

# Marshall Geology Newsletter



## From the Chair



**Dr. Bill Niemann**  
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Greetings to alumni and to the many supporters of the Marshall Geology Department! Our program's focus continues to be on providing quality undergraduate education in geology, and by all indications we are doing just that. We continue to recruit, retain, and graduate a steady stream of students; at present we have 27 undergraduate majors and three graduate students. Our students benefit from ready access to our faculty, and we strive to provide them with challenging and relevant field, laboratory, and classroom experiences that prepare

them for the workplace and graduate school. Our most recent 5-year program review (2006-2011) showed that our students are in high demand: 97% of these graduates were either employed as geologists or were in graduate school! You can read some of their stories in this newsletter.

Probably our biggest recent news item is the hiring of **Dr. Mitchell Scharman**, a structural geologist, as our newest faculty member for 2013-2014. We ranked Mitch as the top candidate among all applicants, and we are delighted that he accepted the position here at Marshall. You can learn more about him by reading his column in this newsletter. Mitch's arrival also means that 2013-

2014 was our first year at full-strength (four tenure-track faculty) following **Dewey Sanderson's** retirement in 2011.

Many alumni will remember the field trips to **Big Bend National Park** in west Texas led by Dr. Sanderson. Along with five students, Dewey and I resumed the trip to Big Bend in 2011 after a 10-year hiatus, and I led the most recent trip in 2013 (12 students). On the 2011 and 2013 trips we were joined by **Dr. Robin O'Keefe**, a vertebrate paleontologist and dinosaur guy from Marshall's biology department who added much to the trip and brought along four of his graduate students in 2013.

Our students were active attendees and participants at several professional conferences over the last year: many attended an **Appalachian Geological Society meeting (AGS)** at Marshall in fall 2013; several students attended an **Association of Petroleum Geologists (AAPG)** workshop in Morgantown last fall; and nine students attended the southeastern section meeting of the **Geological Society of America (GSA)** in Blacksburg, Virginia, in April 2014. **Patrick Foster** also co-presented a poster with **Ron Martino at SE GSA**. We are indebted to our supporters, including **Robert Fox** and **National Resource Partners**, for helping to support student attendance at these meetings as well as provide for other student-driven departmental needs. (Continued on page 4)

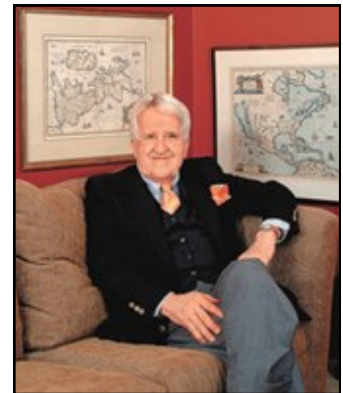
*"We find no vestige of a beginning, no prospect of an end"*

- James Hutton, 1788

## Acknowledging our Supporters

As many of our readers may be aware, budgets at Marshall are very tight these days, primarily due to significant cuts in state funding. Therefore, donations that our department receives from outside sources are more important than ever. In all cases money from these donations is used in ways that directly impact current students. We would like to specifically acknowledge a gift in the amount of \$52,000 from **Robert E. Fox** in 2013. Mr. Fox, a native of Wood County, West Virginia, earned his B.S. and M.S. in Geology from Marshall (1952) and the University of Illinois (1953). Mr. Fox, who resides in Lexington, Kentucky, has had a long and distinguished career as a petroleum

geologist. Portions of Mr. Fox's donation have been used to purchase two Meiji polarizing microscopes (\$9,360) and a Canon EOS DSLR camera (\$550) for our petrology classes. In addition, the Fox gift was used to support travel for nine students to attend the southeastern GSA meeting in April 2013 in Blacksburg, Virginia (\$6,000). We would also like to gratefully acknowledge gifts from **John Popp at Natural Resource Partners, Inc.**, and **Dewey Sanderson**. The above purchases and activities would simply not have been possible without the generosity of these individuals and organizations. If you or your company would like to contribute to the department, please contact us!

