The Expanding Universe of HSU Physics & Astronomy!

New faculty and more majors bring momentum to our programs

Welcome to the first annual Physics & Astronomy Department newsletter; we are excited to update you on recent developments and physics news! We are especially proud to welcome two new tenure-track faculty members to our department: Dr. Paola Rodriguez Hidalgo arrived in the Fall 2015 semester, and Dr. Ruth Saunders will be joining us for the upcoming academic year. In addition, our programs have grown to include nearly 100 majors, with a record 15 graduates this year alone!

Dr. Rodriguez Hidalgo earned her Ph.D. in Astronomy from the University of Florida. She joins us most recently from York University in Toronto, where she studied distant quasars. She is an outstanding researcher and educator, having already established three (!) thriving undergraduate research groups dedicated to astronomical and educational studies.

Dr. Saunders’ research interests lie in nanoscale physics, including studies of ZnO nanostructures. She earned her Ph.D. from Dublin City University in Ireland, and joins us most recently from Cal Poly San Luis Obispo, where she has been a lecturer for three years. We are thrilled by the knowledge and energy that our new faculty colleagues bring to HSU!
2015-16 Highlights

- Cameron Trujillo ('16) was honored as an outstanding presenter at the Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) annual meeting in Washington, D.C.

- Tyler Smart ('16) was honored for his excellent academic record as a Physics major.

- Ian Guerrero ('16) and Isabelle van Hoorn ('16) were awarded summer internships to work on the ATLAS project at CERN in Switzerland.

- Charlotte Olsen ('17) was awarded a NASA CRESST internship to study how star formation is triggered in close pairs of galaxies with high energy data.

- Several students attended the Conference for Undergraduate Women in Physics (CUWIP), held at Oregon State University in January.

- Dr. Rodriguez Hidalgo was awarded a NASA research grant to study quasars with HSU students utilizing the CHANDRA X-ray telescope.

- Dr. Hoyle’s National Science Foundation funding for gravity research was extended for a 5th year.


- Dr. Rodriguez Hidalgo was awarded two internal grants for Diversity Development and Research, Scholarship, and Creative Activities.

- Michael Ross ('15) published an article with Dr. Hoyle in the Proceedings of the National Conference on Undergraduate Research (NCUR).

- Students participated in the COMAP Math Modeling Competition, several of them receiving an “honorable mention” for their work.

In Focus: Student Research and Capstone Projects

One of the challenges that arose as our student numbers rapidly increased in recent years is to continue to provide research opportunities and meaningful capstone projects for as many majors as possible. With the addition of Dr. Rodriguez Hidalgo’s projects, continued work in Dr. Hoyle’s Gravity Lab, and the variety of senior projects guided by other faculty members, we have been able to just keep pace. We are excited to add even more opportunities with the arrival of Dr. Saunders in the fall and are delighted to highlight below some of the student work presented over the 2015-16 academic year.

Student Research Conferences and Presentations

The annual National Conference on Undergraduate Research (NCUR) was held April 5-8 in Asheville, NC. Dr. Rodriguez Hidalgo accompanied three student presenters on the journey. Above left is Sean Haas ('18) and Zane Comden ('18) is on the right; both presented posters describing quasar research being done together with Dr. Rodriguez Hidalgo. Ian Guerrero ('16 – not pictured) gave an oral presentation about his work in Dr. Hoyle’s Gravity Lab.

The annual American Physical Society (APS) April Meeting was held in Salt Lake City, UT. Dr. Hoyle attended along with Gabriela Martinez and Jeremy Johnson (both '18, pictured at left). Both presented gravity research to a broad audience of physicists.

HSU hosted its annual celebration of undergraduate research, IdeaFest, on April 22nd. This year the Physics & Astronomy Department was very well represented with six posters including 18 student and faculty co-authors!

Would You Like to Support Undergraduate Research??

If you believe that involving undergraduate students in performing and presenting research is important preparation for their future careers, please consider making a contribution to the Physics & Astronomy Department trust. Learn how on the next page!!
Alumni News

Featured Alumni Updates*

Crystal Cardenas ('15) is a graduate student at Vanderbilt University in the TLSAMP Bridge to Doctorate Program. She is currently working toward simulating double beta decay in scintillating crystals in order to search for Majorana neutrinos, particles that are their own anti-particle. “Even though I was not working on or studying particle physics or materials science at HSU, my experience there opened doors for me to explore other areas of physics. Our physics department taught me to think bigger, and that anything is possible as long as I have a passion to go for it. And I will be always grateful to our physics department for nurturing my curiosities and showing me that there is no end to where I could go” (Photo taken a the 2013 Conference for Undergraduate Women in Physics (CUWIP) at Caltech).

