

STRUCTURAL GEOLOGY AND TECTONICS DIVISION Newsletter

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CHAIR'S MESSAGE

GSA 2014 Annual Meeting - Highlights

The annual meeting in Vancouver was very popular both for GSA and our division. We sponsored or co-sponsored over 60 topical sessions, including a Pardee symposium on Great earthquakes, the Cascadia subduction zone, and society, headed up by our own **Andrew Meigs**, a fitting finale for his year as chair of the division. A special thanks goes to **Dan Gibson**, who headed our Joint Technical Program committee, for helping to make the meeting a great success. The 2014 meeting included joint GSA/EGU (European Geophysical Union) co-sponsorship of two sessions that have strong common interests between these two groups. This trend of society-level connections will continue at the Baltimore annual meeting this fall (see below).

The SG & T division business meeting and awards ceremony was once again packed (maybe the rumor of free beer helped bring in the younger crowd), and we all rose to applaud **Darrel Cowan** of University of Washington for his achievements that led to the **Career Contribution award** ([p. 3](#)). Applause earlier in the evening went to **Outstanding Publication award** winner **John Tarduno** for his first authorship on a paper that changed our ideas of how oceanic plate motion can be documented ([p. 4](#)). A number of the **student award winners** of both research grants ([p. 4](#)) and field trip and short course scholarships were also on hand to receive applause. We asked the recipients of the field trip and short course funds to provide a brief summary of their experience and a photo from the field trip or another field shot, and their enthusiastic endorsements ([p. 5-14](#)) help us appreciate that this is a good way to spend our division's student fund. This fund is housed in the GSA Foundation which helps it grow through investments, but we hope to continue to have it grow through your contributions (see [pp. 5 and 24](#) for details).

On the business side of things, among other topics, the **NSF Tectonics program** was well represented by David Fountain (Program director) who summarized some of the most important **changes in the new proposal guidelines**. If you haven't had to address these new guidelines yet, please see our web page for several links to the appropriate documents and the text of David's summary (<http://rock.geosociety.org/sgt/NSF-news.htm>).

What's new in Baltimore – Nov. 1-4 annual GSA meeting 2015.

Both GSA and our division are reaching across the ocean to other societies at this year's annual meeting. GSA is holding a "meeting within a meeting", a joint scientific meeting between GSA and

GSC (Geological Society of China). Although the program is not final at this time, a number of sessions in this “m within m” will be of interest to our community.

Our division, under Andrew Meig’s guidance, also reached out to EGU Tectonics and Structure Division President Susanne Buiter and they have encouraged a “paired” EGU-GSA session, meaning the same title and topic held at both meetings, with some shared conveners as well. We also have a co-sponsored GSA-EGU session planned for Baltimore and hope to have more sessions like this at future meetings. These require a year and a half of planning due to the EGU meetings being in April, so please think of a topic that would be appropriate for both venues and consider leading a “paired” session. Feel free to contact a board member if you have questions on how to do this. Our names and contact information are at the end of the newsletter.

Also new in Baltimore – your division is planning to host a **NSF Tectonics program discussion/q & a session** with one or both of our Program directors (David Fountain and Steve Harlan). This might occur as a brown-bag lunch event, or perhaps a short session right before the business meeting. Let us know what you want on the agenda; we currently have lots of ideas how it might be structured, but this is a new event and we want to address questions and concerns of the community, so do speak up!

More NSF news: **Carol Frost** has been appointed the Director of the Earth Sciences Division of NSF ([p. 27](#)). For a complete list of proposals funded by the Tectonics program in the 2013-2014 Fiscal year, see [p. 27-30](#).

The Division thanks Dan Gibson and his colleagues in Vancouver who provided us with free conference room space for our **annual board meeting**. See [p. 24-26](#) for notes from the meeting. As usual, we had too many topics to cover in the hour plus time frame. One topic that will be relevant to all of us is the plan to change all GSA journals to Open Access. GSA is committed to continue publishing the highest quality science and discussions of keeping it also “open access” to those who may not be able to pay high page charges are ongoing.

We note with sadness the passing of **Tim Wawrzyniec**, an active and involved member of our division. Please see a fine tribute to him on [p. 15](#).

And finally – if you are still reading this, you clearly care about the division! Please **consider volunteering** for a board position. We have three openings this spring:

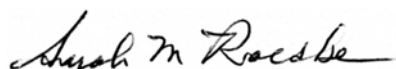
Second vice-chair (4 year position, transitioning through to chair and past chair)

Student member (new position as of two years ago) (2 year position)

Secretary/Treasurer: (2 year position)

(Sad to say Yvette Kuiper has decided not to run again; thanks so much Yvette!!)

Thanks to all who participate – we look forward to continuing to grow our division.



Sarah Roeske, Chair Structural Geology and Tectonics Division GSA



Highlights from the Structural Geology & Tectonics
Business Meeting and Awards Reception
at the 2014 Annual Meeting in Vancouver, B.C.

**GEOLOGICAL SOCIETY OF AMERICA
STRUCTURAL GEOLOGY AND TECTONICS
2014 CAREER CONTRIBUTION AWARD**

Darrel Cowan



Terry Pavlis (left) and SG&T Division chair Andrew Meigs (right) flank 2014 Career Contribution Award winner Darrel Cowan. Please see the division website for Terry's citation and Darrel's response: http://rock.geosociety.org/sgt/2014_CCA_Citation+Response.pdf.

OUTSTANDING PUBLICATION AWARD

Tarduno, J.A., Duncan, R.A., Scholl, D.W., Cottrell, R.D., Steinberger, B., Thordarson, T., Kerr, B.C., Neal, C.R., Frey, F.A., Torii, M., & Carvallo, C. (2003) The Emperor Seamounts: Southward motion of the Hawaiian Hotspot plume in Earth's mantle. *Science* **301**, 1064-1069.



Andy Meigs presents the Outstanding Publication Award to John Tarduno.
Nominations for the OPA and CCA are due March 1 each year.

STEPHEN E. LAUBACH STRUCTURAL DIAGENESIS RESEARCH AWARD FUND:

Randolph Williams, University of Wisconsin – Madison

STUDENT RESEARCH GRANT AWARDEES

Each year the SG&T division recognizes graduate students for excellent research proposals in the annual GSA solicitation. In 2014 the following students submitted outstanding research proposal in Structural Geology and Tectonics:

Ross Anderson, Yale University
Rebekah Cesmat, University of Washington
Benjamin Johnson, West Virginia University
Andrea Stevens, University of Arizona
Randy Williams, University of Wisconsin
Long Wu, Colorado School of Mines

THE SG&T DIVISION STUDENT FUND

Students represent the future of our division, and the board considers the support of students who are interested in structural geology and tectonics to be among our highest priorities. The Student Fund, established within the GSA Foundation, will allow us to more effectively meet this priority. Our initial goal was to grow the fund to \$80,000 before drawing interest from it. However, we were advised by the GSA Foundation that our present Student Fund balance (~\$68,000) generates sufficient interest to utilize. The division will begin using investment earnings to support students on field trips and short courses beginning this year. (Refer to the 2014 SG&T Board meeting minutes, below, for more details about division finances.)

