STRUCTURAL GEOLOGY AND TECTONICS DIVISION
Newsletter

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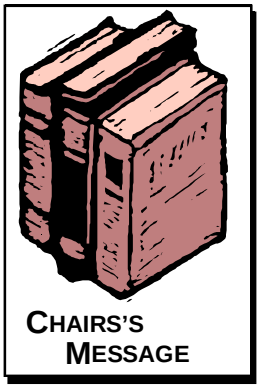

Chair's Message –

Looking back at Structural Geology and Tectonics in 2007

Welcome to the spring newsletter of the GSA Structural Geology and Tectonics Division. You, the membership, have been very active, once again constituting the largest GSA division (1729 members in 2007), up 60 members and 53 student members from 2006. The annual meeting in Denver brought out many of our division members, with 327 abstracts presented, up from 241 abstracts presented in Philadelphia in 2006.

At the division level, we had a very productive year as Bill Dunne moved with lightning speed to motivate a complete revamping of our bylaws. One element left for the 2007 GSA Annual Meeting was the definition of Structural Geology and Tectonics. After input from many individuals before, during and after the meeting, the following definition has evolved, and will find its way into our bylaws:

"Structural geology and tectonics are the investigation of the geometry, kinematics, and dynamics of deformation in natural materials at all scales. These investigations are frequently field-based and draw on remote observations, experimental work, and computer simulations. They are commonly interdisciplinary, involving other geoscientists, scientists and society members. The investigations increase the basic understanding of geological processes, hazards, and resources, thus contributing to the well being of society."

Over the last 6 months, our long-term secretary/treasurer, Peter Vrolijk, has moved to other roles, leaving the division in excellent economic condition, with a net income of $2058.26 for the year and a balance of $22,831.58 in unrestricted assets. Mary Hubbard has taken over the division's secretarial and financial roles. Bill Dunne has moved into the role of past-chair, Claudia Lewis has moved into first vice-chair, and Michele Cooke has entered the board as second vice-chair. Carol Simpson and Peter Geiser have joined the Career Contribution and Best Paper award committees, respectively.

Looking toward the fast-forward year of 2008

In all my years as a structural geologist, I have never seen such demand for the multi-layered expertise of our disciplines. As energy and mineral resources become scarcer, demand for structural geologists has become all the more critical to produce the fuel and materials that run the world. In the tectonic

arena, collaborations with our geophysical and petrologic colleagues in big-think projects like EarthScope, the geosciences' own "Hubble telescope" focusing down on the U.S., provide amazing new opportunities. This demand for our talents has had ripple effects in all the fields, with universities opening new faculty positions in anticipation of future demand, and environmental companies, who have long treasured the integrative skills of our profession, increasing salaries and offering signing bonuses. Scarcity seems to be driving everything faster – offers from companies for our graduate students come earlier each year and demands for professionals make under-employed SGT consultants a rarity.

Along with these opportunities come a multitude of opportunities to attend general and specialist meetings focusing on the full spectrum of pure to applied aspects of our science. GSA has also contributed to speeding the pace of our lives by both setting deadlines for and holding the upcoming GSA Annual Meeting a month earlier than normal. Luckily, our new Program Committee jumped on the task of encouraging submissions. The results are impressive, with SGT sponsoring 1 Penrose Keynote session on large-scale continental tectonics, 32 topical sessions, 5 field trips, and 5 short courses as well as collaborative offerings from our colleagues in the Gulf Coast Association of Petroleum Societies. I think this is exactly where GSA needs to position itself, as a bridge between the applied and the theoretical, a bridge where both are fully valued.

Eric Erslev, Fort Collins, CO

Attention Students--Free $$$

Student members of the SG&T Division are eligible to apply for grants to supplement the cost of field trips and short courses associated with the upcoming GSA Annual Meeting in Houston.

Applications should be sent to Eric Erslev erslev@warnercnr.colostate.edu***. Include your name, institution, class, specialty, poster or talk title, field trip title, and indicate why the field trip or short course is important to your research/professional development.***

Deadline: September 1.

Division Members

If you're doing great stuff, we want to hear about it! When news happens, let us know! Send your updates and announcements to your friendly SG&T Newsletter co-editors, Tim Wawrzyniec tfw@unm.edu or Barb Sheffels barbsheffels@comcast.net. If we can't print it, SGT webmaster Kevin Smart ksmart@swri.org can put it on the web page!

Minutes of GSA Structural Geology and Tectonics Division Management Board Meeting October 30, 2007, Denver, CO

Board members present: Bill Dunne (Chair), Eric Erslev (1st Vice-Chair), Claudia Lewis (2nd Vice-Chair), John Geissman, Peter Vrolijk (Secretary-Treasurer), Mary Hubbard (incoming Secretary-Treasurer), Kevin Smart, Peter Copeland, Darrel Cowan

1. Announcements
   - Minor changes to Structure and Tectonics Divisions Bylaws and Rules and Regulations
   - Peter Vrolijk provided a status report of the past year's budget. For the year ending June 30, 2007 Division Dues had brought in $9288. There was a net income of $2058.26 for the year leaving a balance of unrestricted assets at $22,831.58.
   - John Oldow provided report from Best Paper Award committee stating that Eric Erslev had been given some suggestions for names of new committee members and that there has been a change in the requirement regarding the age of the paper to be considered – there is NO age restriction for the paper being nominated.
   - John Platt gave report from the Career Contribution Award committee stating that they are in need of new committee member nominations
   - Kevin Smart reported for the website and newsletter that there will be an effort to have both an NSF and a PRF report included in the newsletter, they are working on improving the "gossip section" and that they would like to include EarthScope news
   - The next year's meeting is in Houston, and it was discussed by all that this location has benefits with the concentration of energy industry companies and that we should make use of that for the benefit of our students. An ExxonMobil-sponsored structural geology short course is a possibility.

2. Division Topics
   - Eric and Bill presented some ideas about the definition of a Division – it was proposed to distribute the current definition for discussion and comment
   - John Geissman provided update on a new journal recommendation proposed for January 2009 – one possible title proposed was "Structure and Dynamics of the Lithosphere"
   - Discussion was held regarding the increasing entertainment costs for the SGT Management Board lunch and the evening business meeting. It was suggested that off-site locations be investigated for the Houston SGT management meeting. Peter Vrolijk was setting up a collection pot for the business meeting beer social.
   - Bill Dunne announced that the will be a GSA Foundation gift account to support professional development of student members for the SG&T Division/

3. Other Business
   - Darrel and John presented a report from the Council. Globalization had emerged as a topic.

NSF NEWS

Directorate for Geosciences, Division of Earth Sciences

The Division of Earth Sciences (EAR) supports research and education in most areas of the solid-Earth and surficial-terrestrial sciences. Emphasis is on the support of basic research aimed at improving our understanding of the Earth's structure, composition, natural processes, evolution, paleobiology, and interactions with the Earth's biosphere, atmosphere, and hydrosphere. In addition, EAR provides support for instrumental and observational infrastructure and encourages innovative educational activities in the earth sciences.

