

2013 MEDALS & AWARDS

SUBARU OUTSTANDING WOMAN IN SCIENCE AWARD

Presented to
Whitney M. Behr



Whitney M. Behr
The University of Texas at Austin

Citation by John P. Platt

With great enthusiasm, I nominate Dr Whitney Behr for a Subaru Outstanding Woman in Science Award. Dr Behr's dissertation, completed in June 2011 at the University of Southern California, had several related strands, all of which have had significant impact on the geosciences. Early in her graduate career, she carried out a study on the slip-rate of the San Andreas Fault at Biskra Palms, California, initially under the aegis of the USGS in Pasadena, where she worked as an intern before starting her PhD program. This study evolved into investigation into the epistemic uncertainties associated with such measurements, and the possible causes of discrepancies between "geologic" and geodetic estimates of slip rates. These perceived discrepancies have been the source of substantial debate among the earthquake science community, and have led to a variety of hypotheses concerning the causes of earthquake clustering, transient rheological changes within the lithosphere,

and the "storing" of seismic energy in the lithosphere over periods of tens of ky. Dr Behr's contribution was to show that the correct analysis of uncertainties associated with both the measurements of offset geomorphic features, and the dating of these features, meant that the perceived discrepancies were less than the uncertainties on the measurements. Her analysis is already leading the community to reassess many of these perceived discrepancies, and also to re-examine their methods in an attempt to reduce the uncertainties.

As the main topic of her dissertation, Dr Behr worked on the measurement of flow stress in ductilely deformed rocks from various depths in the crust, as exposed in the footwalls of core complexes in SE California and southern Spain. This approach became possible partly because of improved experimental calibration of the "paleopiezometer" used to measure flow stress from the dynamically recrystallized grain-size of quartz in mylonites, and partly because of the realization that increased strain localization with cooling during exhumation of these rocks means that all the stages in their evolution can be preserved. Her contribution was to find and recognize these stages, to quantify the stress and the temperature at which the rocks were deformed, and then to use thermal modeling of the exhumation process to work out the depth from which they came. This led to the construction of a stress/depth profile through the crust in SE California, which is now widely recognized at the first observational validation of the widely used "Christmas tree" diagrams to represent the strength of the lithosphere as a function of depth.

Another aspect of her work in southern Spain was to show that high-strain rocks, which were subducted during the collision of an exotic terrane with the southern margin of Iberia, underwent a progressive evolution in their rheology during subduction and exhumation. During subduction they were deformed primarily by pressure-solution mechanisms at relatively low temperature and low stress. As they were exhumed, they underwent transitions first into the dislocation creep regime, and then into the grain-boundary-sliding regime, as a result of changes in temperature, water activity,

and stress. Her quantification of these transitions has contributed substantially to our understanding of the mechanical properties of intracontinental subduction zones.

In all three areas, Dr Behr's work is having a significant impact on workers in these different fields of endeavor, and the recognition she is receiving is reflected both in citations of her work and in invitations to speak at international conferences.

In conclusion, Dr Behr is a true rising star, whose work has already had impact, and whose on-going research promises to continue to be of great significance. She is an ideal candidate for the Subaru Outstanding Woman in Science Award.

Response by Whitney M. Behr

Thank you to GSA and Subaru for the honor of this award. I would first and foremost like to thank John Platt for nominating me and for being a wonderful Ph.D. advisor and colleague over the past several years. My thanks also go to Greg Hirth, Tom Hanks and Donna Whitney for contributing letters in support of my nomination and for being strong advocates of my dissertation research. I'm also incredibly grateful for the encouragement, intellectual stimulation and mentoring that I received during my Ph.D. from my committee members Greg Davis, Thorsten Becker, and Ken Hudnut. Although this award is based on my dissertation research, my success in graduate school came from the strong educational foundation I received as an undergraduate, first at Pasadena City College and later at California State University Northridge. I am especially grateful for the field and research experiences I had while an undergraduate, and I would particularly like to thank Jerry Lewis, Janet Gordon, Dave Douglass and Bruce Carter at Pasadena City College, as well as Doug Yule, George Dunne, Kathy Marsaglia, Vicki Pedone, and Jorge Vazquez at Cal State Northridge. Finally, last but not least, my dissertation would not have been possible if it weren't for the support I received from my friends and family along the way and I am incredibly grateful for their support as well. Again, it is a great honor to be receiving the Subaru Outstanding Woman in Science award. Thank you."

**This award sponsored by
Subaru of America, Inc.**

