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Geo2YC Division

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President's Column

by Lynsey LeMay
Thomas Nelson Community College

The semester has just recently begun, and as an adjunct, I find myself teaching at two schools, unlike previous semesters. One school is the community college where I have been teaching introductory level geology and oceanography for almost six years. The other is a four-year university a short thirty minute drive west, where I have been teaching only a few days, at this point. As I drive between campuses, I mentally prepare myself for the next class, going through the checklist of material to cover in class. I also spend some of this time reflecting on these two different teaching experiences. And while differences exist, I am also struck by the commonalities. Students are going to have struggles anywhere, and there will always be administrative duties. But one difference stands out to me, and that is the sense of community present on the four-year university campus, which seems to be lacking at the two-year college.

Geo2YC President Lynsey LeMay

Isolation is a word that has come up many times in the past few years, and in many of the meetings and professional development workshops I have attended. Isolation has been used to describe that lack of community felt among community college geoscience faculty, including adjuncts. While I am fortunate to work closely with my geology department head, and feel that I can communicate freely with the dean of the division, many do not have that same experience. Many rarely interact with other faculty outside of their program, and some, those teaching online in particular, often interact with no faculty. We often have to seek opportunities to network at our own institutions, and find it even harder to develop relationships with colleagues in neighboring school, much less those across the country.

Now I think back to my community college students, and wonder if they too feel isolated. They are often not part of a department, or are commuters and not involved in campus activities, which may be few and far between to begin with. They may be sitting behind a computer for many of their classes, not even interacting face-to-face with peers or faculty. An article in *The Chronicle of Higher Education* (Brown, 2011, Community-College Students Perform Worse Online Than Face to Face) that I read recently about student performance in online classes even mentioned isolation as one of the struggles plaguing online students.

So what can we do to help combat isolation in our two-year geoscience community, and how can we help our students? We need to become better connected with each other to start. Dave Voorhees has worked hard to put together a survey (see article by Dave in this newsletter) to help us, the Geo2YC community, figure out who we really are, where we are and where we teach, and what we teach. I hope that you will take the time to complete this. By developing a sense of community amongst ourselves, our students can then become more connected through increased awareness of

opportunities, both within and outside of our own programs, including research opportunities, internships, volunteer opportunities, and more. The better connected we are, the better connected our students can be. Not only will this help the general morale, at least among the 2YC geoscience community, we might also reap the benefits of developing new geoscientists.

New 2YC instructor survey

by Dave Voorhees
Waubonsee Community College

The Geo2YC Division will soon make available on the SERC website a short, 15 minute, survey that will begin to collect information about the variety and diversity of programs and geoscience experiences at community colleges, city colleges, and junior colleges across the United States. This survey is for both full- and part-time instructors of geoscience (geology, oceanography, meteorology, geography, astronomy, earth science), or their representatives (administrator, coordinator, etc) at Two-Year colleges. You should receive an email when it has been published to the SERC website.

Thank you so much in advance. Your completing this survey will not only help Geo2YC to define our needs, goals, and best practices, and will also provide data in our important role as advocate of geoscience education at Two-Year colleges. If you have questions about this survey, please contact David Voorhees at dvoorhees@waubonsee.edu. This survey is sponsored by the Geo2YC Division of the National Association of Geoscience Teachers.

Nominate an outstanding adjunct faculty member in your department for recognition with the Geo2YC Division's new **Outstanding Adjunct Faculty award.**
Submit your nomination at this link:
http://nagt.org/nagt/divisions/2yc/oafa.html

Alumna comes home to 2YC and inspires the next generation

by Kaatje Kraft
Mesa Community College

In the fall semester, I had the good fortune to attend an AGU Chapman conference on volcanism in Hawaii. As I was co-presenting my poster, I started a conversation with a fellow attendee who revealed she was an alumna of my institution. We started talking about her research, and her upcoming schedule to talk in Arizona, and she offered to come talk to my students.

Harmony Coella speaks to Mesa Community College students about her career and education.

What a serendipitous event! Dr. Harmony Colella spoke with my geologic disasters class about her research on slow seismic slip events in subduction zones. The model she has developed is the most accurate model to date for these seismic events, and she described her research in a very comprehensible way. A number of students commented later on how much they learned from her and referred to particular details from her talk throughout the rest of the semester.

Dr. Colella then spoke to an interdisciplinary group of students about her non-traditional path to where she is today. Her "fascination with destruction"

began when she was seven years old. Living in California at the time, she remembers hearing a loud noise and feeling the ground shake. Colella reports that she wasn't frightened, in fact, she found it extremely interesting. Her mother yelled to her to get underneath the door for safety. When it was over, they surveyed the damage. The earthquake left a large crack in the pool. "I remember thinking, wow, there's a phenomenon that did this," Colella said. "Something happened that destroyed our yard. From then on, all I ever wanted to study was earthquakes."

She regaled students with stories about her start at a community college, her struggles to find her true career path, her time away from school and how she ended up back in graduate school and ultimately to her current position as an esteemed NSF post-doctoral fellow. She was approachable, entertaining, and inspiring. One of the students commented, "I have to keep reminding myself that it's not too late to be doing school and to follow your heart and passion because only then is when the true love of life really takes place." Another student's stated reason for registering for geology this semester was because Dr. Colella made it sound like so much fun.

Harmony Colella is really in touch with geophysics!

This reminded me of the importance of attending professional conferences. It's always hard to leave our classroom, but in the end, the impact can be greater than we can directly measure. In addition, it reminds me of the importance of tapping into the strength of former alumni from my institution. It becomes a much more authentic story, when it's told from someone who's been in their shoes.

Brett Dooley supports the tripod against the Badlands wind while a GigaPan is shot.

GigaPans I

A New Take on Virtual Field Trips

by Brett Dooley
Patrick Henry Community College

My husband, Alton C. Dooley Jr., and I are both graduates of Carleton College, a small, liberal arts college with a strong teaching focus. Each fall and spring the entire geology department would stop classes for one week to take a departmental field trip. We would go to places like the U.P. or the Badlands, and each faculty member would guide students through the part of the trip pertaining most to his or her field. These trips were highly informative and helped shape the way we, as undergraduate students, thought about geology. For my husband and me they also were formative in shaping how we interact with our own students.

For those of us teaching at community colleges the notion of a mid-semester, week-long field trip is impractical. Non-traditional students simply have too many obligations outside of school to devote multiple days to a single trip. Still, our students would benefit just as much from the opportunity to experience an outcrop, to learn hands-on how to think geologically, and to appreciate the connection between the lessons/labs from class and what they see and experience outside.

Many companies offer a virtual field trip (VFT) package that can be added to a textbook purchase.

These are generally geared to physical geology courses and are strictly exploring processes. Not that any of these are poorly designed, but they often present students with a body of facts to learn, rather than guiding them to make their own observations, and do not necessarily present information in an historical context.

