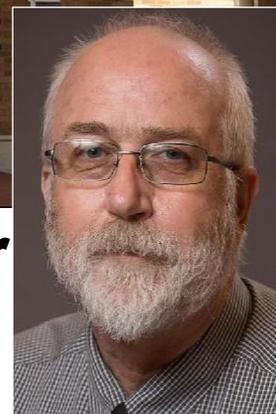
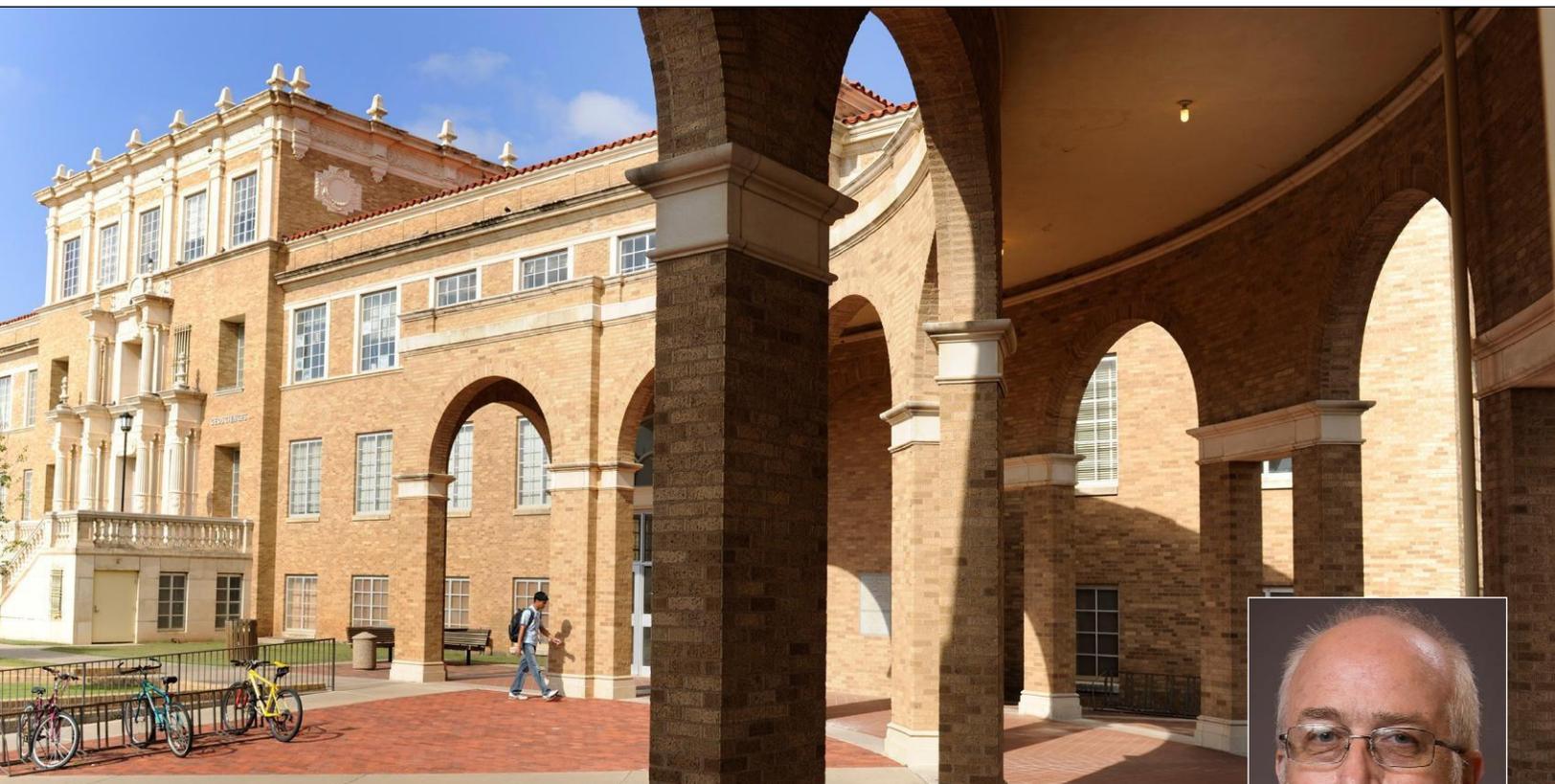




