

#### SPECIAL POINTS OF INTEREST:

- **Big Bang or Big Bounce?**
- **Schaefer to Stockholm**
- **Grad student recognized worldwide.**
- **Steldt Leaves Legacy**

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## Chair's corner

Physics & Astronomy's vision is to use its world-class science to train its students to think creatively, flexibly, and analytically; to prepare increasing numbers of students to produce new knowledge and to be productive citizens of Louisiana and the nation; and to utilize and expand its research capabilities to enhance Louisiana's, LSU's, and the Department's national reputation, technical infrastructure, and workforce.

Three new faculty – Ivan Agullo (theoretical gravity), Mark Wilde (quantum computing), and Guang Jia (medical physics) – will join us in August 2013. John Wefel (astrophysics) retired in March 2013; and Ray Chastain (instructor) left LSU after

## Nanodays...

NanoDays, coordinated by the Nanoscale Informal Science Education Network (NISE Net.), took place nationally March 30-April 7, 2013, at more than 200 science museums, research centers and universities across the country.

In Baton Rouge, NanoDays 2013 was held at the Highland Road Park Observatory, Saturday, March 30, and at the Louisiana Arts & Science museum

the Spring 2013 semester. A search for another medical physicist is underway and additional searches are being considered together with CCT in computational materials and computational nuclear physics.

17 new PhD and 4 Medical Physics Masters students joined us in 2012, and 17 more PhD and 4 Medical Physics MS candidates are expected in August 2013. 8 students received PhDs and 13 received MS degrees during 2012. At the start of the Fall 2013 semester, the total number of students in the PhD and MS program will be 99 and 18, respectively. These numbers were 92 and 20 in Fall 2012. 16 students received Bachelors degrees in 2012. The number of undergraduate majors as of Fall 2012 was 72 compared to 65

in 2011.

Sponsored research expenditures from state, federal, and private sources amounted to \$8.9M, an increase from the \$5.8M total five years ago. Highlights of the faculty's and students' research can be found in this newsletter and on the department's web site at: <http://www.phys.lsu.edu>.



Michael Cherry,  
Chair, Department of  
Physics & Astronomy

on Saturday April 6. Participants learned about nanoscale science and technology during a nationwide festival celebrating the science of ultra small matter. NanoDays featured several hands-on activities for children of all ages.

On Saturday, March 30, in the Highland Road Park Observatory, Richard Kurtz presented Nanotechnology for improved energy generation, storage and transmission. On Saturday April 6th, John DiTusa presented Nanomagnets as a path to new computers and Juana Moreno displayed a Scan-

ning Tunneling Microscope that measures the surface of objects at the atomic level. Faculty, students and staff from the Department of Physics & Astronomy, the Center for Computation and Technology, the Department of Chemistry, the Society of Physics Students, and the National Science Foundation-funded Louisiana Alliance for Simulation-Guided Materials Applications (LA-SiGMA) volunteered their time to make the events a success.

# Highland Road Park Observatory



The Dumbbell Nebula

The Highland Road Park Observatory celebrated its 15th anniversary and remains a popular destination on Friday and Saturday nights in Baton Rouge. You often find an LSU professor or graduate student operating the telescope on a public night.

This past year public lectures from Physics and Astronomy covered a diverse array of topics including:

“What’s New with Comets” (Greg Stacy), “The Life and Death of Stars” (Juhan Frank), “Binary Stars” (Zach Byerly), “The Astounding CCT” (Juana Moreno), “The Star of Bethlehem”, “Dark Energy in Stockholm”, and “Dating the Crucifixion” (Brad Schaefer), “Superluminal Neutrinos” (Thomas Kutter), “Into the Neutron Star” (Rob

Hynes), “From Magnetism to Superconductivity” (David Young), and “Medical Physics” (Wayne Newhauser). We look forward to a major refurbishment of the 20” telescope in the near future.

Check out the Highland Road Park Observatory online at <http://www.bro.lsu.edu/>

## Saturday Science

The Department of Physics and Astronomy runs the Saturday Science series of talks aimed at high school students given by faculty from the Colleges of Science and Engineering. Talks on a diverse set of topics are held every month at Nicholson Hall. They are attended by over 50 people from different schools in Baton Rouge and neighboring areas. School students get school credit for attending these public talks.