In designing our own VFT I wanted something I could use for my historical geology students. I teach in southern Virginia in what are largely Ordovician plutons and Proterozoic metasediments. This is great stuff for my physical geology students, yet it provides a limited story for those in historical geology. We have almost no rocks from other time periods, and almost no accessible fossiliferous rocks outside of what is exhibited at the natural history museum.

For historical geology, we wanted to make VFTs that required the students to use the knowledge they gained in lecture to interpret the history of sequences of rocks, preferably representing a variety of depositional settings and time periods. Our emphasis, just like in a traditional class field trip, would be on directed observation; give the students a chance to see what's present, point out to them important features they may have overlooked, and then use those observations to interpret the site.

Once we had decided to go for it and make our own VFT there was the question of how to proceed. Alton and I are both fairly tech-savvy but certainly not professionals, and this would have to be done around our other duties so we had only a limited amount of time available for the project. We really needed a format that would allow the VFT to be produced quickly and painlessly. After consulting with both the dean of my department and the technology dean at Patrick Henry Community College (PHCC), we decided to use Apple's interactive eBook format running on iPads.

Apple offers a free program, iBooks Author, for generating interactive eBooks. Like many Apple programs, there is a trade-off between customizability and ease-of-use. Even so, iBooksAuthor can accommodate drag-and-drop images and video, and has tools for annotating photos and generating matching and multiple-choice exercises. The simple interface can be mastered with minimal training. The biggest limitation is that the resulting publications can currently only be viewed on an iPad or iPad Mini. However, almost every component of the VFT is stored locally on the iPad, meaning that after download the trip can be run without Internet access. For a rural region, with inconsistent Internet service, this is a significant consideration. PHCC generously purchased a class set of iPads for the geology department to ensure that they would always be available for our students.

To generate content, we used our personal video and still cameras. Image manipulation was done using Pixelmator ($15), while video editing was done in iMovie ($15). We wanted to include GigaPan high-resolution images in the VFTs to give students the opportunity to explore details of an outcrop in a larger context. Again, PHCC stepped up and purchased a GigaPan camera mount, software, and tripod (approximately $500). The GigaPans are the only component of the VFT that require an Internet connection.

I received a grant from the Virginia Community College System (VCCS) to develop our first VFT as a proof-of-concept exercise. For the first field trip we chose Oakes Quarry Park, a small city park in western Ohio. This park is an abandoned limestone quarry that has a nice Silurian transgressive sequence of fossiliferous limestones, dolostones, and mudstones. A story can be inferred from the rock sequence that can be basic enough for an introductory student to decipher, yet complex enough that masters theses have been written about it.

Filming a video about the evidence of glaciation in the Oakes Quarry area of Ohio.

We spent a day at Oakes Quarry Park taking photographs and GigaPans, and shooting video for use in the VFT. It took about 10 hours to process the 1-2 minute video clips, and an additional 20-30 hours to write the text for the field trip, post the Gigapans, and format everything in iBooks Author (most of this was actually done while we were on the road, traveling to our next VFT locality).

Author Brett Dooley is wowed by an eon boundary in South Dakota!

As this was our first effort at producing a VFT, we presented a draft version to various geologists and high school educators for feedback. We then demonstrated the VFT at the GSA 2012 national meeting in Charlotte, North Carolina and at the VCCS Science Peer Group Meeting in Virginia Beach. We'd like to thank everyone at those meetings who gave us suggestions, and especially Patty Weston and Pete Berquist.

Once all of our revisions were made we needed to submit the VFT to Apple for inclusion on the iBookstore. This involved setting up a free iTunesConnect account and uploading the VFT file for review by Apple. The review took about three weeks, after which the VFT listing became publically available.

Thus new VFT can be made fairly rapidly, and with minimal training or monetary investment. Besides the time actually spent on-site, only about a week of dedicated work time is needed for editing and production. (Of course, that is not always an easy thing to come by!) While our iBooks Author-generated VFTs lack some of the flash and gimmicks of high-budget VFTs, the quality of the content does not suffer. Moreover, since we can generate these trips ourselves, we can customize the content to our courses. We also believe that it helps students to see their instructor in these exotic locales (for some of our rural Virginia students, western Ohio is an exotic locale!). We are hoping that our VFT for iPads will enable instructors anywhere to use these to help their students discover the geology of regions beyond their range of travel potential. Our Oakes Quarry Park VFT is available now as a free download from the iBookstore. We are hoping the next one, to Badlands National Park, will be available during the Spring 2013 semester.

Opportunities for 2YC Faculty and Students at the National Science Foundation

by Jill Karsten
NSF Directorate for Geosciences

As a Federal agency in the Executive Branch, the National Science Foundation (NSF) takes its cues from the priorities of the President and his administration. As such, we should all feel good about President Obama's recent inaugural speech and his explicit emphasis on taking action to improve STEM education and workforce development, as well as confronting the Nation's many geoscience-relevant challenges, including climate change and energy independence. Presidential priorities often translate into new initiatives and funding opportunities, so I'd like to share with you some upcoming opportunities at NSF that may be of interest to you and your students.

In February 2012, the President's Council of Advisors on Science and Technology (PCAST) released its Undergraduate STEM Education Report, "Engage to Excel: Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering, and Mathematics", which laid out a strategy to improve STEM education in the first two years. Specific recommendations focus on: catalyzing widespread adoption of empirically validated teaching practices; replacing standard laboratory courses with discovery-based research courses; launching a national experiment in postsecondary math education; promoting partnerships to diversify pathways into STEM careers; and enabling strategic leadership to transform undergraduate STEM education by bringing together leaders from the business and academic communities. The recommendations in this report are now being translated into specific funding opportunities at NSF, either through existing programs, e.g., Transforming STEM Education (TUES) and STEM Talent Expansion Program (STEP), or creation of new programs.

Two new programs – *Widening Implementation and Demonstration of Evidence-based Reforms (WIDER)* and *Expeditions in Education (E^2)* – are of particular relevance to this audience. The solicitations for these two programs are not yet through the clearance process, so I am unable to share specific details, but insights about the goals of these programs can be found in the WIDER Dear Colleague Letter NSF 12-106 and the E^2 chapter from the President's FY2013 budget request. In essence, WIDER is focused on scaling up effective approaches for improving undergraduate STEM faculty teaching. The E^2 program seeks to leverage cutting-edge research in the NSF-supported disciplines and the knowledge that has been gained through research in the learning sciences and STEM education. It is focused on creating and using collaborative teams of disciplinary scientists and learning scientists or STEM education researchers to carry out highly innovative, and potentially disruptive, projects to transform the STEM undergraduate experience in ways that complement more traditional curriculum reforms being supported through TUES and STEP. Community colleges are explicitly encouraged to participate in both of these programs. These two solicitations should be released in February 2013, so be on the lookout! Automatic email updates about NSF programs can be requested through the NSF web site (click the envelope icon at bottom right).

