

Acceptance of the Mineralogical Society of America Award for 2023

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In reflecting on what I wanted to say to you all today, I struggled to find the words that could truly capture the profound excitement, gratitude, and honor I feel in being recognized by MSA. The individuals who make MSA what it is, both today and throughout its long history, deeply inspire me and have influenced the trajectory of my research. Your recognition is the highlight of my career.

I would like to take this opportunity to thank some of the individuals whose mentorship and advocacy have majorly impacted my life and career along the way. I am incredibly grateful to my professors at Georgia Southwestern, especially Tom Weiland, Sam Peavy, and Burt Carter—their generosity and dedication spurred my love of geology, and ultimately led me to pursue graduate studies at the University of Arizona with Bob Downs.

Bob Downs changed my life. He taught me that science should be exciting and, if it isn't, you're wasting your time. He taught me that it's not how smart you are, but how hard you work. He taught me that the status quo should be disrupted, that I should follow my instincts, even when they conflict with conventional ideas. It's hard to know where to begin thanking Bob—he gave so much time and energy to impart his knowledge and passion for crystallography, mineralogy, and math; he spent countless hours teaching me how to be a scientist; he advocated for me, helped me build an incredible network, and gave me opportunities that few students get, and, lastly, he inspired me, in so many ways.

Thanks to Bob, I joined the MSL CheMin team as a graduate student in 2012 and it's the coolest job I'll ever have. I want to thank Dave Blake, Liz Rampe, Dave Vaniman, Dick Morris, Doug Ming, Allan Treiman, Tom Bristow, Cherie Achilles, and the rest of the CheMin team for teaching me how to be a team member, how to do integrated, collegial, and creative science, and how to operate this amazing XRD on another planet, and for letting me break it! I was the first one to put CheMin, and therefore the rest of the rover, into safe mode. I felt terrible and so embarrassed, but I will never forget how gracious the team was and what Dave Blake, the creator and PI of CheMin said of me safing this instrument he'd spent 20 years building and had flown to Mars—he said, "You can only make mistakes if you're doing something". He taught me that it's okay to mess up, learn from it, and try again—and that is what it looks like to do something new and meaningful.

I also met Bob Hazen while in grad school and it's impossible to thank him for all of the ways in which he's impacted my life and career. His unique view of mineralogy and its role in understanding the formation and evolution of Earth and its coevolution with life expanded my outlook. I realized there were so many huge, complex, interdisciplinary questions that could be explored through a mineralogical lens. Bob is an inspiration, to me and to so many others—he exemplifies what it means to be a remarkable, groundbreaking scientist and a kind, generous human being. The projects we work on together are among the most exciting and fulfilling of my career. He's taught me how to be a better communicator, he's



given me countless opportunities to engage in exciting projects and collaborate with extraordinary individuals, and he has been an unwavering advocate, believing in me, even during moments when I struggled to believe in myself.

Bob invited me to a datathon with Peter Fox in 2016. This meeting was an inflection point in my scientific trajectory. I had been frustrated with my inability to visualize and analyze the incredible complexity of mineralogical systems. Here, I saw the possibilities of harnessing the multidimensional and multivariate nature of mineralogical systems and their environments through space and time. It showed me the potential of data science to reshape the way we think about and do mineralogy and Earth and planetary science. I thank Peter for so freely sharing his knowledge and experience with me, and for giving me confidence that I could learn and participate in this new and foreign field. His untimely passing in 2021 has left a tremendous void and as we continue to develop this new field of mineral informatics, I do so in part to honor his memory and his legacy.

It was at this datathon that I met two of my closest collaborators, Anirudh Prabhu and Ahmed Eleish. I thank them for so freely sharing their data science knowledge, for graciously answering hours of questions, for demonstrating how to reach outside of the traditional silos of science, and for becoming so passionate and interested in how minerals can answer the questions of our universe. I am grateful that they want to trek into the unknown with me—they are pioneers of mineral informatics.

I thank Jim Wright, Nathan Yee, Paul Falkowski, and the other Rutgers EPS faculty for believing in my vision and investing in me; my many collaborators across different fields, including Mike Wong, Donato Giovannelli, and Alex Ostroverkhova, who teach me so much and push the boundaries of my scientific questions; Kerstin Lehnert, Marshall Ma, Jolyon Ralph, and their teams for their monumental endeavors to preserve scientific information and make it accessible to all, without which data-driven research in mineralogy and geochemistry could not take place; and, lastly, I thank Carnegie and, specifically, Mike Walter and Eric Isaacs for believing in my ideas and supporting me for the past five years while I've explored this very new, untested direction of science.

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