Structural Geology and Tectonics Division Field Trip and Short Course Grant Recipients for the 2014 GSA Annual Meeting in Vancouver, Canada

This past fall, ten students received grants from the SGT Division to support their participation in field trips and short courses held in conjunction with the 2014 GSA Annual Meeting in Vancouver, Canada.

For more information on the SGT Field Trip and Short Course Student Grant Program, go to <http://rock.geosociety.org/sgt/StudentTravelAward.htm>.

The SGT Field Trip and Short Course Student Grant Program is made possible through donations to the SGT Student Fund. If you would like to make a donation to support the SGT Student Fund, go to <http://rock.geosociety.org/sgt/SGT-Student-Fund.htm>.



Geologists at Mackay Creek Retention Dam during Field Trip #417. Steel decant structure permits flood waters to pass through but retains the coarse material of the debris flow.

Field Trip and Short Course Grant Recipients

Rachel Bobich—Florida Atlantic University

Field Trip #417 Applied Geomorphology Along the North Slopes of Burrard Inlet in North and West Vancouver

I am currently a senior at Florida Atlantic University. I will be receiving my Geology B.S. degree in the spring of 2015 along with a minor and advanced certificate in GIS. I am in the process of undertaking my second independent research project on the hyperspectral analysis of beach sand composition in nourished beaches within Palm Beach County, Florida. My love for geology holds strong in hazard mitigation, karst environments, and aquifer systems. I was awarded a field trip grant for Applied Geomorphology Along the North Slopes of Burrard Inlet in North and West Vancouver. This trip was very important to me because I am interested in the mitigation of rock falls and debris flows. My ideal profession is to further prevent geologic hazards in developed-developing areas. The field trip was incredibly insightful and Dr. Roberts was enthusiastic and enlightening the entire day. We were able to visit unique structures implemented by the communities of North and West Vancouver to protect the higher socioeconomic housing districts. Hopefully in the future, each district or locality will be able to focus on an overall system to aid those in higher risk areas. I took a lot of information and pride for the lands surrounding Vancouver away when the field trip ended. I look forward to attending more in the near future, and hopefully one day leading one.

Tanvi Chheda—Cornell University

Field Trip #402 Karst Lands of Central Vancouver Island



Tanvi Chheda (center) on Field Trip #402.

I am a junior at Cornell University studying Science of Earth Systems / Mathematical Geoscience. I had a great time learning about caves and karst features in the pre-meeting field trip on Vancouver and Quadra Islands. We saw sinkholes, springs, karren, subsurface drainage, etc. in the coastal temperate forests. We discussed the effects of climate, glacial events, and tectonics that influence the formation of karst. More importantly, we talked about sensitivity of karst lands to human activity and logging and about the conservation and management efforts that can be made to protect these unique ecosystems. Field trips are never exclusive to the subject matter. I think I learnt a lot even from simple conversations with Prof. Tim Stokes and other participants from USGS, JPL, and other institutions about mapping software and karst in Russia and on Saturn's moon Titan! Thanks to Structural Geology and Tectonics Division members for making this field trip possible. Sometimes I get caught up in exams and grades for fluid mechanics and applied math classes, but a field trip like this rejuvenates my enthusiasm for understanding spectacular and often complex natural phenomena and reminds me that theory is important to decipher the clues in nature.

Levi Crooke—The University of Alabama

Field Trip #411 The Cretaceous–Cenozoic Coast–
Cascade Orogen Chilliwack Valley–Harrison Lake
Connection

I was able to attend the Cretaceous–Cenozoic Coast–
Cascade Orogen Chilliwack Valley–Harrison Lake
Connection pre-meeting annual meeting field trip this
past October. This field trip was especially memorable
because this was my first time out of the U.S. and
because it began on my birthday. I saw fascinating
geology, and I rekindled old and made many new
friendships. Attending a field trip like this as a student
was an experience that is difficult to put to words
because I was a peer to scientists that I have admired. I
was mentally engaged during the trip, and I cherished the
comradery shared amongst the participants.



Boudinaged pegmatite in a dextral shear
zone observed during Field Trip #411.

Kevin DeLano—Central Washington University

Field Trip #420 Tertiary Stratigraphy and Structure of the Eastern Flank of the Cascade Range, Washington



Kevin DeLano at a scenic overlook on Field Trip #420.

I am very thankful for the grant that enabled me to attend my first GSA field trip. It was an awesome experience. As a structural geology M.S. student at Central Washington University, I got to learn an amazing geologic story right in my own backyard. Prior to the trip, I had a 70 million year gap in my understanding of the geologic history of Washington State because my thesis work is in the Eastern California Shear Zone. Learning how Washington State is a series of tilted and faulted regional-scale anticlines and synclines was incredible. I definitely had several geologic epiphany moments—those times we cherish where suddenly the geologic story clicks and your mind is blown. Analyzing outcrops is refreshing practice for both school and in a job down the road. Dr. Eric Cheney is an excellent field trip leader. His attention to detail and patience make him an excellent teacher. I am grateful to the GSA Structural Geology and Tectonics Division for the opportunity to attend the field trip. I have a deeper appreciation for Washington geology and for the hard work that made that story known.

Michael Eddy—Massachusetts Institute of Technology

Field Trip #411 The Cretaceous–Cenozoic Coast–Cascade Orogen Chilliwack Valley–Harrison Lake Connection



Michael Eddy in the Valley of Ten Thousand Smokes, Katmai National Park, Alaska.

I am very fortunate to have received financial support from the Structural Geology and Tectonics Division to attend a pre-meeting field trip to the Coast Range this past October. Much of my research deals with the Paleogene tectonic history of the Pacific Northwest, and the trip was a welcome opportunity to examine new, but still somewhat familiar, rocks just to the north of my thesis area. The trip also offered insight into the complicated Mesozoic history of the region, thereby providing important context for some of the long-lived structures that I study in the North Cascades. I am indebted to the trip leaders Dan Gibson and Jim Monger for packing so much into just two days and to the other trip participants for stimulating conversation on the outcrops and at dinner. This was my first field trip with GSA and I couldn't have asked for a better group to share it with. I'm already looking forward to next year's trips out of Baltimore!

Samuel Lagor—The University of Vermont

Field Trip #411 The Cretaceous–Cenozoic Coast–Cascade Orogen Chilliwack Valley–Harrison Lake Connection



Samuel Lagor standing in front of the overturned limb of a doubly-plunging, re-cumbent, northeast-trending fold in Permian limestone overlain by Permian volcanic rocks during Field Trip #411. The hinge of the fold is exposed near the summit of Mount McGuire.

I had the chance to see the outcrop pictured below on the first day of the field trip titled The Cretaceous–Cenozoic Coast–Cascade Orogen Chilliwack Valley–Harrison Lake Connection and was only able to participate in this field trip with financial assistance from the Structural Geology and Tectonics Division. In addition to this magnificent structure, we were able to observe conodonts and a handful of other fossils at this quarry outcrop. I can honestly say that seeing this quarry was one of the most impressive experiences of my time in British Columbia, and it was a true pleasure attempting to wrap my head around some of the regional structural problems thanks to Dan Gibson and Jim Monger. Huge thanks to them and the Structural Geology and Tectonics Division for providing me the opportunity to see some spectacular rocks!

