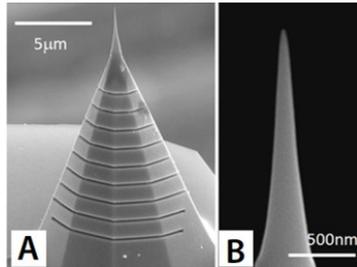


The New University Center for Nano-Optics (CeNO)

The Center for Nano-Optics, a research center focused upon the science of developing tools and instruments as small as 1,000 times thinner than a human hair for breakthroughs in technology and biomedicine, has been created at Georgia State University. "Creation of the Center for Nano- Optics is an important next step for the university," said James Weyhenmeyer, vice president of research and economic development. "Under the leadership of Georgia State Physics Professor Mark Stockman, a group of physics faculty will expand the university's nano-technology focus and continue the development of two uni-



A nanometer size funnel to concentrate and transfer light energy to the nanoscale.

versity inventions - the spaser and the nanoplasmonic metal funnel." The spaser is a laser that is 1,000 times smaller than the smallest laser and also 1,000 times thinner than a human hair. Success in incorporating spaser technology into transistors, something that cannot be done now, may lead

to computer processors that operate 100 to 1000 times faster than today's processors. The spaser may also help biomedical researchers identify and track single cancer cells in the bloodstream. The plasmonic metal funnel, which includes a very thin needle at the end, allows transfer of light energy to the nanoscale. This funnel is already widely used in microscopes to give researchers the ability to see on the nanoscale. For more information on CeNO and Dr. Stockman, see <http://www.gsu.edu/2013/12/12/physics-prof-pushes-boundaries-technology/>.

Department Highlights (2013)

Physics Major Erin Caldwell received the Cooley Scholarship in the Sciences

Dr. Mark Stockman won a large MURI grant

Dr. Todd Henry was appointed Distinguished University Professor

Dr. Unil Perera joined the editorial board of IEEE Journal of the Electron Devices Society

Dr. Thoms, Doluweera, and von Korff received a Phys-TEC grant award

Dr. Russel's student Samuel Quinn won an NSF graduate Fellowship

Drs. Von Korff and Thoms won a NSF grant for physics education research

Dr. Manson's article was highlighted for its outstanding quality

Matt Haddad won a competitive conference travel grant to an APS meeting

Dr. Mani's research was featured in the GSU newspaper and many news outlets around the world

Dr. Dhamala's group discovered a way to localize epileptic seizures for surgical intervention

Chair's Message

Welcome to this inaugural edition of our Departmental Newsletter! Each semester, we will bring you the latest news, accomplishments, and aspirations of our faculty, staff, and students. This is an exciting time for us. We have recently added faculty members to most of our areas of expertise, which encompass condensed matter physics (including nanophysics), nuclear and atomic physics, biophysics (including neurophysics), physics education research, stellar astrophysics, and extragalactic astronomy. We have established

the new University Center for Nano-Optics (CeNO, led by Dr. Mark Stockman) and a partnership with the Astrophysical Research Consortium for use of the Apache Point 3.5-meter Telescope. We continue to enhance our existing facilities and collaborations, including the Center for High Angular Resolution Astronomy (CHARA) Array (led by Dr. Hal McAlister) and the PHENIX experiment on the Relativistic Heavy Ion Collider at Brookhaven (led by Dr. Xiaochun He). Our undergraduate majors have doubled over the

past few years and our graduate students have won several national fellowships. For more details, check out the rest of this newsletter and our web site.

Sincerely,

Dr. D. Michael (Mike) Crenshaw



GSU Physics & Astronomy

Dr. Mark Stockman



Dr. Mark Stockman

This past year was a year of ground-breaking discoveries, international recognition and grant awards for Dr. Mark Stockman. In 2013, he coauthored articles published in Physical Review Letters and Nature Nanotechnology, which reported discoveries that may one day become the basis for ultra-fast computers. His re-

search findings were highlighted in Physics Today and Physical Review Letters. He was selected to the editorial board of a new Nature journal, Light: Science and Applications. He received a large multi-university collaborative “multidisciplinary university research initiative” (MURI) grant award from the US De-

partment of Defense. Along with Dr. Vadym Apalkov, he received a National Science Foundation grant award. Finally, his accomplishments and research leadership resulted in the creation of a university-level center CeNO at GSU. We congratulate him for his accomplishments.