# Caprock Connections

Spring 2018



## From The Chair

**Jeff Lee**  
Professor & Department Chair

Hi Folks. This is my last Chair’s introduction to Caprock Connections. I’ve been Chair for five years now and my term is up in August. Dr. Kevin Mulligan will be our next chair. There are aspects of the Chair job that I won’t miss, mostly the bureaucratic ones, but I am immensely proud of the small role I have played in helping our faculty and students do wonderful things. We have hired outstanding new faculty members and our teaching and research programs remain strong. A few times each semester, I get together with other chairs in Arts and Sciences for pizza and beer. I come away from those rant sessions grateful for a faculty who get along, pitch in when needed, and find innovative ways to help the department in large and small ways.

It is with mixed emotions that I tell you that Dr. Jim Barrick is retiring and Dr. Patricia Solis is leaving us for Arizona State, which happens to be one of the best Geography departments in the country. I speak for the Department in thanking them for their many contributions to the Department of Geosciences and wish them all the best in their future endeavors.

One chair duty that I have enjoyed over the years is writing thank you letters to donors. We get checks for twenty dollars and checks for five thousand dollars and each one tells me that our alumni feel that they are invested in the educational mission of this department. I thank you again, Jeff Lee

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**WE BUILD  
INNOVATORS**

## SCAMS Student Chapter

by Cameron J. Nixon, SCAMS Chapter President

This Spring, the Student Chapter of the American Meteorological Society (SCAMS) at Texas Tech University had a blast hosting the 12th Annual Severe Weather Awareness Day (SWAD)! This is one of the events we take most pride in, held every mid-Spring at the Science Spectrum in Lubbock (see photos at right).

Here we partner with everyone from the local news station KCBD and the National Weather Service to the American Red Cross and several severe storms research groups, and attract over 1500 people with experiments, raffle prizes and information booths from local weather companies. This event aims to provide the public with the severe weather preparedness skills essential for bracing for the upcoming severe weather season.

In addition, we hosted Dr. Will Cantrell from Michigan Tech to be our visiting speaker! He gave an inspiring talk on the so-called "Pi Chamber" his group is developing to examine cloud particles and cloud growth; his excitement for what he does fits our mission perfectly, and we are looking forward to possibly working with him again in the future.

SCAMS is always looking for more members! Even if weather is just a hobby, the years of knowledge and experience brought about by our many members, speakers and networking opportunities is irreplaceable. We set out to ensure Lubbock is weather-aware, one step at a time.



## Geoscience Society (GSS)

by Rachel Owen, Geoscience Society President

This Spring semester was an exciting time for the Geoscience Society! As always, we began the semester by celebrating our school spirit by helping with baseball game clean up. This was a great way for geoscience graduates and undergraduates to root on the baseball team, as well as give back to our school by cleaning up the field afterwards.

In February, GSS members volunteered for a third year in a row at an event called Tech Savvy, held in the Science building. Young female students were able to learn about different fields of science while having fun too! The students were able to make their own fossils from plastic molds (shown above), learned about mineral identification, and fused glass discs to make their own customized jewelry.

In April, GSS came out with new T-shirts to encourage a sense of community within the organization. Additionally, the Society hosted a Spring picnic and park day in order to benefit graduate-undergraduate interaction and enjoy a fun day in the sun. GSS took part in two book sales at a local fundraising event called Friends of the Library. This event directly funds the public libraries around Lubbock.

GSS played large a role in assisting with funding for many academic events in the department. GSS helped organize and fund events such as Annual Student Research Day in the Geoscience Department (see page 9 of this issue) and the Graduate Lunch meet and greet. Additionally, we are proud to say that we have assisted in funding student research and brought in speakers from surrounding universities in order to make valuable connections as well as learn about new and upcoming geological research. We always keep our members updated on the semester events via email, flyers, and our [Facebook Group](#). Texas Tech Geoscience Students and Alumni are always welcome to participate in GSS activities!



We look forward to sharing another wonderful semester with you in the Fall!

# Science Report

by Seiichi Nagihara, Associate Professor (Geophysics)

## Looking back on the Apollo program and preparing for return to the Moon.

Next year marks the 50th anniversary of the first human landing on the Moon. Those of you who are as old as (or older than) I am probably remember the hot summer day in 1969, being fixated on the TV that broadcast Neil Armstrong taking the 'giant leap for mankind' on Apollo 11. December 1972 was the last time humans walked on the Moon (Apollo 17). Back then, nobody probably realized that there wasn't going to be another human mission to the Moon for such a very long time.