Jingyao Meng—Oklahoma State University

Short Course #519D Using Google Earth to Teach Interpretation of Geologic Processes, Bedrock Structures, and Geologic History



Jingyao Meng on a field trip in Texas, June 2014.

I am an M.S. student and research assistant at Oklahoma State University. My study interests are structural geology and unconventional reservoirs. I received a short course grant from the Structural Geology and Tectonics Division this year and that was the most wonderful experience in my first GSA meeting. The short course I attended was Using Google Earth to Teach Interpretation of Geologic Processes, Bedrock Structures, and Geologic History. I learned a lot from the instructors on how to use Google Earth and other related software in teaching structural geology and in geological research. This gave me a huge help in what I am researching now since a large part of my M.S. thesis is to use Google Earth to collect fracture data. Also, this course will be really useful for my future TA jobs.

Johnathon Osmond—The University of Texas at Austin

Field Trip #420 Tertiary Stratigraphy and Structure of the Eastern Flank of the Cascade Range, Washington



Tilted Columbia River flood basalt interbedded with cross-bedded volcaniclastic sandstone alongside an I-82 South rest area, Manastash Ridge, Ellensburg, Washington (Day 3 of Field Trip #420). Note the now horizontal, meter-scale foresets within the sandstone creating fault bedding planes. Western Washington University graduate student, Henry Talley, for scale.

I am a structural geologist at The University of Texas at Austin studying listric normal faults along the Texas Gulf Coast. I enrolled in Field Trip #420 in order to learn more about other fault systems and the geology of the Pacific Northwest. Each day was jam-packed with a suite of outcrop stops that provided a glimpse into the complex overprinting of structural and depositional features in the region. Among many lessons throughout the trip, Dr. Eric Cheney continuously demonstrated the overall importance of precise mapping and identification of field relationships when interpreting geologic histories. The field experience and interaction with the other participants made this trip one of the most memorable in my career.

Rebecca VanderLeest—The Pennsylvania State University

Field Trip #420 Tertiary Stratigraphy and Structure of the Eastern Flank of the Cascade Range, Washington



Rebecca VanderLeest standing at a scenic geologic overlook in Leavenworth, Washington, on Field Trip #420.

I'm a second year M.S. student at The Pennsylvania State University studying structural geology and tectonic geomorphology. Learning about the stratigraphy and structures on the eastern flank of the Cascade Range through the field trip was amazing! I enjoyed learning especially about the various folding events that shaped Washington State's topography and their different length scales. I gained a broad perspective of how smaller scale concepts such as folds are placed in a regional tectonic setting which will help with my M.S. thesis where I am analyzing a portion of the North Canterbury fold-and-thrust belt in New Zealand. Thanks to the Structural Geology and Tectonics Division for granting me this opportunity.

Trevor Waldien—University of California, Davis

Field Trip #411 The Cretaceous–Cenozoic Coast–Cascade Orogen Chilliwack Valley–Harrison Lake Connection

Upon receiving a field trip grant from the Structural Geology and Tectonics Division, I was able to attend a field trip through the Coast–Cascade Orogen in the Coast Range of British Columbia. The purpose of the field trip was to investigate the spatial and temporal relationships between terrane collision, metamorphism, and magmatism that characterize the evolution of this orogen throughout the Mesozoic and Cenozoic. Observing the geology of the Canadian Coast Range in the field was particularly beneficial for me because I research similar terrane accretion and magmatic events in the

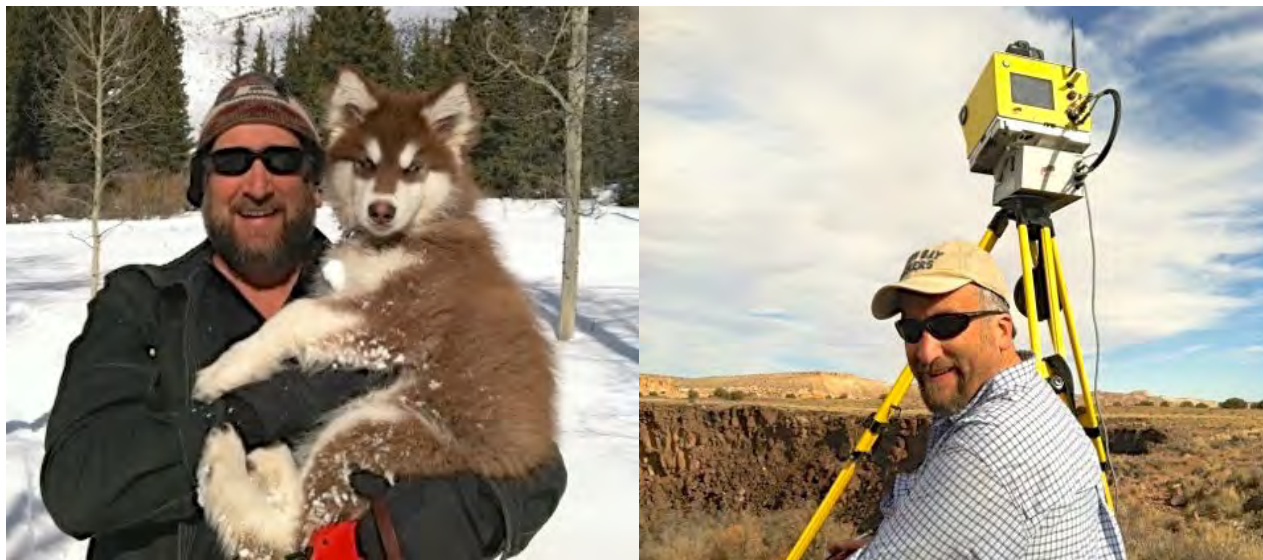
Alaska Range for my M.S. thesis at UC Davis. Learning the geology of the Coast–Cascade Orogen has led me to consider similarities and differences between the Mesozoic–recent tectonics of southern Canada and Alaska. Comparing and contrasting the geology at both ends of the Canadian Cordillera has helped me understand how my observations from the Alaska Range fit into the tectonic evolution of western North America.

During the field trip, I was able to interact with geologists from all over North America. Interacting with these scientists who had spent their careers researching the North American Cordillera taught me a tremendous amount about the geology of the Cordillera and helped me refine my field skills. I also met and networked with other graduate students from universities in the United States and Canada. Being a part of this diversity of students and professionals helped me gain an understanding of other interesting research areas and what it is like to have a career in geology. Overall, this field trip was a unique opportunity for me to learn and network that I could not have done without the help of the SGT field trip grant. Thank you for your support.



Trevor Waldien doing fieldwork in the Alaska Range, summer 2014.

The application deadline for SG&T Division Field Trip and Short Course Grants for the 2015 GSA Annual Meeting in Baltimore is August 18, 2015 (one week after the abstract deadline). Late applications will be considered on a first come and funds available basis. Applications will not be accepted after September 28, 2015.