The research programs and activities in the EAR Division are organized into two areas: core research and special emphasis. Core Research programs support research in the following areas: the solid Earth, with emphasis on our understanding of the Earth's dynamic behavior and structure; surficial-terrestrial research, which deals with processes related to the Earth's environmental envelope and near-surface phenomena; and instrumentation and facilities and education, which focuses on the development and acquisition of instrumentation for the research community and educational aspects of the earth sciences. Special Emphasis areas include research directed toward special scientific opportunities that accommodate the changing needs of the scientific community. This research is often interdisciplinary or multidisciplinary in character or focuses on newly emerging areas of the earth sciences.

Tectonics Program (NSF 06-544)

The Tectonics Program (TE) supports a broad range of field, laboratory, computational, and theoretical investigations aimed at understanding the evolution and deformation of continental lithosphere and how deformational processes have modified the lithosphere through geologic time. Because understanding such large-scale phenomena commonly requires a variety of expertise and methods, TE supports integrated research involving the disciplines of structural geology, petrology, geochronology, sedimentology, stratigraphy, geomorphology, rock mechanics, paleomagnetics, geodesy, and other geophysical techniques. Proposals to elucidate the processes that act on the lithosphere at various time-scales, either at depth or the surface, are encouraged.

Full proposal target dates are June 1 and December 1 annually. Contact persons are Stephen Harlan, Program Director, Rm. 785 S, (703) 292-8552, sharlan@nsf.gov and David M. Fountain, Program Director, Rm. 785 S, (703) 292-8552, dfountai@nsf.gov.

Please note that the Tectonics Program Solicitation (NSF 06-544) can be found at the following URL: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf06544.

Continental Dynamics Program (NSF 04-512)

The Division of Earth Sciences (EAR) will consider proposals for multidisciplinary research that focuses on an improved understanding of the processes governing the origin, structure, composition, and dynamical evolution of the continents and continental building blocks. The program is particularly oriented toward projects whose scope and complexity require a cooperative or multi-institutional approach and multi-year planning and execution. The intent of the program is to fund only relatively large projects that do not fit easily within other Earth Sciences programs and that have broad support of major sections of the Earth Science community. Proposal due date is November 15, 2008. Contact: Leonard Johnson, (703) 292-8559, lejohnso@nsf.gov

The Continental Dynamics Program Solicitation can be found at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf04512

EarthScope Program (NSF 06-562)

EarthScope is an Earth science program to explore the 4-dimensional structure of the North American continent. The EarthScope Program provides a framework for broad, integrated studies across the Earth sciences, including research on fault properties and the earthquake process, strain transfer, magmatic and hydrous fluids in the crust and mantle, plate boundary processes, large-scale continental deformation, continental structure and evolution, and composition and structure of the deep-Earth. In addition, EarthScope offers a centralized forum for Earth science education at all levels and an excellent opportunity to develop cyberinfrastructure to integrate, distribute, and analyze diverse data sets.

The nucleus of the Program is the EarthScope Facility, consisting of the Plate Boundary Observatory (PBO), the San Andreas Fault Observatory at Depth (SAFOD), and the USArray. The EarthScope Facility is a

multi-purpose array of instruments and observatories that will greatly expand the observational capabilities of the Earth Sciences and permit us to advance our understanding of the structure, evolution and dynamics of the North American continent. The Facility is designed to continually incorporate technological advances in geophysics, seismology, geodesy, information technology, drilling technology, and downhole instrumentation. This Solicitation calls for single or collaborative proposals to conduct scientific research associated with the EarthScope Facility and support activities that further the scientific and educational goals of EarthScope.

Proposal deadline is July 16, 2008. Contact person: Kaye Shedlock, (703) 292-4693, kshedloc@nsf.gov

The solicitation can be found at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf06562

Petroleum Research Fund News
2008 Changes in PRF Research Grant Programs

The ACS Petroleum Research Fund is a source of support for "fundamental research in the petroleum field," and has funded research grants in the geosciences, chemistry, materials science, and petroleum engineering since 1954. ACS PRF is an endowed fund administered by the American Chemical Society, and the annual grant budget derives from the proceeds of stocks and bonds; there is no connection between ACS PRF and the petroleum exploration companies.

For the past five years, the total ACS PRF research budget has been $25-30 million per year, with grant funding proportionally divided between PRF-supported research areas (the amount awarded to each area is based on proposal volume). ACS PRF receives 200-260 geoscience proposals per year, resulting in a grant budget of $2.6-3.9 million per year for research in geochemistry and geology.

Beginning in 2008, some changes have been made in the ACS PRF grant programs, to eliminate "continuation research" proposals, and to modify the review procedures for submitted proposals. ACS PRF continues to provide "starter grants" for new researchers, as well as support for petroleum-relevant research at both Primarily Undergraduate Institutions and Research-Intensive Universities. These grants are designed to enable an investigator to obtain the initial "proof-of-concept" data set required for proposals to other agencies which support continuing research programs. Previously, PRF proposal types were a confusing mix of letter designators deriving from formerly consolidated and/or discontinued grant programs. These programs no longer exist and have been replaced by grants having more logical names. The table below lists the current ACS PRF grant types:

Grant Type	**Grant Amount**	**Grant Length**	**Total Grants Per Year***	**Proposals Considered**
New Directions (ND)	$100K	2 Years	~ 100	Sept., Feb., May
Doctoral New Investigator (DNI)	$100K	2 Years	~ 90	Sept., Feb., May
Undergraduate Research (UR)	$65K	3 Years	~ 45	Jan., June
Undergraduate Faculty New Investigator (UNI)	$50K	2 Years	~ 45	Jan., June
*** Number of grants includes *all* disciplines supported by ACS PRF (chemistry, geosciences, engineering, materials sciences)**				

The New Directions and Doctoral New Investigator grant programs are for faculty at departments which offer the doctoral degree. These proposals receive external peer review before being considered by the PRF Advisory Board, which meets in late September, early February, and late

May. The intent of New Directions (ND) grants is to stimulate *new* research projects by established faculty, enabling an investigator to pursue a research direction that has not been previously funded or published in a refereed journal. ND grants are intended to lead to subsequent proposals to other agencies which offer continuation research funding. Doctoral New Investigator (DNI) grants are "starter grants" to scientists or engineers within the first three years of their first academic appointment. These grants should enable new PIs at doctoral degree-granting departments to establish an original research direction, which may then be supported by other agencies offering continuation funding for research. "Original research" is defined as being different from that previously performed by the PI as part of their graduate or postdoctoral studies.

The Undergraduate Research and Undergraduate New Investigator grants are limited to faculty in departments which do not offer the doctoral degree. Undergraduate Research (UR) grants support student-oriented research involving undergraduates, in academic departments which do not award the doctoral degree. Master's degree students may be supported on UR grants, if the M.S. is the highest degree awarded by the department of the Principal Investigator, and if undergraduates are also involved in the research program. Undergraduate Faculty New Investigator (UNI) grants are "starter grants," similar to the DNI grants discussed above, but UNI proposals are limited to new investigators at departments which do not offer the doctoral degree.

