



**Exponent®**  
Engineering & Scientific Consulting

**MariAnne Davis, Ph.D., P.E.**

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## Professional Profile

With a background in materials engineering, Dr. Davis has focused on materials characterization ranging from metals used in common applications for machines and industrial structures to more complex, emerging technologies such as bio-inspired materials and thin films. Her expertise is in the characterization and failure analysis of metallurgical components.

Dr. Davis also has a background in bio-related materials, and has researched the architecture of natural materials for use in protective applications. Additionally, she has worked extensively in the area of characterizing material systems that are now being developed for nanotechnology applications.

Prior to joining Exponent, Dr. Davis worked at Auburn University to develop a new laboratory course, Materials Characterization, which covered topics ranging from scanning electron microscopy (SEM), energy dispersive x-ray spectroscopy (EDS), and x-ray diffraction (XRD), and nanoindentation. She is well versed in a number of mechanical tests and materials characterization techniques. Additionally, she was a teaching assistant for multiple materials engineering courses such as Deformation and Failure of Engineering Materials, Crystallography, and Electron Microscopy.

## Academic Credentials & Professional Honors

Ph.D., Materials Engineering, Auburn University, 2015

B.S., Materials Science and Engineering, Lehigh University, 2011

Walter S. Woltosz Departmental Fellowship, Materials Engineering, Auburn University, 2011-2013

National Science Foundation, Integrated Graduate Education and Research Traineeship, 2014-2015

## Licenses and Certifications

40-Hour Hazardous Waste Operation and Emergency Response Certification (HAZWOPER)

## Professional Affiliations

ASM International, 2008-present (member)

Society for Experimental Mechanics (SEM), 2013-present (member)

Alpha Sigma Mu

## Languages

Spanish

## Publications

Sullivan M, Prorok BC. Evaluating indent pile-up with gold films on ceramic-like substrates. Journal of Materials Research 2015; 30(13): 2046-2054.

Sullivan M, Chen Y, Prorok BC. New strengthening mechanisms of nacre in the abalone shell. International Journal of Experimental and Computational Biomechanics 2015; 3(3): 236-249.

He JE, Sirois D, Li S, Sullivan M, Wickle C, Chin BA. Ballistic impact welding of copper to low carbon steel. Journal of Materials Processing Technology 2016; 232: 165-174.

## Presentations and Proceedings

Sullivan M, Prorok BC. Improving nanoindentation techniques with pile-up and sink-in considerations. Poster Presentation, Honorable Mention, Graduate Engineering Research Showcase, Auburn University, Auburn, AL, 2014.

Sullivan M, Prorok BC. Newly discovered pile up effects during nanoindentation. Oral Presentation, Society for Experimental Mechanics, Greenville, SC, 2014.

Sullivan M, Prorok BC. Controlling abalone shell architecture with temperature. Oral Presentation, Society for Experimental Mechanics, Greenville, SC, 2014.

Sullivan M, Prorok BC. New insight into pile-up in thin film indentation. Conference Proceedings of the Society for Experimental Mechanics: MEMS and Nanotechnology 2014; 5: 89-95.

Sullivan M, Prorok BC. Pile-up considerations during nanoindentation. Oral Presentation, Society of Engineering Science 51st Annual Technical Meeting, Purdue University, West Lafayette, IN, 2014.

Sullivan M, Ramasamy M, Prorok BC. Magneto-mechanical MEMS sensors for bio-detection. ECS Transactions 2014; 58(23): 25-33.

Sullivan M, Prorok BC. Strengthening mechanisms in the abalone shell. Oral Presentation in Spanish, Pan-American Studies Institute, San Jose, Costa Rica, 2013.

Sullivan M, Prorok BC. New insight into the toughening mechanisms of nacre. Conference Proceedings of the Society for Experimental Mechanics: Mechanics of Biological Systems and Materials 2012; 5: 39-44.