Dr. Misty Bentz



Dr. Misty Bentz

This was a banner year for Dr. Bentz, who joined our extragalactic astronomy group as an assistant professor in August, 2010. Last June, she received a very prestigious National Science Foundation CAREER award to continue her ground breaking work on determining masses of supermassive black holes and distances to the active galaxies that host these enigmatic objects. Later that

month, she was recognized as one of the Top 20 Women Professors in Georgia. In December, she won a Dean’s Early Career Award from GSU’s College of Arts and Sciences. Further, Dr. Bentz was selected to serve on NASA’s Astrophysics Roadmap Committee, which recently presented a 30-year vision for space-based missions in astronomy. While unraveling the mysteries of black holes at

GSU, Dr. Bentz has directed the research of 3 Ph.D. and 3 undergraduate students, served as undergraduate advisor in astronomy, served as advisor of the Society of Physics Students, and worked with the Girl Scouts of America. She is an accomplished flautist, pilot, and cat lover. We congratulate Dr. Bentz on her success and look forward to her future accomplishments.

Physics Teachers Education Coalition (PhysTEC) Award

“We will graduate four physics majors with teacher certifications this year”

Former Governor Sonny Perdue pointed out in 2009 that Georgia’s universities had produced only one certified high school physics teacher in 2008. GSU now has a three year, \$300,000 federal grant to improve that number. “We will graduate four physics majors with teacher certifications this year” said Brian Thoms, primary investi-

gator and associate chair of Physics and Astronomy. Graduating physics teachers are the product of the new Physics Teachers Education Coalition (PhysTEC) Comprehensive Site at GSU. Many teachers are “broad-field-certified” to teach more than one science in grades six through 12, and these teachers typically don’t

have physics degrees. The program recruits would-be physics teachers through a course called “Gateway to Physics.” Thoms and other professors give presentations here about teaching opportunities. For more, see the [GSU news article](#).

Physics Graduate Student Association

In 2013, the PGSA visited Oak Ridge National Lab with their advisor (Dr. He), and toured the Graphite Reactor, High Flux Isotope Reactor, Spallation Neutron Source, and Center for Nanophase Materials Sciences. PGSA also hosted a departmental tea party, social events, and the Fall 2013 PGSA Conference. More information can be found at <http://www.phy-astr.gsu.edu/pgsa>.

Dr. Fabien Baron



Dr. Fabien Baron joined the stellar astrophysics group in our Department in April, 2013, as an assistant professor. His previous appointments were as a postdoctoral research associate at the University of Cambridge and the University of Michigan. Dr. Baron is an expert in optical/IR interferometry and image reconstruction, and he specializes in producing images (and movies!) with the CHARA Array's 6-beam combiners. His research interests include young stellar objects, spots on red supergiants, and interacting binaries.

etry and image reconstruction, and he specializes in producing images (and movies!) with the CHARA Array's 6-beam combiners. His research interests include young stellar objects, spots on red supergiants, and interacting binaries.

Dr. Richard Briggs



Dr. Richard Briggs was hired as a tenured full professor in November, 2013 through GSU's Second Century Initiative program on **Human Neuroimaging**. His most recent appointments include Professor of Radiology and Director of Neuroimaging at The University of Texas Southwestern

Medical Center. Dr. Briggs leadership in interdisciplinary studies and his expert knowledge of neuroimaging equipment and techniques are important for GSU's long-term investment in the GSU/Georgia Tech Center for Advanced Brain Imaging (CABI). His research interests include magnetic resonance studies of various diseases in animal models and humans, and, most recently, neurotoxic brain damage in veterans with Gulf War illness.

Ms. Marie Jarra



Marie Jarra is the new Grants and Contracts Officer at the Physics & Astronomy Department. She is a Georgia State Alumni. She is originally from Gambia, a country in West Africa. She moved with her family to the United States when she was 6 years old. Prior to coming to Physics & Astronomy, she worked at Research Services at the college

level for over a year. She enjoys working out, reading, helping people and cooking.

