

# Texas A&M University– Kingsville

## Physics Newsletter

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## Public Viewing Night 3/28/2017

The Physics and Geosciences department hosted the first public viewing of the sun. The Astronomy group decided to share with the public a lab that demonstrated the energy from the sun; as well as a look into the properties of light and a telescopic view of the surface of the sun, through filtered lenses.



Students preparing for sun viewing.

Astronomy and Physics students joined together to build their impressions of the exciting new find of the Trappist -1 planetary system. Just a few short weeks ago, there was breaking news about 7 earth

size planets orbiting a distant star roughly 40 light years away.

These students read all the information that was released and gave us their thoughts about the Trappist-1 planetary system and what these strange worlds may be like. Again, we have very little information – but as visiting participants Ashley, Jessica, Megan, Vanessa, Justine, Juan and Priscilla put it, “It was fun to imagine

what life could be like on a distant planet.”

While waiting for the moon to rise, the staff, students and guests were treated to a movie from the Geology side discussing the faults and earthquakes that happened around our



Movie night at public viewing.

own world.

Finally, several Physics students demonstrated physics principles to fellow students, teachers and guests who were in attendance. Roughly 70 people attended this event. Ages ranging from 6 to 60+ had a chance to visit with the staff and students about their favorite topics from how energy is conserved with the motion of pendulums to Newton’s Laws of Motion. Nestor Flores stated, “*It was a way for me to spark conversations about physics to friends that I could not have done without the experience*”.

## Public Viewing Night 4/28/2017

The public viewing on April 28, 2017 had almost 100 people in attendance. They came to increase their understanding of our sun and earth. More than 40 people came to view the solar surface looking through a specially fitted filtered telescope. The observers were able to view solar hot spots where activity was happening. They could see the “bubbling” of what looked like the surface of the sun, along with a few other activities.



Kids enjoying the telescope view.

We had two schools attend with their students. One was Sta. Gertrudis Academy who brought 10 students and two adult leaders to see the scopes and demonstration tables of Astronomy, Geology and Physics. One student commented that he liked the car demonstration because he had seen lots of collisions and does

bunch at home too. The other school to visit was the New London School with its primary early childhood academy. They had 10 children between the ages of 2 and 6 with again 2 adult leaders visiting.

Over 40 people attended the movie and the “question and answer session” that followed with one of our geologist.



Image of sun in the telescope eye glass.



Kids waiting for their turn to view in telescope

The movie was about life in the Paleozoic Era some 251 million years ago. It discussed one of the mass extinctions, in which 95% of all life on earth was destroyed.

## Kruse Lecture-

On April 17, 2017, the 13th Annual Olan Kruse Lecture was held on the subject of “Recreate a State of the Early Universe in the Laboratory” by Ming X. Liu from the Los Alamos National Laboratory .



**Dr. Ming X Liu (center, right) with faculty and students of Physics & Geosciences Department.**

### About Dr. Olan Kruse:

The Olan Kruse Lecture Series Endowment Fund was established in 2003 for the purpose of bringing distinguished physicists to Texas A&M University-Kingsville for presentations to the students and faculty on current events in physics and astronomy.

Olan Kruse was born in Coupland, Texas on September 6, 1921. He received his Bachelor of Science degree in Physics in 1942 from Texas A&I University. He received his Ph.D. from the University of Texas in 1951. After a short stay at Stephen F. Austin University, he again returned to Texas A&I University as chair of the Physics Department. One of his first tasks was to design a new building for the department, the Lon C. Hill Physics Building. Under his leadership, the physics program offered both undergraduate and graduate degrees, hosted annual physics exhibit displays, and offered a series of “Summer Physics Institutes”. Along with his wife Lucy, he established the Olan Kruse Science Faculty Award for recognition of outstanding accomplishments in the sciences within the College of Arts and Sciences.

### About the speaker:

Dr. Ming X Liu received his B.S. on Electronics Engineering and Superconductivity Physics at Tsinghua University in 1989, his M.S. in condensed matter and Statistical Physics at the University of Pittsburg in 1993, his M.Phil. in physics at Yale University in 1994, and his Ph.D. in High Energy Phys-



**Professor Ming X Liu at lecture.**

ics at Yale University in 1997. Since that time he has worked as a research scientist, visiting scientist, visiting fellow, and/or staff physicist at Brookhaven National Laboratory, Fermi National Laboratory, Japan RIKEN Institutes, University Washington (INI), and most recently as the “High Energy Nuclear Physics Team Leader” at Los Alamos National Laboratory. He received the Norman R. M. Blatherwick Fellowship Award in 1995 and the J. Solan Fellowship Award in 1997. His primary area of expertise is in Experimental High Energy Nuclear and Particle Physics where he uses theory, simulation, and experimentation to probe the most fundamental structure of the universe. He has published his findings in over 250 articles– more than 50 of which are in the prestigious Physics Review Letters.

### About the Lecture:



**Dr. Hewett introduces professor Ming X. Liu, at the Peacock Auditorium**

We believe our universe is evolved from the Big Bang that occurred 13.8 billion years ago. Today, physicists from around the world study what the universe may have been looked like in the first fraction of a second after the “BANG”, and try to understand how our universe works from the smallest subatomic particles to the largest cosmological objects. In this lecture, he highlighted what we have learned from the high-energy heavy ion collisions at the Relativistic Heavy Ion Collider at the Brookhaven National Laboratory and also briefly discussed future prospects.