This year there were 8 Saturday Science public lectures on a very broad range of topics ranging from

origin of stars to the fate of Mississippi river and its impact on our city.

A Saturday Science schedule is available via the departmental webpage and it is also announced to different schools. This year new initiatives were taken to get the word out about Saturday Science which yielded an increase in attendance. Saturday Science activities were run this past year by our department’s Board of Regents Fellows and Parampreet Singh.

### Welcome New Members to Our Department

Faculty	Research Staff
Aaron Grochoski, Instructor	Flor De Maria Blaszczyk (Tzanov)
Will McElgin, Instructor	Bethany Broekhoven (Guzik)
Amber Stuver, Instructor	Winston Capps (Cherry)
	Duncan Macleod (Gonzalez)
Staff	Hangwen Guo (Zhang)
Colleen Fava, Manager of LaSpace	Miguel Megevand (Singh)
Stephanie Jones, Coordinator	Adam Mullavey (Gonzalez)
Tess Leonard, Part-time Coordinator	Stephen Pittman (Blackmon/Newhauser)
Brandon Lohman, Research Specialist	Ching Cheng Hsu (Cherry)
	Edward Wilson-Ewing (Singh)
	Amir Javaid (Guzik)
	Zhenyu Zhang (Plummer/Haber)
	Jisun Kim (Plummer)

# Congratulations!

## Winners of 2013 College of Science Choppin Honors Convocation

- College of Science Outstanding Junior: **Melanie Carroll**
- Keen-Morris Prize: **Daniel Case**
- Gregg Hussey Scholarship for Excellence Award: **Jonathan Curole**
- Outstanding Geaux Teach Student Award: **Mia Ferriss**
- College Honors: **Daniel Case & Mia Ferriss**
- College of Science Untenured Faculty Research Award: **Parampreet Singh**

## Winners of Physics & Astronomy Department Student and Teaching Awards

### 2012 Winners!

- Undergraduate Research Award: **Noah Davis**
- Ganesh Chanmugam Distinguished Dissertation Award: **Biao Hu**
- Joseph Callaway Prize for an Outstanding Research Proposal in the Graduate Seminar: **Laura Linhardt**
- Outstanding Graduate Teaching Assistant: **Charles Wilson & Garrett May**
- Outstanding Graduate Assistant Grader: **Zhiahao Xiao**
- Undergraduate Majors’ Faculty Teaching Award: **Mette Gaarde**

### 2013 Winners!

- Undergraduate Research Award: **Hannah Gardiner & Conrad Sprunger**
- Department Service award: **Chase Brignac & Greg Tobin**
- Joseph Callaway Prize for an Outstanding Research Proposal in the Graduate Seminar: **Ashkan Balouchi**
- Outstanding Graduate Teaching Assistant: **Chris Johnson & Ed Montiel**
- Undergraduate Majors’ Faculty Teaching Award: **Jonathan Dowling**

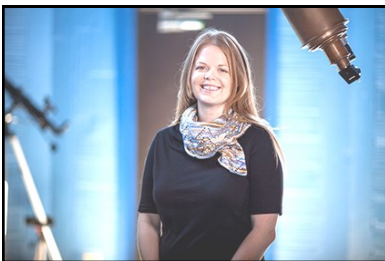
## How many physicists does it take to make liquid nitrogen ice cream?

Well, in our case, the answer is THREE. With the intention of helping our new undergraduate students (both first- and second-year) acclimate to their new academic environment, Professors Deibel, Gaarde, and Stadler organized two ice cream socials for all physics majors. The first one was held in the Fall 2012 semester with a good turnout of ~35 students. By the Spring, word had gotten out that the ice cream was REALLY GOOD, and the numbers increased to around 45. The idea was to give the students an opportunity to meet some more



experienced physics majors, and to ask them questions about classes, the department, and career plans, or to just make some social connections. Based on the positive feedback from the students, the events were deemed successful, and we plan to do this again in Fall 2013.

