

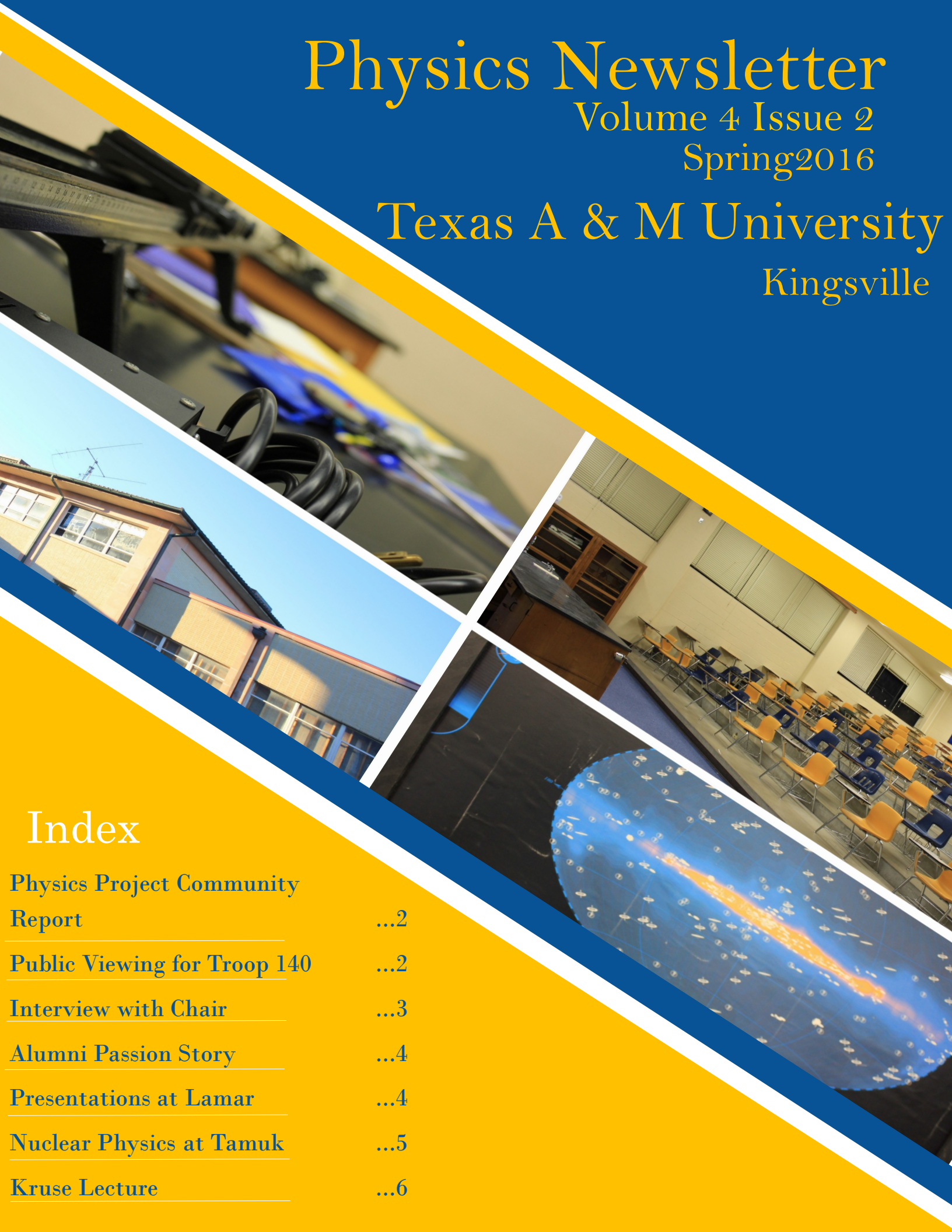
Physics Newsletter

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Texas A & M University

Kingsville



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PHYSICS COMMUNITY PROJECT REPORT



Last week of January was a busy week for Texas A&M University-Kingsville Physics department. It was the start of a new semester here and across the area for local schools. To get the excitement started, some schools put together parent's nights and open new clubs— one of which was Bay Side. On Thursday, January 21, students, parents, and staff from the area schools came out to view the stars, moon, and planets at a first time planned event to promote interest in astronomy. The physics department was there to lead the excitement.

On Friday January 22, 2016, the West Oso students took part in Science Night from 5 pm until 8 pm. The physics department provided a telescope to excite young minds and increase their curiosity of space and science. Families gathered around the telescopes and talked about the celestial bodies they had seen. Some topics discussed were why an object appears as it does and what are the meanings behind the rocks and debris.

