Exponent®
Engineering & Scientific Consulting

Ryan Harrison, Ph.D.

Senior Associate | Materials & Corrosion Engineering
149 Commonwealth Drive | Menlo Park, CA 94025
(650) 688-6712 tel | rharrison@exponent.com

Professional Profile

Dr. Ryan Harrison specializes in failure analysis of engineering structures. He has specific interest in applying image analysis techniques for the examination of materials, and the automation of these analyses. Dr. Harrison has expertise with machine learning methods to quantitatively investigate structure/property/processing/performance relationships in material microstructures. He is also well-versed in a range of imaging techniques (e.g., scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDS/EDX), electron backscatter diffraction (EBSD), and optical microscopy).

Dr. Harrison completed his PhD at Carnegie Mellon University, where he focused on developing methods to quantify microstructure morphology and examining how shape plays a role in material properties. Specifically, he utilized both 2D and 3D moment invariants (MIs) as shape descriptors to examine microstructural morphologies in a diverse range of materials. His doctoral thesis focused on the relationship between precipitate shape and creep resistance in nickel-base superalloys, the use of MIs in quantifying and classifying metal 3D printing feedstock, and the identification of cellular function in plant tissue through cell morphology.

Academic Credentials & Professional Honors

Ph.D., Materials Science and Engineering, Carnegie Mellon University, 2018

M.S., Materials Science and Engineering, Carnegie Mellon University, 2017

B.S., Materials Science and Engineering, Washington State University, 2013

Publications

Harrison, Ryan, Elizabeth A. Holm, and Marc De Graef. "On the use of 2D moment invariants in the classification of additive manufacturing powder feedstock." Materials Characterization 149 (2019): 255-263.

Sahasrabudhe H, Harrison R, Carpenter C, Bandyopadhyay A. Stainless steel to titanium bimetallic structure using LENS™. Additive Manufacturing, 5 (2015): 1-8.

Presentations

Harrison R, De Graef M. Automatic shape-based cell identification in Arabidopsis Thaliana cotyledons using 3D moment invariants. TMS Annual Meeting, Phoenix, AZ, March 2018.

Harrison R, Callahan P, Pollock T, De Graef M. Characterizing γ’ Shape Evolution in Nickel-Base

Superalloys Using Lower Order Moment Invariants. TMS Annual Meeting, San Diego, CA, February 2017.

Harrison R, De Graef, M. γ' Precipitate Shape and Mechanical Properties in Ni-Base Superalloys. 3D Materials Science 2016, St. Charles, IL, July 2016.

Harrison R, De Graef M. On the Use of Higher Order Moment Invariants in the Classification of Microstructural Shapes. TMS Annual Meeting, Nashville, TN, February 2016.

Harrison R, De Graef M. Shape Analysis Using Higher Order Moment Invariants. Materials Science and Technology 2015, Columbus, OH, October 2015.