The Directorate for Geosciences (GEO) at NSF is a major contributor to the E^2 initiative, so we are eager to have a strong response from the geoscience education community in taking advantage of this exciting opportunity. Unfortunately, due to major budget constraints for Federal agencies, one consequence of GEO's participation in E^2 is that funding for other education programs in GEO has been substantially affected. The *Opportunities for Enhancing Diversity in the Geosciences (OEDG)* program budget was reduced from $3.6 million per year to $1.0 million in FY 2013; a revised OEDG solicitation is in preparation and should be released by March 1st. The *Geoscience Teacher Training (GEO-Teach)* program has been eliminated, and the Geoscience Education (GeoEd) program has been put on hiatus. NSF continues to honor its $1.1 million annual commitment to the *Global Learning and Observations to Benefit the Environment (GLOBE)* program, and a revised GLOBE solicitation to invite early career scientists to get involved with GLOBE is in the works. It is unclear whether the budget picture will be any rosier next year, but GEO will continue to seek ways – through cross-Directorate and interagency collaborations – to maintain our efforts to improve the quality of geoscience education at all grade levels, increase the participation of underrepresented minorities in the geosciences, prepare the geoscience workforce for the future, and increase public Earth system science literacy. We value the many important contributions being made by the 2YC programs in helping us achieve those goals!

As a final comment, I want to applaud your pioneering efforts to launch a "revolution" and raise the profile and impact of geoscience education in the 2YC setting. Thinking again of President Obama's inaugural speech, I was humbled by the realization that there have been only 44 Presidents in the course of our 236-year-old American experiment and its remarkable accomplishments. It is a reminder that, with shared vision and dedication, even a small number of individuals can make a significant difference. As you continue this work, please keep NSF informed as to how we can support your efforts.

GigaPans II

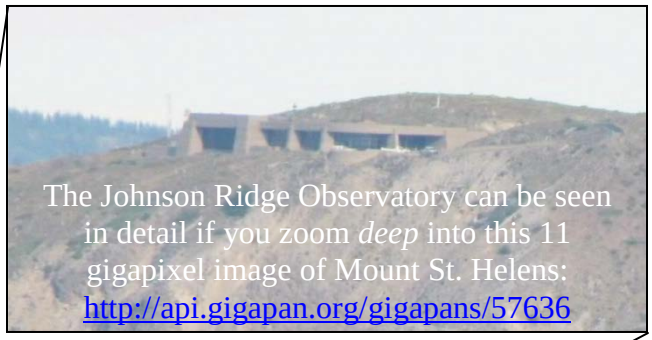
GigaGeology Will Transform the Way You See the Earth, a Billion Pixels at a Time

by Ron Schott
Bakersfield College

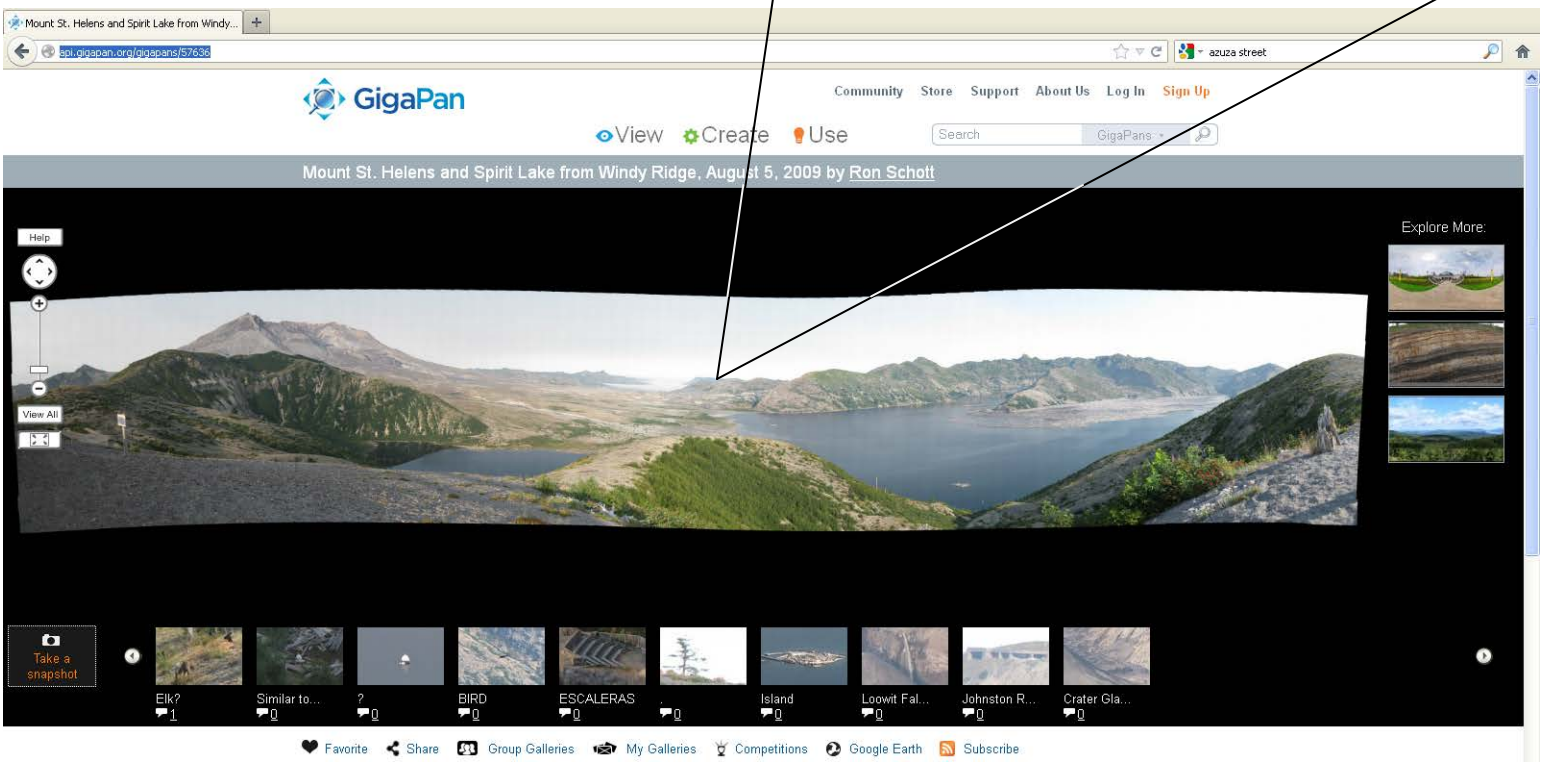
Have you ever gotten so deeply engaged exploring the details of a photograph you look up half an hour later and wonder where the time has gone? I do it all the time with gigapixel panoramas (GigaPans). If a standard photo of a few megapixels from a digital camera is worth a thousand words, it may not be stretching it too far to say a detailed GigaPan is worth a million words.

