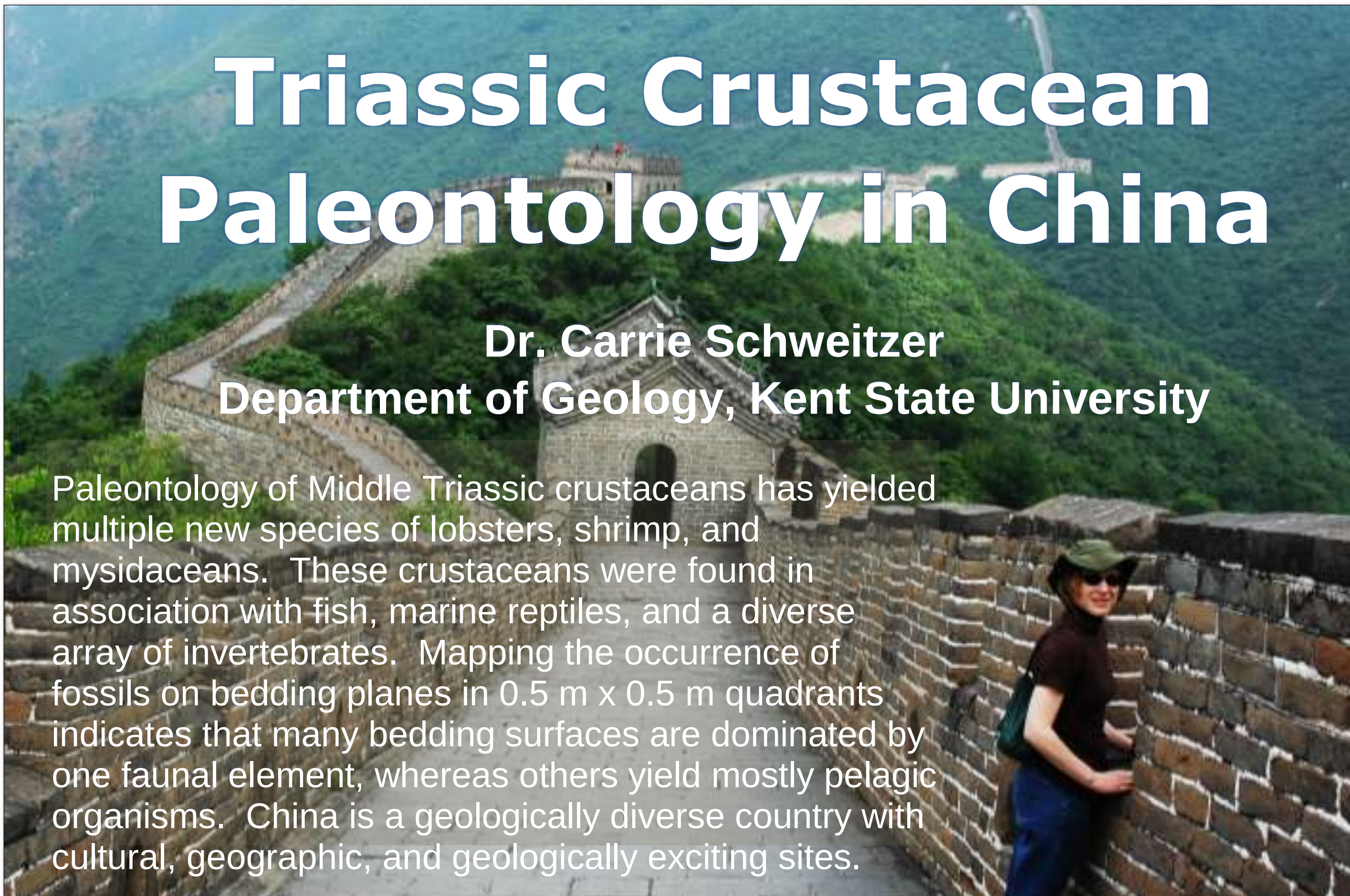
PGS Newsletter

http://www.pittsburghgeologicalsociety.org/

Vol. LXVIII, No. 9 | Karen Rose Cercone, Editor | May 2016

Wednesday, May 18, 2016

The Pittsburgh Geological Society presents



Triassic Crustacean Paleontology in China

Dr. Carrie Schweitzer
Department of Geology, Kent State University

Paleontology of Middle Triassic crustaceans has yielded multiple new species of lobsters, shrimp, and mysidaceans. These crustaceans were found in association with fish, marine reptiles, and a diverse array of invertebrates. Mapping the occurrence of fossils on bedding planes in 0.5 m x 0.5 m quadrants indicates that many bedding surfaces are dominated by one faunal element, whereas others yield mostly pelagic organisms. China is a geologically diverse country with cultural, geographic, and geologically exciting sites.