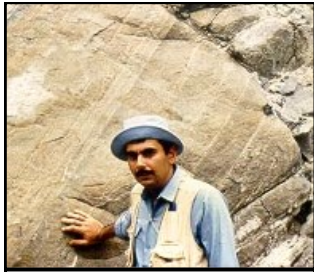


Robert E. Fox  
B.S. Geology, 1952



# Greetings from our Faculty

## Dr. Aley El-Shazly



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This is my 10<sup>th</sup> year at Marshall University .... hard to believe that 10 years have passed so quickly! For those of you who don't know me, I came to Marshall in 2004 as a replacement for **Protip Gosh**, who retired earlier that same year (2004). I am a metamorphic petrologist by training, but have taught an array of classes (including Historical Geology!) at several institutions both in the US and abroad. At Marshall, I teach Mineralogy, Petrology, Geochemistry, and Lab Techniques in Geology and Environmental Sciences. The latter is a relatively new class designed to familiarize sophomores and juniors with lab techniques and

instrumental analysis in our department/college, and prepare them for research-based senior capstone projects.

One of my main accomplishments at Marshall has been getting the **scanning electron microscope (SEM)** to function like an electron microprobe for quantitative analysis of minerals. **Anna Steele (BS Geology, 2009)** and I fine-tuned the technique and wrote detailed step by step instructions for its operation. Data collected using this technique has led to one MS thesis (**Breana Felix, 2012**), one senior capstone (Anna Steele, 2009), one independent study (**Nathan Rohrbaugh, 2012**), and three published research papers. With the help and guidance of Drs. Gosh and **Dr. Tom Wilson** in Physics, we were also able to get the **X-ray diffractometer (XRD)** to record the data digitally, and make the **inductively coupled plasma atomic emission (ICP-AES)** and **atomic absorption (ZGF-AAS) spectrometers** fully functional.

In general, my students and I have been involved in several projects that in-

clude: (i) the petrogenesis of metamorphic rocks and the origin of cross-cutting pegmatitic dikes from the Blue Ridge Province, southern Appalachians (done in part in collaboration with Virginia Tech scientists); (ii) petrogenesis of a granitic stock from Nevada (in collaboration with Dr. Sanderson and **Jeff Napier; BS Geology, 2007**); (iii) petrogenesis of Au - bearing veins from the Eastern Desert of Egypt; (iv) acid mine drainage and its effects on streams in WV and OH; and (v) origin of banded iron formations from the central Eastern Desert of Egypt (in collaboration with professors from Egypt). The latter project was funded by NSF, and has allowed me to travel to the field areas in 2012 and 2013.

I am very excited about the future of the department. I hope it continues to flourish, and that the program grows and develops. Our majors continue to inspire and motivate us to improve and support our program. However, we need the feedback from our alumni and friends to continue our mission. Please do not hesitate to contact us with your ideas.

*"The present is the key to the past."*

- Charles Lyell, circa 1830

## Dr. Ron Martino



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The past year has been a busy one in the areas of teaching, research, and service. Fossil Fuels, taught in spring 2012, had a good mix of undergraduate and graduate students. In addition to the Oil Game Project, another highlight was the field trip to an

underground coal mine in Wyoming County WV. The trip featured mining techniques and equipment, and the mine planning application of a roof rock depositional model for sulfur anomalies that I developed from a core study in 2012. I presented the results at the National **GSA** Meeting in Denver in October 2013 and submitted a paper for publication in the **International Journal of Coal Geology**. My Sedimentary Petrography course hosted a small group of undergrads and grad students in fall 2013. The grad students, **Justin Painter** and **Forrest Mattox**, did extensive projects on the Tuscarora and Berea Sandstones. I had three students take an independent study this spring on the use of **Petra** software for oil and gas exploration.

