Texas A&M University Kingsville

Physics Newsletter

Volume 6
Issue 1
Fall 2017

Contents Included

Around the Physics Department

New Concentration in Geophysics

The Department of Physics and Geosciences will be offering a BS degree in Geology with an emphasis in Geophysics starting Fall 2017. We also received approval to offer a minor in Geophysics and Certification in Geophysics starting Fall, 2017. We added this new concentration at the request of local industry. We are the only Department in South Texas that offers a degree concentration in geophysics. Also a master's degree program in Petrophysics is currently under review with the TAMUS System in College Station.

Graduate Student Research

Two graduate students from Natural Gas Engineering, Xavier Wright and Anish Kishore worked with Dr. Yelisetti on seismic research projects over the Summer, 2017.

Seismic Research team out in the field, collecting data

Seismic Studies of the Himalayas

During the Summer of 2017, Dr. Yelisetti along with his collaborators from the Indian Institute of Technology Kanpur, India conducted seismic acquisition field trip in the foothills of Himalaya near the India-Nepal border to study the shallow morphotectonics beneath the central seismic gap. The project was funded by the Indian Government (~$77,000). They deployed 18 sophisticated cableless seismometers (remote acquisition units) that were acquired from Sercel to record ambient noise.

Marine Geophysics Cruise

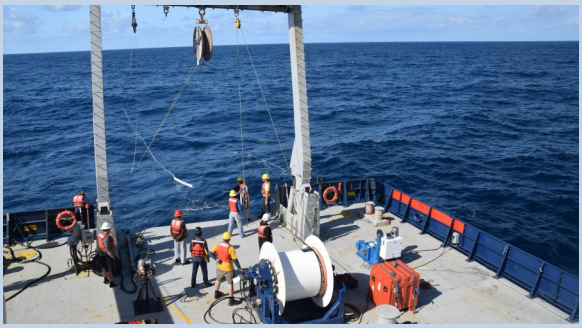
Dr. Yelisetti's proposal to participate in the NSF sponsored marine multichannel seismic acquisition cruise off Oregon and Washington was accepted. He is one of the 19 scientists selected from across the nation to participate in the research expedition from September 24th – October 5th, 2017 to study the Cascadia subduction zone earthquakes, submarine landslides, and undersee volcanoes.

Summer Research Award

Dr. Yelisetti received a 2017 summer support award of $3,000 from TAMUK to develop a research proposal that would be submitted to secure external funding.

Editor for *Oceanography* Journal

Dr. Subbarao Yelisetti is the Guest Editor of the Oceanography Journal for 2017-2018.



Equipment for the marine research being done by Dr. Yelisetti

Leadership Role in Coastal Bend Geophysical Society

Dr. Subbarao Yelisetti is the President of the Coastal Bend Geophysical Society (CBGS). Dr. Yelisetti proposed to provide scholarships to TAMUK geophysics students through CBGS funds.

Publishing of Two Papers in International Peer-Reviewed Journals

1. Subbarao Yelisetti, Spence, G.D., Scherwath, M., Riedel, M., and Klaeschen, D.; Dual-vergence structure from multiple migration of widely spaced OBSs from northern Cascadia margin. Tectonophysics, 2017, doi: 10.1016/j/tecto.2017.04.005.
2. Anastasia G. Yanchilina, Subbarao Yelisetti, Monica Wolfson-Schwehr, Nicholas Voss, Thomas B. Kelly, Jennifer Brizzolara, Kristin L. Brown, Megan Fung, Melania Guerra, John M. Zayac, Bernard Coakley, Robert Pockalny; Exploring methane gas seepage in the California Borderlands, EOS transactions, American Geophysical Union, 2017, accepted.

Lecture at Coastal Bend Mathematics and Statistics Symposium

Dr. Subbarao Yelisetti gave an invited lecture entitled "Seismic full waveform inversion" at the 2nd Coastal Bend Mathematics and Statistics Symposium, Kingsville, TX, 1 Apr, 2017.

Meet the New Faculty

Dr. Darshika Keerthisinghe

Areas of Special interest/specialization: Material Physics, Atomic and Molecular Physics, Nanophysics

Research Interests: Characterization of electron and ion beams through micro and nano capillaries for future applications

Short Interview With Dr. Keerthisinghe

How is Texas A&M University-Kingsville different from other universities you have previously been in?

I like that this campus has particularly friendly faculty and staff. Students are also very polite. This makes TAMUK a nice campus to be in.

What part of teaching at Texas A&M University-Kingsville do you like the most?

I teach several classes (PHYS 2325, PHYS 1471, PHYS 2126). Supervising PHYS 2126 is my favorite, because the lab just has some hands-on experience students would not get otherwise.

What are some of your hobbies?

I have many varied hobbies. They include jewelry making, crocheting, watching movies and traveling.