For 2008, there are two Requests For Proposals per year for Type UR and UNI grants, with these proposals evaluated by expert panel panels meeting in mid-January and mid-June. Our hope is to receive the same total number of UR and UNI proposals per year as the prior Types B and GB grants, to improve the review process. For example, in previous PRF Advisory Board meetings, some committees were asked to fund "30 percent" of only two submitted proposals. Our hope is that dividing the yearly total proposal submissions between two panels will lead to better evaluation of these proposals, as the review panels will have more proposals to evaluate at any panel meeting.

Proposals to ACS PRF must be fundamental and not "applied research." The PRF Website (http://www.acsprf.org) has a listing of areas deemed by the PRF Advisory Board to be applied research. For the geosciences, the following areas have been deemed applied, and thus outside the scope of PRF: Pollution and environmental remediation studies, research on anthropogenic effects of petroleum, and groundwater hydrology.

All applicants for ACS PRF funding must provide a 100-word statement of the "petroleum-relevance" of their research as part of the electronic submission process for research proposals. For New Directions proposals, the Principal Investigator must also include a one-page description of their current research and how this proposal is a "new and innovative area" of research for the PI, as part of their proposal.

For questions concerning the relevance of research topics to the ACS PRF guidelines, or any other inquiry about geoscience proposals, please contact the Program Manager for geology and geochemistry, Dr. Dean A. Dunn, by email d_dunn@acs.org or telephone (202-872-4083).

Division Members

Do you have a suggestion for a GSA Annual Meeting short-course?

Send your requests and ideas to the Short Course Committee Chair Claudia Lewis at clewis@lanl.gov. She can help get you started on the short course proposal process!

We are always looking for good courses, so contact Claudia anytime!

STRUCTURAL GEOLOGY AND TECTONICS DIVISION
2007 BEST PAPER AWARD
Presented to Dave Pollard and Ray Fletcher
Citation by Peter Geiser

I have been given the honor of presenting the 2007 Division of Structural Geology and Tectonics best paper award to Dave Pollard and Ray Fletcher for their text, "The Fundamentals of Structural Geology." I also feel that this is a bit like being given the honor of being between a rock and a hard-place as our community seems to be in the midst of what I'd like to think of as a constructive tension. A tension between those whose work and teaching emphasizes geometry and kinematics, to which group I confess to belong, and those, such as Dave and Ray, advocating a greater emphasis on mechanics.

From an historical perspective, Structural Geology is no different than any other natural science, moving from an initial descriptive phase full of classifications and nomenclature towards a more quantitative manifestation and the working out of first principles. As with all things human there's always a bit of rancor that attends this process. In fact Dave and Ray citing the *eminence grise* Bruno Sander who proposed that "we set aside much of the physics in our initial study of rock deformation and focus exclusively on kinematics," then go on to note that although a prominent school of structural geologists continue to follow this approach, they, Dave and Ray, are not members of this academy.

Of course a lot of this has to do with how much math and physics you've had and how comfortable you are with these tools. The problem with math and physics is that they are so abstract! And as Samuel Johnson chose to demonstrate, what's more real than a rock? Also many of us derive great pleasure in working out the often intricate geometric puzzles that describe the history and physical appearance of our beautiful planet that moves in such mysterious ways.

Yet as I think we will all admit, the descriptive phase even in its more quantitative manifestations takes us only so far. And after all, science is fundamentally about first principles, the How, rather than the "what is it?"

If you will indulge me, I would like to describe my own moment of epiphany about first principles, where, like Lawrence Fehrlinghetti I encountered that penny candy store beneath the El, the place where I first fell in love with unreality and a girl ran in and her hair was rainy and a voice said "too soon, too soon."

So far, far away and a long time ago (1961) I was serving as a field assistant to a U Mass graduate student, John Pepper. There we were in deepest, darkest New Mexico attempting to map the apparent chaos of the Tinnie fold belt, where the San Andres Limestone detaches on the Yeso formation forming an incredible tangle of rock. On the day of epiphany John and I were slowly mapping our way up one of the nameless arroyos that dissect the area. Suddenly, like the opening of a theater curtain, our arroyo widened into what seemed like a giant amphitheater at the head of which was cliff perhaps 50 to 100 meters high displaying a structure that made us gasp in disbelief. Massive limestone beds on the order of 5 m thick were folded like toothpaste forming vertical isoclinal folds the height of the cliff. Neither of us had ever seen nor read of such fabulous creatures, how could such things be? How could rocks, which at most saw 100^{o}C, act like toothpaste? It seemed impossible yet there it was. The description, the "What", was clear. The "How" was a total mystery, a seeming physical impossibility which we could not explain.

So I think we're all on the same page with regard to what constitute the truly fundamental and in some ways, the most interesting questions of our science; the How question, that of the so-called "first principles"" as described by physics and its attendant mathematics. The problem is that structural geology has lacked a formal pathway into this arena.

To me such pathways have two major properties. First the discipline itself is taught in terms of the Math and Physics that describe it, i.e. as an integral part of the subject, not a passing reference. Secondly it is begun at the undergraduate level, because that's where you have to start. Take the abstract and make it real, the sooner the better.

So where does this leave Structure? I feel that up to now there has been only one text that truly advanced the use of mathematics in structure and that is Ramsay's "Folding and Fracturing of Rock." To my mind what makes Ramsay's contribution seminal is the clarity and depth of the integration of the mathematics with real rocks and with its immediate application to field problems. Instead of having random equations appearing out of nowhere, Ramsay develops the equations before your very eyes.

Dave and Ray take this approach several steps further, starting with elementary field techniques and relatively elementary mathematics, they proceed through virtually the full scope of structural geology, developing the requisite math and physics en route. And they really do develop it. Not only do they write with clarity, you can actually learn mathematics and physics from their text, but like Ramsay they make explicit the relationship between the abstraction of the math and physics and the real world of structural geology.

I'd like to close by returning to the earlier Sander citation. It's worth noting that not only is it highly recursive, Dave and Ray citing Sander citing Becker citing none other than Lord Kelvin, so in the end the proponent of the study of kinematics turns out to be a very eminent physicist. Further, in this very same quote Kelvin goes on to say that kinematics, although important, is only "to be considered as a first step." The implied second step being the working out of first principles through mechanics. Thus there is a spirit of harmony in the Kelvin quote with respect to kinematics and mechanics; to understand physical phenomena you must first be able to describe them.

Well perhaps it's time for Structural Geology to take that second step towards first principles more seriously, perhaps making it an integral part of its discipline, perhaps moving towards making it its very basis. I would like to suggest that with the advent of Pollard and Fletcher's text, structural geology now has a tool for making such a project a reality and it is for this reason that it is my great pleasure to present them with the Division's best paper award for 2007.