IN MEMORIAM:

The SG&T Division was saddened last year by the passing of Tim Wawrzyniec, who edited this newsletter from 2005 to 2008. Jane Selverstone contributed the following:

Tim F. Wawrzyniec, widely known to the geoscience community as “Tim W”, died of brain cancer on November 6, 2014, at age 49. Tim was science co-editor of *Geosphere* at the time of his death. Tim began life moving around as a military brat, but his family finally settled in Wisconsin, where Tim learned to appreciate the other kind of brat(wurst), along with other examples of Midwestern food and drink. Tim was a talented artist, and started his college career as a fine arts major. However, it wasn’t long before Tim discovered a passionate interest in the geosciences. He graduated from the University of New Mexico in 1987, intent on going into the oil industry – only to discover that the industry had tanked while he was busy taking classes. Academia began to seem more appealing, so Tim signed up for more classes, this time in the MS program at the University of Minnesota. After flirting with geochemistry and metamorphic petrology, Tim moved back to the University of New Mexico, where he began PhD work with John Geissman, using paleomagnetism to address structural and tectonic problems in the Rocky Mountains. However, a single PhD project was simply not enough for someone with Tim’s intellectual curiosity and drive, so he added what effectively turned into a second dissertation, working with Jane Selverstone (and Gary Axen at NM Tech) on mechanical responses of rocks to variations in metamorphic fluid compositions in the Swiss Alps. Tim and his life partner, Amy Ellwein, left deep roots in the UNM community, becoming lifelong friends with faculty and fellow students alike. John and Jane repeatedly threatened not to sign Tim’s dissertation in a futile effort to keep Tim from leaving the department. Eventually, though, Tim did graduate and finally got his chance to play in the oil patch. With encouragement from Rusty Riese, Tim took a position at Vastar (later a part of Arco and then BP), in large part because he did indeed want to play with the toys and large data sets available in industry. Tim loved the work, but he and Amy did not love Houston. And so began Tim’s peripatetic years, moving to the Bureau of Economic Geology at the University of Texas, then to Minnesota, then back home to the University of New Mexico, where he managed the Paleomagnetism Lab and taught a wide array of classes while Amy

completed her PhD. Tim never met an emerging technology that he didn't find fascinating, and while at UNM, he pushed hard to convince the university and industry partners to invest in a ground-based Lidar scanner. The hallways – particularly in front of the women's bathroom – were soon the sites of numerous experiments to develop new Lidar target materials to enhance the field capabilities of the scanner in characterizing complex outcrops. From these early efforts, Tim's companies, Lidar Guys and Paradox Geologic Consulting, were born, and subsequent years saw Tim traveling the world to scan outcrops and provide GIS services – both for science and for the movie industry. In 2010, Tim was appointed to the Moncrief Chair in Petroleum Geology at Western State College in Colorado. In 2012, while teaching at Western, Tim was diagnosed with glioblastoma. Thanks to aggressive treatment at Swedish Hospital's Colorado Neurological Institute, coupled with both Tim and Amy's unflagging senses of humor and zest for life, Tim lived life to the fullest for two and a half more years. Tim finally found the job of his dreams at Antero Resources when treatment required him to spend more time in Denver, and he continued to work there until three weeks before his death. Tim was legendary for his fearless and creative approach to science and for his fierce love for his friends, his dogs, boisterous parties, skiing and all other outdoor pursuits, the Green Bay Packers, and most of all, for his love of Amy. His death leaves a very large hole in the universe. A fund in Tim's name is being established at GSA to support graduate student research; a condition of receiving a grant from the fund will be the ability to pronounce Wawrzyniec correctly (Vov zhin' yets). Donations can be made to the Tim Wawrzyniec Fund at <http://www.gsafweb.org/fund-and-awards/>.

"FUTURE DIRECTIONS IN TECTONICS" – WORKSHOP AND WHITE PAPER

When: July 22-24, 2015

Where: University of Wisconsin – Madison

We are in the process of developing a white paper for geological research and infrastructure in the broad field of Tectonics and Structural Geology. It will attempt to synthesize the thoughts and needs of a large and diverse community, through a variety of mechanisms. Central to the effort is a ~70 person workshop to be held in Madison, WI, on July 22-24, 2015. This workshop will bring together a diverse group of scientists whose research addresses various aspects of Tectonics and Structural Geology.

Our goal is to identify pertinent and promising areas of new scientific research, recognize and prioritize infrastructure needs that are necessary to making scientific progress, and articulate the societal relevance of research in these fields. A further goal is to make this workshop a community building activity, in which the community feels involved and engaged.

The process

Our approach to writing this white paper has been to create an open and transparent process where any interested individuals or groups may participate. The approach follows three steps:

(1) An **Organizing Committee**, consisting of three faculty who initiate the process, obtains funding for a workshop, and recruits a Workshop Committee. These people are:

Basil Tikoff and Laurel Goodwin, University of Wisconsin-Madison

Yvette Kuiper, Colorado School of Mines

(2) A **Workshop Committee** is chosen, based on nominations and self-nominations received over the past months. The Workshop Committee organizes a workshop where input from participants is solicited in order to outline the most compelling and broadly supported future directions of Tectonics. This process is commencing now, and there will likely be a call for ideas about topics. Thus, it is an ideal time to provide input about what topics should be covered. These people are:

Rick Allmendinger, Cornell University

Marin Clark, University of Michigan

Becky Dorsey, University of Oregon

Paul Kapp, University of Arizona

Kevin Mahan, University of Colorado

Jim Spotila, Virginia Tech

(3) At the workshop, a **Writing Committee** will be identified to form to write the White Paper (to be completed by Late Spring 2016), based on directions outlined during the workshop. However, the co-chairs of the writing committee have already been identified by the organizing committee, because their early involvement was necessary for planning. These people are:

Kate Huntington, University of Washington

Keith Klepeis, University of Vermont

Input from the community will be sought in a variety of ways for those who cannot make it to the workshop. These will include (but are not limited to): 1) Post-workshop discussion groups (e.g. webinars); 2) Town hall meetings at the annual Geological Society of America and American Geophysical Union meetings; and 3) An open comment period on the draft of the white paper.

How can you participate?

There are several ways to participate:

- (1) Attend the Summer 2015 **Workshop**. The dates for the workshop are July 22-24, 2015. Details will be forthcoming from the Workshop Committee.
- (2) Volunteer to serve on the **Writing Committee** and/or provide feedback on the written document.
- (3) Provide input/feedback **throughout the process** by participating online or at the town hall meetings (details will be provided later).

Basil Tikoff

Yvette Kuiper

Laurel Goodwin

COMMITTEE OF VISITORS – DEEP EARTH SECTION, NATIONAL SCIENCE FOUNDATION

As part of the National Science Foundation oversight and responsiveness to the community, each program is reviewed by an external committee to examine the operations of programs. This review is a brief overview of the detailed reports that are available at the NSF website (http://www.nsf.gov/geo/acgeo_cov.jsp), and the 2014 report is available at http://www.nsf.gov/geo/adgeo/advcomm/fy2014_cov/dep-cov-report-2014.pdf.