## Graduate Honors & Awards



Eddy Perez/University Relations

**Ashley Pagnotta**  
recent Ph. D.  
graduate in  
Physics from  
LSU

Ashley Pagnotta, who recently completed her Ph. D. in physics, was part of the team, along with LSU professor Bradley Schaefer, that solved the question of what produces thermonuclear, or Type Ia, supernovae. Type Ia supernovae are bright explosions often brighter than a whole galaxy. Schaefer and Pagnotta's research, featured in *Nature*, has proven that Type Ia supernovae are caused by a pair of white dwarf stars. A video interview with Ashley

## 2014 Conference for Undergraduate Women in Physics

The LSU Department of Physics and Astronomy will be hosting the South Central 2014 Conference for Undergraduate Women in Physics (CUWiP). CUWiP will take place January 17-19, 2014. The CUWiP allows for undergraduate women to meet and network with each other and with professional women in physics.

The conference will consist of three days of talks, workshops, poster sessions, panel discussions and socials. We will have talks and poster sessions about research, and through workshops and panels explore

different careers in physics. We will also organize tours of the local facilities and laboratories.

We are hoping to get between 80 and 100 participants from across the region. The local organizers are Gabriela Gonzalez and Mette Gaarde from Physics and Astronomy, and Theda Daniels-Race from Engineering. Student members of the organizing committee are Bethany Broekhoven, Mia Ferris (seniors), Hannah Gardiner (junior), Amy LeBleu (freshman), and Anamaria Effler (grad. student).

See <http://www.aps.org/programs/women/workshops/cuwip.cfm> for more details.

## Pagnotta, A Shining Star..

is posted on the department website.

Pagnotta is also the recipient of the Charles E. Coates Outstanding Dissertation Award for 2011-2012. While at LSU, Ashley enjoyed being involved in outreach programs like Saturday Science for local high school students and Astronomy Public Nights. She is currently a postdoc at the American Museum of Natural History in New York City where she will continue her research and public outreach. "It is a great place to use and expand upon the skills and interest I developed

while at LSU," says Pagnotta.

"Pagnotta has a wonderful research plan to test whether old novae fade on the time scale of a century, with this dimming as part of the controversial 'Hibernation Model,'" said Schaefer, her dissertation advisor. "Few graduates make big waves in the scientific community, but Ashley's press conferences, press releases, and press interviews in January carried her science results worldwide."

Article adapted from the LSU Graduate School website located at [http://www.lsu.edu/departments/gold/2012/06/pagnotta\\_supernovae.shtml](http://www.lsu.edu/departments/gold/2012/06/pagnotta_supernovae.shtml)

## Caudill Wins Distinguished Dissertation Award

Sarah Caudill, former graduate student and current postdoctoral researcher at the University of Wisconsin, is the winner of the 2013 LSU Distinguished Dissertation Award for Science, Technology and Mathematics. Her thesis describes the development of a search for gravitational waves from perturbed intermediate mass black holes, a class of elusive objects for which electromagnetic observational evidence has been historically difficult. Direct detection of gravitational waves from these sources could provide irrefutable evidence for their existence.

The work in her thesis focused on the collaborative work to design an effective matched filtering analysis pipeline to search LIGO (the Laser Interferometer Gravitational Wave Observatory) data for ringdown signals, the waveform we expect to see from a perturbed black hole. One exciting new development was the implementation of a machine learning algorithm to help separate hidden ringdown signals from the LIGO detector noise. The search pipeline succeeded at detecting simulated ringdown signals and improved the upper limit on the rate of occurrence of signals from perturbed intermediate mass black holes in our local universe.

Additionally, her thesis discussed the benefits of upgrading the search to a multi-mode ringdown

search. The inclusion of multiple modes would improve both efficiency and parameter recovery but would be computationally expensive. Many of the techniques and results described in Caudill's thesis are applicable to multiple facets of the overall search for gravitational waves, not just the ringdown search.