So many questions were asked by both grade schoolers and adults increasing then interest in sciences. Mrs. Nelson and her staff clearly enjoyed answering everyone's questions. She also told the group about the transformative power of observation and encouraged students to expand their interest in science and astronomy. Students using the telescope were so excited to have seen stars they could not otherwise with only their eyes.

The event was a big success. Public viewing night is one of the more popular exhibitions presented by the physics department and takes place frequently throughout the year. Mrs. Nelson can be contacted for further information.

PUBLIC VIEWING FOR BSA TROOP 140-

On April 5, Charlie Cardenas, Cub Scout Master and City Engineer for Kingsville, invited Professor Nelson from Texas A&M University-Kingsville Physics Department, to come talk with his cub scouts and their families about the night skies. The department provided a portable telescope to show everyone the stars and planets.



The aim of this public viewing set up was to teach scouts about the universe and basics of how a scientist studies them. It was a fun evening filled with knowledge, after a short speech on the universe, every eye from child to parent was scouring the skies in search of the prize of finding a star or planet to view.



By 8 pm, the scouts had located their first star in the Canis Major Constellation and The Wezen Constellation. Everyone was excited at all they could see with the telescope's view finder and now were even able to identify some of what they had seen. With Mrs. Nelson's cheerful guidance, the children were very excited with their experience and had found a new interest to pursue.

INTERVIEW WITH THE CHAIR-



Dr. Stephen H. Tallant, President of Texas A&M University—Kingsville, Presenting 50th year service award to Dr. Lionel Hewett

On May 6, 2016, Dr. Lionel Hewett received an award for 50 years of service and contribution to the university. Fifty years is quite an achievement. We thank and congratulate him for his dedication.

Please highlight your work & services to the department for the past 50 years.

Actually, I have been working intermittently in the Physics Department for more than fifty years. I first came here as a freshman physics major in September 1956 and began teaching physics laboratories even before graduating in 1960. Then I left for graduate school in Rolla, Missouri for four years and returned to teach here as an Assistant Professor in 1964. The following summer, I received my Ph. D. degree in Engineering Physics from the University of Missouri at Rolla and have been teaching here ever since.

My passion has been to help students discover the marvelous foundation of the physical world in which they live. Whether these students were majoring

in the humanities, arts, sciences, engineering, agriculture, or education, I have tried to show them how the fascinating field of physics intersects with and impacts their lives.

My primary area of research has been in general relativity and cosmology. My doctoral dissertation was on a relativistic star, I am now working on a model of cosmology that goes all the way back to the beginning of time and explains the invisible dark energy causing the universe to accelerate its rate of expansion and the mysterious dark matter that caused the visible matter of which we are made to condense into galaxies and clusters. I have also done research on the Christmas Star, Solar Energy, Desiccant Air Conditioning, Wind Energy, the Physics of Towing Hang Gliders, and Innovative Techniques in Teaching Physics. I have produced more than 43 professional publications, made more than 50 professional presentations, and served as Chairman of the Physics Department from 1987 to 1998, Interim Chair of the Physics/Geosciences Department from 2007 to 2013, and Chairman of that department from 2013 to the present.

How do you feel about receiving the award.

I feel quite honored. When I was in graduate school, one of my fellow students, upon learning that I was planning to go back to Kingsville to teach, remarked, "Don't do that. If you do, you will never leave." It appears that he was right. As long as I continue to enjoy what I am doing, am able to enrich the lives of my students, can contribute to the success of the university, and have the health to continue, I see no reason to quit. Eventually of course, if I live long enough, I will retire. In anticipation of this, I have designed and am building an off-grid, zero energy, solar powered and heated retirement home in the mountains of Colorado.

Would you like to express your appreciation to those who have contributed to your receiving this award?

Yes, I would like to say that Dr. Olan E. Kruse was my teacher, my inspiration, my model, and my mentor during my formative years as a physics student and professor. Without his encouragement, assistance, and guidance I would not be where I am today. I also want to thank my wife, Helen, who has endured my peculiarities and lovingly supported my career throughout our 46 years of marriage.

WHAT IS YOUR PASSION?



Jesus M. Salas
Alumni Student

When I was 7 years old, I read a book about the solar system. I was astonished by what I learned, and my passion for science, especially astrophysics, started there. I grew up reading about stars, planets, galaxies, black holes, the birth and fate of the Universe. Also, when I was in High School, there was a documentary TV series called “The Universe” which featured interviews with experts in astrophysics. My favorite subject in the show was the supermassive black hole at the center of our galaxy, studied by Drs. Mark Morris and Andrea Ghez, professors at the University of California – Los Angeles (UCLA).