Each student used Petra to develop a structural and stratigraphic model for a prospect area. A 1-day short course on Petra by **Brandon Nuttall** of the **Kentucky Geologic Survey (KGS)** was extremely helpful and was recorded for future reference. One student from this course was hired full time in May by an exploration company working the Berea in Kentucky. The Geology Department hosted the September 2013 meeting of the **AGS** at which **David Harris** of the **KGS** gave an excellent presentation on horizontal drilling for oil in the Berea Sandstone of eastern Kentucky. The meeting was extremely well attended and AGS is interested in having another meeting at Marshall this year. The meeting provided exposure for

(Continued on next page)

# Greetings from our Faculty, continued

## Dr. Ron Martino, continued

our Geology program and afforded our students excellent networking opportunities with industry representatives.

In November of 2013, a group of our majors attended the **AAPG Mudrocks Symposium** in Morgantown. This was another great opportunity to hear papers presented on horizontal drilling in the Marcellus and Utica Shales and to network with industry professionals. A number of awards were presented at the luncheon. I was humbled to receive the **Gordon H. Wood, Jr. Memorial Award**, for "outstanding contributions to the geology of coal through your years of work on Pennsylvanian stratigraphy, sedimentology, and paleontology in the Appalachian Basin."

This Spring, I undertook another research project on the spectral analysis and origin of siltstone rhythmites in the roof of the Glenalum Tunnel Coal with professor emeritus **Dewey Sanderson** and undergraduate **Patrick Foster**. The results suggest a tidal-estuarine origin and were presented this spring by Patrick at the **SE GSA** meeting in Blacksburg, VA, and also at **Sigma Xi** where it received second place for best poster. Patrick also received an **MU-STEM** grant to support research this summer with me on a project involving the petrography and sequence stratigraphy of coastal carbonates in the Mid-Late Pennsylvanian Glenshaw Formation.

I serve as the Geology Department representative of the COS Research Committee which reviews application for grants to students and faculty. In Spring of 2013, I also served as the Chair of our search committee to recruit a tenure track faculty member in Structural Geology. We succeeded in hiring our top candidate, **Dr. Mitchell Scharman**, for this position last spring and are very pleased to have him as part of our team.

Finally, I was in northern California and Oregon in May and got to see up close and personal mélange, Mt. Shasta, Mt.

*"In geology the effects to be explained have almost all occurred already, whereas in these other sciences effects actually taking place have to be explained."*

— James Croll, 1875

## Dr. Mitchell Scharman



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This is the end of my first year in the Geology Department at Marshall University. I was hired as a replacement for **Professor Sanderson**, who retired in 2011. I am a structural geologist, with a larger interest in tectonic processes. I most recently moved to West Virginia after a year teaching in Maine, but completed my B.S. at the University of Idaho in 2004, and M.S. and Ph.D. in 2006 and 2011 at the **University of Texas at El Paso**. So far at Marshall, I have taught the courses General Geology, Earth Materials Lab, Geological Field Mapping, and a seminar in Geophysics. In the 2014-2015 academic year, I am preparing to teach Structural Geol-

ogy and Computer Methods. I will also be teaching a section of First Year Seminar in the Spring 2015 semester, with a theme centered around Earth Hazards and Mountain Building, especially focusing on human interactions with these systems.

My research interests are focused on understanding the crustal structure of strike-slip systems - particularly in regions that experienced oblique convergence, and resulted in transpressional deformation. I am also interested in structural development of extensional settings, especially low-angle normal faults. In pursuit of these interests, I have conducted research field research in the Chugach metamorphic complex in Southern Alaska, as well as in the Rio Grande rift of

New Mexico and west Texas. Currently, **Kelli Gagnon** (M.S. student) is working with me to add to the finite strain data and define microstructures in rocks from the Chugach metamorphic complex.

I look forward to extending my research to the tectonic development of the Appalachian Mountains and adjacent regions, and hope to work with students in the coming years on my research in Alaska, the Rio Grande rift, and in the Appalachians. I am also excited to help lead the next field excursion to Big Bend National Park in Spring 2015, and to get back to some of the world class geology of the southwest. Here's to another great year of geology at Marshall University.