NASA went to the Moon mainly for political reasons. We had to get there before the Soviets did. But, the lasting legacy of the Apollo program is the rock samples and scientific data returned from the Moon. Starting from Apollo 12, the astronauts deployed an array of geophysical instruments that were collectively called the Apollo Lunar Surface Experiment Package (ALSEP) at each landing site (Fig. 1).



Photos by James B. Irwin

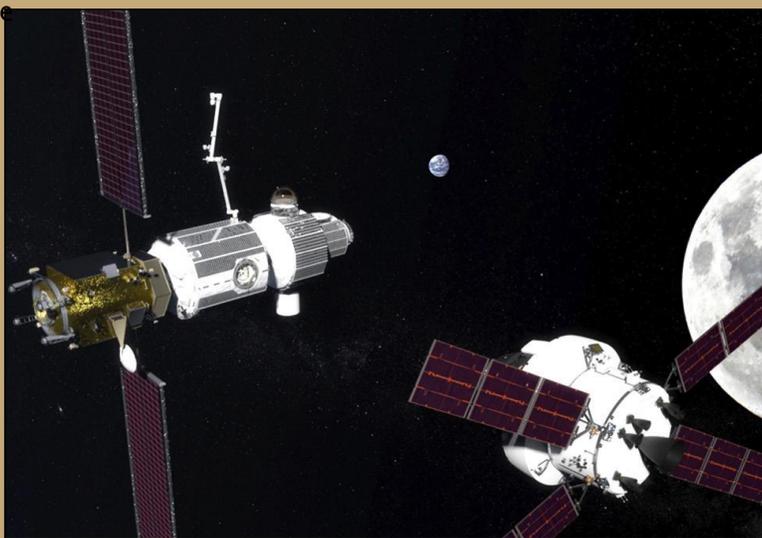
**Figure 1.** A panoramic view of the Apollo 15 ALSEP Station (Apollo Lunar Surface Journal, <https://www.hq.nasa.gov/alsj/main.html>).

When Apollo 17 ended, there were five ALSEP stations operating on the Moon, and all were sending data back to the Earth. These instruments included seismometers, heat flow probes, magnetometers, etc. Some of these instruments did not last very long, but others kept operating until September 1977, when NASA commanded off all the surviving instruments. To this day, ground-based observation at this scale, 20+ instruments, distributed over 5 locations on the Moon, simultaneously beaming data to the Earth for almost 5 years, has never been repeated on the Moon or any other extra-terrestrial body.

I am now wrapping up a 5-year-long, NASA-sponsored project that restores and analyzes some of the previously unarchived data from these ALSEP stations. Because the ALSEP experiments were unique, these data are still heavily used by contemporary researchers. The experience of the ALSEP experiments also teaches us many important lessons for future lunar-landing missions.

Yes, you may have heard that NASA is now planning to send robots and humans to land on the Moon again. The plan is still evolving, but the latest I've heard is that, in as early as 2021 or 2022, NASA may sponsor private companies to land small, unmanned spacecraft, which carry science payloads. That would be followed by construction of a human-crewed 'outpost' to orbit around the Moon (Fig. 2).

NASA is now coordinating scientific discussions on where to land and what kinds of experiments can be performed. I have already participated in two such workshops this year. It is an exciting time again to be doing lunar science! Stay tuned for future updates.



**Figure 2.** An artist's rendition of the DeepSpace Gateway concept currently pursued by NASA to set-up a human-crewed outpost to orbit around the Moon ([www.nasa.gov](http://www.nasa.gov)).

# Robert S. Nail, Ph.D.

## Career of a TTU Geoscience alumnus in the oil patch including the Permian Basin “Renaissance”

Dr. Nail earned his B.S. from Texas Tech in 1986. After earning his M.S. from the University of Texas at Arlington in 1991, he returned to Texas Tech to work with Dr. James Barrick. Robert focused his research on Pennsylvanian fusulinid biostratigraphy of the North American Midcontinent and the Paradox Basin, earning his Ph.D. in 1996. Knowing he wanted to work within the Oil and Gas Industry, Robert also focused on learning petrophysics from Dr. George Asquith.



