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Niloofar Nabili Tehrani, Ph.D.

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Professional Profile

Dr. Tehrani specializes in materials science and physical and mechanical metallurgy of various alloys with specific expertise in high strength aluminum alloy development for automotive structural parts. She is experienced in failure and root cause analysis, creep damage and welding characterization, as well as ultrasonic non-destructive testing.

Dr. Tehrani has worked with manufacturing plants across the globe for casting, rolling, and processing of aluminum alloys followed by design and execution of experiments to investigate their chemical and mechanical properties, corrosion and crash resistance, and joining/bonding of components.

Prior to joining Exponent, Dr. Tehrani worked as a Senior Metallurgy Engineer at the Novelis Global Research and Technology Center, where she served as a project manager and technical lead on multiple projects related to next-generation aluminum alloys for the automotive market. Her areas of focus were lab capability development for advance coupon-level crash testing methods for automotive structural components, surface quality improvement, and fundamental metallurgical investigation on processing-microstructure-property relationship of high strength alloys for improving formability.

Dr. Tehrani is well-versed in a range of characterization techniques including optical microscopy (OM), scanning and transmission electron microscopy (SEM and TEM), energy dispersive spectroscopy (EDS), X-ray diffraction (XRD), focused ion beam milling (FIB), differential scanning calorimetry (DSC), as well as non-destructive evaluation techniques such as linear and nonlinear ultrasonic testing (UT).

She completed her Ph.D. in Materials Engineering at University of Illinois at Chicago (UIC) where she focused on early creep damage detection in 410 stainless steel using nonlinear ultrasonics. Her investigations led to improvements in sensitivity of nonlinear UT to minute metallurgical variation in the microstructure that are not detectable by linear UT, which can prevent catastrophic failures in parts subjected to both high temperature and mechanical loading.

Dr. Tehrani is an advocate for STEM and women in engineering and has served as President of the Society of Women Engineers (SWE) at UIC.

Academic Credentials & Professional Honors

Ph.D., Materials Engineering, University of Illinois, Chicago, 2019

B.S., Materials and Metallurgical Engineering, Iran University of Science and Technology, 2014

Chancellor’s Student Service and Leadership Award (CSSLA)

Academic Appointments

Instructor of Materials Engineering Course, Loyola University Chicago, Spring 2019

Prior Experience

Senior Metallurgy Engineer, Novelis Global Research and Technology Center, Automotive R&D, 2019-2021

Materials Engineer Intern, ArcelorMittal, Plates Section, Summer 2018

Languages

Persian (Farsi)

Publications

Tehrani N, Abbasi Z, Ozevin D, JE Indacochea. Metallurgical Characterization of a Low Carbon Steel Microstructure Using Linear and Nonlinear Ultrasonics. Journal of Materials Engineering and Performance 2019; 28:7206-7212.

Mostavi A, Kamali N, Tehrani N, Chi SW, Ozevin D, Indacochea JE. Wavelet Based Harmonics Decomposition of Ultrasonic Signal in Assessment of Plastic Strain in Aluminum. Measurement 2017; 106:66-78.

Kamali N, Tehrani N, Mostavi A, Chi SW, Ozevin D, Indacochea JE. Influence of Mesoscale and Macroscale Heterogeneities in Metals on Higher Harmonics Under Plastic Deformation. Journal of Nondestructive Evaluation 2019; 38:53.

Abbasi Z, Yuhas D, Zhang L, Basantes ADC, Tehrani N, Ozevin D, Indacochea E. The Detection of Burn-Through Weld Defects Using Noncontact Ultrasonics. Materials 2018; 11(1):128.

Gattu VK, Ebert WL, Tehrani N, Indacochea JE. Electrochemical Measurements of Steel Corrosion for Modeling H2Generation. NACE International 2018; 11370.

Presentations

Abbasi Z, Tehrani N, Ozevin D, Indacochea JE. The influence of ferrite volume fraction on Rayleigh wave propagation in A572 grade 50 steel. AIP Conference Proceedings 1806 2017; 090001.

Tehrani N, Influence of phase volume fraction on acoustoelastic constant and ultrasonic velocity in A572 grade 50 steel. Poster presentation, ASM international, Chicago, IL, 2017.

Mostavi A, Tehrani N, Kamali N, Ozevin D, Chi SW, Indacochea JE. The application of water coupled nonlinear ultrasonics to quantify the dislocation density in aluminum 1100. AIP Conference Proceedings 1806 2017; 060003.