



ELLEN L. SOLOMON, Ph.D., P.E.
SENIOR STAFF CONSULTANT

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Dr. Ellen Solomon is a Senior Staff Consultant for ESi in the Materials Practice Group in Ann Arbor, Michigan. Dr. Solomon specializes in materials characterization and examining the relationships between material processing, structure, and properties. Her technical interests include failure analysis of materials and multiscale characterization techniques. Additionally, she has significant experience with analytical equipment including optical microscopy, scanning electron microscopy (including EBSD and FIB), conventional and scanning transmission electron microscopy, and atom probe tomography.

Her dissertation focused on quantifying the mechanisms controlling precipitation in magnesium rare earth alloys and understanding the relationship between the microstructure and mechanical properties. Dr. Solomon has published her work in multiple scientific journals and presented at various workshops and conferences.

Dr. Solomon has also performed research on ceramic materials used for biomedical implants and examined the effect of processing on the mechanical properties of bone cements. She also worked in a steel mill where she investigated the root cause of inclusion buildup during continuous casting.

Areas of Specialization

Engineering Failure Analysis
Materials Characterization
Ferrous/Non-Ferrous Metallurgy
Lightweight Materials for Transportation Applications
Heat Treatment and Materials Manufacturing

Education

Ph.D., Materials Science and Engineering, University of Michigan, Ann Arbor, MI, 2017
M.S., Materials Science and Engineering, University of Michigan, Ann Arbor, MI, 2015
B.S., Materials Engineering with a minor in Spanish (Cum Laude), Iowa State University, Ames, IA, 2012

Licensed Professional Engineer (P.E.)

State of Michigan License No. 6201069988

January 2021

Professional Affiliations/Honors

Failure Analysis Society

Programming Committee Member for IMAT 2020

TMS Light Metals Magnesium

Best Paper Award, 2016

MSE Graduate Symposium

Silver Award, 2016

Graduate Student Service Award

Recruiting in MSE, 2013

Rackham Merit Fellowship

Recipient, 2012-2014

Sorijan Scholarship

Recipient, 2011

MSE Academic Scholarship

Recipient, 2010

Tau Beta Pi

Initiation, 2010

Keramos

President, 2011-2012

Secretary, 2010-2011

Positions Held

Engineering Systems Inc., Ann Arbor, MI

Senior Staff Consultant, 2020 – Present

Staff Consultant, 2017 – 2020

University of Michigan, Ann Arbor, MI

Graduate Research Assistant, 2012 – 2017
Adjunct Instructor, 2012

Iowa State University, Ames, IA

Undergraduate Research Assistant, 2010 – 2012

Nucor, Hertford County, NC

Melt Shop Metallurgical Intern, 2011

Continued Education

Traffic Crash Reconstruction I

Northwestern University for Public Safety, Ann Arbor, MI, 2019

Applied Vehicle Dynamics Course

Autobahn Country Club, Joliet, IL, 2018

Human Factors in Traffic Crash Reconstruction

Institute of Police Technology and Management, University of North Florida, Fort Myers, 2017

Courses Taught

University of Michigan

Introduction to Materials and Manufacturing, January-April 2016

Publications/Presentations

“Corrosion of Sulfur Removal Tanks Used in the Processing of Landfill Gas,” **E.L.S. Solomon**, A.M. Pettinger, J.R. Babcock, S.A. Sanders, J.L. McDougall, *Journal of Failure Analysis and Prevention*, (Submitted)

“Evidence Preservation & Failure Analysis,” **E.L. Solomon**, presented at International Association of Special Victims Units (IAISU), Livonia, MI, October 2019

“Failure Analysis Techniques for Potable Water Components,” **E.L. Solomon**, E.R. Weishaupt, presented at Failure Analysis & Characterization – Microanalysis, Microscopy, and Metallography in Failure Analysis, MS&T 2019, Portland, OR, October 2019

“Products Failure Analysis and Reliability,” **E.L. Solomon**, E.R. Weishaupt, S.P. Capser, presented at ESi Open House, Ann Arbor, MI, September 2019