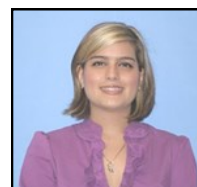


Caudill

To learn more about her work go to: <http://etd.lsu.edu/docs/available/etd-07112012-150956/>

## Graduate School's 2013-2014 Dissertation Year Fellowship Award

Mesa



Congratulations to graduate student Dalgis Mesa winner of the Graduate School's 2013-2014 Dissertation Year Fellowship. The focus of her PhD research is to use Neutron Scattering to investigate electron spin and lattice coupling, a complex interaction. Such an interaction is known to result in the emergence of exotic phenomena and functionalities in strongly correlated electron systems. Her thesis title is *Neutron Scattering of Unusual Spin Structure and Local Correlation in Complex Oxides* and she will graduate with a PhD in Condensed Matter Physics in Spring 2014.

## Faculty Awards

## Jin Named Rainmaker

Rongying Jin was presented with LSU's Mid-Career Rainmaker Award in Science, Technology, Engineering and Mathematics (STEM), which recognizes an associate professor or recently promoted professor who exhibits a sustained program of excellence. Jin's research focuses on the development and characterization of novel complex materials with intriguing physical properties, such as new phases that exist on the edge of instabilities. Her research effort is devoted to "science-driven" synthesis and investigation of basic physical properties. Jin was also named a fellow of the American Association for the Advancement of Science (AAAS) for her "significant contributions to materials physics, including science-driven materials development and pioneering studies of their underlying physics".



Jin

## Schaefer Gets Ticket to Stockholm

Many members of the Department study supernovae, as they have profound implications in most areas of astrophysics. Starting in the early 1990's the "Supernova Cosmology Project", headed by Saul Perlmutter (Lawrence Berkeley), showed that one type of supernovae can be used as superb distance markers, and found ways to discover and measure the supernova out to roughly half the way to the edge of the Universe. Bradley E. Schaefer was a member of the Supernova Cosmology Project.

The goal was to measure the slowing down of the expansion of the Universe, and predict the mass of the entire Universe. The primary tool was the construction of the Hubble Diagram, which plots out the expansion history of the Universe. In 1998, surprisingly, the Supernova Cosmology Project's version of the plot showed that the Universe's expansion was not decelerating, but rather was accelerating. Something was making the Universe speed up, and this would require a huge amount of energy. This 'something' is still completely mysterious, but we have given it the name

'Dark Energy.'

Dark Energy is now known to be the dominant constituent, comprising about three-quarters of the mass-energy of the Universe. The fate of the Universe is also determined. An accelerating Universe will keep expanding forever and ever, with the Universe becoming perpetually darker and darker, emptier and emptier, and colder and colder. By 2003, the supernova result was independently confirmed. The identical results from separate methods convinced the astronomical community that Dark Energy, whatever it is, must exist.

In 2007, the whole Supernova Cosmology Project was awarded the \$500,000 Gruber Prize for Cosmology. Schaefer was thus a recipient of part of this award, as one of the discoverers of Dark Energy. On October 5, 2012, the Nobel Prize in Physics was announced, with Saul Perlmutter one of the winners. Perlmutter's first email outbound was to all the members of the Supernova Cosmology Project in thanks and celebration for the work of the whole team. Perlmutter had the original insight as to how to construct the Hubble Diagram,



Schaefer

and he tirelessly led the rest of the team. Schaefer got 'his ticket to Stockholm'. He and his wife (Prof. Martha Schaefer, Department of Geology and Geophysics) both had a wonderful time with the gala extravaganzas associated with Nobel Week.

Schaefer was also named the LSU's 2012 Distinguished Research Master. "I have a wide range of interests throughout astrophysics," said Schaefer. His research includes Gamma-Ray Bursts, supernovae, supernova remnants, as well as astronomical events in history and literature.



Jerry P. Draayer, LSU Distinguished Research Master and President of Southeastern Universities Research Association (SURA) was honored last June. More than 100 people, including some of the most prominent scientists from

## Draayer Honored

the U.S. and abroad, paid tribute to Draayer's world-wide recognized research and academic achievements during Horizons of Innovative Theories, Experiments, and Supercomputing in Nuclear Physics, or HITES 2012, an international conference held June 4 - 7 in the historic New Orleans French Quarter.