Response by Dave Pollard and Ray Fletcher

David Pollard would like to acknowledge several teachers and colleagues who shaped my understanding of structural geology as presented in the textbook. Donald McIntyre of Pomona College sparked my interest in the subject and provided a wonderful historical context. Arvid Johnson of Stanford University introduced me to mechanics integrated with detailed field mapping. John Ramsay of Imperial College showed me how to unravel the geometry of complex structures in metamorphic terrains and use kinematic indicators to measure strain. Neville Price of Imperial College help set my research focus on brittle deformation, a topic that continues to challenge and fascinate me to this day. Atilla Aydin of Stanford University continues to provide an insightful perspective on structural relations in the field and the applications of structural geology to the energy industry through the Stanford Rock Fracture Project. Ray Fletcher, communicating largely through countless emails as we worked on this project, demanded a level of scientific integrity and physical accountability that set the tone of the entire book. This textbook would not have been possible without the help of more than 50 graduate students, who can not be named individually here, but are gratefully acknowledged. They provided insightful feedback, worked problem sets, participated in thoughtful discussions, and most importantly carried out the basic research that underlies much of material presented in the book.

Ray Fletcher also would like to acknowledge several teachers & colleagues. Bill Brace's course initiated my interest in structural geology. The "C" I got provided a well-appreciated expert opinion on

how far I needed to go to become competent. Bill later showed me the results of indentation of an unconfined sample meant to achieve high pressures under the indenter and hence ductile deformation. It occurred to me that it would be interesting to devise a mathematical model of such an inhomogeneously deforming body. Imagining the indenter to be a body of magma pushing upward against the country rock suggested a model for emplacement of an igneous stock. Simplified to achieve tractability, the igneous stock morphed into a mantled gneiss dome. From Emir T. Onat's course, I learned enough continuum mechanics to carry out a thesis project on this topic. Field motivation was provided by John Rosenfeld, master of rolled garnets and New England gneiss domes.

Bill Chapple supplied uncounted hours of scientific discussion over the course of my graduate study and beyond. In a reading course, he asked me to find the error in Ode's classic paper on the dike pattern around the Spanish Peaks, an error later corrected to good effect by Otto Muller & Dave Pollard in 1977. Chapple had to tell me what it was: violation of a boundary condition. After giving my first AGU talk, I discovered that I had made the same mistake! Hopefully, our textbook provides some problems and avenues for research that are sufficiently challenging to cause the reader to make errors - great sources of insight! I also thank my few but exceptional graduate students, all of whom mapped structures, and formulated neat models for how they might have formed. Al Hofmann, Bernard Hallet, Arvid Johnson, Dave Pollard, Enrique Merino, and Sue Brantley have been valued collaborators in efforts that showed, in some cases, that a complete mechanics could be applied to many, if not all, geological processes.

We would like to thank the officers of the SG&T Division for their efforts to promote structural geology and tectonic within the GSA, and the members of the Award Committee for their choice of our book as this years best paper.

Pete Geiser deserves a special word of thanks for his citation which accurately identifies the central role in our textbook of the question: "How did this deformation come about?" He also cites our attempt to "make explicit the relationship between the abstraction of the math and physics and the real world of structural geology." We worked hard on that, continuing efforts by numerous workers, some mentioned above, that go back at least 50 years. Compelling examples linking field observations to results of a complete mechanical analysis are not that easy to find. However, a working knowledge of a complete mechanics invariably provides insight on deformation processes from field observations, and is something that can be easily carried into the field.

Nonetheless, there are tangible indications that our discipline is, in Pete's words, taking the second step, perhaps for the 2nd, 3rd, or nth time. For example, there is the Special Session at this meeting organized by Dave Wiltschko and John Spang on "Bridging the Gap Between Kinematics and Mechanics." Clearly these structural geologists are contributing to the effort to integrate geometry and kinematics with constitutive laws and the equations of motion.

Speaking of those equations… they are exactly what is necessary to address the spatial and temporal variations in the kinematic quantities such as displacement and velocity, strain and deformation rate, that we love to talk about at the outcrop. *Fundamentals of Structural Geology* provides a new framework for the investigation of geological structures by integrating field mapping and mechanical analysis. It emphasizes the observational data, modern mapping technology, principles of continuum mechanics, and the mathematical and computational skills necessary to quantitatively map, describe, model, and explain deformation in Earth's lithosphere.

Structural geology is a rapidly evolving discipline which is transforming as all science disciplines do from qualitative, descriptive, and taxonomic to quantitative, model oriented, and process focused. We hope that students, young and old, will find our textbook a helpful guide to this transformation.

STRUCTURAL GEOLOGY AND TECTONICS DIVISION
2007 CAREER CONTRIBUTION AWARD
Presented to Warren Bell Hamilton
Citation by Keith Howard

Warren Hamilton's powerful and innovative contributions to the development of tectonic concepts have had major influence on the directions of our science, consistently breaking new ground and undermining entrenched old dogmas.

Warren's prolific career has time after time presented us lucid and perceptive syntheses setting forth new and long-lasting concepts in global and crustal-scale views of tectonic and magmatic processes. Warren's current debunking of deep-seated plumes ("they don't exist"), his proposals for a weak, plateless Archean crust, and his drastic reinterpretation of Venus as a low-heat-flow planet that preserves its early crust and impact basins pose only the latest of many bold challenges he has offered the structure and tectonics community. And he doesn't go into these topics lightly, but carefully critiques, questions old paradigms, and integrates cosmic and mantle geochemistry, seismic tomography, and reams of geologic observation into his syntheses.

In 1966, the 100 percent Cenozoic extension that he and Brad Myers proposed for the Basin and Range faced a skeptical reception from stabilists, but it spurred the community to test it, and find it near the mark. On a similar note, I watched many California experts initially deride his late-1960s integration of Mesozoic California geology into subduction models. Yet it paved new paths for the structure and tectonics community to integrate plate-tectonic concepts and on-land geology.

His 1979 synthesis of Indonesian tectonics remains a standard of comparison for countless newer studies of subduction belts worldwide. His Indonesian knowledge led to his elegant analysis that subduction drives plate tectonics, and that top-down cooling of oceanic lithosphere produces the density inversions that drive subduction. Other contributions provided tectonic syntheses of regions as diverse as Antarctica, the Gulf of California, Laramide uplifts and the Colorado Plateau, Cordilleran metamorphic core complexes, and the Urals and a broad range of topical studies. Insights into magmatic processes in relation to tectonics arose from field relations in island arcs, western American batholiths, exposures of the deep crust, and much more. He comprehensively integrated crust-building magmatic processes and their variations with depth into tectonic models. His global view has brought us concepts of sill-like batholiths, extension in volcanic arcs as a natural consequence of subduction, and a proposed new framework for understanding tectonism and magmatic heat loss in an Archean world lacking rigid plates and subduction.

Warren's ability to synthesize sweeping new general insights rests ultimately on his appreciation of, and perceptive contributions in, detailed field geology. His long-time collaborator Brad Myers once remarked to me proudly about Warren's mapping of the Big Maria Mountains that the maps were "full of squiggly lines—and Warren isn't a squiggly-line person!" The highly detailed mapping in the Big Maria area prompted Warren's notions of extensional faulting, ductile Cordilleran thrusting, and stunning 100:1 tectonic attenuation of the Grand Canyon's Paleozoic formations — concepts as usual ahead of their time.

