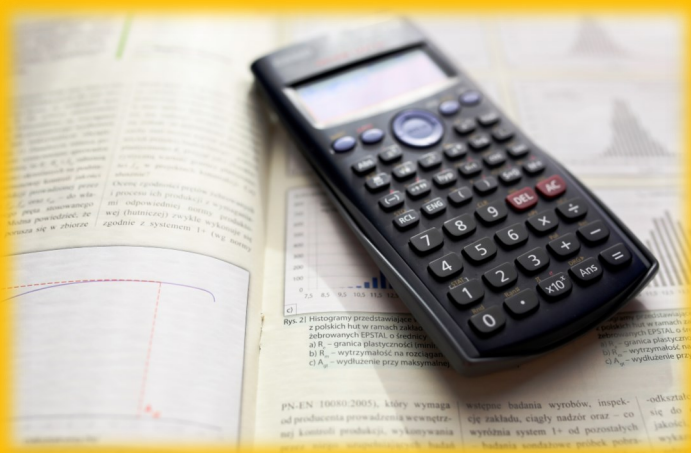




TEXAS A&M  
UNIVERSITY  
KINGSVILLE®



# Department of Physics and Geosciences

Spring 2018 Newsletter, Issue 6, Volume 2

## Contents:

- Astronomy Night

- Ted H. Foss Scholarship

- Tritium Experiments

- *New Petrophysics MS*

# New Master of Science in Petrophysics

The first such program in the nation, it addresses the rock formation and the fluids within those strata with particular application to the petroleum exploration and production industry.



## This program's coursework includes:

- Exploration Geophysics
- Seismology
- Borehole Geophysics
- Graduate Research Project
- Topic: Petroleum Geology
- Geochemistry
- Geology of Groundwater
- Special Topic: Advanced Petrophysics
- Petroleum Property Evaluation
- Pressure Transient Analysis
- Advanced Reservoir Engineering
- Quantitative Well Logging Analysis

The coursework for this multidisciplinary program involves courses in Physics, Geology, and Natural Gas Engineering.

## Contact Information

All interested candidates should contact *Dr. Subbarao Yelisetti*, the Graduate Coordinator for this program:

Voice: 361.593.4894

Fax: 361 593 2184

email: [subbarao.yelisetti@tamuk.edu](mailto:subbarao.yelisetti@tamuk.edu)

Personal Website: <http://www.web.uvic.ca/~subbarao/>

# Around our Department

## Recent Publications

- 2018 - **Subbarao Yeliseti** and Spence, G.D., 'Geophysical Journal International, major revision.', "Seismic velocity and attenuation structure beneath the Vancouver Island continental shelf using frequency domain viscoacoustic full waveform inversion of multichannel seismic data"
- 2018 - Smith, L.M., T.J. Cowles, R.D. Vaillancourt, and **S. Yeliseti**, 'Oceanography, 31(1), <https://doi.org/10.5670/oceanog.2018.104>.' "Introduction to the special issue on the Ocean Observatories Initiative"
- 2017 - M. Defurne, A. Martí Jiménez-Argüello, Z. Ahmed, **Hisham Albatineh** et al., 'Nature Communications', "A Glimpse of Gluons through Deeply Virtual Compton Scattering on the Proton"
- 2017 - A A. Adare, S. Afanasiev, C. Aidala, N.N. Ajitanand, Y. Akiba, **H. Al-Bataineh**, J. Alexander et al., 'Phys. Rev. C 96, 024907', "Measurements of  $e^+e^-$  pairs from open heavy flavor in p+p and d+A collisions at  $\sqrt{s_N} = 200$  GeV"
- 2017 - M. Mazouz, Z. Ahmed, **Hisham Albatineh**, K. Allada et al., 'Phys. Rev. Lett. 118, 222002', "Rosenbluth separation of the  $\pi^0$  Electroproduction Cross Section off the Neutron"
- 2017 - Yanchilina, A.G., **Yeliseti, S.**, Wolfson-Schwehr, M., Voss, N., Kelly, T. B., Brizzolara, J., Brown, K.L., Fung, M., Guerra, M., Zayac, J.M., Coakley, B., and R. Pockalny, 'Eos, 98, doi: 10.1029/2017EO087843.', "Exploring methane gas seepage in the California Borderlands"
- 2017 - **Subbarao Yeliseti**, Spence, G.D., Scherwath, M., Riedel, M., and Klaeschen, D., 'Tectonophysics, doi: 10.1016/j.tecto.2017.04.005.', "Dual-vergence structure from multiple migration of widely spaced OBSs from northern Cascadia margin"



# Around our Department



## Department News

**International Research:** Dr. Yelisetti participated in over half a million dollar NSF sponsored marine multichannel seismic acquisition cruise aboard *R/V Revelle* off Oregon, Sep-Oct, 2017.

**Research Award:** Dr. Yelisetti Won the College of Arts and Sciences Research Development Award

**International Conference Presentations:** Students Lenora Perkins and Felipe Alarcon-Canto presented research at international conferences.