These external review committees are called Committees of Visitors (COV) and they meet every three years. The composition of the COV is drawn from the disciplinary backgrounds of the programs, types of institutions, and avoidance of conflicts of interest. The main charge of the COV is to review proposal actions and program effectiveness within the operations of NSF, and the COV of interest to our group examined five Deep Earth Programs: Continental Dynamics (CD), EarthScope (ES), Geophysics (PH), Petrology and Geochemistry (CH), and Tectonics (TE). The membership of the 2014 COV for the Deep Earth Section was:

COV Chair: Dr. Karen M. Fischer Brown University

COV Members:

Dr. Steven M. Day, San Diego State University

Dr. James P. Evans, Utah State University

Dr. Anke M. Friedrich, Ludwig Maximilian University of Munich

Dr. Edward J. Garnero, Arizona State University

Dr. Peter J. Hudleston, University of Minnesota, Twin Cities

Dr. Mary L. Leech, San Francisco State University

Dr. Charles E. Leshner, University of California, Davis

Dr. Carolina R. Lithgow-Bertelloni, University College London

Dr. Calvin F. Miller, Vanderbilt University

Dr. Michael P. Poland, Hawaiian Volcano Observatory, USGS

The review involves a specified process by which COV members are provided overviews of the operations of each program from the program officers, followed by program evaluation. The program evaluation provides the COV temporary access to almost all aspects of proposal handling, (the “e-jackets” in NSF parlance), and the COV is subdivided into smaller committees to thoroughly examine a selected set of proposals considered in one panel cycle. For any questions or issues, the COV meets with the relevant program officers to get clarification as to the processes and procedures of the programs.

In addition to the programmatic reviews, the COV also examines the past COV reports, and the responses from the NSF section officers. After the 2 days of discussions and reviews, the COV drafts a report and within a few weeks of the visit, the report is completed. The key summary points of the 2014 COV, quoted from the report, include:

- DEP programs are funding essential and cutting-edge science, including potentially transformative research and an appropriate blend of inter-disciplinary and disciplinary projects.
- DEP POs are doing an outstanding job of running their programs. The COV was particularly impressed by the excellence of this management in the face of very high PO workloads and flat or declining program budgets.
- The proposal review process in each program is based on expert information from mail, panel and PO evaluations. It is fair, transparent, and in general clearly documented.
- DEP POs have been pro-active in working with their research communities to define and develop new research directions, and they pay close attention to funding trends and concerns (e.g. large observational projects, experimental and analytical labs) and the health of the research workforce.

The COV found that the Deep Earth Section is operated by a dedicated NSF staff that are doing an excellent job in a financially constrained environment. Program officers in the Deep Earth Section work at finding “co-funding” opportunities for proposals, and in making sure that the proposal review process is clear, fair, and consistent. The NSF staff have also done a great job of responding to previous reports and concerns, and the COV highlighted a set of concerns, manifested by the relatively restricted funding environment.

While reading reports is not always on the front burner of SGT members, these reports and the process are an important part of the operations of the NSF programs of interest. The interests of SGT members are well represented at NSF, and the Deep Earth Section program officers work at being responsive to the community.



The Structural Geology and Tectonics Division is sponsoring or co-sponsoring **23** topical sessions that review advances, examine paradigms, and celebrate the breadth, depth, and vigor of the many topics of interest to Division members. The Division is also sponsoring two pre-meeting and one post-meeting field trip. The sessions and field trips are described below:

T2. Bridging Two Continents: Advances in Crustal Subduction and Ultrahigh-Pressure Metamorphism. Conveners: Jane A. Gilotti, Yong-Fei Zheng. Presentations that explore the mineralogical, petrological, geochemical, geochronologic, and tectonic aspects of crustal subduction and ultrahigh-pressure metamorphism are welcome. Papers presenting theoretical, analytical, or conceptual advances toward the understanding of deep subduction-zone processes are encouraged.

T3. Bridging Two Continents: Comparative Studies of Accretionary Orogenesis in the Central Asian Orogenic Belt, North American Cordillera, and Other Orogenic Belts. Conveners: John Wakabayashi, Wenjiao Xiao, Laura E. Webb. We seek contributions on aspects of the accretionary orogenesis of the Central Asian Orogenic Belt and the North American Cordillera. Comparative studies or research on either belt, or on other accretionary orogens, are welcome.

T4. Bridging Two Continents: Diamonds, Zircons and Native Elements in the Mantle: New Discoveries and Models on the Properties and Petrogenesis of Oceanic Mantle Lithosphere. Conveners: Yildirim Dilek, Paul T. Robinson, Juhn G. Liou, Jingsui Yang. Contributions on the processes of element fluxing, crust-mantle recycling, and petrogenetic evolution of the mantle, based on studies of ophiolites and oceanic lithosphere and using mineralogical, geochemical, and geodynamic data for modeling at nano, micro, and global scales are welcome.

T5. Bridging Two Continents: Geologic Configuration of the Tibetan Plateau Region Prior to the Indo-Asian Collision: Setting the Stage for Development of a High Elevation Plateau. Conveners: Amy L. Weislogel, Delores M. Robinson. Geoscientists from diverse disciplines will assess the complicated geologic record produced by successive tectonic collisions, with the aim of piecing together the geologic history that culminated in Earth's largest and highest plateau.

T45. Transforming the Life of the Geoscientist from Planning to Post-Submission: Cyberinfrastructure as an Agent of Change. Conveners: Simon Goring, Noah McLean. This end-user focused session will showcase the ways that science supported by EarthCube and other large-scale cyberinfrastructure projects will help shape and advance the research and outreach activities of geoscientists now and in the future.

T59. Advances in Crustal Geophysics and Tectonics: In Honor of G.R. Keller. Conveners: Kevin L. Mickus, Catherine M. Snelson, Dennis L. Harry. This session is to honor G.R. Keller, a leader in applying geophysics to solve tectonic and geoinformatic problems. He has used seismic and potential field data to investigate numerous tectonic environments (e.g., continental rifts, orogenic belts, and plateau uplifts) worldwide.

T63. Intraplate Earthquakes, Seismotectonics, and Geodynamics in Eastern and Central North America. Conveners: J. Wright Horton Jr., Christine A. Powell, Robert A. Williams. Intraplate earthquakes and seismic zones in eastern and central North America are poorly understood. The 2011

Virginia earthquake, technological advancements, EarthScope, and GeoPRISMS offer exciting research opportunities. We welcome contributions in any geoscience or engineering discipline.

T64. Rotations, Oroclinal Bending; Variscan-Alleghenian Nondipoles; Diagenetic Enigmatic Remagnetizations; Vignettes of Orogenies and Oceans: A Celebration of Rob Van der Voo's Career. Conveners: John W. Geissman, Joseph G. Meert. Our session honors the numerous contributions to the geosciences, involving a wide spectrum of scales and processes, by Professor Rob Van der Voo over his 45-year career at the University of Michigan.

T164. Magmatic Processes in Peridotites: Connection to Tectonics. Conveners: Gordana Garapic, John Wakabayashi, Ulrich Faul. Melting and melt segregation influences the dynamics of partially molten mantle and the chemistry of melt and residuum. Submissions are welcome on all aspects of mantle melting, including experimental, field, and modeling studies.

T167. Metamorphic, Metasomatic, and Igneous Processes in the Mid- and Deep Continental Crust: Mechanisms and Processes That Impact Mass Transport and Rheology. Conveners: G. Christopher Koteas, Callum J. Hetherington. Showcase the integration of field studies, with textural and compositional analysis, and modeling of processes in continental crust: This session will highlight mechanisms and processes that produce, transport, and modify the deep continental crust.