Dr. Sergiy Kaim

Areas of Special interest/specialization: Laser Beam Quality and Laser Beam Combining, Optical Performance of Volume Bragg Gratings, Stretching/Compression of Short Laser Pulses

Current Research: Optical performance of volumetric diffractive structures

Short Interview With Dr. Kaim

How is Texas A&M University-Kingsville different from other universities you have previously been in?

The campus is located in the region that has its cultural and climatic specifics different from most of the country, and I greatly enjoy both. This is a somewhat new experience for me. However, the largest difference is the student body. The students at TAMUK are the most polite and curious to learn I have seen so far.

What part of teaching at Texas A&M University-Kingsville do you like the most?

I love the organizational structure of the University. There is a very clear workflow so you always know how things are done, but at the same time the University is compact enough that things and people are treated individually, not as numbers on paper.

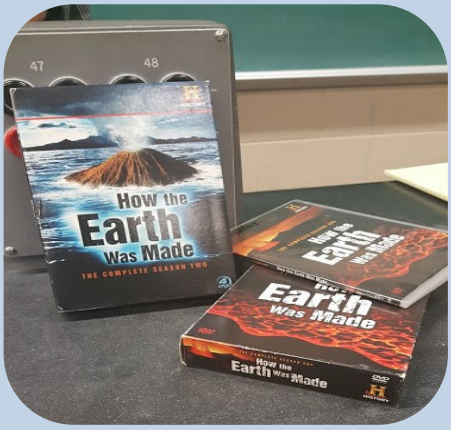
What are some of your hobbies?

I greatly enjoy all types of outdoor activities – hiking, backpacking, canyoneering, rock climbing and … the list is unlimited.

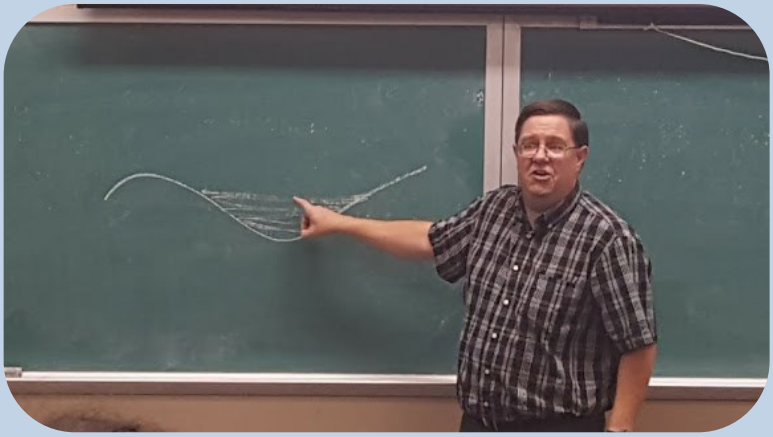
Earth and Space Science Night

By Cherrie Nelson

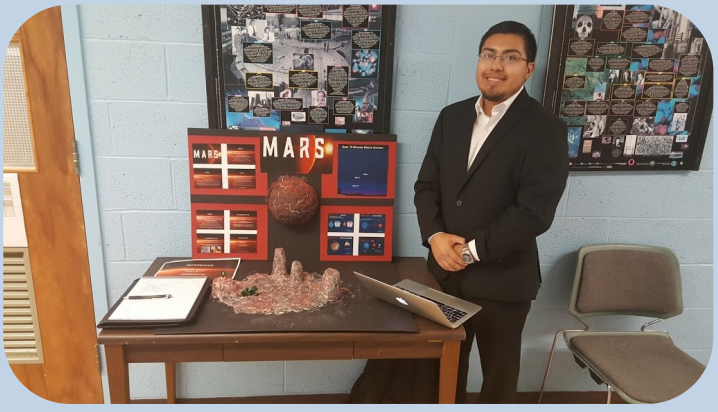
On the 12th of October, Hill hall opened its doors to the public, allowing individuals to view places on the earth and the solar system. Families and individuals were given special tours to view the scope. Many local children had the opportunity to look at the stars through the telescope.



There was also a movie night, which many students attended. Some videos from the History Channel's series "How the Earth was Made" were viewed.



There were two student groups that presented information to the public about Science. The first group discussed the use of seatbelts and using Newton's law to discuss their importance. Maria Garcia said the best part of working this activity was that it gave her more insight and understanding about how safety is so important. The second project was in the field of Astronomy, showing us what life would be like living on the surface of Mars.



AAPT-SPS Conferences

Two physics majors, Blas Guadiana and Thomas Cruz, traveled with Dr. Lionel Hewett to attend the 2017 Fall Meeting of the Texas Section of the American Association of Physics Teachers, Texas Section of the American Physical Society and Zone 13 of the Society of Physics Students at the University of Texas at Dallas on October 20-21.