Holly Leopardi ('14) was honored as one of the two HSU Outstanding Students of the Year in 2014. After graduating, she accepted a graduate position at the University of Colorado in Boulder, where she is currently pursuing a Ph.D. in physics in collaboration with the NIST Optical Frequency Measurements Group. Her work concerns the development and applications of laser frequency combs.

Holly Edmundson ('09) entered industry after receiving a MS degree in Optics and Materials Sciences from the University of Oregon. She currently develops optics for a semiconductor company near Portland, OR. “HSU not only gave me the foundation in physics to make my career possible; the program and professors also gave me the practical skillset and fostered critical thinking that made me ready to tackle problems in the lab.”

We hear that…

• David Smith ('14) is pursuing a Ph.D. in solar physics at Utah State University. He recently survived teaching his first class of 300 students! Congratulations!
• Jordan Pierce ('11) is at the University of Oregon pursuing a Ph.D. in physics, studying complex matter wave beams.
• David Shook ('11) completed dual MS degrees in physics and applied chemistry at the University of Oregon and now works in industry.
• Jacob Crumney ('07) has recently returned to the Arcata area and works at the USGS Earthquake Science Center.

* If you would like to submit an update to be featured in the newsletter, you can do so from the link on our website, or directly from here! We look forward to hearing from you!!

Support Physics & Astronomy at HSU!

We invite you to consider supporting Physics & Astronomy students at HSU! The Physics & Astronomy Department trust account funds a variety of student-centered activities. Some examples from recent years include support for:

• Travel and registration costs to attend the Conference for Undergraduate Women in Physics (CUWIP).

• Student expenses to attend the Northern California Physics GRE Boot Camp. This event is an intensive weekend meeting where students learn the best practices to study for and pass this exam that can be crucial for graduate school acceptance.

• Purchasing equipment and supplies for outreach efforts such as the community-oriented Science on Tap lecture series that is held monthly.

• Departmental social functions including beginning of the semester “meet and greet” events and special Physics & Astronomy Club gatherings.

• Printing expenses for conference posters.

• The annual graduation dinner.

• Annual prizes awarded to outstanding students.

To make a financial donation to the trust, please visit our website and follow the appropriate link. If you have received this newsletter electronically, you may click directly here.

The students, faculty, and staff greatly appreciate your generosity!!
Almost exactly 100 years after Einstein published his theory of General Relativity, one of his key predictions was directly observed. On September 14th, 2015 the Laser Interferometer Gravitational-wave Observatory (LIGO) detected the gravitational waves emitted by the merger of two black holes 1.3 billion light years away. The faint ripples in spacetime were observed by the LIGO interferometers in Hanford, WA and Livingston, LA. Each interferometer has two perpendicular arms of length 4km, and gravitational waves are observed by measuring the tiny variations in the differential arm length at each site. Even though each detector is enormous (containing some of the largest and best vacuums on Earth), the observed variations in the arm lengths were only 1/1000th of the size of an atomic nucleus! Among other amazing facts, the observers were able to determine that gravitational waves do travel at the speed of light (as Einstein predicted), and that the total gravitational wave energy released was equivalent to the mass-energy of three entire solar masses! Finally, the observation essentially opens a whole new window on the universe through gravitational wave astronomy that will eventually complement traditional optical techniques.

HSU has several connections to this discovery. Physics & Astronomy alumnus Corey Gray ('97) is a lead operator at the Hanford, WA site. In April 2016, over 100 audience members came to hear Corey describe the discovery and how his experience at HSU had set him on the path to being part of this groundbreaking work. For the lecture, recent graduates Garret Benson and Benjamin Daly constructed a tabletop interferometer demonstration. Additionally, Michael Ross ('15) is currently a Ph.D. student at the University of Washington in Seattle, where he works on the LIGO detectors. Michael started his work in Seattle through the collaboration that the HSU Gravitational Research Laboratory has with the University of Washington’s Eöt-Wash experimental gravity group.

Left: Inside the LIGO control room in Hanford, WA: Corey Gray ('97), Michael Ross ('15), and Dr. Krishna Venkateswara (U. of Washington). Photo courtesy of Corey Gray. Right: Corey Gray and Benjamin Daly ('16) prepare an interferometer demonstration before Gray’s public lecture on gravitational waves.