# Greetings from our Faculty, continued

## Dr. Dewey Sanderson, Professor Emeritus



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Since retiring, I have been busy and wonder how I ever had time to teach. I have been to Florida four times (Sanibel Island and Panama City Beach). I have given thought to buying a condo down there. Much of my time now is spent playing my hammer dulcimer. I am still in the **Appalachian Celtic Consort**, in a culdimer club in Raceland, Kentucky, and have met a number of new musical friends. I have a composing program on my computer that I used to transcribe and arrange tunes for a keyboard. I use the keyboard as my backup band when I play at retirement and nursing homes.

On Labor Day 2012 my home in rural Milton caught fire and was totally destroyed. Fortunately I was home at the time

and was able to save my Yorkie buddy, **Rowdy**. Besides losing the home, one of my cars and Harley went up in smoke too. Only a week before the fire I had purchased two miniature donkeys, Smart and Dumb. (By the way, those were their first names only!). I am now living with Rowdy in a South Point, Ohio, condominium overlooking the Ohio River.

I am still collecting sand for the collection I left behind. With **Patrick Foster's** help I want to photograph the sand and put the collection online. The collection stands at 500 now. I also worked with Patrick and **Dr. Martino** on a tidalite project. I now have an old XP based computer that I want to use to get my Fourier and shape programs up and running while I learn Visual in Excel.

I try to keep in shape with lots of walking with my dog, Rowdy. I don't have the legs to climb as in the past.

Some thoughts on my career at Marshall: I came to Marshall the year after the football team plane crash in 1970. I arrived at the same time **Dr. Alan Bailey** came to the department, who had been a fellow

student of mine at **Michigan State**. I feel like a survivor for Dr. Bailey: he and the two other geology members at that time have passed on. For over 20 years we did not have any change in the departmental faculty. **Dr. Protip Ghosh**, who retired about five years ago, lives in the area and we see each other on a regular basis.

Perhaps the course I liked best at Marshall was the introduction of **Big Bend Field Excursion**. I first visited Big Bend National Park in 1966 as a graduate student. I knew that I wanted to go back there someday, so I offered it as a special topics course at Marshall in 1981, then upgraded it to a full-fledged course. It was offered nine times from 1981-99. We generally had 22-25 participants each time it was offered. A number of students went more than once and I have had some of the former participants say they would like to go back someday. In 2011 **Dr. Niemann** and I guided five students to Big Bend. We flew to El Paso and drove from there to the park, thus eliminating the grueling 36 hour drive we did in the past. (A couple of my black/white photos of Big Bend are framed and hung in the department).

## From the Chair, continued

On a personal note, I have just completed my 10<sup>th</sup> year at Marshall and fourth year as chair of the department. My education is in both geology and engineering, and my specialties are hydrogeology and engineering geology. At Marshall I teach classes in hydrogeology, geomorphology, engineering geology and environmental geology. Prior to Marshall I worked in the Chicago area as an environmental consulting geologist. I enjoy the fact that geology at Marshall is a small department within a mid-sized university, which seems the best of both worlds. This fall, 2014, will be an exciting time for me. Along with the changes that come from stepping down as chair, I will be

going on sabbatical for the fall term, my first sabbatical in 15 years of teaching. In addition to some personal travel, I have arranged to do two job-shadowing experiences, one with an environmental consulting firm in

West Virginia, and a second with a geotechnical consultant in California. The primary objective is to be able to bring experiences and observations back to the classroom to benefit Marshall geology students .



# Field Trip Photo Gallery



Students, including Laura Mitchell from Marshall Geology (far right), excavate a trench at the Gray Fossil Site in northeast Tennessee.