Warren's communication skills -- on field trips, informal contacts, hundreds of lectures, and many visiting professorships and distinguished lectureships -- have stimulated and influenced large numbers of students. He has served as a visiting scientist in many countries, and he has been charismatic mentor, guide, and friend to countless colleagues and students. Colleagues come to him as a sounding board on subjects ranging from giant Precambrian impact structures to environmental policy. Though he is never one to coddle or mince words at work with which he disagrees, Warren is outgoing, generous

with his time, and a helpful tutor to those with whom he comes in contact. His crisp, power-packed collegial letters enjoy their own celebrated reputation.

You would think that five decades of huge contributions, membership in the National Academy of Sciences, and a Penrose Medal would be more than enough for any career, but Warren shows no signs of slowing down. Three meaty and eloquent papers by him due to be published this month forcefully argue for top-down cooling of slabs as the driver of plate motions and of upper mantle convection, for a lack of plate tectonics in Earth's first two billion years, and for a plume-free planet Venus. Like many of his other works, these diverse iconoclasms are directly at odds with accepted paradigms. Pay close attention. Warren's intellectual ability to grasp the simple picture from a mass of details has been stunningly perceptive.

This man has been enormously influential on tectonic concepts, and on geologists. It is a high honor to present to you Warren Hamilton as the 2007 Career Contribution Awardee of the Structure and Tectonics Division.

Response by Warren Hamilton

Thank you, Keith, for that generous account. For 60 years, I have been having a marvelous time seeing as much as possible of our planet and trying to figure out how it works. Being honored for the products of that exciting activity, and being placed with the eminent prior awardees, is a huge bonus.

I have always learned from people who knew more than I did about many things. From Keith, for example, I learned much about the nature of large-offset extensional faulting, and about the behavior of sedimentary rocks depressed into anatectic regimes. My longtime colleague Brad Myers was the best reader of geologic maps I have known. I have swapped and developed ideas with hundreds of colleagues, often in the field, and could not have worked without the reports generated by thousands of other scientists.

I was repeatedly fortunate to be in the right place at the right time. My first Antarctic season, 1958, changed me from a silent to an active continental drifter, at a time when the overwhelming American view was that no lateral motion of part of Earth's outer shell was possible. I was a visiting prof at Scripps when plate tectonics was brand new, and students including Tanya Atwater and Dan Karig brought me up to speed before most landlocked geologists knew anything was up. My early plate syntheses of continental geology led to the opportunity to integrate and learn from the onshore geology and offshore geophysics of spectacularly complex Indonesia and surrounding regions. This and much more was made possible by my USGS position (although some of my synthesis was unfunded, and even time for it was bootlegged). Fast forward, and I have been for seven years in a mind-opening multidisciplinary e-mail round table with Don Anderson, Gill Foulger, Jerry Winterer, Jim Natland, and others.

We now know that Earth accreted rapidly, violently, and hot. Nevertheless, popular geodynamic theories are descended from 1950s conjecture that Earth has fractionated only very slowly and incompletely. 1960s geochemists hardened this speculation into dogma that was accepted by newborn geodynamicists, who built whole-mantle convection, bottom-up drives, plumes, and deep subduction from it. Powerful evidence contradicts all components of these chemical and dynamic conjectures, yet they are now parts of the belief systems of most geoscientists. Alternatives are little considered. The balance worsens as specialties become more myopic, expensive, and inbred, and as broad approaches wither for lack of financial support.

Enter peer review. Recycled popular dogma breezes through, but new concepts displease challenged experts. It is difficult to publish, or get a grant for, work contrary to conventional wisdom because many reviewers, editors, and managers obstruct anything that conflicts with their beliefs. My

own descriptive work sailed through, but the innovation for which you honor me often did not, and some of my best work was wholly blocked. Keith mentioned my three current major contrarian papers. These are appearing in books with supportive editors because I am now unwilling to probe successive journals for possible chinks in their conventional-wisdom armor. Two of these three multidisciplinary manuscripts were attacked viciously, on personal as well as contextual grounds, by turf-defending specialist reviewers. Other geoscientists whose work I most admire report similar personal and topical obstruction of contrarian papers which ultimately proved to be broadly correct.

So I appeal to all of you, as judges at all levels, from what you and others write to whom you support or hire or promote, to recognize that consensus may not define truth. Changes as profound as plate tectonics, and as unanticipated by the majority, likely lie ahead. This awareness should generate both positive and negative attitudes. On the one hand, innovative work should be evaluated on its own terms. Do the new concepts provide a viable explanation for the relevant evidence? What sorts of evidence are cited in support of each, and what does each misfit or overlook? What is required, and what is merely permitted, by independent data from different disciplines? What are the explicit and implicit assumptions behind new and old interpretations? On the other hand, any work that reaches a traditional conclusion should be viewed with skepticism. Are there flaws or gaps in the logic claimed to support the conclusion that was determined before the work was done, and could that conclusion be merely a popular assumption? A red flag for failed conjecture is special pleading to excuse each misfit of data to predictions, such as now characterizes advocacy of deep mantle plumes.

Science functions best when we can override our hard-wired inclination to blindly defend our clan. The mythology of science says that multiple working hypotheses lead to efficient incorporation of improved concepts. The reality is that ruling conjectures have great inertia, and that much that is patently false is widely accepted as true. Many current dynamic and petrologic invocations of plate interactions, 40 years on, are of misconceived cartoon systems that resemble nothing on Earth. Chemical and isotopic numerology has largely displaced igneous petrology, and impossible magmagenesis is widely postulated. Dick Armstrong showed decades ago that isotopic data do not require the common assumption that the upper mantle has fractionated unidirectionally, but only recently have a few geochemists begun to recognize that he was correct. And so on.

The schedule of a roving geologist produces hardships for young families. Alicita, my wife for those 60 years, nevertheless raised three wonderful children, and not until they were all in or beyond college was she able to widely share in the perks.

Thank you much. It has been a great trip.

2008 Joint Annual Meeting
Celebrating the International Year of Planet Earth

5-9 October • George R. Brown Convention Center • Houston, Texas
https://www.acsmeetings.org/2008/

Abstracts due 11:59 p.m. (U.S. Eastern time), 3 June 2008

The GSA Annual Meeting in 2008 is a joint meeting between The Geological Society of America (GSA), Soil Science Society of America (SSSA), American Society of Agronomy (ASA), Crop Science Society of America (CSSA), and the Gulf Coast Association of Geological Societies with the Gulf Coast Section of SEPM (GCAGS), hosted by the Houston Geological Society (HGS).