For more information about what's going on..

visit our Physics & Astronomy website at

[http://  
www.phys.lsu.edu](http://www.phys.lsu.edu)

## NSF CAREER Award Winners

Thomas Corbitt and Daniel Sheehy are winners of NSF CAREER awards. Sheehy is part of the theoretical physics research group at LSU that investigates the properties of atomic gases at extremely low temperatures (around a billionth of a degree above absolute zero). Experiments on these cold atomic gases use complex laser fields to confine and manipulate the atoms and observe collective phenomena such as superfluidity.

The team uses theoretical models to understand these experiments and make predictions for future experiments. "What is the motivation for studying such cold gases? The collective quantum mechanical phenomena exhibited by cold atoms is closely related to

other important (but more complex) physical systems such as the behavior of electrons in electronic materials. By extracting fundamental physics principles from cold atoms, we hope to better understand the physical properties of electronic materials, that will form the backbone of future energy and computer technologies," says Sheehy.

Thomas Corbitt has also received an NSF CAREER award to perform experimental testing of methods to mitigate quantum noise in gravitational-wave interferometers, such as the LIGO detectors. Radiation pressure noise and opto-mechanical coupling are the prime effects of interest. Prototype experiments will be performed with micro-fabricated mir-



Corbitt



Sheehy

rors, comparable in diameter to a human hair, suspended on cantilevers, and placed in a high finesse optical cavity operated at cryogenic temperatures. The small mirror size and low temperature are necessary to reduce thermal fluctuations and reveal the quantum behavior.

These experiments are important for Advanced LIGO and future gravitational-wave detectors. Operation of the macroscopic mechanical systems at the quantum level allows for the possibility of observing non-classical behavior at size and mass scales previously inaccessible. This could also potentially have applications in quantum computing.

## Congratulations also goes to....



Blackmon

Jeffrey Blackmon, who has been named a *Fellow of the American Physical Society* for his vision and innovation in exploiting radioactive nuclear beams to advance our understanding of nuclear processes that govern astrophysical phenomena and to Kenneth Schafer, named a *Fellow of the American Association for the Advancement of Science* (AAAS) for his "seminal contributions in the field of laser-matter interactions through extensive theoretical studies of high quality and great innovation."



Schafer

## Research News



Clayton

Geoffrey Clayton worked with Marianne Konikoff, a student at St. Joseph's Academy, on her project "Molecular Hydrogen and Far-Ultraviolet Extinction due to Dust: A Two-Year Study," which won 1st place overall in the senior division, grades 9-12, of the 2013 Region VII Louisiana Science and Engineering Fair. This project involves the analysis of measurements of the amount of molecular hydrogen in various directions towards stars in the Milky Way galaxy. The presence of molecular hydrogen is an indicator of cold, dense clouds of gas and dust in the interstellar medium.

## MARSLIFE: Scientific Balloons Lead the Charge Toward Identifying Microscopic Life Outside of Earth



The MARSLIFE balloon payload sampling for microbes 10,000 feet above Fort Sumner, New Mexico.

Little green men. Silver space suits. Flying saucers. These are the images that often come to mind when the term “alien life” is discussed. But in reality, scientists are looking for nothing so grand – or so cliché. In fact, the search for life on other planets has begun on a microscopic level... and the search begins right here at home.

LSU physicists and biologist, along with more than 20 undergraduate and graduate students, plus collaborators from Southern University, Louisiana Tech, NASA-Ames and Aarhus University in Denmark, have taken on a project studying earthly microorganisms that tolerate conditions similar to those found in extraterrestrial environments. It’s called MARSLIFE, or Modes of Adaptation, Resistance and Survival for Life Inhabiting a Freeze-dried-radiation-bathed Environment.

“Determining the limits of the biosphere here on Earth is the important first step for studying life on other planets,” said Professor of Physics & Astronomy John Wefel, “and MARSLIFE is taking that step.”

Some goals of MARSLIFE include investigating existing and novel microorganisms with tolerances to cold, desiccation and radiation as models for astrobiology; using laboratory simulators to assess responses to temperature, pressure and radiation conditions that exist in a range of extraterrestrial environments and improving technologies for the detection and sampling of microorganisms under conditions similar to the surface of Mars.