Dr. Martino discusses sedimentary formations with his stratigraphy and sedimentation class along Interstate-64 in western Kentucky/



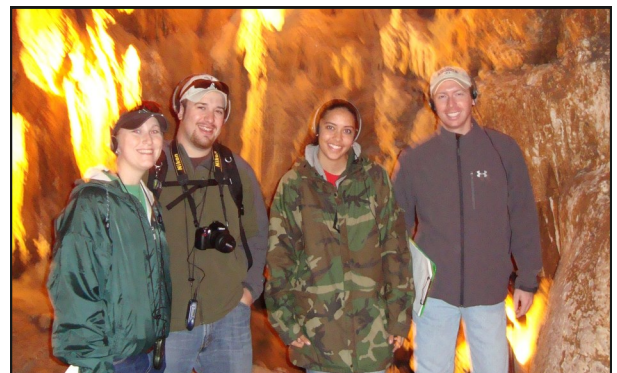
Tapir fossil recovered from the Gray Fossil Site. The Miocene age of the site's fauna suggests an early age for karstification in the Valley & Ridge.



Historical Geology Students



Students enjoy a stop to view rocks of the Blue Ridge Province in Shenandoah National Park on the Geomorphology field trip.



Students view Luray Caverns, spectacular evidence of karst features in the Valley & Ridge Province, on the Geomorphology field trip.

# Honors and Awards



Clayton Gue is recognized as the 2013 **Fox Field Camp** Scholarship recipient at the Honors Convocation.



Patrick Foster, accompanied by his grandmother and father, proudly displays his award as 2013-2014 Geology Undergraduate of the Year



Michael Pickens, accompanied by his parents, displays his award as co-recipient of the 2014 Fox Field Camp Scholarship following the Honors Convocation.

## 2013-2014 Geology Department Awards

2013	2014
<b>FOX FIELD CAMP SCHOLARSHIP</b>	
Clayton Gue	Victor (Cody) Adams & Michael Pickens
<b>GEOLOGY ENDOWED SCHOLARSHIP</b>	
Patrick Foster	Jamie Turley & Patrick Foster
<b>TUITION WAIVER</b>	
Bill Sevy	Dana Williams
<b>OUTSTANDING UNDERGRADUATE</b>	
Patrick Foster	Patrick Foster
<b>OUTSTANDING SENIOR</b>	
Ethan Backus	Matthew Kestner

Geology Employment Trends (US Dept. of Labor, 2014)  
Median salary: \$90,890  
Job Outlook: +16% for 2012-22 (compared to +11% average for all occupations)  
Dominant sectors: 26% of geologists are involved in oil and gas extraction, 16% in engineering services.



## Invited Speakers in Recent Years

<i><b>SPEAKER</b></i>	<i><b>TOPIC</b></i>
Dr. Antonios Marsellos, University of Florida	"Revealing multi-stage extension using shear sense kinematic indicators and thermochronology in zircons"
Dr. William Andrews, Jr. Kentucky Geological Survey	"Fifty years of geologic mapping at the Kentucky Geological Survey"
Dr. Woldai Ghebreab Marshall University	"Has Pan-African tectonic grain influenced Red Sea extension in Eritrea?"
Dr. William F. Kane KANE GeoTech, Inc., Stockton, CA & Honolulu, Hawai'i	"You <u>can</u> 't stop rock 'n roll"
Kirk Beach Geology Program Supervisor, Ohio Department of Transportation	"Abandoned Mines and Highway Construction"
Dr. Edmond Mathez Curator for the Earth and Planetary Sciences, American Museum of Natural History	"Origin of stratiform chromitites in the Bushveld and other layered intrusions"
Dr. Alycia Stigall Ohio University Department of Geological Science	"Brachiopod Invasion! Unraveling biogeographic patterns in Ordovician and Devonian seas by combining GIS and evolutionary analysis"
Jeff Napier Geologist, Cardno Marshall Miller & Associates	"Coal and Mineral Exploration"
Ed Rothman & Adam Sholes Mountaineer Gas Services, LLC	"Marcellus Shale-How technology has changed hydrocarbon exploration in the Appalachian Basin"

## News from the Geology Club

*The following was prepared by Matt Kestner (2014), Club President for 2013-2014.*

### Marshall University Geology Club 2013/2014 Yearly Review

#### Fundraising

Designed and sold over \$1,500 worth of t-shirts, hats, bags, koozies.