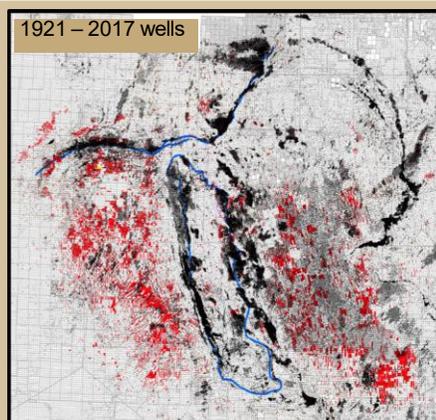
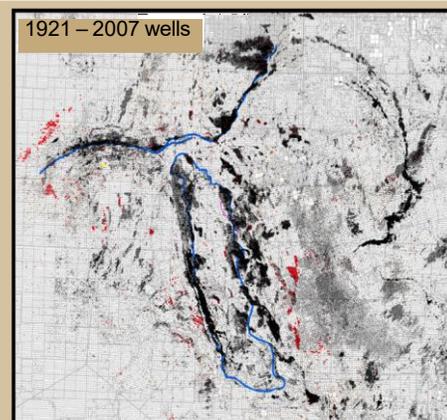
After graduation, Dr. Nail moved to Houston and worked as a petroleum geoscience consultant for ten years, specializing in Stratigraphy, Sedimentology, Petrophysics, and Science Instruction. Several clients, including Mobil, BP, ConocoPhillips, Unocal, ARCO, Petrobras, and many more, provided wonderful opportunities to work petroleum systems around the world. Having developed skills for both clastic and carbonate systems, he worked in many areas including the Gulf of Mexico (onshore and offshore), Permian Basin (USA), Campos and Potiguar Basins (Brazil), North Sea, Equatorial Guinea, Venezuela, Argentina, Israel, and Bohai Bay (China) to name a few.

In 1997, Robert met his wife Luisa and they married the next year. In 2001, they had their only son Sean. After Sean’s birth, Robert wanted to better understand child development and learning so he took several courses from Sam Houston State University, eventually earning his Texas State Board of Educator License in 2004.

In 2006, the family moved to Midland, TX after Robert joined Chevron’s Permian Asset Development Technical Team. Since then, he has worked with SM Energy, Whiting Petroleum, and is currently working with Apache Corporation. In his multiple roles as a lead geologist, prospect generator, team lead, assistant manager, and petrophysicist, Dr. Nail has been directly involved in asset sales of \$640+ million; reserve additions of 15+ million barrels of oil equivalent (mmboe); and capital preservation of more than \$3 million.

Since returning to west Texas, Dr. Nail’s career has mainly focused on Permian Basin exploration and development, in both conventional and unconventional plays. He considers himself very fortunate to have experienced and played a role in the Permian Basin “renaissance” (see graphics below) and considers the last few years to have been the most enjoyable of his career.

As a student at Texas Tech, Robert was the recipient of several monetary awards and grants from professional societies, state surveys, and even university departments. This experience instilled in him an understanding of how important these professional organizations are for the advancement of the science and the geology students who often depend on this financial and instructional aid. Throughout his career Robert has provided his support to local and national societies in multiple roles, from presenting at conferences to committee chair to executive board member. Recently, Dr. Nail accepted the opportunity to be an Adjunct Professor at The University of Texas of the Permian Basin, teaching and sharing his petroleum geology experience with students.



Increase in horizontal drilling in the Permian Basin since 2008. Black – vertical wells. Blue line – lower Leonardian margin. **(Far Left) 1921 – 2007 wells:** Red – directional / horizontal wells in Devonian Gas (compliments of renewed Austin Chalk activity, 1980’s) and shallow Conventional Guadalupian reservoirs; > 1,000,000 wells drilled. **(Immediate Left) 1921 – 2017 wells:** Red – directional / horizontal wells, started in 2008 with Avalon, Delaware Basin, NM and Wolfcamp, Midland Basin. Rapid horizontal development evolved in multiple formations from Atoka to Grayburg, with Wolfcamp “A” (lower Leonard) being most widespread economic horizon. 82,246+ wells completed since January 2008.

# Jim Barrick is retiring!!

by Cal Barnes, Professor

Jim Barrick joined the Department of Geosciences in 1980, after holding a visiting professor position at the University of Oklahoma and a National Science Foundation Postdoc in Marburg, Germany. Although an Ohio native with the BS degree from Ohio State, Jim's MS and Ph.D. were from that hotbed of paleontology, the University of Iowa. Jim advanced to Associate Professor in 1987 and to Full Professor in 1995. With his retirement in May 2018, Jim can count 38 very productive years in the Department.

