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# Samantha Lawrence Shares Insights on Hydrogen-Metal Interactions

**Lynne Robinson**

## young professional technical notes

Young Professional Technical Notes is an occasional feature highlighting the scientific interests and professional accomplishments of an early career TMS member who has contributed to the technical content of the current issue of *JOM*. The development of this feature is a special project of the TMS Young Professionals Committee. For additional information, contact Lynne Robinson, Magazine Editor, *JOM*, at lrobinson@tms.org.

**Samantha Lawrence**

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Samantha Lawrence began her exploration into hydrogen degradation of structural alloys as a research practicum for the U.S. Department of Energy National Nuclear Security Administration Stewardship Science Graduate Fellowship that supported her doctoral studies at Purdue University. "The variety of hydrogen-metal interactions, as a function of environment, alloy, and loading conditions, continues to fascinate me and provides a field rich with research opportunities," said Lawrence.

Lawrence shares the work that she conducted on this topic as a post doctoral researcher at Sandia National Laboratories in the January 2017 *JOM* technical paper, "Elastic Property Dependence on Mobile and Trapped Hydrogen in Ni-201." "The *JOM* paper focuses on the effect of internal hydrogen on the elastic properties of an alloy known to be susceptible to hydrogen degradation," Lawrence said. "The techniques applied allowed us to examine small volumes of a bulk material and begin to connect small-scale degradation mechanisms with bulk scale mechanical responses."

With the conclusion of her post doctoral appointment at Sandia, Lawrence joined the Los Alamos National Laboratory Electrochemistry and Corrosion team in November 2016. In this new role, Lawrence plans to expand her research to high-density alloys, as well as contribute to the overall understanding of hydrogen effects on materials. "I think the most exciting possibilities in the field are also the most challenging—linking microscopic degradation mechanisms with macroscale property alterations," she said. "A major goal that I think the whole community shares is to use the data we can collect from techniques with ever-increasing resolution to inform and validate multi-scale materials models, which can one day be used to predict bulk-scale degradation and failure of structural metals."

Lawrence acknowledges that her aspirations as a scientist are informed by a number of "top-notch mentors" who guided her throughout her post doctoral and graduate work, as well as her undergraduate studies at the Colorado School of Mines (CSM). She is quick to note, however, that she first stepped on to her career path at a very early age. "Perhaps the most influential moment in starting my career came under the guidance of Joram Lichtenstein, one of my early science fair mentors, who pointed out that I could attain degrees in metallurgy and ultimately pursue the study of corrosion and its control as a career," Lawrence said.

A 2016 TMS Young Leaders Professional Development Award recipient, Lawrence is looking forward to the professional journey that still lies ahead of her. "The most important lesson I've learned throughout my career is to always stay curious," she said. "Ask questions. Be critical of your own work. Find mentors who are curious and creative and pick their brains often. I am convinced that teams of people who are curious, passionate, and open to new ideas conduct the best science and develop the most useful engineering solutions."