(continued, p. 13)

Joint Session categories include:

- Climate Change through Time: Evidence in the Geologic Record
- The Impending Global Water Crisis: Geology, Soils, Agronomy, and International Security
- Energy Budgets and the Global Market
- Globalization of Biogeochemical Cycles
- Wetland and River Restoration: Environmental Saviors or Scientific Failure?
- Coastal Impacts: Can Massive Environmental Restoration and Coastal Engineering Protect the Gulf Coast from Future Hurricane Impacts and Rising Sea Levels?
- Geobiology and Biomineralization: From the Origins of Life to the Origins of Cities
- Emerging Trace Contaminants in Surface and Ground Water generated from Waste Water and Solid Waste Application
- Carbon Sequestration: Methods, Markets and Policy
- Human Influences on the Stratigraphic Record

The Joint Session Categories encompass the 10 broad, societally relevant and multidisciplinary themes declared by The International Year of Planet Earth (health, climate, groundwater, ocean, soils, deep Earth, megacities, hazards, resources, and life). The International Year of Planet Earth aims to ensure greater and more effective use by society of the knowledge accumulated by the world's 400,000 Earth scientists to build safer, healthier and wealthier societies around the globe.

CALL FOR ABSTRACTS—Topical Session Number 65
2008 ANNUAL GEOLOGICAL SOCIETY OF AMERICA MEETING

LATE JURASSIC TO RECENT GEODYNAMIC EVOLUTION OF THE CARIBBEAN REGION
Conveners: Sandra J. Wyld, swyld@gly.uga.edu, James E. Wright, jwright@gly.uga.edu
Sponsorship: GSA Geophysics Division, Gulf Coast Association of Geological Societies
Scientific Categories: Tectonics, Geophysics/Tectonophysics/Seismology, Stratigraphy

The geodynamic evolution of the Caribbean region, from its origins in the break-up of Pangea to its complex current tectonics, continues to be a topic of widespread and active research, multidisciplinary interest, and ongoing controversy. Houston's location so close to the Caribbean and its easy access for international flights makes it an ideal venue for bringing together the diverse and highly international group of earth scientists working on this region. The focus will be current research on such topics as: origin of the Caribbean Large Igneous Province (CLIP) and associated marine basins; evolution of Cretaceous and Cenozoic magmatic arc systems; tectonic reconstructions of the region and its rapidly evolving plate boundaries; tectonic driving forces and geodynamic modelling; terrane translation, strike-slip faulting and collisional orogenesis; and active plate motions, seismology and neotectonic processes. The conveners are part of the BOLIVAR Southeast Caribbean Continental Dynamics Project (lead institution Rice University, in Houston), that is investigating accretion of the Leeward Antilles to the South American plate margin through on-land geologic studies, land and marine seismology and geodynamic modelling.

We solicit presentations on all aspects of the geodynamic and tectonic evolution of the Caribbean plate, its fringing arc systems, and adjacent continental provinces. Both oral and poster sessions are planned. Note that speakers may present two volunteered abstracts during the Annual Meeting, as long as one of these abstracts is a poster presentation. (This limitation does not apply to, nor does it include, invited contributions to keynote symposia or GSA topical sessions.) All talks are 15 minutes slots. Poster sessions will be scheduled for the entire day, with authors to be present from 4 to 6 p.m.,

followed by a reception.

Note that all abstracts must be submitted electronically through the GSA website, and are due by 11:59 p.m., June 3 (U.S. Eastern time). The electronic submission form is currently available at http://gsa.confex.com/gsa/2008AM/index.epl. Please make sure to submit your abstract to Topical Session Number 65, and to specify your preference for Oral or Poster (or Either). More information on the meeting can be found at https://www.acsmeetings.org/2008/.

OTHER UPCOMING MEETINGS

Penrose Conference

Plumes and Their Role in Whole Mantle Convection and Recycling
17–21 September 2008, Pico, the Azores
Conveners: C. Beier, T. Rushmer, S. Turner, E. Widom, Z. Franca
Application deadline: 25 June 2008

Field Forum

Late Archean Crust: Magmatism and Tectonics of the Abitibi Subprovince, Canadian Shield
Abitibi granite-greenstone belt and Kapuskasing structural zone
19–25 July 2008, Ontario and Québec, Canada
Conveners: Keith Benn, Phillips C. Thurston
http://www.geosociety.org/fieldForums/08canada.htm

You are invited to express your interest to participate in a Field Forum that will offer a unique opportunity to study the origins and evolution of one of Earth's major Late Archean terranes. The Field Forum will include visits to exposures of Late Archean lower, middle, and upper crust, ranging from granulite grade to subgreenschist grade. The meeting will also include visits to two major greenstone-hosted mining camps.

The ~1.6 × 105 km^2 Abitibi granite-greenstone belt is part of the southern Superior Province, a region of the North American craton that was formed during one of Earth's major periods of crustal growth. The principal subjects of this proposed Field Forum are the formative processes and crustal architecture of the Late Archean Abitibi granite-greenstone belt, including its middle and lower crust, as exposed in the Kapuskasing structural zone and within antiformal hinge zones within the greenstone belt. The Field Forum will also provide the geological and tectonic contexts of major precious and base metals deposits.

You can inform the organizing committee of your interest by sending an e-mail to Keith Benn at kbenn@uottawa.ca. Please indicate your area of specialization and affiliation, and let us know if you are a graduate student. When responding, please indicate your level of interest (i.e., definitely wish to participate, likely participant, possible participant). The forum is limited to 50 participants, and the deadline to indicate interest is 24 March 2008. Registration and fees are still to be determined.

Fault Zones: Structure, Geomechanics and Fluid Flow

16-18 September 2008, Geological Society of London, Burlington House, London
Co-convenors: Christopher Jackson (Imperial College, London), Zoe Shipton (University of Glasgow), Rebecca Lunn (University of Strathclyde), Martha Withjack (Rutgers), Roy Schlische (Rutgers), Dan

Faulkner (Liverpool University), Chris Wibberley (Total), Martin Mazurek (University of Bern), Simon Norris (Nuclear Decommissioning Agency)
Abstract deadline: 16 May 2008

Faults play an important role in accommodating crustal strain. At the largest scale, they control the geometry and evolution of sedimentary basins; at the smallest scale, the development of fault zones changes the mechanical and hydrological properties of rocks. With recent advances in subsurface, modeling (numerical and experimental), and field-based studies, the conference will bring together scientists interested in fault growth, fault-zone properties, fluid-flow, and the mechanics of earthquakes and faulting. Applications include earthquake prediction, groundwater resources, hydrocarbon exploration and production, deep-waste disposal, and greenhouse-gas sequestration.

Specific themes include (but are not limited to):

- Control of fault growth on basin structure and stratigraphy in various tectonic regimes
- Importance of faults for the flow of hydrocarbons, water, ore and waste fluids
- Fault structure, development and earthquake processes
- Numerical and analogue modeling of fault development
- Fault development in different lithologies (especially in clays and shales).

Please submit abstracts of 500 words or less to Chris Jackson c.jackson@imperial.ac.uk and Zoe Shipton Zoe.Shipton@ges.gla.ac.uk.

For further information about the conference, please contact Kerri Deegan at kerri.deegan@geolsoc.org.uk.