Social hour - 6:00 p.m. **Dinner - 7:00 p.m.** **Program - 8:00 p.m.**

Dinner costs $30.00/person, students $10.00; checks preferred. For reservations, please email pgsreservations@gmail.com with your name and number of attendees in your party. You can also reserve and pay for dinners via PayPal on our website http://pittsburghgeologicalsociety.org. Please include your name and number of attendees in your party. Deadline for reservations is noon Monday, May 16.

Meeting will be held at Foster's Restaurant, Foster Plaza Building 10, Green Tree.

SPEAKER BIOGRAPHY

Dr. Carrie Schweitzer carries out research at Kent State University's main campus in Kent and teaches introductory geology courses at the Kent State University Campus at Stark, in North Canton, Ohio.
Dr. Schweitzer's research focuses on the taxonomy, systematics, and evolution of fossil decapod crustaceans - the shrimp, lobsters, and crabs. While her work concentrates on Jurassic, Cretaceous, and Eocene groups, it has spanned the full range of the decapod Crustacea and also includes the paleobiogeography and paleoecology of these animals. Dr. Schweitzer has worked on decapod faunas both in the field and from museums across North America, the Caribbean, Argentina, Chile, New Zealand, and eastern Europe as well as China.

PRESIDENT'S STATEMENT

As the 2015-2016 Society year comes to a close with the May meeting I would like to thank my fellow officers and Board members for their dedicated service to the Society. It has been another rewarding year in which our membership numbers have remained steady in the professional category and slightly decreased in the student and corporate categories. These are common fluctuations and have had little impact on our meeting attendance which has averaged 70 attendees per meeting with a professional/student average of 42 /28, a great mix! I hope to see us strengthen these numbers in the future.

May, of course, is Society election month as we look to fill future officer and Board positions. I would like to thank all of our professional members who chose to be nominees. I encourage all of our professional members to VOTE via internet, U. S. Mail, or at the May meeting. (the ballot accompanies the newsletter sent to professional members. Student members are not eligible to vote.) Please feel free to use the write-in slot if you feel there is a good candidate that is not represented on the ballot. I would like to send out a big thank you to outgoing Board member Erica Love who has been an active Board member for 13 consecutive years in which she has spent time serving as Chair of the Communications Committee as well as Secretary for a period of time. I would also like to acknowledge all of our new and returning corporate sponsors whose monetary contributions to the Society make all the difference. Lastly, it has been an honor to again serve as president of the PGS the last two years. Our Society is a strong as ever in our 71 year history and that is a credit to our membership, officers and board members.

Please join us at our May meeting. Our speaker this month is Carrie Schweitzer, Professor of Geology at Kent State University. Carrie has performed considerable global field research in the areas of the taxonomy, systematics, and evolution of the fossil decapod crustaceans, the shrimp, lobsters, and crabs. She will present "Triassic Crustacean Paleontology in China". Hope to see you there.

Please remember to VOTE.

Ray Follador

CALENDAR OF EVENTS

GEOPHYSICAL SOCIETY OF PITTSBURGH

May 3, 2016
John Castagna, University of Houston – A New Three-Dimensional Look at Faulting on Seismic Data
Cefalo's Restaurant, Carnegie PA

HARRISBURG GEOLOGICAL SOCIETY

May 12, 2016
Ted Daeschler, Academy of Natural Sciences and Drexel University – New Discoveries from the Age of Fishes in PA and Beyond
GTS Technologies, Harrisburg, PA

OHIO GEOLOGICAL SOCIETY

May 13, 2016
Erica Howat; Battelle Memorial Institute – Lessons Learned from Wireline Logs and Core Analysis of an Appalachian Basin Cambrian-Ordovician Core: Exploration for Vugular Carbonate
Ohio Geological Survey, Collins Core and Sample Repository, Delaware, OH

PTTC – EFD Workshop

May 19, 2016
Learning from Shales: Applying New Technology to Old Plays
WVU Alumni Center, Morgantown, WV