**(These items available for purchase. Please contact Teresa Holschuh at 304-696-6720 or holschuh@marshall.edu)**

Bake Sale each semester.

Jurassic Park Movie Night for Intro classes.

#### General Info

Help supply pizza and pop for guest lectures.

Help send students to professional meetings.

About 10 of us took a trip up to Snowshoe this past winter for the weekend to hangout and ski.

Host Back-To-School Parties.

#### What we could use.

New office chairs for the Grad Office.

Contributions to Geology Club Account ( make checks payable to Teresa Holschuh).



Matt Kestner, 2014 Geology Club President

## Some Recent Graduates Now in Grad School

**Who:** Chloe Wonnell, B.S. Geology, Marshall, 2011.

**Hometown:** Mount Carmel, Illinois.

**Now:** M.S. candidate, West Virginia University.

**Research Topic:** Evaluation of Gradational Sequences in the Marcellus Formation using Core Analysis and Petrophysics.

**Career Goal:** Research for the government or work in a research and development department in an industry setting.

**Fun Stuff:** I enjoy whitewater kayaking, gardening, and yoga.

**Memories of Marshall Geology:** "There were many good times shared. The most fun I had was on field trips, specifically the geology clubs field trip to the Blue Ridge Mountains. Visiting a garnet and mica mine, camping, and the camaraderie shared with my classmates and the faculty is something I'll never forget. I also have fond memories of doing homework, finishing labs, and cramming for tests in the undergraduate office with classmates. Usually, we had many laughs as well as shared ideas and advice that undoubtedly helped us all get through our undergraduate careers."



**Who:** Peter Starnes, B.S. Geology, Marshall, 2013.

**Hometown:** Celina, Ohio.

**Now:** M.S. candidate, Auburn University.

**Research Topic:** Remediation of naturally dissolved arsenic in shallow Holocene alluvial aquifers.

**Career Goal:** Use my skills as a geologist to serve others. Currently, this desire seems to be prodding me into the field of hydrogeology.

**Fun Stuff:** Fishing when I have the time, beach bumming.

**Memories of Marshall Geology:** "I am rather fond of the time Ethan Backus and I were chased down hill by a large dog, but fended it off with our rock hammers and Jacob's staff while working on our outcrop project for strat/sed."



**Who:** Ethan Backus, B.S. Geology, Marshall, 2013.

**Hometown:** Frametown, West Virginia.

**Now:** M.S. candidate, Texas Tech University.

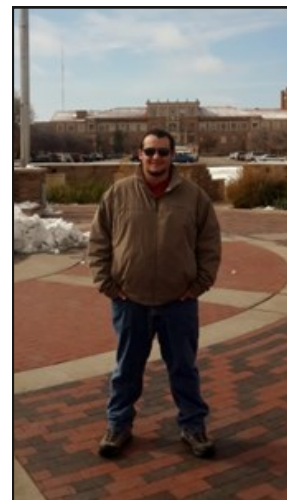
**Research Topic:** "Integrating Bulk Rock Compositions with Monazite and Zircon Geochronology to Resolve the Pressure-Temperature History of Magmatism in Lamoille Canyon, Ruby Mountains, NV"

**Career Goal:** Economic geology.

**Fun Stuff:** Reading, especially dystopian novels.

**Memories of Marshall Geology:** "The field trips are my best memories.

They provided me an opportunity to see what I had been learning in the classroom and also get to know the other students in the program."