Sponsored by NASA EPSCoR and the Louisiana Board of Regents, the team, led by Wefel, biologist Brent Christner and physicist Gregory Guzik, uses a scientific balloon, which starts off as a relatively large, helium-filled inflatable, but expands to become larger than LSU’s Tiger Stadium. These balloons carry experimental payloads to sample the microbes found at various heights, and returns samples to the biology labs to test the microbe’s “hardiness.”

“Scientists have used ballooning technology for more than 200 years to investigate the secrets of the universe,” said Guzik. “Modern scientific balloons allow instruments weighing thousands of pounds to be placed above 99 percent of the Earth’s atmosphere for extended periods of time at fraction of the cost to put a satellite in orbit. For MARSLIFE we are using this technology to investigate the limits of our biosphere as a function of altitude.”

Originally, members of the group worked on very different projects in Antarctica. Christner studied microbes that live in subglacial lakes of the frozen continent, while Wefel and Guzik ran scientific ballooning experimental missions there. Now, as a team, the group can test their theories much closer to home, while continuing to offer area students a unique, research-intensive experience.

“The strongly interdisciplinary and technical nature of this project provides a unique training opportunity for our students, allowing them to broaden their scientific horizons beyond the typical experiences gained during an undergraduate or graduate education,” said Christner.

“MARSLIFE is producing technologically-informed, interdisciplinary students and will have long-term benefits in nurturing the next generation of scientists in Louisiana.”

Other LSU participants include John Battista, Gary King, Dana Browne, Jim Giammanco, Michael Stewart, Doug Granger and Brad Ellison. Participants from area universities include Sumeet Dua and Pradeep Chowriappa of Louisiana Tech and Larry Henry from Southern University, and external advisors include Kai Finster from Aarhus University and Rocco Mancinelli and Chris McKay from NASA Ames.

Launch of a sounding balloon vehicle typical of those used for the MARSLIFE research and LaACES student training programs.





Singh

**big bang ... was more of a big bounce, according to Parampreet Singh and Peter Diener**

## Singh and Diener making news..

Parampreet Singh was chosen as one of Greater Baton Rouge Business Report's *Forty Under 40 for 2012*. Singh, an Assistant Professor, holds a Ph.D. from Inter-University Centre for Astronomy and Astrophysics in India. His work involves the study of the origins of the universe. He was also featured along with just four other experts on quantum gravity in the 2010 BBC documentary production, *What Happened Before the Big Bang?*

"Right now, we are answering certain questions that have not been answered before—like how the universe started. Conventional wisdom, via Einstein's theory, in what is

known as the Big Bang theory basically says our universe began with a huge explosion and is now expanding outwardly, away from the point of origin. Our research shows that it was more of a big bounce," said Singh in an interview by Baton Rouge's *225 Magazine*.

Singh along with Peter Diener, Research Assistant Professor of Physics, were both featured in the January issue of *225 Magazine* describing their research. Singh and Diener are among just 20 scientists worldwide to receive funding from the Templeton Foundation New Frontiers in Astronomy & Cosmology International Grant.

Singh feels that LSU is an

ideal place for him to do his work, and that our department has the needed resources for his research including "some of the most powerful supercomputers in the world." says Singh. Singh has also been invited to join the Editorial Board of the journal *Classical and Quantum Gravity*, published by The Institute of Physics (UK).



Diener



Pullin

## Pullin: The Montevideo Interpretation

Jorge Pullin of the LSU Relativity Group and Hearne Institute and Adjunct Professor Rodolfo Gambini of Universidad de la Republica in Montevideo, Uruguay, have made a step forward in reconciling quantum mechanics with gravity using a new interpretation – the Montevideo interpretation – that eliminates the need for outside observers. Their new view on the meaning of measurement in quantum mechanics may yield insights into the development of a quantum theory of gravity, a major unresolved issue in theoretical physics. It may also allow a connection between a possible quantum mechanical phase early in the history of the universe and imprints of that phase on today's classical universe.