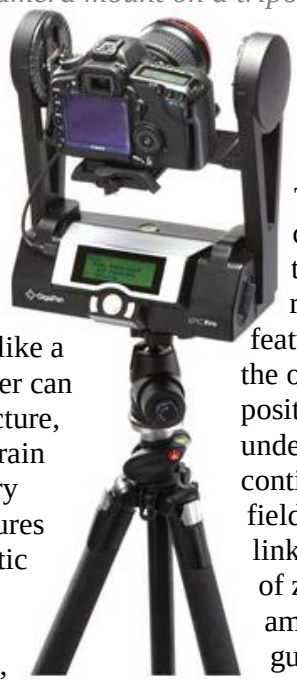
I got started with GigaPans back in the fall of 2007, shortly after they were first introduced to the public in an update of Google Earth. I had already dabbled with making stitched photographic panoramas with an eye towards developing virtual field experiences for a couple of years by that point. So when I was offered the opportunity to be one of the beta testers working to develop scientific applications of this new robotic technology, I jumped at the opportunity.

So what exactly is a GigaPan, you may be wondering, and how are they made? Well, in a sense, it's Martian technology brought back to Earth. When the Mars rovers started sending back hundreds of single megapixel, mosaiced images of the red planet, NASA scientists realized they didn't have an elegant way to share those images with the public. Working with the robotics department at Carnegie Mellon University, NASA engineers developed not only a way to view the stitched Martian panoramas, but also a cheap robotic tripod head that could be used with a consumer digital camera that would make capturing such images accessible to almost anyone back here on Earth. The consumer version of the GigaPan robotic tripod head that you can buy today takes a few simple steps to set up and then automatically maneuvers a standard digital camera to capture hundreds to thousands of digital photos in a rectangular grid. Those photos are later digitally stitched together into a single massive image using the GigaPan Stitch software and then uploaded to the GigaPan.com website where they can be explored in all their glory.



The Johnson Ridge Observatory can be seen in detail if you zoom *deep* into this 11 gigapixel image of Mount St. Helens: http://api.gigapan.org/gigapans/57636





The GigaPan robotic camera mount on a tripod.

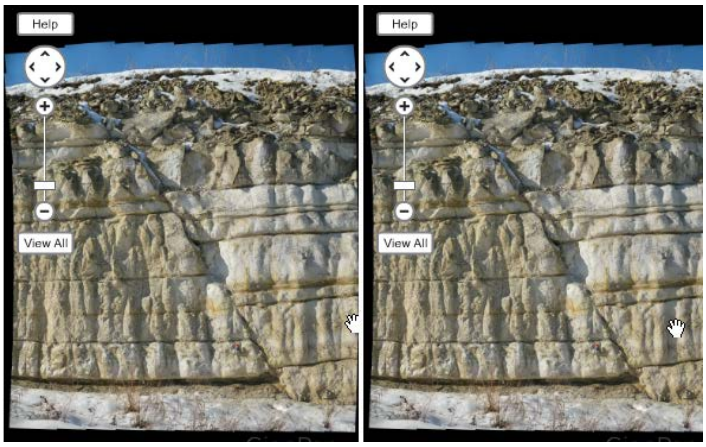
Explorability is the hallmark of a well conceived and executed GigaPan image. The GigaPan web viewer delivers an initially zoomed out view of the entire panorama. With a simple set of controls, one can pan around the image and zoom deeply into and out of it. In a GigaPan of a roadcut or quarry wall, for example, one might initially recognize sedimentary bedding and perhaps a larger scale feature like a fold or a fault. Upon zooming in, the viewer can explore details of the stratigraphy and structure, potentially all the way down to details of grain size variations, macrofossils, or sedimentary structures like ripple marks; structural features of a fault like slickensides; or minor parasitic folds or cleavage development. It's certainly possible to capture separate photos of these features without a GigaPan, but often the context of how small scale features relate to the larger scale features would be lost, whereas GigaPans inherently preserve spatial context. Moreover, one often discovers features while exploring a GigaPan that one simply didn't notice in the field. It is this joy of discovery that makes GigaPans such a compelling way to experience a photograph.

There are a number of ways to use GigaPans in the classroom. The first and easiest is to simply link to GigaPans in place of traditional photos to illustrate geologic landforms and concepts. There's a definite "Wow" factor as one zooms in to point out some interesting geologic feature that may not have been visible at first. This is even better if students have access to their own computing devices to explore and discover on their own. The GigaPan website allows users to take snapshots of interesting things they find in a GigaPan. This could be used as an assignment where students are pointed to a GigaPan and asked to snapshot and describe certain types of features (*e.g.*, imbricated clasts in a conglomerate).

The GigaPan viewer can also be embedded into a webpage. I take advantage of this to build a scaffolded exercise utilizing GigaPans to illustrate stratigraphic correlation. Check it out online at: http://ron.outcrop.org/GigaPan/correlation.html. I guide students through the first example, by aligning offset strata in the hanging wall and footwall of a small fault, demonstrating the use of the GigaPan controls and explaining how strata are matched. Then I let the students try their hand at matching strata from a pair of "bookend" roadcuts (not quite as simple as it might at first appear, but definitely possible), and finally, I encourage them to try to match strata from the two roadcuts located 20 miles apart on their own.

The third way that I use GigaPans in the classroom is by embedding them in Google Earth to build virtual field trips. Once again there's a real "wow" factor in being able to see geologic features all the way from the continent scale down to the outcrop scale, and the addition of geographic positioning adds another dimension to the student's understanding of regional context of outcrops. I am continuing to work on building GigaPan based virtual field experiences - some of the next frontiers include linking and nesting GigaPans to display deeper levels of zoom, and guided/interactive tours that are amenable to both the novice, who needs the guidance of a narrator/tour guide, but also the explorer, who seeks to strike out on their own and experience the joy of discovery in a self-guided manner.

I hope you will find that there are a lot of reasons to take advantage of GigaPans in a two year college setting. First and foremost for me is that (outside of field trips) GigaPans offer one of the best means of introducing a sense of awe, stimulating a spirit of exploration, and encouraging the joy of discovery in students who experience them. Furthermore, GigaPans make an excellent complement to actual field experiences, allowing students to preview or review field localities, and in the event that field trips are not possible, a virtual field trip built from GigaPans and previously collected rock samples is probably the next best thing to experiencing the rocks in their natural habitat. Finally, GigaPan is a great tool for two-year colleges because of its relatively low cost (under $500 if you already have a digital camera and tripod) and easy learning curve.



Correlation exercise using two GigaPans that are displayed side by side.