Annual Summer Conference, Pacific Northwest Section, National Association of Geoscience Teachers

17-20 June, 2008, Yakima, WA

The Pacific Northwest Section of the National Association of Geoscience Teachers (PNW NAGT) will be holding their annual summer conference in Yakima, WA, June 17- 20, 2008**.** On Tuesday, June 17, Dr. Steve Reidel of Washington State University will lead participants on a hard rock exploration of the Columbia River Basalts and the Yakima Fold Belt. On Wednesday, June 18, we will host another all-day field trip, this time heading west into the south-central Cascades. Pat Pringle of Centralia College, Centralia, WA, and Dr. Paul Hammond, emeritus professor at Portland State University, will showcase the tectonic and volcanic history of the White Pass and Bumping Lake areas on our way to Mount Rainier National Park. Thursday, June 19, will be the formal conference day. The schedule includes talks, a poster session, a session on using computer-based labs and exercises for all Earth Science classes, and a workshop on teaching global climate change. Please consider presenting on this day. We also encourage student participation! Friday, June 20, will be the final day of the conference and the final field trip. Dr. Alan Busacca, emeritus professor in Washington State University's department of Crop and Soil Sciences and owner of Vinitas Vineyard Consultants, will lead us on a day trip to explore the terroir of the Yakima Valley.

Early registration materials, abstract submission forms and more in-depth information can be found at www.nagt.org/nagt/organization/northwest/meetings.html. For more information, please contact Cassandra Strickland at cstrickland@columbiabasin.edu.

Miniconference on the Geology of the area between North and South America, Asociación Congresos Geológicos Sigüenza

2-4 June, 2008, Sigüenza, Spain

There is a new geological society in Spain. The Asociación Congresos Geológicos Sigüenza aims to organize international conferences using the successful format of the Caribbean conference held in Sigüenza in 2006.

If anyone has an idea for an international conference and is prepared to attract speakers/attendees, we will supply our experience in organizing the conference.

We will be repeating the week-long, international conference on the Caribbean theme in 2009.

Meantime, 2-4 June, 2008, we will hold a "miniconference" on the geology of the area between North and South America, with focus on the geology of the Caribbean Plate. This is primarily aimed at bringing together in an informal and constructive environment people who work on this area in Spain. However, everyone is welcome. Email address: caribbean_conference@yahoo.es.

Please let us know as soon as possible if you are interested in this meeting, to take place June 2, 3 and perhaps 4, in Sigüenza, at the Hospedería Porta Coehli and the Casa del Doncel. We hope this venue will be economical. We especially hope that students will attend.

For those who intend to present a talk or poster, thank you. We will distribute the meeting proceedings as soon after the meeting as practical. For this reason, we will ask (insist) that you bring a ready-to-publish presentation to the meeting. Our objective is to encourage discussion, collaboration and (rapid) dissemination of ideas.

In order to help us organize this event, please send the following information to caribbean_conference@yahoo.es. Thank you. Name, address, e-mail, title of talk or poster (please specify), staying at Hospederia Porta Coeli or another hotel (please specify). (You can find other hotels at the Tourist office of Sigüenza: http://www.siguenza.es/siguenza/es/turismo/tur_oficina.php.

As a reference, here are some of the prices of the Hospedería (tax and breakfast not included): Double room 58€ , Double room, single occupancy 54€, Single room 47€, breakfast 4,80€.

CoDaWork'08, The 3rd Compositional Data Analysis Workshop

27-30 May 2008, Girona, Spain
http://ima.udg.edu/Activitats/CoDaWork08/

LOCAL ORGANIZING COMMITTEE
Josep Daunis-i-Estadella (Chair), Josep A. Martín-Fernández, Glòria Mateu-Figueras, Santiago Thió-Henestrosa

CONFERENCE SECRETARIAT
CoDawork'08 Local Organizing Committee
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After the successful first two editions of CoDaWork in 2003 and 2005, the University of Girona Compositional Data Group is very proud to announce the third edition of the workshop, **CoDaWork'08**. It will take place in the city of Girona, during the last week of May 2008.

OBJECTIVES OF CoDaWork'08

The Workshop on Compositional Data is intended as a forum for discussion of research issues related to the statistical treatment and modelling of compositional data, the interpretation of models and applications involving compositional data. The primary goal of the workshop is to identify important potential lines of future research and gain insight as to how they might be tackled. With this goal in mind, we intend to bring together specialist researchers, postgraduate students, data analysts as well as those with a general interest in the field.

TOPICS

Some indicative topics of interest are:

- Theory and methods
- Applications to life sciences
- Applications to economy, official statistics and social sciences
- Applications to earth sciences
- New teaching and computing tools

ABOUT COMPOSITIONAL DATA

Compositional data (CoDa) are those which represent parts of some whole and which only carry relative information. Typical examples are data presented in percentages, ppm, ppb, or the like. Since John Aitchison introduced the logratio approach to analyse CoDa back in 1982, much progress has been done in understanding the geometry peculiar to their sample space, the D-part simplex. http://www.compositionaldata.com

11th International Conference on Thermochronometry

15-19 September, Anchorage, Alaska

The 11th International Conference on Thermochronometry will be held from 15-19 September 2008 in Anchorage, Alaska, at the Captain Cook Hotel in downtown Anchorage.

The meeting will focus on the theory and application of fission track, helium, and argon dating. The meeting will include activities directly related to IGCP Project 543 "Low-temperature thermochronology: applications and inter-laboratory calibration," which is a multi-year project aimed at knowledge transfer across the thermochronology community.

The following topics will be covered at the meeting: 1) New analytical developments helium and fission track analysis; 2) Thermochronology of orogenic belts; 3) Detrital thermochronology, provenance, and basin analysis; 4) Kinetics and thermal modeling; 5) The thermotectonic framework of Alaska and adjacent areas.

During the meeting there will be a one day trip to Seward Alaska on the Kenai Peninsula. There is an optional (first to register) pre-meeting 3 day trip to Denali National Park. Get ready for crisp clean Alaskan air, and beautiful fall colors: this is one of the most beautiful times to visit Alaska.

DEADLINES: Thursday, May 1st - Early registration ends. Friday, June 13th - Extended abstracts due and the last day to register for FT2008, as well as the deadline for rooms at The Hotel Captain Cook. The meeting website is: http://www.union.edu/ft2008/index.html

For the Latest on Meetings and Field Trips go to

Upcoming Meetings

http://rock.geosociety.org/sgt/sgt_meetings.html

RESOURCE BIN

Google Earth for Structural Geologists

Below is a website with several different Google™ Earth downloads that might be of potential interest to the structural community. In particular, the DELUGE project contains Google™ Earth overlays with (1) 2-D topographic contour maps and (2) 3-D red-blue anaglyphs of topographic maps of various landforms: http://www.depauw.edu/acad/geosciences/mswilke/DELUGE.html.