Jim's research specialties encompass conodont biostratigraphy, micropaleontology, paleoecology, and carbonate sedimentology, and recently have included sedimentary geochemistry and chemostratigraphy. His research, along with students and colleagues, has resulted in more than 75 published papers and more than 70 abstracts. His expertise in Silurian-Carboniferous biostratigraphy is widely acknowledged, as indicated by regular consulting work with mining and hydrocarbon industries and global scientific collaborations, notably in Russia, China, Estonia, Spain, and Sweden. This expertise is also evident in his work in the IUGS-ICS Subcommittee on Carboniferous Stratigraphy.

Many of you will remember taking Paleontology and Historical Geology with Jim, but it is noteworthy that he has taught many other undergraduate classes and in addition directed field camp for four years. His interactions with students also involved long stints as both undergraduate and graduate advisor and sponsor of Sigma Gamma Epsilon. Of course Jim also actively supervised graduate students: a total of 27 MS students and 13 Ph.D. students. Many of the latter group found employment in higher education and it's safe to say that Jim placed more Ph.D. students in academic jobs than any other faculty member.

A complete listing of Jim's service to the profession and the university would take up more space than is available. It includes editorial and reviewing activity for journals and government agencies, membership on the South-Central GSA management board and technical chair of the 1999 South-Central meeting (in Lubbock), and numerous committees at TTU for the University, Graduate School, College, and, of course, Geosciences. He served as Department Chair from 2004-2007 during a time of rapid transition in the department and in the O&G industry.

One of the things you won't find in Jim's CV is the fact that throughout his time in Geosciences, he has been go-to person for information, encouragement, and sage advice—for students, staff, and faculty colleagues. Why? I think it's because he is a good listener, he is deeply interested in science, he likes to see people succeed, and—oh yes—he's pretty smart.

Luckily for us, Jim will keep a seat in Geosciences as an emeritus faculty member, at least for a while. So when he's in the office, we will keep going to the sage for advice.



**Jim Barrick  
Retirement  
Party  
May 12, 2018**



# Karst Waters Institute Honors TTU Geoscience Alumnus Dr. Victor J. Polyak

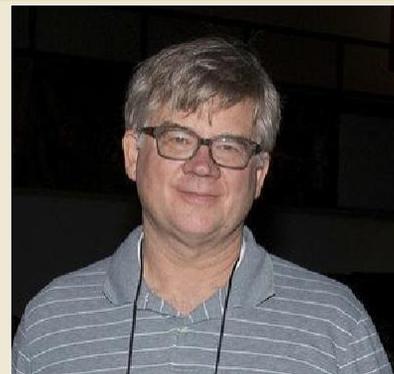
The Karst Waters Institute awarded its Karst Award for 2018 to Dr. Victor Polyak of the Department of Earth and Planetary Science at the University of New Mexico (UNM) in Albuquerque at a ceremony on March 3, 2018. Dr. Polyak received his Bachelor of Science degree from the New Mexico Institute of Mining and Technology and his Masters and Doctoral degrees from Texas Tech University.

In 1985, Victor and Noble Stidham founded the Lubbock Area Grotto of the National Speleological Society. While a graduate student at Texas Tech he was encouraged by Professor Alonzo Jacka to collect samples for study from Guadalupe Mountains caves. The work led to his Master's Thesis, entitled "The Mineralogy, Petrography, and Diagenesis of Carbonate Speleothems from Caves in the Guadalupe Mountains, New Mexico".

Necip Guven, professor and clay mineralogist at Texas Tech, encouraged Victor to continue his cave studies, focusing on clays in Carlsbad Caverns. Using material from his dissertation, Victor and associates published a landmark paper entitled Age and Origin of Carlsbad Cavern and related caves from  $40\text{Ar}/39\text{Ar}$  of alunite.

In 1998, Victor became manager of Yemane Asmerom's Radiogenic Isotope Laboratory at the University of New Mexico. Since then, Victor and Yemane, through multiple collaborations, have continued studies using caves. Victor has applied age-dating isotope geochemistry to the studies on diverse topics such as paleoclimate, landscape evolution, sea level change and archaeology. Victor is the author or co-author of more than 115 publications on speleology and radiogenic isotope geochemistry.