PITTSBURGH ASSOCIATION OF PETROLEUM GEOLOGISTS

June 3-4, 2016
PAPG Spring Field Trip to the Blue Ridge
(Dr. Thomas Anderson, Trip Leader)

AAPG 2016 EASTERN SECTION MEETING

September 25-27, 2016
Lexington Convention Center, Lexington KY

The Pittsburgh Geological Society is delighted to welcome the following new members to the society:

Daniel A. Guy
Geologist, BioMost Inc.
2010 BS in Geology
Slippery Rock University of PA

William R. Baker
Current Student
California University of PA

THE ORIGIN OF WESTERN PENNSYLVANIA PLACE NAMES

Monroeville Mall opened in 1969

In 1807, the Northern Turnpike (now US 22) was completed between Philadelphia and Pittsburgh. A little village on the border of Allegheny and Westmoreland counties, 13 miles east of Pittsburgh, became the first east-bound stagecoach stop on the new turnpike. By 1810 there were two blacksmiths, two stores, and an inn. Then a local farmer named Joel Monroe began selling off lots along the road, thus forming the core of the modern borough now called Monroeville. In the late 1800s, Monroeville was still mostly a farming community. Pittsburgh's coal industry began extending eastward, however, and the area around the town became enriched by the mining boom. When coal mining ran its course by the early 1900s, many of the town's inhabitants went to work at the Westinghouse plant or the railroad yards on nearby Turtle Creek.

In due course, Monroeville eventually grew from a farming village to a flourishing suburban community with a major highway running through the middle of it. In 1950, Monroeville was designated as the Pittsburgh interchange for the Pennsylvania Turnpike. Soon, shopping centers, gas stations, car dealerships, fast food restaurants, banks, and other businesses sprang up along US 22. In 1963, the eastern extension of the Parkway East (now I-376) was completed, resulting in a dramatic surge in population. The area also grew in importance as a retail center, with the opening of the Monroeville Mall in 1969. Monroeville today boasts about 30,000 residents, two hospitals and many shopping plazas, but travel and transportation remain mainstays of the community.

DID YOU KNOW . . . ?

The gem known as lapis lazuli (pronounced lap'-iss laz'-you-lee) is a beautiful blue rock composed of multiple minerals. The blue color comes mainly from lazurite, $(Na,Ca)_8(AlSiO_4)_6(S,Cl,SO_4,OH)_2$, a blue silicate mineral of the sodalite group.

Two cut and polished specimens of lapis lazuli

Besides lazurite, lapis lazuli typically contains calcite and pyrite, and might contain sodalite, dolomite, diopside, wollastonite, mica, and other minerals as well. Calcite commonly represents the second most abundant mineral present in the rock. It appears as white layers, fractures, or mottling, and when finely mixed with lazurite, it produces a rock that looks like faded denim.

Where pyrite occurs, it typically consists of tiny, randomly spaced grains with a contrasting gold color, and where it is abundant, the grains might concentrate into distinct layers or patches. Pyrite can also occur as a fracture-filling mineral.
To be called "lapis lazuli," the rock has to have a distinctly blue color and contain at least 25% blue lazurite.

Lapis lazuli forms near igneous intrusions where lazurite replaces portions of carbonate rocks that have been altered by contact metamorphism or hydrothermal metamorphism. It often develops preferentially within bands or layers. The world's leading producer of lapis lazuli is Afghanistan; mining of the rock is known to have occurred in northeastern Afghanistan as early as 7000 BC.

Lapis beads, small jewelry items, and small sculptures have been found at archaeological sites dating back to about 3000 BC in Afghanistan, Egypt, Iraq, and Pakistan. Other producing countries include Argentina, Canada, Chile, Pakistan, and Russia, and even Arizona, California, and Colorado have been known to produce it in small amounts. Europeans began importing lapis lazuli during the Middle Ages in the form of jewelry and finely ground pigment. Lapis lazuli is still used today in jewelry and ornamental objects. Its use as a pigment has been replaced with modern materials, however, except by artists who strive to use historical methods.