Dr. Sebastien Lepine



Dr. Sebastien Lepine was hired as a tenured associate professor in July, 2013, through GSU's Second Century Initiative program on **Stellar Astrophysics and Astroinformatics** (led by Dr. McAlister). Dr. Lepine's most recent

appointments were as Senior Research Scientist at the American Museum of Natural History and as Adjunct Professor at the City University of New York. Dr. Lepine's interests include low-mass stars, brown dwarfs, galactic structure, all-sky surveys, data mining, and extrasolar planets. He is widely recognized in the astronomical community for his work in astrometry and big datasets, and his work is highly complementary with Dr. Todd Henry's extensive characterizations of nearby stars.

Dr. Rachel Kuzio de Naray

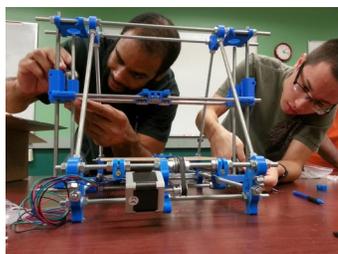
Dr. Rachel Kuzio de Naray joined the extragalactic astronomy group at GSU as an assistant professor in January, 2013, after being an NSF Fellow at UC Irvine and a Research Associate at the Royal Military College of Canada. Her research expertise includes low surface brightness galaxies and the mysterious dark matter that dominates the mass content of our Universe. She is an expert in spectroscopy and imaging, especially with the new generation of integral field instruments, and a frequent user of the WIYN telescope at Kitt Peak National Observatory.



Dr. Misty Bentz hosting a daytime event at GSU with Junior Scouts learning about the Sun.



Astronomy Club demonstrates the use of telescopes to children



Above: SPS undergrads build a 3D printer.

Below: A demonstration of the angular momentum in a spinning wheel at the Fernbank Museum.



Mr. Sahil Bajaj, Dr. Dhama's student, received the "GSU International Student of the Year 2013" award. From the left are: Dr. Liu, Mr. Bajaj, Dr. Housely, and GSU President Dr. Becker.

Astronomy Club

The Astronomy Club (Dr. Kuzio de Naray, advisor) had an exciting and busy year. In November, club members had a Star Party at Hard Labor Creek Observatory, where students learned about the stars and even a bit about camping. They also shared the wonders of the Solar System with the public at the Fernbank Museum's Science At Hand Day.

Society of Physics Students (SPS)

During the Fall semester, a small team of SPS club members (Dr. Bentz, advisor) built a 3-D Printer. Those who were involved really enjoyed getting hands-on experience, and SPS is hoping to do similar maker projects in the future. Members of the chapter also hosted a table at the Fernbank Museum's Science At Hand Day in November, showing kids and their parents some of the basic principles of physics, using fun, hands-on methods. In December, the GSU SPS chapter attended a White Elephant Christmas party hosted by Georgia Tech's SPS chapter. According to Matt Rager (the GSU SPS president), "We met a lot of new people and it was a great end to the semester."

We are on the web: <http://www.phy-astr.gsu.edu>

Follow us on Facebook: [GSU Physics and Astronomy](#)

Support Physics & Astronomy at GSU

There are a number of ways to show your support for our programs through giving:

- Endow an undergraduate scholarship or award in physics and/or astronomy. Set up a general fund or fine-tune the award to a specific field of research, disadvantaged students, etc. (An example is the annual **Robert H. Hankla Award for Outstanding Physics Major**.)
- Set up an endowment for a graduate research fellowship in your field of interest or contribute to an existing annual student award in physics or astronomy (see http://www.phy-astr.gsu.edu/new_web/2312.html).
- Fund a Visiting Distinguished Scholar for a semester-long visit or a Distinguished Speaker Series. (An example of the latter is the **William H. Nelson Fund**.)
- Endow a professorship or postdoctoral fellowship in a specialized field.
- Help to establish new facilities or enhance existing ones. (Examples include partnerships in **large telescope consortia**, or the new **CeNO**).
- Contribute directly to the general fund of our Department (fund code: 0241). Contributions support faculty, staff, and students, professional- and social- functions, or recruitment. Any amount is appreciated.
- There are many ways and options to support Physics & Astronomy at GSU. See <http://giving.gsu.edu> or call Hope Carter, Senior Director of Development (404-413-5739, hcarter8@gsu.edu) for more information about giving opportunities. Come visit us! Contact our Chair, Dr. Mike Crenshaw (404-413-6036, crenshaw@phy-astr.gsu.edu).