My desire of understanding how the Universe works led me to major in physics at TAMUK. Nevertheless, I knew that an undergraduate career was not enough; a graduate education was necessary for me to become a researcher in astrophysics. I was accepted to research internships at UCLA and the Massachusetts Institute of Technology (MIT) during my sophomore and junior years at TAMUK, respectively. I worked hard to polish my skills, so I could apply to graduate school.

Today, I am a PhD student at UCLA, Dr. Mark Morris is my advisor, and I am part of the Galactic Center Group at UCLA. I am able to sit down at the same table as Dr. Morris and Dr. Ghez, and work with the people who once inspired me to pursue my goals.

This may sound like a nice story, but I did not mention the many struggles and adversities I encountered over the years: language barriers, financial struggles, and not to mention that astrophysics is hardly an easy subject; there were times when I considered giving up. But my passion was so great that it kept me going through the hardest times. When I was young I had a dream... today I am living that dream. Following your dreams is not easy, but your passion will not only allow you to keep going during hard times, but also, if you dedicate your life to do what you love, you will never have to work a day in your life. So, I ask again: What is your passion?

PRESENTATIONS AT LAMAR UNIVERSITY



Dr. Quantum
A YouTube Video Character

“Is Information Gained, Conserved, or Lost in a Quantum Observation?” is the title of a paper presented by **Dr. Lionel D. Hewett**, Chair of the Physics/Geosciences Department, at the Spring 2015 Joint Meeting of the Texas Section of the American Physical Society, Texas Section of the American Association of Physics Teachers, and Zone 13 of the Society of Physics Students, held at Lamar University, Beaumont, TX, on March 2, 2016. In the presentation, Dr. Hewett discussed how certain information about the previous state of a quantum system is lost when it is observed, how other information is conserved, and how some new information is gained. Observation of the quantum world is truly a fascinating exercise. This is illustrated by the YouTube video [Dr Quantum- Double Slit Experiment](#) which shows how the information gained from experimental observations challenges our understanding of the quantum realm.

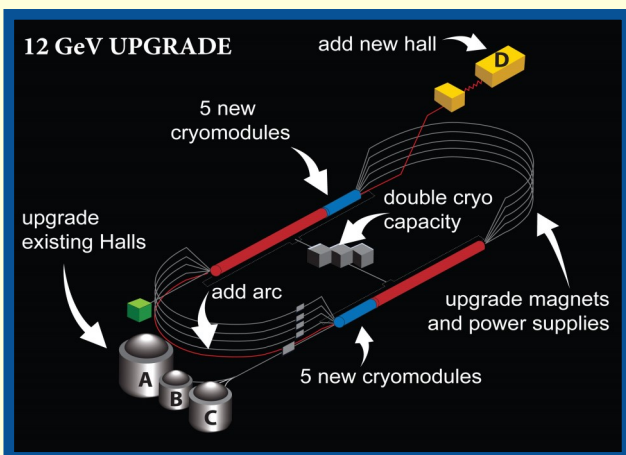


Rodolfo Gonzalez II
At Lamar University in Beaumont

Rodolfo Gonzalez II, a double major in mathematics and physics made an oral presentation summarizing his physics senior research report entitled, “Orders of Infinity.” His written report was too extensive to present in its entirety as it provided a rigorous mathematical framework for a new branch of mathematics that involves orders of infinity and their applications in mathematics and physics. This new branch of mathematics involves hyperreal numbers (real numbers, infinitesimal numbers, and infinite numbers defined as the reciprocals of infinitesimals) categorized as higher order infinities defined as reciprocals of higher order infinitesimals.

NUCLEAR PHYSICS AT TAMUK

Students interested in nuclear physics research will have the opportunity to carry their research at the Thomas Jefferson National Laboratory (JLab). **Dr. Hisham Albataineh** is working on the Deep Virtual Compton Scattering (DVCS) along with other collaborators (national and international). The objective of the DVCS experiment is the construction of a three-dimensional image of nucleon structure. The study of the inner structure depends on the extraction of Generalized Parton Distributions (GPDs) from beam and target spin asymmetry measurements, which will introduce constraints in current models of nucleon structure.



What makes Jefferson Lab Unique?

Using superconducting Radiofrequency (SRF) technology to accelerate its electron beam makes the laboratory unique. Researchers use Jefferson Lab's Continuous Electron Beam Accelerator Facility (CEBAF) – the first large scale application of SRF technology – to conduct experiments. The accelerator provides high-energy electron beams of up to 12 billion electron-volts (12 GeV) for probing the sub-nuclear realm, revealing how quarks make up protons, neutrons and the nucleus itself. Using the same superconducting electron-accelerating



technology, Jefferson Lab staffers designed and constructed an accelerator that also powers a laser of unprecedented versatility called a free-electron laser.