- Subbarao Yelisetti, Dibakar Ghosal, George Spence, 2017, Shallow subsurface imaging of northern Cascadia margin using downward continued short-streamer data, Abstract NS33A-0055 presented at 2017 Fall Meeting, AGU, New Orleans, LA, 11-15 Dec.
- Songbo Long, Tao He, Kun Lan, George Spence and Subbarao Yelisetti, 2017, 3D Finite Element Modeling for Possible Creeping Behavior of Gas Hydrate-related Slipstream Submarine Slide, offshore Vancouver Island, Canada, Abstract OS51C-08 presented at 2017 Fall Meeting, AGU, New Orleans, LA, 11-15 Dec.
- Subbarao Yelisetti, Tao He and George Spence, 2017, Role of gas hydrates in slope failure of northern Cascadia margin, Abstract presented (*Invited* talk) at the 11th International Methane Hydrate Research and Development Workshop, Corpus Christi, TX, 5th-8th December.
- Lenora Perkins, Subbarao Yelisetti, Felipe Alarcon-Canto, and RR1718 Science Party, 2017, Distribution of hydrate BSRs and fluid flow off Oregon, Abstract presented at the 11th International Methane Hydrate Research and Development Workshop, Corpus Christi, TX, 5th-8th December.

**International Collaboration:** Collaboration with scientists from the Chinese Academy of Geosciences to work on Himalayan crustal structure and our department

**Scholarships:** Student Lenora Perkins offered Ted H. Foss scholarship from American Institute of Professional Geologists

# Nuclear Physics at Thomas Jefferson Lab

Dr. Hisham Albataineh traveled in January 2018 to the Thomas Jefferson Lab (JLab) to attend the Hall A and DVCS Collaboration meetings and to participate in the current Tritium experiments at the laboratory.



MeAsurement of the  $F_2^n/F_2^p$ ,  $d/u$  RATios and A=3 EMC Effect in Deep Inelastic Electron Scattering Off the Tritium and Helium MirrOr Nuclei (MARATHON)

This experiment use deep inelastic scattering off of the mirror nuclei  $^3\text{H}$  and  $^3\text{He}$  to measure the EMC effect for  $^3\text{H}$  and  $^3\text{He}$  and determine the ratio of the neutron to proton inelastic structure functions,  $F_2^n/F_2^p$ , and the ratio of the down to up quark distributions in the nucleon,  $d/u$ , at medium and large Bjorken  $x$ .

EMC effect: Measurements by the European Muon Collaboration (EMC) over a large- $x$  range at CERN observed a large  $x$  dependence for the ration of the iron  $F_2^{Fe}$  per nucleon over the deuteron  $F_2^d$ . This effect, the EMC effect, was confirmed in a subsequent analysis of old SLAC data, and an extensive study, using different nuclear targets, provided the exact  $x$  behavior of the effect versus the mass number  $A$  of nuclei.



# Nuclear Physics at Thomas Jefferson Lab, continued

## A precision test of the isospin dependence of two-nucleon short range correlations using mirror nuclei ${}^3\text{H}$ and ${}^3\text{He}$

Short-Range Correlations (SRCs) have been recognized as responsible for the high momentum tail of the nucleon momentum distribution in nuclei. In dense enclosure of nuclei, the attractive core produces overlaps between nucleon wavefunctions. The strong short-range repulsive core leads to hard interactions between nucleons that are close together, yielding nucleon pairs which have large relative momenta but a small total momentum, referred to as short-range correlations.



## ${}^3\text{H}$ - ${}^3\text{He}$ charge radius difference

This experiment proposes to measure the ratio of the electric form factors of  ${}^3\text{He}$  and  ${}^3\text{H}$  over a range of  $Q^2$  from 0.05 to 0.09  $\text{GeV}^2$ . From this measurement, the relative charge radii for the  $A=3$  nuclei can be determined. From this relationship, the experiment plans to extract the charge radius difference with an uncertainty of  $\sim 15\%$  – a significant reduction from the current 50% uncertainty.

# Astronomy Viewing Night



Announced for several weeks in the Astronomy and Physics classes, we offered a movie and then see this in the stars night. Students were offered extra credit for coming to view the movie and after the movie were rewarded to take a view of the skies at night.

The forecasts indicated that the cloud cover would be severe. By the start of the movie, at around 6:30, the skies were clear and everything indicated that the weathermen were wrong. Our viewing night was a go. We started the movie Contact, by explaining the important factors that set the back drop to the movie about space and time travel.

# Astronomy Viewing Night

Asking the students to take into account major key points to the movie, such as the real meaning behind the title of the movie “Contact”. Then the students were asked to explore the idea how to communicate with a civilization more advanced than their own. Thinking in terms of our society and then in terms of theirs.



At the end of the movie, to explain the significance of the 18 hours of blank tape that her cam-recorded had made. Even though this was the first time offering this kind of a night we had a small turn out of around 10 people, it was well worth it.