# GEOPRISMS Distinguished Lecture

**Lecture Title:** “The Legacy of Ancient Plate Boundaries in Continental Intraplate dDeformation”, By Dr. Beatrice Magnani, Seismologist, Southern Methodist University, Dallas

**Lecture Abstract:** One of the most fundamental questions



**Dr. Beatrice Magnani presenting at the lecture.**

about earthquakes in stable continental regions is why they occur where they do. Most earthquakes can be associated with pre-existing structures post facto, but because continents contain many such features it is difficult to predict which one will become active. Hence, it is important to know whether, over time, seismicity continues on structures that are most active at present, or whether current seismicity is a rejuvenation of long dormant faults. This issue is both scientifically important and has a crucial impact for seismic hazard assessment. Devastating intraplate earthquakes, such as the 2008 Wenchuan, China event, remind us that earthquakes in continental interiors frequently take place on faults that are either previously unknown or whose threat has been underestimated.

The Central US is the result of a long history of tectonic and magmatic events that shaped the southern margin of the Laurentian continent; that includes multiple episodes of rifting, collision and accretion dating back to the Proterozoic. Today, the legacy of this ancient tectonic grain is manifested in the persistent seismicity of the New Madrid seismic zone (NMSZ) that reactivates Paleozoic fault relicts of a rifting event that occurred about 500 M years ago that ruptured in 1811-1812 with three  $M > 7$  earthquakes. However, why deformation is concentrated along these faults and whether only these faults are capable of being reactivated, is still a matter of debate. Since 2009, the Central US has witnessed an increase in rate of seismicity, a major fraction of which has been associated with shale gas production and related wastewater injection. Within this context, it is important to discriminate between seismic activity that is anthropogenically induced from that arising from natural tectonic deformation. Manmade related seismic hazard offers mitigation opportunities that are not available in the case of natural seismicity. This discrimination is particularly challenging because in this intraplate region, tectonic strain rates and natural seismicity rates are low. Lows that tectonically ac-

tive faults may display periods of quiescence that are long (100's to 1000's of years) relative to the short (10's of years) instrumental record. In addition, causative faults are unknown with a poor surface expression; both types of seismicity occur on reactivate ancient faults in the Precambrian basement, and the instrumental seismic record is sparse.

While seismicity provides information about the short-term history of deformation on the involved faults, the long-term is missing. Seismic reflection data offer a means by which to interrogate the long-term history of these faults, which can be discriminatory. In this talk, Dr. Magnani used a variety of geological and geophysical techniques to investigate fault behavior in two different areas of the Central US, the Mississippi Embayment, and the Fort Worth basin in order to answer some of the outstanding questions of plate tectonics in intraplate regions.



**Dr. Beatrice Magnani addressing students before lecture.**

**Lecture Bio:** Dr. Beatrice Magnani is a seismologist at Southern Methodist University whose overarching research theme is the formation, evolution of continents, and continental dynamics. She employs controlled-source seismology to image continents at a wide range of scales and resolutions, from the lithosphere to the near surface. Her research interests include induced seismicity, the Eastern North American passive margin structure and evolution (ENAM Community Seismic Experiment Project), seismic oceanography, and glacial isostatic adjustment (GIA) investigations in the Patagonian Andes.

## Dr. Cox Recognized for Service to the University



Dr. Paul Cox received his retirement award from Provost Heidi Anderson on May 3, 2017.

Dr. Paul Cox retired from teaching physics at TAMUK on September 2016 and was recognized for his 30 years of service to the University at the Thirty-Fourth Annual Continuous Years of Service Awards and Retirement Luncheon on May 3, 2017.

He joined our faculty in 1987 as an Associate Professor of Physics and taught graduate and undergraduate physics courses in the Department of Physics/Geosciences since that time. He was one of the pioneer instructors of our advanced physics courses and graduate physics courses in the Texas Electronic Coalition of Physics (TECP) during the early days of distance education using a hybrid TTVN/Internet combination that is still being used today in our current Texas Physics Consortium (TPC) which consists of the physics programs in eight different universities spread across the State of Texas.

Dr. Cox's primary area of research was theoretical physics in the fields of Super Symmetry and String Theory – fields on the very frontier of physics trying to explain why the fundamental properties of our universe happen to be what they are today. For most of his years here, he was the faculty sponsor of the Kingsville Section of the National Society of Physics Students (SPS) and the National Physics Honor Society Sigma Pi Sigma (SPS).

## Ms. Sylvia Gatewood Recognized For Service to the University



"Employee of the Year" Award.

Ms. Sylvia Gatewood, Administrative Associate for the department, received the "2017 Employee of the Year" award from the Staff Council of Texas A&M University-Kingsville. She was selected among other Administrative level candidates from all over the campus. Ms. Sylvia began working in the department on March 13, 2006 and since then has been helping

students and faculty with whatever needs they may have.



Award for Bringer of light at Ms. Sylvia's desk.

She was also recognized in 2014 by an anonymous collection of campus community members, known as the *Servants of Las Luminarias*. They select those they feel are "bringers of the light of the knowledge and goodness to the Texas A&M University-Kingsville campus community." Ms. Sylvia was awarded the "Bringer of the Light" award because of her helping nature and being a wonderful, kind hearted person.

The department of Physics and Geosciences is very proud of her. Every person who gets to know Ms. Sylvia will certainly keep an impression of her for a life time!