T169. The Extremes of Metamorphism. Conveners: Victor Guevara, Chris Yakymchuk, Besim Dragovic, Omar Bartoli. Extreme crustal metamorphism (UHT, UHP) informs us about fundamental Earth processes, but difficulties in quantifying such metamorphism remain. We encourage innovative approaches to understanding the hottest, deepest, shortest, longest, oldest, and youngest metamorphism on Earth.

T175. Oceans, Fire, and Ice of the Outer Solar System. Conveners: D. Alex Patthoff. We encourage abstracts relating to surface, structural, and tectonic processes; interior, and thermal evolution of solid bodies of the outer solar system; and planetary analogs. This includes experimental, observational, and theoretical approaches.

T198. Shale Gas Basins: Their Stratigraphy, Sedimentary Environments, Tectonics, and Structural Evolution (Posters). Conveners: Ibrahim Çemen, Jack C. Pashin, James O. Puckette, Denise J. Hills. This forum will facilitate discussion and exchange of ideas and encourage collaboration to help design research methods to test important questions related to different geological problems associated with shale-gas basins throughout the world.

T206. Constraints on Fault Constitutive Behavior from Nature, Lab, and Theory. Conveners: Phillip G. Resor, Johanna M. Nevitt, W. Ashley Griffith, Thomas M. Mitchell. In this session we seek contributions from studies of active deformation, exhumed faults, and laboratory experiments that characterize the range of fault constitutive behavior and the underlying physical processes and properties that govern fault slip.

T207. Folds and Folding: Earth's Surface to Depth. Conveners: Juliet G. Crider, Mary Beth Gray. We seek contributions on the kinematics and mechanics of folds, active or ancient, across the spectrum of rheology and scale, and the relationship of folding to tectonic history, active crustal deformation, and fluid migration.

T208. Perspectives on Orogenic Evolution, Dating Brittle Faults and Mylonitic Shear Zones, Bending Mountains, and Assembling Supercontinents: A Session to Honor the Career of Ben Van Der Pluijm. Conveners: Arlo Brandon Weil, Eric Tohver, Bernard Housen, Samuel Haines. This session honors the work of Ben van der Pluijm with a focus on the variety of temporal and spatial scales that Ben and his students work on to better understand the complex evolution of orogenic systems.

T209. Rheological Behavior of Ductile Lithosphere during Strain Localization. Conveners: Vasileios Chatzaras, Julie Newman, Basil Tikoff. This session seeks contributions from field-based, microstructural, experimental, and modeling studies that provide new insights on the deformation processes promoting strain localization and shear zone formation in the lower crust and upper mantle.

T210. Strike Slip Fault Systems Transfer Stress Inboard from the Subduction Zone Margin Leading to Basin Subsidence and Orogenesis, Are Conduits for Magmatism, and Are Responsible for Far-Traveled Terrane Translation. Conveners: Jeff Benowitz, John I. Garver, Michele Cooke. Strike-slip faults act to partition and transfer plate boundary stresses into the continental interior and are responsible for block translation. We seek contributions from all geologic and geophysical disciplines on the geodynamics of strike-slip faults.

T211. Structural Geology and Geomechanics in the Petroleum Industry. Conveners: J. Steve Davis, Peter Hennings. This session highlights structural geology and geomechanics research with strong petroleum industry applicability. Topics include regional structural analysis, computational and kinematic deformation modeling, fracture and fault characterization, and the interaction of buoyant fluids with geologic structures.

T212. Deconstructing Rodinia: Neoproterozoic-Cambrian Geologic Evolution of Laurentia's Margins. Conveners: Chris Holm-Denoma, Arthur J. Merschat. This session aims to bring together scientists with broad interests and ideas regarding the breakup of Rodinia and its impact on the geosphere and biosphere, especially in regard to the Neoproterozoic-Cambrian geologic evolution of Laurentia's margins.

T214. Mountains across the Oceans: Caledonian, Variscan, and Appalachian Orogenies through Time.

Conveners: Jeffrey Marsh, Loic Labrousse, Nicolas Pinet, Stacia M. Gordon. This session seeks abstracts concerning the Caledonian, Variscan, and Appalachian orogens and aims to have a wide variety of geologic subdisciplines represented, with work from geologists, geophysicists, and modelers.

T215. Novel Methods, Applications, and Data Interpretations in Thermochronology. Conveners: Alexis K. Ault, William R. Guenther. This session highlights new thermochronometers, novel applications of existing thermochronometers, and innovative approaches to interpreting complex datasets. Contributions addressing a range of geologic questions and from the high to low temperature thermochronology communities are encouraged.

T217. Rift-Drift, Seafloor Spreading, and Subduction Zone Tectonics of Collisional Orogens: Comparative Analysis of the Circum-Mediterranean and Appalachian-Caledonian Orogenic Belts. Conveners: Andrea Festa, Yildirim Dilek. Contributions presenting new geological, geochemical, geochronological, and geophysical data and tectonic models from the Circum-Mediterranean and Appalachian-Caledonian orogenic belts are welcome in order to discuss processes involved in different stages of their collision-driven geodynamic evolution.

FIELD TRIPS



Left, deformed clasts in the Neoproterozoic Rockfish Conglomerate, Blue Ridge province, Virginia, Trip 403 (photo: Chuck Bailey). Right, fishmouth boundins in the Rockford Park Gneiss, Central Appalachian piedmont, Delaware, Trip 415 (photo: Sandy Schenck).

Pre-meeting:

403. From the Freezer to the Fire: Neoproterozoic Tectonics, Glaciation, and Volcanism in the Central Appalachian Blue Ridge Province. Thurs.–Sat., 29–31 Oct. Leaders: Christopher Bailey, College of William & Mary; Callan Bentley; Scott Southworth; Alan J. Kaufman.

415. The Tectono-Thermal Evolution of the Central Appalachian Orogen: Accretion of a Peri-Gondwanan(?) Ordovician Arc. Sat., 31 Oct. Leaders: Howell Bosbyshell, West Chester University; LeeAnn Srogi; William S. Schenck; Gale C. Blackmer.

Post-meeting:

425. A Billion Years of Deformation in the Central Appalachians: Orogenic Processes and Products. Wed.–Fri., 4–6 Nov. Leaders: Steven J. Whitmeyer, James Madison University; Christopher M. Bailey; David B. Spears.



Recumbently-folded Edinburg Limestone on the South Fork of the Shenandoah River, Trip 425 (photo: Steve Whitmeyer).

GSA Structural Geology and Tectonics Division Management Board Meeting Minutes

Monday, 20 October 2014, 11:30 AM-1.30 PM

Great Bear Resources board room, Suite 302, 750 West Pender Street, Vancouver BC

Prepared by Yvette Kuiper, Secretary/Treasurer of the GSA SG&T Division

Attending:

Chuck Bailey, Hal Bosbyshell, Kurt Burmeister, Elizabeth Catlos, Jean Crespi, Levi Crooke, Dyanna Czeck, Jim Evans, Dan Gibson, Yvette Kuiper, Andrew Meigs, Enrique Reyes, Sarah Roeske, Chris Tallackson

1. Welcome and Introductions – Andrew Meigs (outgoing Division Chair)

2. Financial status of the Division – Yvette Kuiper

The fiscal year ended (June 30) with ~\$18K in our operating account and ~\$68K in the Student Fund. Over the past year, income for the division from dues has decreased since student memberships became free instead of \$5. Our expenses gradually increase. Most of them go to awards for students, and more students are applying for GSA field trip and short course funds. We currently fully fund all student and field trip and short course requests that meet the criteria and the board would like to continue this practice as long as it makes fiscal sense. We also supported the 2014 Structural Geology and Tectonics Forum with \$2K and may do that again in the future. We decided to increase our membership annual fee by \$2 to offset the loss of student membership income. Our aim is to spend ~\$3K for student field trip and short course support and ~\$2K for student travel grants next year, which is about the same as we spent in 2013 and 2014.