Through continuing research and the need for ever more accurate and precise paleoclimate data, Victor has developed new techniques for dating speleothems and increased the resolution of climate studies using speleothems by a factor of 100. This has allowed near annual resolution of climate data using speleothems from caves around the world providing researchers valuable insight into climate studies, climate variability and landscape evolution.



He and his wife, Paula Provencio, reside in Albuquerque, New Mexico.

## Stay Connected!

### We Want To Hear From You!



Geosciences Alumni, Keep Up Your Connections With Us! We would like to hear from you! If you would like us to include a profile of your career or some recent news in a future newsletter, or just update your contact information, please drop us an email or letter or visit the ['Texas Tech Geosciences Alumni'](#) page on Facebook.

Please consider making a charitable gift to the Department. Instructions to gift specific student activities are given [online](https://www.depts.ttu.edu/geosciences/giving/donating.php). (<https://www.depts.ttu.edu/geosciences/giving/donating.php>)

Editor, Caprock Connections

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Cressinda Hyatt (center), Executive Director, Pevehouse Family Foundation, and Memory Callison (left), Director, TTU Foundation Relations, visit with Prof. Sylvester in his laboratory in the Experimental Sciences Building in February 2018.

# Science Report

by Christopher Weiss, Professor (Atmospheric Science Group )

## Tornado genesis and structure.

As the spring months are upon us, most residents of the Plains turn a wary eye to the sky in anticipation of tornadoes. On average, about 1200 tornadoes are reported in the United States each year, the great majority in the regions of the central and southern Plains referred to as “tornado alley”. This portion of the world is virtually unrivaled (except, perhaps, by areas of eastern India and Bangladesh) in tornado frequency owing to a unique combination of terrain to the west and warm waters to the southeast.

The Atmospheric Science Group within the Department of Geosciences has been working for decades on gaining a better understanding of what causes tornadoes to occur, and how they can be better forecast. In projects funded by the National Science Foundation, the National Oceanic and Atmospheric Administration, and the Air Force Office of Scientific Research, Texas Tech faculty and graduate students have gone to the field to make critical observations of the atmospheric state near developing tornadoes.

There are two primary types of instruments used for this line of research, the “StickNet” an array of 48 instrumented tripods (Fig. 1) that are staked into the ground ahead of the target storm, and two mobile Doppler (“TTUKa”) radars (Fig. 2), which permit the interrogation of the low-level wind field near developing and mature tornadoes.

Specific attention has been paid lately to the role that sharp changes in air temperature have in the development of tornadoes within a specific type of thunderstorm referred to as a supercell. During the spring seasons of 2009 and 2010, Texas Tech collaborated with a number of other institutions and national laboratories for the Verification of the Origin of Rotation in Tornadoes Experiment (VORTEX2) to make measurements of how much thermodynamic heterogeneity existed in these storms.

More recently, in the late winter of 2016 and 2017, Texas Tech was involved in the VORTEX-Southeast project (see alumnus Erik Rasmussen’s profile on page 10), where similar research objectives were sought, specifically for tornadoes that occur in the Alabama and Tennessee regions. This spring, in collaboration with the University of Colorado and the University of Nebraska, we are bringing unmanned aircraft technology to the field to give a three-dimensional picture of how buoyancy evolves near these tornadoes.



**Figure 1.** (left) Prof. Chris Weiss and (right) Ph.D. Graduate Assistant Aaron Hill, deploying a StickNet probe in northern Alabama during the 2016 phase of the VORTEX-SE project.



**Figure 2.** A TTUKa mobile Doppler radar scanning a tornado in June 2017, near Cheyenne, Wyoming

### Otis W. Templer Jr. (1933 - 2018)

Prof. Otis Templer passed away on May 8, 2018. The Geography Program was founded within the Department of Geology in the late 1960’s with the hiring of Prof. Templer (1968), Prof. William Conroy (1969), Prof. Claude Davidson (1969) and, soon afterwards, Prof. Gary Elbow (1970). Otis taught at TTU from 1968 to 2016, and almost everyone with a degree in geography from Texas Tech during that time has had a class with him. He served as chairman of the Department of Geography for 15 years until 1994. The Otis & Josephine Templer Geography Scholarship, supports graduate and undergraduate students majoring in Geography in the Department.