An international team of paleontologists led by Derek Briggs of Yale has found a fossilized arthropod in Herefordshire, England that carried its young in pouches tethered to the parent's body, like a stream of tiny kites. The ancient creature, named *Aquilonifer spinosus*, lived on the sea floor during the Silurian Period (the generic name comes from '*aquila*,' meaning kite [the eagle-like bird, not the toy], and '*fer*,' meaning carry. *Aquilonifer spinosus* grew to less than 1/2 inch long. Ten juveniles of different stages of development were found attached to it with thin, flexible threads. It is the only known example of this unusual parenting method. Many different arthropods adopt different strategies to protect their young from predators, including attaching them to their limbs, holding them under their shell, or enclosing them within a special pouch until they are old enough to be released. But no known arthropod living today attaches the young by threads to its upper surface. Thus, the adult *Aquilonifer spinosus* would have postponed molting until the juveniles were old enough to hatch, otherwise the juveniles would have been shed with the animal's exoskeleton.

Aquilonifer spinosus

Eruption of two volcanoes apparently caused adverse weather in the 530s and 540s AD

Chroniclers writing in the years 536 and 537 AD talked about a "mystery cloud" that dimmed the light of the sun above the Mediterranean. It was discovered that tree rings indicated poor growing conditions over the entire Northern Hemisphere during that time, and a series of unusual natural phenomena occurred afterwards. Numerous crises, including the first pandemic European plague beginning in 541, have come to be associated with the "mystery cloud".

Just recently, an international team of climate scientists found conclusive proof of a volcanic origin for the 536 solar dimming, based on traces of volcanic sulfur from two major eruptions dated to 536 AD and 540 AD in ice cores from Greenland and Antarctica. Using the new ice core data, historical evidence, and climate models, the researchers found that the impact of the volcanic double event of 536/540 on Northern Hemisphere climate was stronger than any other documented or reconstructed event of the past 1,200 years. Either of the eruptions would have led to a significant cooling of Earth's surface. Two of them so close together in time caused what is probably the coldest decade of the past 2,000 years. Using the available data from ice cores and the descriptions from ancient scholars, the team estimated the magnitude of the eruptions and their approximate locations, and then simulated the spread and impacts of the aerosol clouds resulting from the volcanic injection of sulfur into the stratosphere. This revealed that following the eruptions, the solar radiation at Earth's surface was strongly reduced over the Northern Hemisphere for several years, and caused decreases in the hemispheric average temperature of up to 2^{o}C.

The team used climate model simulations to directly estimate the impact of the eruptions on agriculture in Europe, and identified Northern Europe, and Scandinavia in particular, as the most likely locations to have suffered under the cold conditions after the eruptions. This result supports the theory of a connection between the eruptions and archaeological evidence of a large-scale societal crisis in Scandinavia in the 6th century. Each one of the eruptions would have strongly impacted societies, and it happened twice within four years.

The team has not identified which particular volcanoes were at fault. There are several candidates being discussed, including volcanoes in Central America, Indonesia and North America.

The current concept of the demise of the dinosaurs is that they reigned throughout the Mesozoic right up to the bolide impact, and it's the impact that drove their final extinction. In reality, they were already in decline long before that. A study of dinosaurs conducted two years ago indicated that some forms were in decline within the last few million years before a 6-mile-wide asteroid slammed into Earth 66 ma, at the end of the Cretaceous Period. A new assessment, however, suggests the creatures were already in a long-term decline, supposedly because they could not cope with the ways Earth was changing.

The researchers analyzed the remains of dinosaurs from 231 ma up to the point where they went extinct. At the beginning, new species appeared at an explosive rate, but evolution started to slow about 160 ma, leading to a decline in the number of species beginning around 120 ma. Climatic conditions 230 ma were perfect for the dinosaurs when they first emerged – warm and lush from equator to pole. As the climate changed and sea levels shifted due to plate tectonics, the dinosaurs were subjected to new evolutionary pressures.

Were the dinosaurs wiped out by an asteroid, or were they already on the way out?

The analysis showed that the giant sauropod dinosaurs like *Diplodocus* declined the fastest, whereas the theropods like *Tyrannosaurus* declined more gradually. It is probable that the dinosaurs' 50-ma decline rendered them even more susceptible to the environmental catastrophes that followed the asteroid impact. Mammals, which evolved at about the same time as dinosaurs, are much better adapted to colder climates. Thus, even if the asteroid hadn't hit, thanks to plate tectonics and shifting global climates, mammalian supremacy might eventually have occurred anyways.

Chemical weathering occurs when minerals in rock react with water. The chemical reactions physically weaken rock by altering its structure. Rocks in streambeds then become more susceptible to erosion by physical processes, such as sediment impacts in flowing water. It has been established that chemical weathering influences rock strength, but scientists lacked comprehensive data on the extent to which chemical weathering influences river erosion.

