to both Christa and Matthew on their nuptials.

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