Elizabeth Catlos (GSA Council Member, Liaison to the Division) noted that GSA anticipates increasing membership dues in the next year or two in order to raise money for open access publication. Currently about 40% of revenue comes from publications, which is going away. This is something to keep an eye on.

3. GSA Foundation discussion – Chris Tallackson (GSA Director of Development)

We asked Chris Tallackson to join our board meeting to advise us on how to more effectively raise money for our student fund. Chris informed us on how the Foundation has a new policy on working with Divisions and Sections by (1) assisting them by holding funds that are established and managing the money, and (2) helping with fundraising strategies. He recommended that we align our fundraising goals with those of GSA. Student support for field trip and short courses is in line with GSA goals. Other examples of GSA fundraising goals are the 'On to the Future' program, education/outreach and Geocorps, the Teacher Advocacy program, and Earthcache. In our fundraising efforts, we could make use of the GSA directory of corporate support. Chris also advised us that the recommendation is to have \$50K in a Foundation Fund before money is taken out, which is less than the \$80K we were aiming for. As we have passed the \$50K, we will start using investment earnings to support students on field trips and short courses in the future, which will yield ~2,500 per year (5% of our Student Fund).

4. Student research, short course, field trip support – Sarah Roeske (incoming Division Chair) and Jean Crespi (incoming Division Vice-Chair)

Every year, we are sent the names of the top five or six Graduate Student Research Grant applicants. Currently we support each of these students with a \$500 travel grant to a GSA meeting, which they can use in the same year or the year after. This past year we adjusted the application deadline for student

applications for GSA short course and field trip support, so that it is better coordinated with the GSA abstract and early registration deadline. All worked very well and we decided to keep all as it is.

5. Membership communication – Kurt Burmeister (Facebook Guru), Hal Bosbyshell (Newsletter Editor)

We currently have 139,000 people linked to the Division Facebook page and about 300-500 visits per day. We will make an effort to increase comments from US membership by increasing our content based on the division, such as stories and pictures from students, e.g. based on their GSA field trip and short course experiences. We will start making more use of GSA's Connected Community. Last year, we had only one newsletter because of the change in newsletter editor (welcome Hal Bosbyshell, and thank you Dave West!), but we will continue with a biannual letter.

6. Joint Technical Program Committee (JTPC) – Dan Gibson

This year there were more than 60 topical sessions sponsored by the Division. Chuck Bailey is the incoming lead JTPC member. Next year we need to identify a keynote speaker. We discussed the idea of offering this honor to the Career Contribution Awardee.

7. Outstanding Publication Award (OPA) committee – Dyanna Czeck

Committee members are Dyanna Czeck (outgoing chair), Paul Karabinos (incoming chair) and Juliet Crider.

The main challenge of this committee is that there are never enough nominations. Perhaps we can ease the nomination process. Problems are: (1) OPA nominations from previous years do not roll over from previous year as the CCA nominations. Options to improve this include changing the rules or encouraging nominators to resubmit their nominations. (2) CCA and OPA deadlines are currently not the same and should be made the same.

8. Career Contribution Award (CCA) committee – Andrew Meigs

The committee consists of Jane Gilotti (outgoing chair), Daniel Stöckli (incoming chair) and one member to be recruited.

This award also could use more nominations. Only one woman ever received this award. Something to remember when considering nominees?

9. Stephen E. Laubach Structural Diagenesis Research committee – Andrew Meigs

Members are: Whitney Behr, and SGTD member to be recruited, and two Sedimentary Geology Division members.

10. Nominating Committee – Andrew Meigs

Every year we need new members for our OPA, CCA, Laubach and JTPC committees, for Second Vice Chair, and occasionally for Secretary/Treasurer. Since you have made it to the near-end of these minutes, you are obviously interested in the Division. Consider nominating yourself!

11. Other topics – Andrew Meigs

There will be an GSA/EGU paired session: "Mountains across the oceans: Caledonian, Variscan and Appalachian orogenies through time" convened by Loic Labrousse (EGU) and Stacia Gordon (GSA).

George Davis mentioned earlier to us that for the next year's national GSA meeting the theme is 'William Smith' – honoring the geologist who made the first national geology map (of Great Britain). GSA hopes that there will be Division-conceived and Associated-Society-conceived 'Smith Sessions'.

This fits well with the ‘interest groups’ GSA is trying to establish across boards. We could approach other GSA Divisions to discuss this.

12. Adjourn

The meeting was adjourned at 1.30 pm.

SG&T 2014 Annual Business and Awards Meeting



Join us for more fun in Baltimore (November 1 – 4)!
The SG&T Reception Business and Awards Meeting is scheduled for Tuesday, Nov. 3.

NSF NEWS

EAR Welcomes the new Division Director Dr. Carol Frost



Carol Frost joined the Earth Sciences Division as on December 15, 2014. Carol has been a professor in the Department of Geology and Geophysics at the University of Wyoming since 1983, and has served the university in various administrative roles including associate provost, associate vice president for research, and vice president for special projects. Her research focuses primarily on granite petrogenesis and the evolution of the continental crust, but she has also developed isotopic fingerprints for ground and surface waters including those co-produced with hydrocarbon resources. Cambridge University Press published her co-authored textbook, *Elements of Igneous and Metamorphic Petrology*, earlier this year. She is former science editor of *Geosphere*, was CASE Professor of the Year for the University of Wyoming, and has been awarded the University of Wyoming's highest faculty prize, the George Duke Humphrey Award. She is enthusiastic to represent the Earth Science community and advance basic geoscience research and education as the Division Director for the Earth Sciences Division.