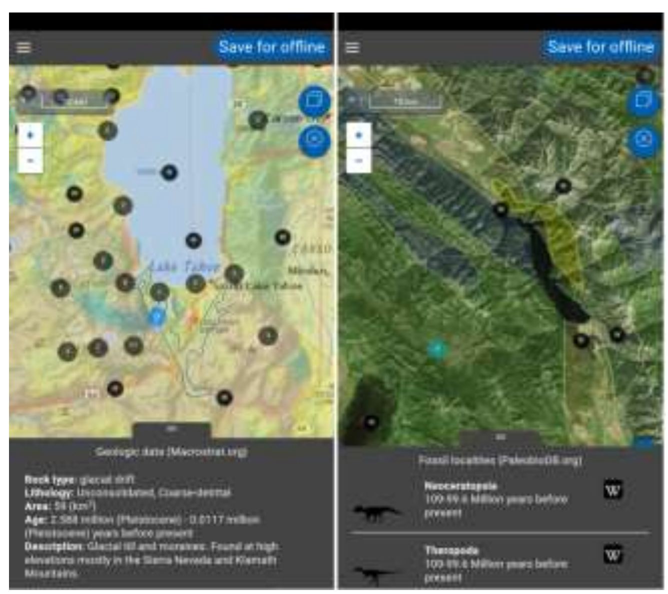
Chemical weathering of volcanic basalt by extreme precipitation

To explore the issue, a team of researchers travelled to Hawaii where volcanic basalt makes up the bedrock to collect data on chemical weathering, rock strength, and erosion rates in streams across wet and dry regions of the island. Hawaii, with its uniform lithology and extreme precipitation gradient, is a simple, natural laboratory for studying how climate controls river erosion. The team measured the strength of the rock using a device that measures surface hardness in the field, and also analyzed the chemistry and density of rock samples back in the lab to determine the influence of chemical weathering. They found that bedrock was more chemically weathered and physically weaker where local precipitation rates were greater. In addition, they found that locations of high precipitation could maintain high erosion rates despite continuously exposing "fresh rock"; this weathers rapidly when exposed at the surface, weakening the rock and allowing it to be eroded efficiently by the river.

The chemical weathering data drastically improved their ability to predict patterns of river incision, so based on their findings, the team was able to modify a numerical model describing how rivers cut into a landscape. Despite examining only a single rock type, the team decided that the mechanism linking chemical weathering to rock strength and erosion should apply to all types of rock. Understanding the relationship between erosion and chemical weathering can help tease out the role climate has on sculpting landscapes and influencing global cycles.

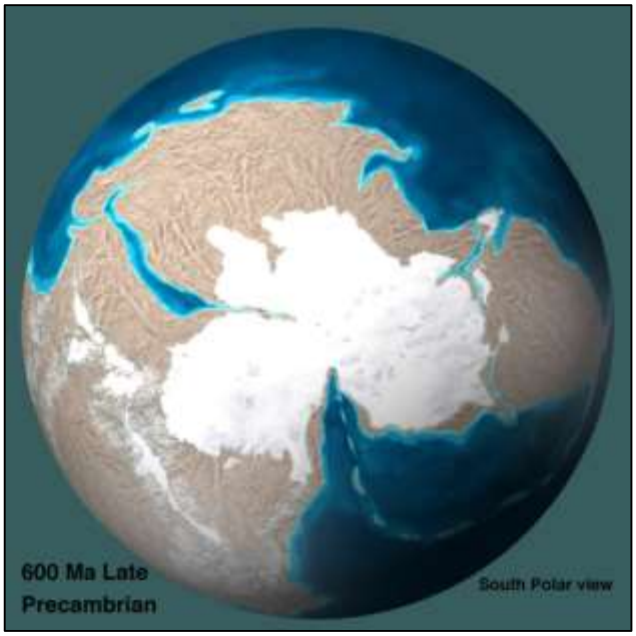
Have you ever seen an interesting geological feature from the window of your plane and wondered exactly what it might be? Well, pull out your smart phone, because it turns out there's an app for that! Invented by geology master's student Shane Loeffler of the University of Minnesota and funded by the National Science Foundation, the free app called "**Flyover Country**" shows you what geology lies beneath your flight path – or along your car ride.

Once you tell the app where you're taking off, and where you're going, it tells you what interesting geological features, including fossil localities, you might be passing along the way. You can also track your journey via GPS and save the information to use offline, in case you're far away from a cell tower.