## Kutter's Paper receives Physical Review Editor's Selection

A paper by Thomas Kutter, former LSU postdoc Jason Goon, and their collaborators on the Sudbury Neutrino Observatory describes a new analysis of the Sudbury solar neutrino data using an array of He-3 proportional counters. The total flux of active neutrinos was measured to be consistent with both previous measurements and standard solar models. The paper was selected as a "Phys. Rev. C Editor's Suggestion".



Kutter



## Where does the Periodic Table Come From?

LSU experimental physicists Jeff Blackmon and Catherine Deibel study atomic nuclei and nuclear reactions in the laboratory that are important in astrophysical objects, particularly in explosive stellar events such as novae, X-ray bursts and supernovae. The nuclear reactions occurring in these events are believed to have formed most of the elements found in our galaxy.

These reactions are also studied at accelerators using particle beams incident on targets of stable nuclei. Currently, the field is advancing rapidly with the advent of radioactive ion beams, which for the first time allow us to study reactions with radioactive atoms that are important in stellar explosions.

Blackmon and Deibel and their students perform measurements at Oak Ridge National Laboratory; at Argonne National Laboratory; at the National Superconducting Cyclotron Laboratory, NSCL, at Michigan State University; and at TRIUMF in Vancouver. Their recent results have been published in

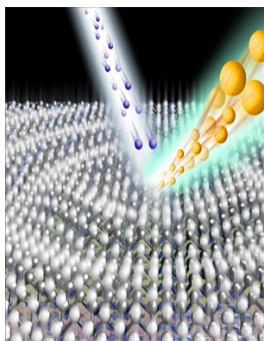
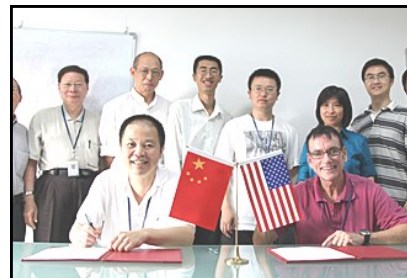
*Nature* and featured on the cover of the August 2010 *Physics Today*.

The group collaborate with colleagues at Florida State University to construct the Array for Nuclear Astrophysics Studies with Exotic Nuclei (ANASEN). Students at LSU and FSU are now using ANASEN at Florida State's linear accelerator facility to directly measure nuclear reactions important in X-ray burst explosions. The development of ANASEN allows LSU students to gain invaluable hands-on experience in forefront instrumentation that is important for fields from health care to national security. Two LSU undergraduates, Laura Mondello and Hannah Gardiner, traveled to present results of their research with ANASEN at the American Physical Society Conferences in Santa Fe, NM and East Lansing, MI earlier this year.

Adapted from the LSU Office of Research & Economic Development Fall 2012 *LSU RESEARCH* online at: <http://www.research.lsu.edu>

## Working with Beijing

A cooperative agreement was signed between the Beijing Computational Science Research Center and the Hearne Institute For Theoretical Physics. On July 1, 2012, the Director of the Beijing Computational Science Research Center (CSRC), Prof. Hai-Qing Lin, and the Co-Director of the Hearne Institute for Theoretical Physics at LSU, Jonathan P. Dowling, signed a Cooperative Agreement for academic exchange and collaboration between the two institutions. The initial focus area of cooperation is quantum optics and quantum information science.



Jing Teng, Chen Chen, Yimin Xiong, Jiandi Zhang, Rongying Jin and E. W. Plummer have recently reported in *Proceedings of the National Academy of Sciences* the observation of extremely large spin-charge-lattice coupling driven by the broken symmetry present at the surface. The study was conducted on single crystals grown at LSU of the newly discovered Fe-based superconductors  $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ , using high resolution inelastic electron scattering to probe the lattice dynamics.

## Alumni News

**What I did with my Physics Degree...** A series of discussions were held this year with alumni, industry representatives, faculty, and on the general topic of career opportunities and prospects for undergraduate physics majors. The first presentation on Oct. 11, 2012, on *Landing Curiosity on Mars* was delivered by Keith Comeaux, who works with NASA Jet Propulsion Lab. Comeaux is a 1989 LSU Physics and Mechanical Engineering graduate.