# Alumni Profile: Jo Tippett

**Who:** Joanna Tippett, B.S. Geology, Marshall, 2010

**Hometown:** Damascus, MD

**Now:** Viera, FL

**Employer:** URS Corporation



**Description of what you are doing:** I am an Environmental Scientist for a large engineering and environmental consulting firm. I currently work on the Sustainable Environmental Management Group on the Environmental Compliance & Management Systems team. My project experience includes Environmental Compliance Auditing for clients Environmental Health and Safety (EHS) programs, Phase 1 Environmental Site Assessments (ESA), site resource evaluations, Hazardous and Non-Hazardous Waste Transportation and Disposal Services (TSDF) audits, compliance for the National Environmental Policy Act (NEPA) and includes Environmental Assessment (EA), Environmental Impact Statement (EIS) preparation due diligence research and evaluations, U.S. Army Environmental Performance Assessment System collaboration, risk analysis, and environmental liability evaluation.

**Name(s) of spouse, significant others, children:** Ryan Kiel, fiancé, Marshall University graduate. Ryan graduated with a Political Science degree and was a baseball pitcher for the Herd. He is now an Assistant Athletic Director at Eastern Florida State College.

**Interesting hobbies:** I spent 3 years as a Baltimore Ravens Cheerleader receiving numerous awards including Rookie of Year, Cheerleader of the Game(s) and Unsung Hero. I was a member of the Marshall University Dance Team during my time at Marshall. My science and cheerleading worlds combine as I am also a member of the Science Cheerleaders. A large group of current former NFL and NBA Cheerleaders who are pursuing Science, Technology, Engineering, and Math (STEM) degrees and careers.

**Advice to current students:** Take advantage of Job Fairs, internships, and advice from professors and other professionals. There are so many different fields and companies a geologist can pursue, so be sure to exhaust all of your options.

**Anything else interesting you wouldn't mind sharing:** I got engaged at the Marshall vs. University of Maryland Military Bowl game in December 2013 at the Naval Academy in Annapolis, MD.

*"From the late 1980's to the early 00's, the percentage of Bachelor's degrees earned by women in the geosciences has increased dramatically, though it has not yet reached 50% overall."*

– Science Education Center at Carleton College (SERC), 2014

# Big Bend Photo Gallery



Sunset, looking west from The Basin Resort towards The Window



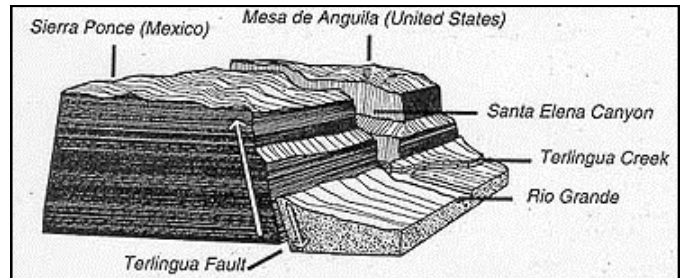
Group picture, 2011



Group picture, 2013



Dr. Sanderson discusses a Tertiary-age volcanic breccia with Nate Rohrbaugh at Tuff Canyon



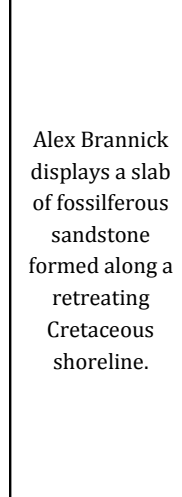
Persimmon Gap, looking North



# Big Bend Photo Gallery (continued)



Dr. O'Keefe and Mike Pickens examine dinosaur bone fragments.



Alex Brannick displays a slab of fossiliferous sandstone formed along a retreating Cretaceous shoreline.



Fossil turtle shell in the Aguja Formation (Cretaceous), 2013.



Dr. Niemann discusses a volcanic flow in Tuff Canyon, 2013.



At Big Bend students were able to see evidence for structural features reflective of dramatically different tectonic stresses through time. Shown here are recumbent folds in the Buda Limestone (Cretaceous) formed during the Laramide orogeny.



Josh Shepard does his best James Dean impression at Santa Elena Canyon.