Flyover Country can be downloaded for Android or I-Phone from: http://fc.umn.edu/

The age-old riddle of how continents were arranged in two Precambrian supercontinents, Nuna-Columbia and Rodinia, may have been answered, and it might have future economic implications for mining companies.



Ron Blakey's reconstruction of the Late Precambrian supercontinent

According to a researcher from the University of Wyoming and his coworkers, the rocks now exposed in southern Siberia were once connected to northern North America for nearly a quarter of the Earth's history. Those two continental blocks now form the cores of modern-day Asia and North America. The researchers used the ages, orientations, and paleomagnetic characteristics of short-lived (1-10 million years in duration) mafic dike swarms as piercing points to determine nearest-neighbor continents in the past. They determined the magmatic ages of numerous dikes through uranium-lead radiometric dating. These linear dikes are relatively narrow, roughly 330 feet or less, but can be 620 to 930 miles in length, and typically erupt in a radial pattern.

The project determined the ages of nearly 250 mafic dikes worldwide, a number large enough to build a database comparison between all of the older continental fragments from roughly 500 ma to 2,700 ma. The research group also worked on more recent dikes, from about 400 ma to 100 ma.

As the supercontinents split up, each continental fragment preserves a dike swarm record, so that comparing the temporal records of, they were able to test whether the cratons were close enough to share dike swarms. In this new study, the team believes that northern Laurentia (now North America) and southern Siberia were joined for nearly 1.2 billion years, from 1,900 bma to 700 ma. The team's findings disprove previous constructions of Nuna-Columbia and Rodinia, and establish new arrangements of the continental blocks within them.

A consortium of mining companies funded the research project for five years because the continental reconstructions for times when major, known metal deposits formed would be useful for prospecting new finds. These new deposits may be buried under hundreds of feet of younger rock. A lot of the major metal deposits in the earth formed in the early part of Earth's history, so by establishing which continents were next to the known deposits when they formed, the hope is that additional minerals may be found in the future.

An example of a mafic dike on the Baranof Cross-Island Trail, Alaska

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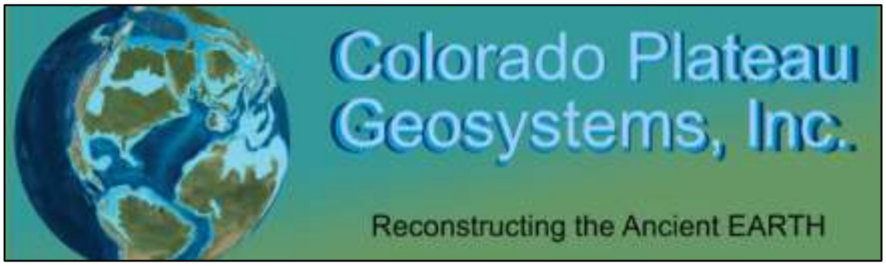
PGS Website of the Month



http://cpgeosystems.com/index.html

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Officer Contacts: If you wish to contact a current PGS Officer, you can email Ray Follador, President, at geodawg@comcast.net; Tamra Shiappa, Vice President, at tamra.schiappa@sru.edu; Kyle Fredrick, Treasurer, at fredrick@calu.edu; and Karen Rose Cercone, Secretary, at kcercone@iup.edu.

Memberships: For information about memberships, please write PGS Membership Chair, PO Box 58172, Pittsburgh PA 15209, or e-mail jharper.pgs@gmail.com. Membership information may also be found at our website: www.pittsburghgeologicalsociety.org.

Programs: If you would like to make a presentation at a PGS meeting or have a suggestion for a future speaker, contact Tamra Schiappa, Program Chair at tamra.schiappa@sru.edu.

PGS Website: To contact the Webmaster, Mary McGuire, with questions or suggestions, please either email marykmcguire@comcast.net or use the site's "Contact Us" link at www.pittsburghgeologicalsociety.org.

Facebook: Follow the PGS at https://www.facebook.com/PittsburghGeologicalSociety for breaking news, announcements and interesting geological facts.

News items: If you have news items you would like to have included in the PGS newsletter, please send them to Karen Rose Cercone at kcercone@iup.edu.

Fun Fact Having Nothing to Do with Geology

Smokey the Bear has his own zip code. He received so much fan mail over the years that, in 1964, the US Post Office gave him the zip code 20252.