Geological Society of America
Structural Geology & Tectonics Division

2018 Career Contribution Award
Presented to Elizabeth Miller

Citation by Jeff Lee and Victoria Pease

I, along with my co-nominator Victoria Pease, and colleagues who wrote supporting letters, are honoured to present Elizabeth Miller as the 2018 GSA Career Contribution Awardee in Structural Geology & Tectonics. Elizabeth has made unparalleled advances in our understanding of tectonic processes through data-intensive multidisciplinary studies of the crust and mantle. Her scientific legacy lives on not only through her influential papers, but also through her students who have been inspired by her stimulating and animated mentoring.

Elizabeth is known for challenging key research paradigms in structural geology and tectonics, particularly extensional tectonics, by investigating lithosphere-scale deformation and the coupling between deformation at depth and at the surface. Elizabeth is a field geologist at heart—and as one colleague wrote “one of the greatest field geologists”—who has mapped and worked across the Cordillera from the Mojave Desert, to the Northern Snake Range metamorphic core complexes starting in 1981 and continuing to today, the Arctic including the Brooks Range and the Seward Peninsula, Far East Russia which presented some particularly challenging field conditions and use of unusual field vehicles, the Albion-Raft River-Grouse Creeks metamorphic core complex because research in the the Northern Snake Range core complex was not enough, across the Basin and Range and NW Sierra Nevada, and Death Valley.

Elizabeth combines her geologic mapping expertise with a stunning array of petrologic, stratigraphic, structural, metamorphic, igneous, geochemical, geochronological, thermochronological, and geophysical investigations, and set a standard for how multidisciplinary studies should be done. Through this work, she has contributed to fundamental discoveries in structural geology, tectonics, and lithospheric deformation that have had global impact. Her approach to science has resulted in an exceptionally broad record of publications centered on the Paleozoic evolution and Mesozoic arc tectonics of the coterminous US Cordillera, Mesozoic arc magmatism in far-east Russia, and Arctic orogenesis. Of particular note, her research on extensional tectonics across the Basin and Range, including metamorphic core complexes, and the Arctic has yielded new and fundamental insights into extensional processes from the lower crust to the surface, as well as provided links among surface processes, shallow crustal brittle and mid-crustal ductile processes, metamorphism, and heat input associated with igneous activity during extension.

In addition to Elizabeth’s outstanding research contributions is that the remarkable success of her students highlights her exceptional abilities as a challenging and engaging teacher and mentor. Her legacy, as another colleague wrote, is that “Her intellectual DNA is in play all over the world...” We are honoured to have Elizabeth as a colleague and friend. We, along with so many others, are energized by her sharp mind, keen nose for important scientific problems,

relemtless inquisitiveness, contagious passion for geology, and indefatigable nature. Colleagues and former students will not forget stays at the “Shrimp Hotel”, Elizabeth’s home where she welcomed visiting geologists with her generosity, warm heart, good food, plenty of strong coffee, and lively scientific discussions that often she initiated first thing in the morning as you staggered into the kitchen to grab your first cup of coffee.

Elizabeth is 31st recipient of the Career Contribution award joining a distinguished and illustrious group of previous recipients, including two other female recipients, a structural petrologist, a tectonist, and now a field geologist, her PhD advisor Cark Burchfiel, as well as three others who have been sucked into the vortex of metamorphic core complex investigations.

Congratulations to Elizabeth Miller as the 2018 GSA SG&T division Career Contribution Award winner.
Response by Elizabeth Miller

Thank you GSA, the Structural Geology and Tectonics Division and those writing supporting letters for this award. I am honored to join the distinguished list of recipients, many of them mentors and heroes. I thank my nominators, Jeff Lee, who voyaged forth with me in our studies of ductile extension of the crust (helped by Gordon Lister) and Victoria Pease, with whom I have shared some exciting times in the Arctic, advancing science in the face of dicey conditions. I thank all of my graduate students for their intellectual energy, curiosity, passion and hard work that led to their thriving careers and whose efforts underpin the receipt of this award.

I have had many exceptional opportunities and many people to thank for shaping me as a scientist. I knew very little about the geological sciences until Tony Morse at Franklin and Marshall taught me Intro Geology. I was impressed by his ability to roll cigarettes with one hand and draw ternary diagrams with the other, but what truly came across was his passion for research and discovery. I was hooked — I could spend my life seeking explanations for all the amazing phenomena one encounters in the field. As a graduate student, Clark Burchfiel taught me the importance of documenting structures by geologic mapping and, at a much larger scale, how to skillfully describe and interpret the histories of entire mountain belts. Hans Ave Lallemant taught me all I could digest about deformation at the crystal lattice scale and introduced me to the complexity and vast range of deformation-related microstructures. As a post-doc at Lamont, Bill Ryan taught me that geology doesn’t stop at the beach and gave me amazing opportunities to apply my skills to what lay at the bottom of the ocean.

At Stanford, I had wonderful opportunities to learn from Ben Page and Bob Compton. Bob gave me many gems of field-based wisdom that I continue to teach. Stanford attracted talented graduate students and generously supported them but undergrads also played an important role in my career. My field expertise grew from many summers of leading the “Stanford Geological Survey”. Here the energy and hard work of students allowed us to traverse miles of unchartered geology, untangle its complexities, and organize this information on maps and cross sections. From this experience alone I can tell you—there are endless questions, problems (and answers) as to how the earth deforms, waiting for discovery.

A broad group of collaborators helped train and co-advice my graduate students over the years. They are too numerous to list, but we relied heavily on the petrologic and geochronologic expertise of Jim Wright, Gail Mahood, Trevor Dumitru, Mike McWilliams, Joe Wooden, Marty Grove and George Gehrels at Arizona. Visitors to the USGS-Stanford SHRIMP inspired us to take more petrologic approaches to lithospheric tectonics. With Simon Klemperer we learned about the geophysics of the deep crust and mantle beneath extended regions, attempting to link the shallow to the deep.

My Russian colleagues helped me explore Arctic Russia to better constrain the rift history of the Arctic Ocean. Slava Akinin's work on xenoliths, igneous rocks and gneiss domes led us to a deeper understanding of the interplay between magmatism and deformation in extending crust. I thank my close family members for their support and especially my partner Dwight and sons Egan and Wheeler for putting up with my long absences and my uncertain return times from Russia.

In closing, curiosity and a passion for exploration led to many new insights in our collective scientific voyage. If I had another life, I would do it all over again, but I imagine the voyage would differ in detail. Most important to me is that time with students and colleagues in the field have led to friendships that have endured over the years. I am deeply grateful we are here to celebrate this moment. Thank you everyone so very much for making it happen.