The following day, Michelle Holoubek, graduate of our department and now a patent attorney and director of the Electronics Group at

Sterne Kessler Goldstein and Fox Law firm in Washington, met with undergraduates of Physics and Astronomy to discuss her career path.

Brian Burgess, a 1983 graduate and now a project manager with defense contractor Praeses, met with undergraduates in November.

The series resumed in April with Christopher Welch, BS in Physics '04 and MS in Medical Physics '08, who spoke about his work at St. Luke's Hospital in Houston and his current job as a petro-physicist and radiation detection expert for Shell Exploration Company.

The final presentation was on April 26, 2013, by Major General Jasper A. Welch, Jr., a 1952 graduate in Physics and a member of the College of Science Hall of Distinction



Major General Jasper Welch, Jr.

and the National Academy of Engineering. Major Welch's career path includes being a former advisor to the White House Office of Science and Technology Policy; the Defense Science Board; the Secretary of the Air Force; the Office of the Secretary of Defense; defense policy coordinator for the National Security Council; and a member of the Council on Foreign Relations.



Steldt

## Steldt Leaves Legacy

LSU alumnus Frank Richard "Rick" Steldt, retired physics professor at Indiana University, recently returned to LSU after more than 30 years since receiving his doctorate in physics with an electrical engineering minor in December 1971. Steldt was a research associate and taught a semester of sophomore physics to undergraduate students in our department. He was hired shortly after by Indiana University at a time when academic positions were scarce.

Steldt feels the reason he got the job at IU was because of the research he did at LSU with his advisor, Paul G. Varlashkin. While at Indiana University, Steldt also developed an interest in astronomy, particularly in solar eclipses. Steldt has traveled around the globe photographing these events.

In addition, he became interested in lasers and holography and these interests led to the building of the IU Kokomo Observatory/Lecture Hall which also contained a laser laboratory. This building is still used today by students in astronomy, physics and physical science.

Steldt credits LSU for his successful career as an educator. Upon his retirement, he received an annuity, and has since established a trust to be used to help graduate students at LSU. "When I first started at LSU, I did not have any financial aid. I'd like to have a fund in part to service incoming graduate students who don't have any kind of assistance themselves," Steldt said. During his recent visit to campus, Steldt enjoyed stopping by his former graduate student office and laboratory in Nicholson Hall and meeting with Dean Kevin Carman.

Steldt is leaving a trust to the LSU Foundation valued at more than one million dollars for the benefit of the Department of Physics & Astronomy. Though he is retired, Steldt still keeps up with the field of physics. "Physics is the world around us, it's how things work. You can't have anything more important than how things work in the world in which you live," he says. Steldt has always felt indebted to LSU and wanted for a long time to leave a legacy. His generous gift will benefit future generations of LSU physics students.

Adapted from LSU College of Science website. For more information about Prof. Steldt, go online to <http://science.lsu.edu/Alumni+Giving/Give-to-the-College/item56188.html>

## Grest: Hall of Distinction

Gary Grest has been named to the College of Science Hall of Distinction. Grest earned BS, MS, and PhD degrees from LSU in physics in 1971, 1973, and 1974. After graduation, he worked at Rutgers and the University of Chicago before accepting a faculty position at Purdue in 1979. He is currently at the Center for Integrated Nanotechnologies at Sandia National Lab working in the Theory and Simulation of Nanoscale Phenomena unit that studies the assembly, interfacial interactions, and emergent properties of nanoscale systems. Dr. Grest is a member of the National Academy of Engineering and winner of the American Physical Society’s Aneesur Rahman Prize for Computational Physics in 2008 and the Polymer Physics Prize in 2011.

## Physics & Astronomy Alumni

Please help us update our alumni database. Take a few minutes to respond with news about yourself to be included in our Alumni database. The Department of Physics and Astronomy maintains a database of all our alumni - Ph.D., M.S. and B. S.

The following information is needed and can be submitted by email to [alumni@phys.lsu.edu](mailto:alumni@phys.lsu.edu) or visit us on the web - <http://www.phys.lsu.edu/dept/alumni>

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