Accelerator Sciences and Technologies-

Graduate & Undergraduate Research Opportunities at Jefferson Lab

At Jefferson Lab—the Thomas Jefferson National Accelerator Facility in Newport News, Virginia—physicists and engineers are advancing the sciences and technologies of particle accelerators and light sources for use in basic science, applied science, and industry. In partnership with universities, JLab's Accelerator Division offers a spectrum of research opportunities for outstanding undergraduate and graduate students in accelerator-related physics or engineering curricula. Each student is guided by an advisor from the home institution and mentored by a JLab scientist or engineer, and produces a bachelor's or master's thesis or a doctoral dissertation based on original research conducted at Jefferson Lab.

Research fields include:

Superconducting radio-frequency (SRF) accelerating structures, materials for future superconducting cavities, RF controls for high-gradient, high- Q superconducting cavities, beam dynamics in electron-ion collisions, novel accelerator designs such as energy-recovery linacs (ERLs), high-current (hundreds of mA), high-polarization (>90%) electron guns, light sources, including free-electron lasers (FELs) and synchrotrons simulation and visualization tools for the design and operation of accelerators, diagnostic techniques for studying beam properties, industrial-scale, real-time systems for accelerator control, cryogenics, and accelerator-related mechanical and electrical engineering.

THE KRUSE LECTURE 2016 -

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

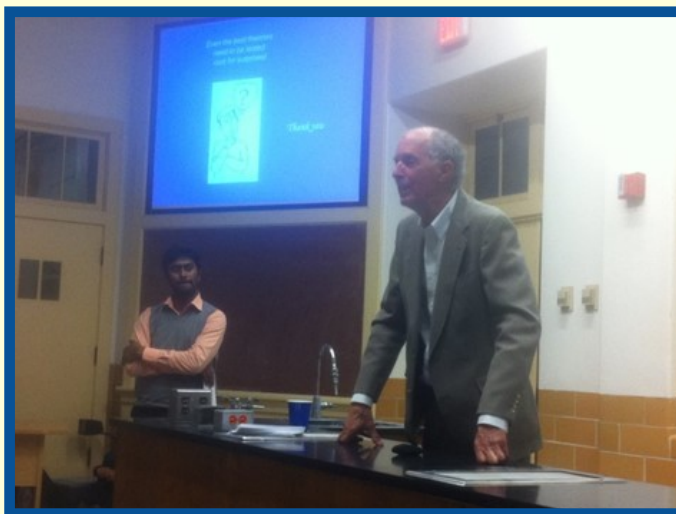
Olan Kruse was born in Coupland, Texas on September 6, 1921. He received his Bachelor of Science degree in Physics in 1942 from Texas A&I University. He served in the Navy during World War II, teaching sailors how to use the newly developed technology, radar. Dr. Kruse returned to South Texas after the war, teaching math while carrying out his graduate work in Physics at the University of Texas in Austin. He received his Ph.D. from UT in 1951. After a short stay at Stephen F. Austin University, he again returned to Texas A&I University; this time 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, where the department is still located. Under his leadership, the physics program offered both undergraduate and graduate degrees, hosted an annual Physics Exhibits display, and offered a series of Summer Physics Institutes.

Dr. Kruse helped shape the University that exists today as Texas A&M University-Kingsville. He chaired the committee that created the Faculty Senate, was its first president and served in that assembly for every term that he was eligible. He chaired the Physics Department until 1987, and continued to teach at the university until 2000. He was awarded Professor Emeritus rank in 1994. Along with his wife, Lucy, he established the Olan Kruse Science Faculty Award, which recognizes outstanding accomplishments in the sciences within the College of Arts and Sciences.



Dr. Roy Hyndman with the Olan Kruse Lecture plaque

Dr. Roy Hyndman presented the 12th Annual Olan Kruse Lecture on April 21, 2016. His topic was, "The Origin of the North American Cordillera and Other Mountain Belts." The current theory for the



Geophysicist Dr. Subbarao Yelisetti listens as Dr. Roy Hyndman finishes his prestigious lecture this year

formation of the mountains on our west coast is that the collision of the Pacific tectonic plate with the North American plate caused the earth's crust to pile upward and downward to float the mountains on top of the denser



Dr. Roy Hyndman talking to Lucy and John, the wife and son of Olan Kruse

mantle. Dr. Hyndman presented an alternative theory that would explain why the downward crust seems to be absent. This theory asserts that the upward crust is so hot that its density is light enough to float upward without needing as much downward crust. Attendance at the event was the largest recorded for a Kruse Lecture. It was held in Chemistry's largest lecture room, Nierman Hall Room 251, and was filled to capacity with more than 135 attendees.