(circa 2013)

Prof. Templer is well known for his research on Texas Water Law. As he once explained: *Scientists generally consider all water as merely passing through, but in different phases of, the endless hydrologic cycle. In contrast, the law divides water in the hydrologic cycle into several different classes based on real or supposed physical differences between the classes. Application of this legal system to hydrologic realities has, as one scholar aptly noted, resulted in ‘a lawyer’s paradise and logician’s nightmare.’* (Great Plains Research, February 1992)

# Symposium Report: Digital Technologies for a Better World

by Patricia Solis, Co-Director, Center for Geospatial Technology, Research Associate Professor of Geography

Digital technologies, including communications and geospatial technologies, are not only changing how we know the world, they are changing the world, as we know it. While some may lament that the digital revolution is corrupting society and institutions, there are many ways in which users are leveraging this power to make a better world. Deploying the digital revolution in places of the world suffering pressing needs offers an opportunity to achieve development goals with the participation of communities, to address issues in health, education, disaster prevention, energy, food security, peace and prosperity.

To consider these themes, Texas Tech University chapter of YouthMappers with the College of Arts and Sciences' Center for Geospatial Technologies sponsored by the Center for Global Communication held a free, public event entitled, Digital Technologies for a Better World on Wednesday, April 18, 2018 in the Student Union of Texas Tech. In this day-long symposium, we heard from cutting-edge change makers about how information technologies are shaping responses to the most pressing needs of humanity, by exploiting such innovations as the availability of ubiquitous satellite imagery, to social media platforms, to open big data, to crowdsourced mapping.

Speakers represented groups including:

- Facebook: Drishtie Patel, Program Manager;
- Microsoft: Jubal Harpster, Senior Program Manager;
- Environmental Systems Research Institute (Esri): Astrid Ng, Education Outreach Specialist, and John Gravois, Product Engineer;
- United States Agency for International Development (USAID): Chad Blevins, Director of Mapping for Resilience, and Carrie Stokes, GeoCenter Director;
- Clinton Foundation Health Access Initiative: Abigail Ward, Spatial Analyst;
- Digital Globe: Matt Hallas, Sales Engineer;
- Humanitarian OpenStreetMap Team: Tyler Radford, Executive Director.

The symposium featured the YouthMappers program, led by Geosciences research faculty Patricia Solís, and TTU students who founded the local chapter of this global network. YouthMappers has grown to more than 115 campuses in 36 countries. In addition, the entire group of guests sat on a noon panel to a large crowd of students to talk about jobs and careers in this field. Also mid-day, TTU faculty showcased their related work in a research exhibit that demonstrated 3-D printing for Habitat for Humanity designs, a “classroom in a box” for bringing digital education to places of the world without electricity or internet, virtual reality mapping experiments, and much more.

Eighteen students received travel awards for Story Maps they created on mapping for global good. Students and visitors participated in an evening mapathon to digitize features from satellite imagery in Peru to be used by the Volcano Disaster Assistance Program (VDAP) efforts in mapping of volcanic hazards and their potential impacts for Disaster Risk Reduction for the USAID and USGS. This activity was supported by a grant from the Texas Tech University’s Quality Enhancement Plan: Communicating in a Global Society, through the Center for Global Communication. To watch recordings of the video, thanks to Jason Cannon, TTU OVRP, see the YouTube links on [bit.ly/ttudigital](http://bit.ly/ttudigital).



# 12th Annual Department of Geosciences Research Day

by Branimir Segvic, Research Day Coordinator

The Geosciences Research Day is organized at the end of every Spring semester in the Department of Geosciences. This year, it was held on the 9th of May 2018. It attracted a total of 28 student presenters whose work covered a wide variety of study topics that highlighted ongoing research in the Department. This year's Research Day was the 12th consecutive annual event of its type, continuing the tradition of bringing together undergraduate and graduate students, their professors and guests.

At its core, the purpose of Research Day is to showcase current research activities in the Department and to provide a forum for the exchange of ideas by exposing students to the experience of presenting their research in a conference-like environment. The students share their knowledge and ingenuity through high-quality poster displays. A judging panel is responsible for selecting the best posters from the undergraduate students entries. Judging is based on poster quality and the oral presentation performances.