Recent Awards From the Tectonics Program (FY 2014 made from Oct. 1, 2013 to Sept. 30, 2014)

The Socorro Magma Body: Surface Uplift History and Crustal Dynamics

Award: 1348076 Axen (New Mexico Institute of Mining & Technology)

Enhancing Diversity in the Geosciences by Testing the Rigidity of the Eurasia Plate Using GPS

Award: 1347561 Bennett (University of Arizona)

What Causes UHT Metamorphism: Lengthscales and Timescales

Award: 1348003 Hacker (University of California Santa Barbara)

Collaborative Research: Plio-Quaternary History of Basin Evolution, Climate Change, and Fold Growth in the Qaidam Basin-Investigating Wind-enhanced Climate-Tectonic Feedback

Award: 1348075 Heermance (California State University Northridge)

Award: 1348005 Garzione (University of Rochester)

Climatic and Tectonic Insights from Low-Temperature Thermochronometry Across the Himalayan Rain Shadow, Everest Region, Nepal and Tibet

Award: 1346360 Hodges (Arizona State University)

Rapid Miocene Thrust Propagation and Wholesale Basin Partitioning along the Central and Southern Andes, Argentina

Award: 1348031 Horton; McKenzie (University of Texas Austin)

Significance of Newly Discovered Subduction Complex, Including Partially Serpentinized Mantle Peridotite, Southwest Arizona

Award: 1347954 Jacobson (Iowa State University)

Origin and Vertical Extent of Damage Zones Around Continental Strike-slip Faults

Award: 1347087 Johnson (University of Maine)

Collaborative Research: The Age of Grand Canyon: Applying New Tests to Resolve the 150-year-old Debate

Award: 1348007 Karlstrom (University of New Mexico)

Award: 1347990 Shuster (Berkeley Geochronology Center)

Building India: Clues from the Singhbhum Craton & Southern India

Award: 1347942 Meert (University of Florida)

Collaborative Research: Evaluating the Influence of Crustal Deformation on Episodic Magmatism: Southern Coast Mountains Batholith, British Columbia

Award: 1347212 Rusmore (Occidental College)

Award: 1347219 Cecil (California State University Northridge)

Award: 1347341 Stowell (University of Alabama Tuscaloosa)

Award: 1347375 Gehrels (University of Arizona)

CAREER: Investigating Controls on Arc Flare-ups and the Growth of Lower Continental Crust

Award: 1352021 Schwartz (California State University Northridge)

Collaborative Research: Deformation-induced Hydration of Peridotite Mylonites in Nature and Experiments

Award: 1347696 Warren (Stanford University)

Award: 1347309 Teyssier (University of Minnesota Twin Cities)

Collaborative Research: Interrelations Between Foreland Deformation and Flat-slab Subduction: Integrated Analysis of the Sierras Pampeanas to Cordillera of the South-central Andes

Award: 1347604 Weil (Bryn Mawr College)

Award: 1347558 Yonkee (Weber State University)

Collaborative Research: A Detrital Zircon Record of California Arc Magmatism

Award: 1348059 Barth (Indiana University)

Award: 1347957 Jacobson (Iowa State University)

Award: 1347985 Surpless (Trinity University)

Award: 1348078 Clemens-Knott (California State University Fullerton)

Collaborative Research: Development of Hematite (U-Th)/He Chronology to Directly Date Fault Slip and Ancient Seismicity

Award: 1419828 Ault (Utah State University)
Award: 1419897 Shuster (Berkeley Geochronology Center)
Award: 1419745 Reiners (University of Arizona)

Collaborative Research: Heterogeneous Rupture of Great Cascadia Earthquakes Inferred from Coastal Subsidence Estimates

Award: 1419844 Engelhart (University of Rhode Island)
Award: 1419846 Hawkes (University of North Carolina Wilmington)
Award: 1419824 Horton (Rutgers University New Brunswick)

Collaborative Research: Investigating the Sedimentary Record of Differing Modes of Flat-Slab Subduction

Award: 1419683 Finzel (University of Iowa)
Award: 1419790 Enkelmann (University of Cincinnati)

Collaborative Research: Structure and Quaternary Kinematics of Amagmatic Rifting in the Central Afar Triple Junction

Award: 1419906 Gomez (University of Missouri Columbia)
Award: 1420054 Tesfaye (Lincoln University)

Collaborative Research: Incorporation of Metasedimentary Rocks into the Deep Levels of Continental Arcs: Insights from the North Cascades

Award: 1419810 Gordon (University of Nevada Reno)
Award: 1419787 Miller (San Jose State University)

Collaborative Research: Proterozoic Mountain Building and Collapse, Eastern Adirondacks, New York

Award: 1419852 Grover (Castleton State College)
Award: 1419876 Williams (University of Massachusetts Amherst)

Collaborative Research: Did the Pamir Gneiss Domes and Salient form by Northward Underthrusting of India or Southward Subduction and Rollback of Asia?

Award: 1419748 Kapp (University of Arizona)
Award: 1419751 Hacker (University of California Santa Barbara)

Collaborative Research: Investigating Slip Distribution over Multiple Timescales across the Central Walker Lane: Implications for the Evolution of an Active Tectonic Plate Boundary

Award: 1419809 Langille (University of North Carolina Asheville)
Award: 1419808 Lee (Central Washington University)
Award: 1419855 Sharp (Berkeley Geochronology Center)

Fabric Evolution and the Development of Ductile Shear Zones

Award: 1419826 Montesi (University of Maryland College Park)

Collaborative Research: Deciphering Subduction Dynamics: Case Study of the Catalina Schist

Award: 1419871 Penniston-Dorland (University of Maryland College Park)

Collaborative Research: Deciphering Subduction Dynamics: Case Study of the Catalina Schist

Award: 1419865 Kohn (Boise State University)

Active Tectonics of the Africa-Eurasia Zone of Plate Interaction in the Western Mediterranean

Award: 1419854 Reilinger (Massachusetts Institute of Technology)

Collaborative Research: Quantifying Laurentia's Motion, Advancing Paleogeography and Constraining Rifting with New Paired Dates and Paleomagnetic Data from the Midcontinent Rift

Award: 1419894 Swanson-Hysell (University of California Berkeley)
Award: 1419822 Bowring (Massachusetts Institute of Technology)

Collaborative Research: Neotectonics and Structural Development of the Northern Walker Lane

Award: 1419724 Wesnousky (University of Nevada Reno)

Award: 1419789 Owen (University of Cincinnati)

Building the Precambrian Laurentian Core of the North American craton: Resolving the Age and Tectonic Setting of the Snowbird Tectonic Zone of Canada

Award: 1419843 Williams (University of Massachusetts Amherst)

The Wegener Fault, Nares Strait: Myth or Reality?

Award: 1432970 Gilotti (University of Iowa)

RAPID: GPS and InSAR Observations in Bolivia and Chile of the Co-seismic and Post-seismic Deformation Associated with the 1 Apr, 2014 Mw 8.2 Pisagua, Chile, Earthquake

Award: 1443317 Foster (University of Hawaii)

RAPID: GPS Observations of Co- and Post-seismic Deformation in the Argentine Puna from the 1 Apr 2014, Mw 8.2, Pisagua, Chile, Earthquake Sequence

Award: 1444233 Smalley (University of Memphis)

RAPID: Investigation of Co-seismic Surface Cracks Produced during the April 1, 2014, Magnitude 8.2 Pisagua, Chile, Earthquake

Award: 1443410 Allmendinger (Cornell University)

Microstructural Analysis and EBSD Applications in Earth Sciences (workshop)

Award: 1406054 Leech (University of San Francisco)

Structural Geology and Tectonics Forum at the Colorado School of Mines, Golden, CO, June 16-18, 2014

Award: 1439508 Kuiper (Colorado School of Mines)

Support for 2014 Gordon Research Conference and Gordon Research Seminar on Experimental Rock Deformation

Award: 1437343 Zhu (Gordon Research Conferences)

Student Support for participation in a Penrose Conference - Linkages and feedbacks in orogenic processes: a conference honoring the career of Robert D. Hatcher, Jr.

Award: 1419397 Stowell (University of Alabama)

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