If you're interested in getting started with GigaPans the first place to go is the GigaPan.com website. There you'll find many highly explorable geologic GigaPans. I estimate about 25% of all the GigaPans uploaded to the site have at least some geologic content. To get started, you might want to explore some of the over 100 galleries of geologically themed GigaPans on the site. Beyond the website, geobloggers like *Foundations* editor Callan Bentley (http://blogs.agu.org/mountainbeltway/category/gigapan/) and myself (http://ron.outcrop.org/blog/?cat=26) frequently post about their geologic GigaPanning experiences. And when you're ready to purchase your own GigaPan unit and join in the fun of creating these wonderful images, there's a link for that, too: http://www.gigapan.com/cms/shop/store

Happy GigaPanning!

GigaPans III

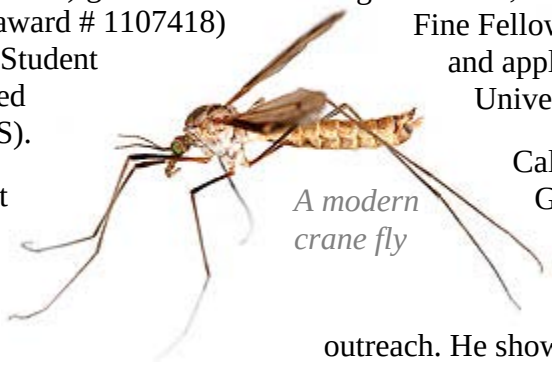
Eyes on the Flies

A story of two community colleges collaborating on original research using Macro GigaPans

by Callan Bentley and Joshua Villalobos
Northern Virginia Community College and El Paso Community College

The 2013 AGU Fall meeting was a great sharing of science. Among the 20,000+ attendees were seven students from El Paso Community College (EPCC) in El Paso, Texas. Each of them had completed an independent research project supervised by Joshua Villalobos or a faculty member within the Department of Geological Sciences at the University of Texas at El Paso (UTEP). In Fall 2011, Josh was awarded a OEDG (Opportunity in Enhancing Diversity in the Geosciences) grant from the National Science Foundation (award # 1107418) for a new research program called Student Opportunities in Learning Advanced Research in Geoscience (SOLARIS).

Part of the SOLARIS funding went towards financing student research costs. For instance, some SOLARIS student projects involved the use and rental of geophysical equipment from UTEP while other projects needed lab supplies or basic field equipment. Joseph Cancellare, a second-career student and geology major at EPCC, wanted to work on fossil crane flies (in the insect family Tipulidae) from the Eocene-aged Florissant fossil beds in Colorado. Joseph has a degree in entomology and had been collecting fossil insects from the Florissant Formation for close to a decade and has amassed an impressive collection of cataloged specimens of known and unknown classification. Joseph wanted to utilize his collection in his study which was the further classification of previous and recently acquired specimens.



A modern crane fly

Since he had previously traveled to the region to collect specimens, his main expenditures had already largely been met. However, his samples were small,finely detailed, and extremely delicate and his research would be aided with durable, shareable images of the fossil insects. As part of Joseph's projects he sought out advice and suggestions from experts in the field of entomology from academia to Smithonian Institute and sending his speciemen would have been expensive, time consuming, and possibly dangerous to the integrity of the sample.

Callan Bentley of Northern Virginia Community College (NOVA) had a way to help. Callan had first met Josh at an InTeGrate planning workshop in El Paso in February of 2012. They discussed their recent initiatives, and Josh learned of Callan's interest in GigaPanning (see previous article). As a member of the 2010 cadre of Fine Outreach for Science "fellows," Callan had been gifted a basic GigaPan robot, camera, and tripod. With 25 other Fine Fellows, he had been trained in its use and application at Carnegie-Mellon University in Pittsburgh.

Callan played around with his new GigaPan, and found that it was easy to use and produced landscape and outcrop GigaPan images that were useful in teaching and outreach. He showcased several on his geology blog *Mountain Beltway*.

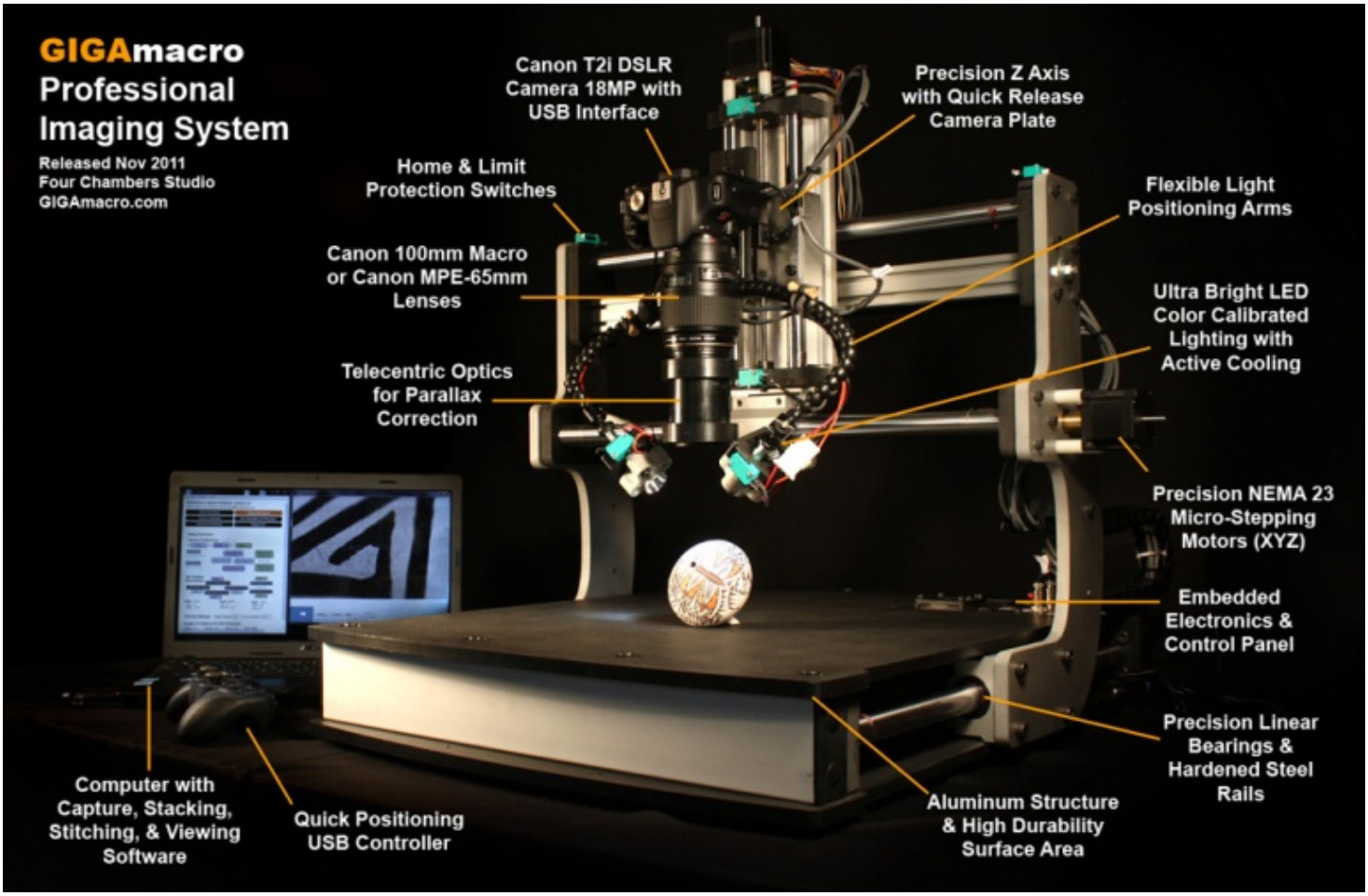
Later, when some grant money became available through NOVA, Callan commissioned a sample-imaging device, the so-called GIGAmacro. This prototypic photographic rig was custom built for the NOVA geology lab by Four Chambers Studio of Vallejo, California. The goal was to apply the GigaPan viewing interface to a new suite of subjects: those smaller than a loaf of bread. Callan assigned one of his Honors students, Robin Rohrback-Schiavone, to be lead operator on this "macro rig." After being trained by Gene Cooper of Four Chambers, Robin developed a mastery of the machine, and was soon churning out dozens of amazingly detailed GigaPan images of samples ranging from Precambrian banded iron formation to modern sand from Dubai.