This year we had exactly 20 posters that were first authored by Geosciences undergraduates, whereas 8 posters were prepared by graduate students. The somewhat fewer undergraduate posters compared to previous years was understandable given that undergraduate research became an elective course starting this year. And yet, the quality and quantity of the work presented by our undergraduates clearly indicated their motivation and genuine interest in scientific research. Student presenters represented a broad range of geoscience disciplines, including hydrogeology, geophysics, sedimentology, atmospheric sciences, paleontology, mineralogy, petrology and low-temperature geochemistry. Most of the research had a focus set in the area of West Texas and neighboring New Mexico.

This year a team of four boys from the Southcrest Christian School in Lubbock joined our Research Day presenting their research alongside with our students. The participating team advanced to nationals in the STEM competition. We hope that participation in our Day helped them gather some valuable experience for their competitions to come.

And finally, the 2018 Research Day poster winners were: 1st place **Moustapha Diaby** (Clay Minerals as Quaternary Climate Change Indicators Southern High Plains, West Texas), 2nd place **Tania Babu** (Apatite Chemistry and its Relationship to Magma Composition in the Tuolumne Intrusive Complex), and 3rd place **Morten Kretschmer** (The Effect of Perturbation Pressure on Thunderstorms), an exchange student from Germany working with Dr. Johannes Dahl. Congratulations to the winners and thanks to all participants!

# Alumni Profiles



## Kyle Falk, M.S.

Kyle Falk, originally from the Chicago area, received a composite bachelor's degree in Geology and Chemistry from Hope College in Holland, Michigan, before moving to Lubbock in 2013. There he worked with Dr. Juske Horita studying Stable Isotope Geochemistry and its use in determining sources of natural gas compounds found in the aquifers of the Southern High Plains of West Texas. At Texas Tech, Kyle's courses focused on both Chemistry and Hydrology, which provided a strong background for work in the environmental field.

Shortly before graduating from Texas Tech with his M.S. in the Geosciences (2016), Kyle accepted a position as a Geologist at Langan Engineering and Environmental Services in Warrington, Pennsylvania, a suburb of Philadelphia. There, he completes a myriad of tasks both in the office and field. In the field, Kyle completes on site characterization through soil and groundwater sampling and logging, as well as air sampling to maintain worker safety in areas that may become contaminated. In the office, Kyle is tasked with designing and overseeing the construction of remedial systems for tackling various environmental concerns including light (LNAPL) and dense (DNAPL) non-aqueous phase liquid, groundwater contaminants, and soil impacts. As with all environmental work, one of the major requirements is the writing of reports to satisfy government agencies.

A majority of the sites Kyle is responsible for are located in scenic Northern and Southern New Jersey, and have variable industrial histories. Each site is a complex puzzle that requires individualized solutions, keeping his work fresh, challenging and enjoyable. Currently, Kyle is pursuing his professional geologist license in the state of Pennsylvania and is working on earning his requisite number of years of experience prior to examination.



## Erik Rasmussen, Ph.D.

Erik Rasmussen is a Kansas native who earned a BS in Meteorology at the University of Oklahoma in 1980. Being an avid storm chaser, he did photogrammetry on 16-mm movies of tornadoes for his MS thesis (1982) under the mentorship of Dr. Richard Peterson in the Texas Tech Atmospheric Science Group. He worked in the private sector creating meteorological software and doing forecasting, and then pursued his PhD (1992) at Colorado State University under Dr. Steven Rutledge. After graduating, Erik organized the Verification of the Origins of Rotation in Tornadoes EXperiment (VORTEX94-95), and was the Field Coordinator, organizing a group of about twelve mobile research teams and two aircraft to gather data on tornadic supercell storms in the Great Plains.

Erik presently is employed by the Cooperative Institute for Mesoscale Meteorological Studies at the University of Oklahoma and the National Severe Storms Laboratory. Much of his time is dedicated to being the Project Manager for VORTEX-Southeast. This project, managed through the National Severe Storms Laboratory, involves about 25 U.S. research universities and institutions, including Texas Tech. The project aims to improve forecasts and warnings of tornadoes in the Southeast U.S., where they are much less predictable than in the Great Plains. About half of the research emphasis in this program is in social and behavioral sciences, economics, and engineering, recognizing that the disproportionate threat posed by Southeast tornadoes has roots in societal and communication issues as well as meteorology.

When not managing this project, Erik engages in his primary research interests, focused mainly on understanding and forecasting tornado formation. His side interests include sustainability, human cognition and mindfulness, energy production, organic food growing, and camping and backpacking.