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Presentation of the 2018 MSA Award of the Mineralogical Society of America to Laura Nielsen Lammers

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Laura Nielsen Lammers was given the MSA Award in 2018 for her work in developing the theory relating mineral surface dynamics of calcite during growth from aqueous solutions to its trace metal and isotopic composition.

Laura came to Berkeley in 2008 from Dartmouth and seemed to know pretty much exactly what she wanted to do for her Ph.D. work. I discovered this retroactively when I looked up her statement of purpose just before she was about to graduate and realized that what she had done for her Ph.D., which seemed to me to arise gradually from discussions we had along the way, was described in detail in her graduate application statement of purpose! And I also realized I had made a mistake. She finished her Ph.D. in slightly less than 4 years, whereas it would have been much more clever of me to figure out a way to stretch it out for another year or two!

Laura is receiving this award largely because of a series of papers she wrote in 2012 and 2013 that explain how ion-by-ion growth models of calcite can lead to detailed predictions of how Ca isotopes and Sr are incorporated into a growing crystal as a function of growth rate and the ratio of Ca^{2+} to CO_3^{2-} ions in solution. This work extended the excellent work done by many previous workers on calcite growth mechanisms to make specific predictions related to calcite geochemistry. Her work has broad implications for environmental reconstructions based on carbonate minerals, and also makes trace elements and isotopes into probes of mineral surface dynamics. Her work also paved the way for other studies that addressed O and C isotopes, clumped isotopes, and Mg incorporation in calcite. This work is a turning point in what you might call isotopic and trace element mineralogy because it bridged a yawning gap between mineral growth studies and mineral chemistry studies. The approach she developed also provides a quantitative means to treat kinetic effects, which dominate the growth of calcite under biogenic and most laboratory conditions.

Laura's work is an excellent example of how scientific advances can be made when people with different backgrounds work together in small groups and learn from each other. In Laura's case, it is my impression that what she learned from Gary Sposito and Jim DeYoreo, in particular, was essential in allowing her to do work that was entirely original and groundbreaking. Neither of them was in her home department at Berkeley, but she sought them out for their wisdom and advice. It requires a particular type of person to make this all work, one that is both extremely bright and also fearless. There is still, of course, much more that needs to be done in understanding the origins of mineral chemistry variations in nature, but Laura's work provides a firm foundation for future progress.

Please join me in congratulating Laura Lammers on the MSA Award for 2018.

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