The GIGAmacro can take GigaPan-scale images of small objects, like rock "hand samples," sediment samples in a petri dish, or even… fossil crane flies. After a successful demonstration shoot, Josh was convinced that this technology could aid in Joseph's project. Joseph's allotment of SOLARIS money, $500, could be directed to the NOVA GigaPan operation. A total of 50 macro GigaPans of Joseph's crane fly fossils would be produced by Callan's student Robin.

Here's an example of the resulting product:

Screenshot of the full-screen GigaPan viewer image of one of Joseph Cancellare's (EPCC) crane fly samples, as imaged by Robin Rohrback-Schiavone (NOVA) on the GIGAmacro system.

That image took about 250 individual photographs to make. It sounds laborious, but once the photographic parameters are entered into the GIGAmacro, it does the tedious work of moving the camera exactly the right amount so that the resulting suite of images can be stitched together using

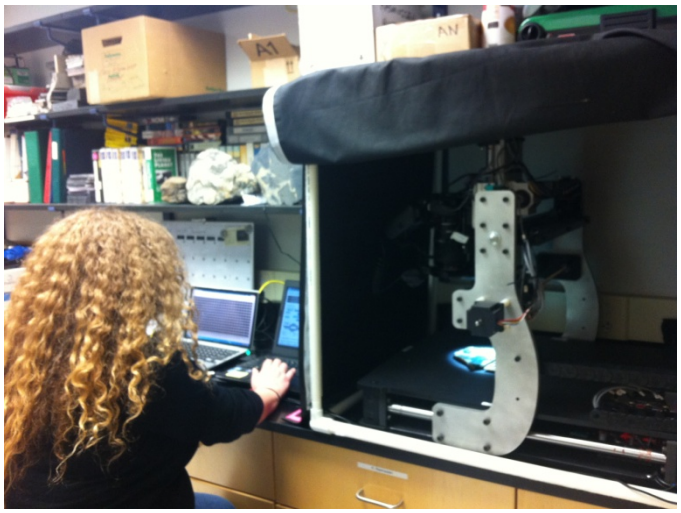


GigaPan Stitch software into a single large panorama. Users can then choose where to zoom into the image to see higher-resolution details. They can formulate hypotheses, and test these ideas with self-directed exploration, just as if they were visiting an outcrop, or holding a fossil specimen in their own hands!

Screenshot of the full-screen GigaPan viewer image of the details of the fly's head, eyes, and proboscis from the previous image (~2mm long).

You can view this sample for yourself (it's much more dynamic when you can experience the zooming in!) at this link: http://gigapan.com/gigapans/107792

The entire suite of images can be seen here: http://gigapan.com/galleries/10221/gigapans



Robin Rohrback-Schiavone (NOVA) operating the GIGAmacro photographic rig.

Once Robin produced the GigaPan images of Joseph's samples and posted them to the GigaPan website, Joseph was able to use the web address for each GigaPan and show it with his iPad! The iPad has an app specifically for GigaPans and can be used anywhere Wi-Fi is available This unique way of demonstrating Joseph's samples illuminated the need to; transport delicate samples, carry heavy or costly microscopes, and the need to set-up equipment. Along with six of his peers, Joseph traveled to San Francisco last December and presented his results at AGU's fall meeting.

Joseph Cancellare (EPCC) at his poster at AGU. Note the dynamic macro GigaPan viewer (iPad) by Joe's right hand!

The final phase of this collaboration came in settling the bill, which turned out to be more complicated than Josh or Callan anticipated. Being a community college, NOVA is not used to billing other schools for scientific or technical services. Individual billing was also out of the question due to the tax liability it would bring with it. So we hit upon a workable solution: the GIGAmacro needed a lighting system upgrade, and so we ordered one via Four Chambers Studio, who then billed EPCC but shipped it to NOVA! When the dust settled, Four Chambers made some money and had a public demonstration of its device, NOVA got a new lighting system for the GIGAmacro, and EPCC got 50 high-quality GigaPan images. It was win-win-win.

Have you collaborated on new, innovative collaborations with your 2YC peers? If so, we want to hear about it! Please consider submitting your story to *Geo2YC Foundations*.

SAGE 2YC

Supporting and Advancing Geoscience Education in Two-year Colleges

SAGE 2YC Workshop

Supporting Student Success in Geoscience at Two-Year Colleges

College of William & Mary, July 17 - 20, 2013

Application deadline: March 4, 2013

Improving student success is an important priority at most U.S. two-year colleges (2YCs), whether as an institutional goal, for accreditation, or as part of the Achieving the Dream initiative. Work on this priority is especially challenging because of the variety of students who enroll at a 2YC. By working together, 2YC geoscience educators can address the challenges and share their successes in teaching students with a wide range of abilities, preparation, and goals.

This workshop will bring together faculty, administrators, and education researchers from across the country to share successful programs and activities for supporting the success of all students in geoscience at 2YCs, both in and outside the classroom. We also welcome participation from representatives of professional societies who can contribute to this synthesis.

At this workshop, participants will learn how recent research on topics such as student learning, social psychology, metacognition, and differentiated instruction can help support student success in geoscience at 2YCs. Since no 2YCs are alike, participants will assemble a menu of best practices and strategies for supporting student success. Contributions from participants and summaries of workshop discussions and recommendations will be important additions to the SAGE 2YC website. Workshop participants will also prepare individual or collective action plans for future work and leave with new ideas for their courses and institutions. They will become part of a network of colleagues who share similar challenges and concerns for the success of 2YC geoscience students.