NEW! Stone-Hollberg Graduate Scholarship in Structural Geology

The Don Stone (GSA Fellow) - John Hollberg partnership has established the Stone/Hollberg Graduate Scholarship in Structural Geology with a partnership contribution of $40,000 and an RMAG Foundation contribution of $10,000. The Scholarship fund will be administered by the Foundation and will receive the net proceeds from sales of the Wyoming Transect, which is now available in digital format. The Wyoming Transect is a detailed structural cross section drawn across the state of Wyoming from the northern Black Hills to the Wyoming thrust belt, a distance of ~400 miles, traversing the important oil- and gas-producing basins and the intervening mountain ranges of the central Rocky Mountain foreland. Constructed and copywrited by Don in 1987, the Wyoming Transect was constructed using an extensive geologic and seismic data base. It is intended to provide a foundation for analyzing structural relationships on both a regional and local scale. In compressed file formats (PDF, JPEG2000, MrSid), the Transect and its 15 individual Segments are easily accessed, manipulated, and printed (in part or in whole) by anyone with computer/printer equipment.

"Setting up a scholarship was an idea that I (Don) had been considering for some time. Back in 1951, I was lucky enough to attend Cornell University graduate school on a scholarship in structural geology that paid my tuition and a little extra. I would not have been able to attend Cornell without this financial help and might have ended up in a different profession and missed out on the excitement and the challenges of structural interpretation in the search for petroleum. It seemed time to do something to acknowledge this debt to Cornell and to the geologic profession which has fascinated and entertained me for more than 55 years. John did not hesitate to agree with these sentiments and with the scholarship idea.

"I feel it is important to support the study of structural geology in our university graduate programs, particularly as this branch of geology applies to petroleum exploration and development. At the same time that there are many elements of structural kinematics and dynamics that we still do not completely understand, in the oil and gas fraternity there seems to be a declining awareness of the fundamentals of structural geology and the importance of striving for accuracy in three and four-dimensional structural interpretation. In the modern computer-driven manipulation of structural data (e.g., 3D volumes) it seems that the conversion of digital data to real structure (in depth) is often neglected, perhaps partly because this requires more than computer manipulation. John and I hope this new scholarship will encourage more graduate students to major in structural geology, choose petroleum-related thesis projects, and move on to a career in the petroleum industry."

The plan is to start by funding a $2500 grant for a student at the University of Colorado, Colorado State, or Colorado School of Mines, and/or the University of Wyoming the first year and hopefully one or more similar grants in later years as proceeds from the sale of the Wyoming Transect package accumulate. This cross section was actually published in a redrafted black and white (in three

folded plates) as part of Don Stone's *Basement-involved thrust-generated folds as seismically imaged in the central Rocky Mountain foreland of the western United States* in GSA Special Paper 280 (back in 1993). However, this publication is long out of print. The transect can be ordered on line at www.RMAG.org (click on "Publications," then on "Videos, Abstracts & Special Reports.") **Member Price: $150.00; Non-Member: $175.00; Corporate License: $1,500.00.**

NEW! In Harms Way: a non-profit organization for natural disaster mitigation

AGU recently revised its position statement on natural hazards, which calls on geoscientists to participate in mitigation activities beyond forecasting events and research of processes. Education is mentioned as one of the most important needs.

Ron Harris, Professor of Geological Sciences, has recently set up a Non-Profit Organization known as "In Harms Way," which is a federally registered 501(c)(3) tax-exempt charitable foundation. Its goals are the education and protection of those in the path of natural hazards. Harris has been involved in Natural Disaster Mitigation research in Indonesia for several years, and has also conducted research in India, the Middle East, Taiwan, Italy, Greece, and Central and South America. These are densely-populated regions where the geological record reveals numerous hazardous events in the past, but where awareness of these hazards is limited.

Educational activities supported by In Harms Way include:

1) Training local experts how to protect those in their communities that are most in harms way.
2) Teaming with local experts to visit those communities most vulnerable to recurring natural hazards and conducting workshops and projects that empower families to protect themselves.
3) Providing incentives, such as tuition support, for those in threatened communities to receive a college education in content areas that can contribute to natural disaster mitigation in their communities.
4) Involving youth and students in activities that make their homes and schools more disaster resistant.
5) Assisting communities to develop and implement a disaster mitigation plan.

Most disaster aid is reactive; In Harms Way is about the ounce of prevention needed to protect those in the path of future disasters. In Harms Way provides the means to make scientific knowledge and support of disaster mitigation available to those living in regions where natural disasters are a possibility. It seeks to change the focus from dependency-related relief to self-reliant disaster prevention. In addition to education, In Harms Way promotes sound, but inexpensive protective measures that have worked in the past. Some of these include:

1) reforestation of coastal regions to minimize effects of tsunami and hurricane wave surges
2) training in sound building practices in earthquake prone regions
3) warning those living in red zones around potential landslides and volcanic eruptions and practicing effective evacuation drills
4) community construction of raised platforms in flood and tsunami prone areas
5) cell-phone and short-wave radio-based early warning systems and emergency drills.

For more information, visit http://www.utahearthquake.org/Donate.aspx or call Steve at the foundation office at 801-361-2512.

Earthquake Mapping Partnership in the New Madrid Region

Preparation for earthquake activity in the New Madrid region received a boost from a new partnership between the Missouri Department of Natural Resources and State Farm Insurance. The partnership between the department and State Farm Insurance will further the department's work to create detailed surficial materials maps for the Greater St. Louis area.

Surficial materials mapping comprises the first phase of an earthquake hazard map. The hazards maps will identify the various areas at higher and lower risk for ground acceleration or amplified ground shaking. All the information and maps generated by the project will be made available to anyone interested in this type of information.

The St. Louis Area Earthquake Hazards Mapping Project is a cooperative effort by the Department of Natural Resources, the Missouri University of Science and Technology Natural Hazards Mitigation Institute, the Illinois Geological Survey, the Central U.S. Earthquake Consortium emergency managers, Central United States Earthquake Consortium State Geologists and the U.S. Geological Survey in Memphis.

The New Madrid Seismic Zone is the most active seismic area in the United States east of the Rocky Mountains. More than 200 small earthquakes occur each year along this zone. One of the largest historical earthquakes in this area occurred in New Madrid on Feb. 7, 1812. A repeat of this earthquake (M7.5+) would affect a large area including parts of Missouri, Arkansas, Tennessee, Kentucky, Illinois, Indiana, and Mississippi. Extensive population growth in the region, which includes metropolitan areas such as St. Louis and Memphis, means that a repeat of the 1812 earthquake could cause considerably more damage. Identification of areas of highest risk will allow for better preparation and prevention of earthquake damage.

Greetings from Massachusetts! *Here's the Spring 2008 news—well, what there is of it. Don't let the call for news for the fall newsletter go by without sending in your news—there must be more going on than just one item! If you need a quick update or want to get your information out on the fly, contact me barbsheffels@comcast.net, Tim* tfw@unm.edu, *or Kevin, and we will get your information into the newsletter or posted on the SGT website.*

Academic news: *Dr. Carol Simpson moved in January '08 to Old Dominion University in Norfolk, VA, to assume the position of Provost & Vice President for Academic Affairs and Professor of Ocean, Earth, & Atmospheric Sciences.*

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