- “Stability and strain-driven evolution of β' precipitate in Mg-Y alloys”, **E.L.S. Solomon**, A.R. Natarajan, A.M. Roy, V. Sundararaghavan, A. Van der Ven, E.A. Marquis, *Acta Materialia*, 166, (2019)
- “PRISMS: An Integrated, Open-Source Framework for Accelerating Predictive Structural Materials Science”, L.K. Agesen, J.F. Adams, J.E. Allison, W.B. Andrews, V. Araullo-Peters, T. Berman, Z. Chen, S. Daly, A. Githens, M. Hedstrom, Z. Huang, H.V. Jagadish, J.W. Jones, J. Luce, E.A. Marquis, A. Misra, D. Montiel, P. Motamarri, A.D. Murphy, A.r. Natarajan, S. Panwar, B. Puchala, L. Qi, S. Rudraraju, K. Sagiya, **E.L.S. Solomon**, V. Sundararaghavan, G. Tarcea, G.H. Teichert, J.C. Thomas, K. Thornton, A. Van der Ven, Z. Wang, T. Weymouth, C. Yang, *Integrated Computational Materials Engineering of Magnesium*, JOM, The Minerals, Metals and Materials Society, (2018)
- “Precipitation behavior of Mg alloys containing Nd and Y”, **E.L.S. Solomon**, presented at PRISMS Workshop, Ann Arbor, MI, August 2017
- “Early precipitate morphologies in Mg-Nd-(Zr) alloys”. **E.L.S. Solomon**, V. Araullo-Peters, J.E. Allison, E.A. Marquis, *Scripta Materialia*, 128 (2017) 14-17
- “Aging behavior of Mg alloys containing Nd and Y”, **E.L.S. Solomon**, T. Chan, A. Chen, B. Uttal-Veroff, E.A. Marquis, *Magnesium Technology 2017*, The Minerals, Metals & Materials Society, 2017.
- “Misfit-Driven Precipitate Composition and Morphology in Mg-Nd Alloys”, S. DeWitt, **E.L.S. Solomon**, A. Natarajan, S. Rudraraju, L. Agesen, B. Puchala, E.A. Marquis, A. Van der Ven, K. Thornton, J. Allison, *Acta Materialia*, 136 (2017) 378-389
- “Deformation behavior of β' and β'' precipitates in Mg-RE alloys”, **E.L.S. Solomon**, E.A. Marquis, *Materials Letter*, 216 (2018) 67-69.
- “Aging behavior of Mg alloys containing Nd and Y”, **E.L.S. Solomon**, presented at Magnesium Technology 2017, The Minerals, Metals & Materials Society, San Diego CA, March 2017
- “Precipitate structures in Mg alloys containing Nd and Y”, **E.L.S. Solomon**, presented at Solid State Precipitation, The Minerals, Metals & Materials Society, San Diego CA, March 2017
- “The structure of β'' and β' in an aged Mg-Nd alloy”, **E.L.S. Solomon**, E.A. Marquis, *Magnesium Technology 2016*, The Minerals, Metals & Materials Society, Nashville, TN, February 2016.
- “On the early stages of precipitation in dilute Mg-Nd alloys”, A.R. Natarajan, **E.L.S. Solomon**, B. Puchala, E.A. Marquis, A. Van der Ven, *Acta Materialia*, 108 (2016) 367-379
- “Precipitation mechanisms in Mg-RE alloys”, **E.L.S. Solomon**, presented at MSE Graduate Symposium, Ann Arbor MI, October 2016—Awarded MSE Graduate Symposium Silver Award 2016
- “Quantitative characterization of the precipitate microstructure in an aged Mg-Nd alloy”, **E.L.S. Solomon**, presented at PRISMS Workshop, Ann Arbor, MI, August 2016

“Precipitate structure and morphology evolution in an aged Mg-Nd alloy”, **E.L.S. Solomon**, presented at Magnesium Technology 2016, The Minerals, Metals & Materials Society, Nashville TN, February 2016

“Chemistry and morphology of β' precipitates in an aged Mg-Nd-Y-Zr alloy”, **E. Sitzmann**, E.A. Marquis, *Philosophical Magazine Letters*, 95 (2015) 7-13.

“Precipitate structure and morphology evolution in a Mg-Nd alloy during aging at 250°C”, **E.L.S. Solomon**, presented at PRISMS Workshop, Ann Arbor, MI, September 2015

“Precipitate morphology and chemistry in an aged Mg-Nd-Y-Zr alloy”, **E. Sitzmann**, presented at PRISMS Workshop, Ann Arbor, MI, May 2014

“Characterization of magnesium rare earth precipitates”, **E. Sitzmann**, presented at Engineering Graduate Symposium, Ann Arbor, MI, October 2013

“Characterizing precipitates in WE43 using atom probe tomography”, **E. Sitzmann**, presented at PRISMS Workshop, Ann Arbor, MI, May 2013