This workshop is open to 30 participants by application**. There is no charge to attend and our grant will support faculty travel expenses as well as meals and lodging at the workshop.**

http://serc.carleton.edu/sage2yc/studentsuccess/index.html

Workshop conveners:
Heather Macdonald, College of William & Mary
Eric Baer, Highline Community College
Robert Blodgett, Austin Community College
Jan Hodder, University of Oregon

The workshop is offered by SAGE 2YC (Supporting and Advancing Geoscience Education in Two-year Colleges).

Upcoming workshop and webinar opportunities from On the Cutting Edge

Information, including application deadlines, for this year's workshops and webinars is given on the workshop schedule page. A few of the opportunities that might be of higher interest are given below. NOTE: Application deadlines for some workshops/events are coming up soon.

Teaching Oceanography (A Face-to-Face Workshop) June 18-20, 2013, with optional field trips on June 17 and 21 - City College of San Francisco, Chinatown/North Beach Campus Conveners: Katryn Wiese, Petra Dekens, Jan Hodder, Dave Mogk, Kristen St. John, and Al Trujillo. Application deadline: March 1, 2013

Effective Strategies for Undergraduate Geoscience Teaching Webinars (1-hour webinars) Application deadline: 1 week prior to each

(Re)Designing introductory geoscience labs to promote inquiry

February 20, 2013: Time: 3 pm Eastern | 2 pm Central | 1 pm Mountain | 12 pm Pacific

Teaching and assessing in-depth understanding of fundamental concepts using concept sketches
March 27, 2013: Time: 12 pm Eastern | 11 am Central | 10 am Mountain | 9 am Pacific

Energizing your class with ConcepTests: A simple technique to engage students and improve learning
April 10, 2013: Time: 3:30 pm Eastern | 2:30 pm Central | 1:30 pm Mountain | 12:30 pm Pacific

Workshop for Early Career Geoscience Faculty: Teaching, Research, and Managing Your Career (A Face-to-Face Workshop)

July 28-August 1, 2013, with an optional visit to NSF August 2 - American Geophysical Union, Washington DC
Application deadline: March 8, 2013

(if you have a new faculty hire - please encourage them to apply to this workshop

Geophotography Virtual Webinar Series
Events on: February 26, March 5, March 19, & April 2, 2013
Application deadline: February 1, 2013

An InTeGrate Opportunity:

Author an introductory geoscience or environmental science module

Application deadline is February 15, 2013

As part of their effort to develop new types of teaching materials, InTeGrate is seeking team members who will collaboratively author, test, revise, and publish modular teaching materials for use in college-level introductory geoscience or environmental science courses. This is a big effort and requires lots of work. If you are selected as one of the authors, you would have the materials you develop published on the website, and would receive $15,000 for all the work (requirements given in more detail below).

The goal of these modules is to support broad development of geoscience literacy by teaching about geoscience in the context of societal issues. A module would fully support teaching of a topic over approximately two weeks of classes. Modules for this year are:

- **Energy and sustainability for the next generation:** *Module materials should examine the factors that will influence future decisions about energy use and how those choices may effect the Earth system.*
- **Living on the edge:** *Discuss the costs and benefits of living on the edge of a tectonic plate with particular emphasis on the west coast of North America and equivalent settings in less developed nations/regions.*
- **Earth systems and ecosystems in Earth's history:** *Explain how life has affected conditions on Earth and how changes to Earth affected life on the planet and what are the implications for our future.*
- **Changing the chemistry of Earth:** *Discuss the nature of biogeochemical changes in the Earth system due to human development and what this predicts for the future of the atmosphere, hydrosphere, and/or biosphere.*
- **Into the Blue:** *Examine how the small things we do every day result in permanent and profound changes in the character of the world's oceans. What is the nature of those changes and implications for the future of the Earth system?*

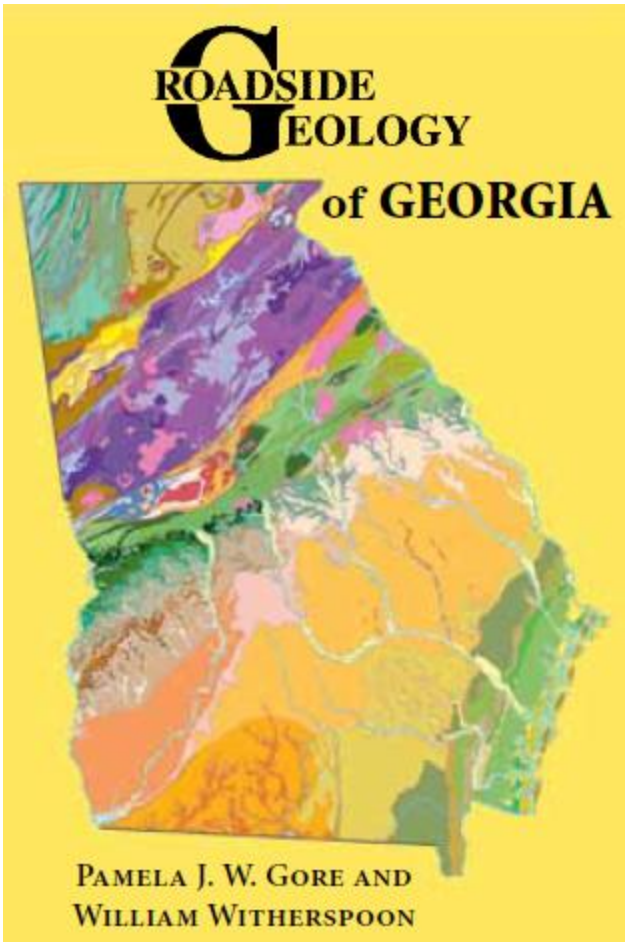
Please complete the application form if you are interested in being a module author. Submissions will be accepted until February 15, 2013. Selected team members must be available to attend an planning workshop May 19-22, 2013. Attendance at the workshop is mandatory for all team members. Travel and lodging costs will be covered by the project.

For additional information please contact: David McConnell (damcconn@ncsu.edu)

Reflections on Writing the *Roadside Geology of Georgia* and Lessons Learned

by Pamela J. W. Gore
Georgia Perimeter College

For the past several years, I have been writing the *Roadside Geology of Georgia*, which is scheduled for publication this spring (April 15, 2013 according to Amazon.com). As you may know, the objective of the Roadside Geology series is to publish scholarly, well-written books for the layman, in language that non-geologists can understand and enjoy. We were instructed not to write for geologists, but for their spouses and parents: curious, well-educated people who know a lot about accounting, law, or insurance, but not much about geology.