The plenary sessions addressed such topics as dark energy, neutrino oscillations, molecular imaging, the 2020 Mars Mission, and the importance of protecting other planets from human contamination. There were numerous concurrent sessions reporting on the latest developments in astronomy, high energy physics, particle physics, condensed matter physics, material science, general physics, space physics, biophysics, optics, nuclear physics, nanoscience, and teaching physics.

There were also numerous poster presentations, various workshops (providing hands-on experience), and a banquet speaker who discussed several exotic particles lurking in ordinary crystals.

The thoughts of one of the students attending, Blas Guadiana, follow

How was the conference you attended?

It was really nice. Last time we attended was in a smaller campus, the San Antonio College, this time around it was in the University of Texas at Dallas. The installations were much nicer and there were more presentations. The conference is structured in individual, 15-minute presentations. There were a lot more options of talks to attend in different fields. The thing is, since there were a lot of presentations happening, many of them happened at the same time, meaning we actually had less time to go to them. But it was really nice.

Did you attend any particularly interesting presentations while at the conference?

Yes. Most of the physics majors here are interested in astronomy and cosmology, there were a lot of interesting talks about that. There were also a lot of talks about gravitational waves. As you might have heard, last year they detected the first gravitational waves, as predicted by Einstein... The last conference was held the same week that [the physics community] had just detected gravitational waves coming from a merging binary neutron stars. This is two neutrons stars revolving around each other and eventually merging. They detected the gravitational waves from that event, and that's huge. Both conferences had presentations given by professors who had stakes in the discovery of gravitational waves, so it was very interesting to attend those presentations.

The discovery of gravitational waves was very momentous. Back then, it was mentioned that it was complicated to detect them. Why?

Gravity is the weakest force of nature. There are four forces in nature: Gravity, Nuclear Weak, Nuclear Strong, and Electromagnetism. Gravity is the weakest by far. This is why gravitational waves are very hard to detect. The fact we detected it, and from such an important occurrence as the merging of two neutron stars is, has the scientific community very happy.

AAPT-SPS Conferences

How many people were in attendance?

We do not know exactly, but we know for sure that most member universities from the Texas Physics Consortium, which accredits the Physics Degrees in many schools around Texas, including ours, were in attendance. Some of those universities would be from West Texas, Tarleton, several universities from Dallas and San Antonio. We also get many guest speakers from around Texas, for instance, Lubbock and San Antonio. But the conference is not limited to schools and universities, it is a meeting for the physics community around Texas in general.

How did you get there?

The trip was sponsored by the Physics Department, so it has limited availability. This time we were actually two students and a faculty member. The department rented a van, and we drove there. This time around, we had a long drive ahead of us, about eight or nine hours, but last time we went to San Antonio, it was only two or two and a half.

Overall, would you say the experience is worth it?

Yes, it is worth it, and more so if you are actually interested in the events and have a more proficient knowledge in physics. This makes it so much more enjoyable for the students. A lot of people attend but do not really understand everything that is being taught, even we do not understand most of it, as many of the presentations are on individual research which only the presenter fully understands. But if you attend with a higher grasp of conceptual physics, it is going to be much more beneficial for you. This is because you get to expand your interest in physics, you get to know what is going on with the scientific community, and you might even get inspired for some future self-research.

Photo Credit: www.aapt.org and https://www.spsnational.org/about/society-media/

Dr. Hewett's Astronomical Adventure

By Dr. Lionel Hewett

Picture of solar eclipse at totality. The moon completely covers the sun, and there is darkness

Dr. Lionel Hewett, Chairman of the Physics/ Geosciences Department, tried three times during his career to view a total solar eclipse. On his first attempt, he went to Mexico near Monterrey and to see an annular eclipse (where the moon was too small to completely cover the sun). On a second trip he went to Mazatlan, Mexico, to see a total eclipse (but the sky was so cloudy that the eclipse was not visible). On his third attempt, he drove 1,440 miles to a point 12.5 miles north of Riverton, Wyoming, so as to be directly in the path of totality for the Great American Eclipse of August 21, 2017. And this time the sky was clear! For 3 minutes and 25 seconds and the sun was hidden by the moon and the solar corona was visible. Nighttime stars could be seen, and the air temperature had dropped by 10 degrees or more. Before the eclipse, Hewett set up a projection telescope so he and others could watch the partial eclipse progress toward totality. And after the eclipse he encountered a bumper to bumper traffic jam on the highways across the wide open Wyoming countryside before continuing on his 1,440 mile drive back to Kingsville. Upon returning, he learned that the physics faculty and students at TAMUK had set up equipment to watch the 65% partial solar eclipse that was visible from the sun deck on Hill Hall.

Eager observers of the Eclipse in Wyoming waiting for the event to start.

Dr. Hewett and his eclipse-observing equipment. A projection screen is clearly visible.

Projection of the eclipse on the ground. Totality of the eclipse is near at this point.