This has been a long project. Looking back at old emails, I was able to put together a bit of the chronology, documenting the process. I was invited to begin work on the book by a colleague back in summer of 2004, and the writing began. (Lesson 1: It takes a lot longer to write than you expect, so schedule some uninterrupted writing time.) Helping in this endeavor was a "Writers Institute Fellowship" from my institution, Georgia Perimeter College, which gave me a semester off from teaching in Spring 2005 to work on the book. I was very eager and ready to research every outcrop along every interstate. One of the first road guides I wrote was I-75 between Atlanta and the Tennessee state line, crossing over Piedmont, a bit of Blue Ridge, the Valley and Ridge, with a brief mention of Appalachian Plateau, and it came in at over 18,000 words. The editor responded back that length was going to be a problem. I learned that for a book less than 350 pages long, we had about 100,000 words. I had written one road log (out of about 30 or so) and had already used nearly 20% of my page allotment. So the book is nowhere near as detailed as it might have been. I also learned that road guides run from north to south, and east to west, and must begin and end at province boundaries. (Lesson 2: Find out the word and page lengths and plan accordingly.)

Over the course of the writing, many things changed. One major change was a change in my co-author. For various reasons, my original co-author was unable to continue working on the book, and his colleague, Bill Witherspoon took his place late in 2007. We divided up the workload and, as part of his share, Bill quickly became proficient at using Adobe Illustrator and went on to create the many maps that appear in the *Roadside Geology of Georgia*. (Lesson 3: Be sure you know how to draw maps on the computer, or have a co-author who can do this. Map making is a lot of work.)

Photos are an important part of a book like the Roadside Geology series. When I started writing, the Roadside books were published in black and white. Some of the initial guidelines for photos and artwork called for black and white prints, and original artwork (on paper). The *Roadside Geology of Florida* (2008) was one of the first to include color photos, although some were still in black and white. By the time the *Roadside Geology of Maryland, Delaware and Washington, D.C.* was published in 2010, all photos were in color. Today, everything is color and digital. I have found that my more recent images taken with a digital camera are much easier to put into publication than my older slides and print photos, which have to be scanned at the appropriate resolution, and which are

not always satisfactory. (Lesson 4: Planning for the type of images you will need is important. Pay close attention to the required resolution and size.)

The editing and reviewing process also evolved as I was writing the book. In the early stages, I emailed drafts to the editors or reviewers, and sometimes received hardcopy back with edits and comments in pencil. Today, a number of publishers are using a "cloud-based" system, where you copy a text or image file into a "Dropbox folder" on your computer, which uploads and synchronizes with a folder somewhere on a "cloud" online that you can share with other users, or log into and access from other computers. This has been very useful as Bill and I collaborated on the document, and speeds turnaround time with reviewers and editors. (Lesson 5: Technology changes and cloud-based computing makes collaboration easier, but you still have to coordinate so that only one person is editing the cloud-based document at a time.)

Colleagues have been very helpful by answering many questions we had as we worked on the manuscript and sorted out stratigraphic terminology. We spent much of 2011 having colleagues review our work, and are very grateful for their helpful comments. Some of our colleagues also supplied us with several much needed images related to their area of expertise, which greatly enhanced the manuscript. I really appreciate all of their hard work and contributions to the book. (Lesson 6: Colleagues are important when doing research or writing and editing a manuscript. Join geological societies and attend the meetings – local, regional and national. The people you meet there are often the best part.)

Early in 2012, we provided a draft of the manuscript to the editor. The manuscript was about 125,000 words. The editor had to cut about 20,000 words and we had to trim about 10,000 more. We had about 470 images, but Roadside books typically have only about 250 images, so cuts were made there as well. So if you are reading the book this spring and don't see a road, outcrop, or park included that you hoped would be in there, or if you don't see a thorough coverage on the tectonic history or fossils of a particular area, chances are that section was one of those that wound up on the cutting room floor. (Lesson 7: Plan carefully and prioritize when writing and working on illustrations. You can't include everything.) In hindsight, it seems like it would have been much easier to have written a shorter manuscript, but even with word limits for each geologic province, we found that we had much more material than could be included. Bill and I learned a lot while writing the *Roadside Geology of Georgia*. It is a fascinating and varied state, from coast to mountains, and from Proterozoic to Quaternary. We hope you will enjoy reading the book as much as we enjoyed writing it.

Who's on deck?

This is a call for nominations from the Geo2YC community for our division's next Vice President.

Merry Wilson is our current V.P., and will take over the helm next year when current President Lynsey LeMay shifts into the role of Past President (currently held by Dave Voorhees). Nominees should be hard-working professional geoscience educators in the two-year-college community, and be dedicated to improving 2YC geoscience education across the country. Send your nominations to Lynsey LeMay: lemayl@tncc.edu

Thanks for helping us find the ideal future leader of Geo2YC!

NAGT Geo2YC Division

Dorothy Stout Professional Development Grants

In honor of Dottie Stout's work as the first female president of NAGT and lifelong dedication to Earth Science Education, grants are made in her honor to faculty and students at 2 year colleges teachers in support of the following:

- Participation in Earth science classes or workshops
- Attendance at professional scientific or science education meetings
- Participation in Earth science field trips
- Purchase of Earth science materials for classroom use

Grants of $750 will be made annually in three categories: Community College Faculty, Community College Student, and K-12 Educator. Award winners will also be given an one-year membership to NAGT.

Eligibility

Community College Faculty and K-12 teachers who teach one or more Earth science courses and Community College students actively pursuing a career in the Earth sciences are encouraged to apply for these awards.

Apply online:
http://nagt.org/nagt/programs/stout.html

FOUNDATIONS is edited by Callan Bentley, Northern Virginia Community College. Please get in touch with your feedback: cbentley@nvcc.edu

MAIL TO
National Association of Geoscience Teachers
P.O. Box 1897, Lawrence, KS 66044, U.S.A.

The membership year runs from January through December.

NAGT Membership Application / Renewal

ONLINE MEMBERSHIP SERVICES ARE AVAILABLE AT: www.nagt.org

Name (please print) _____
Mailing Address _____ City _____
State/Province _____ Zip/Postal Code _____ Country _____
Phone (____) _____ Fax (____) _____ E-mail _____

Check One:
❑ College Faculty at _____
❑ Two-Year College Faculty at _____
❑ Teacher at _____
❑ Other at _____

PAYMENT (SEE OTHER SIDE FOR MEMBERSHIP OPTIONS)
❑ **Check** (in U.S. funds), made payable to: **National Association of Geoscience Teachers**
❑ **Credit Card:** Card type _____ Card number _____ Expiration date _____
Amount authorized: $ _____ Authorized signature: _____

APPLICATION TYPE ❑ New Applicant ❑ Renewal

Regular, domestic membership
(*JGE* online only and *In The Trenches* in print) ❑ $45
Signature of NAGT member: _____
School: _____

I want printed copies of *JGE* mailed to me ❑ $35
Membership in NAGT's Geo2YC Division ❑ $7

TOTAL $ _____

The full range of membership services is available online.