Exponent®
Engineering & Scientific Consulting

Megan Trombley, Ph.D.

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Professional Profile

Dr. Trombley is an expert in failure analysis and materials characterization of metals. Her research and testing experience is primarily in fatigue loading failures and the influence of material defects and residual stresses on the strength of materials. Dr. Trombley uses this knowledge to aid the Vehicle Practice group in cases assessing crashworthiness of vehicle structures.

Prior to joining Exponent, Dr. Trombley was a Graduate Research Assistant in the Materials Science and Engineering department at the University of Michigan. Her work focused on identifying the mechanisms by which fatigue failure occurs in additively manufactured (3D printed) stainless steel. This work investigated how manufacturing processes influence the material properties in order for this knowledge to be implemented into computational models.

Dr. Trombley also has 5 years' automotive industry experience at Ford Motor Company, working in Vehicle Manufacturing as a Co-Op Engineer. She has participated in numerous vehicle production launches and completed an undergraduate thesis assessing the feasibility of joining dissimilar sheet metals in vehicle production through the use of single-sided mechanical joining technologies. This work assessed the material flowability and the amount of subsequent part distortion for numerous joints used in production today.

Dr. Trombley has additional automotive knowledge courtesy of multiple graduate level automotive engineering courses including Vehicle Body Structures, Vehicular Crash Dynamics and Accident Reconstruction, Vehicle System Dynamics, and Chassis System Design. Dr Trombley's combined academic and industry experience make her well-versed in the manufacture and performance of vehicle structures.

Academic Credentials & Professional Honors

Ph.D., Materials Science and Engineering, University of Michigan, Ann Arbor, 2024

Rackham Merit Fellowship, University of Michigan

Sigma Pi Sigma

Tau Beta Pi – chapter president

Pi Tau Sigma – chapter vice president

MMRI Graduate Student Poster Contest, 1st Place, November 2021

Prior Experience

Graduate Research Assistant, University of Michigan, 2019-2024

Co-Op Engineer, Ford Motor Company, 2014-2019

Professional Affiliations

The Minerals, Metals & Materials Society (TMS) – member, conference presenter

Materials Research Society (MRS) – member

ASM International – member

Association for Iron and Steel Technology (AIST) – member

American Society of Mechanical Engineers (ASME) – member

Society of Women Engineers (SWE) – member

Publications

Presentations

Trombley ML, Birnbaum, AJ, Allison JE. Residual Stress and Surface Roughness Effects on the Size Effects Observed in Ultrasonic Fatigue Testing of LPBF 316L. Symposium presentation, TMS 152nd Annual Meeting & Exhibition, San Diego, CA, 2023.

Trombley ML, Birnbaum AJ, Heinkel ZK, Fisher CR, Allison JE. Size Effect on the Ultrasonic Fatigue Behavior of Laser-Powder Bed Fusion 316L Stainless Steel. TMS 151st Annual Meeting & Exhibition, Anaheim, CA, 2022.

Trombley ML, Allison JE. Size Effect on the Ultrasonic Fatigue Behavior of Laser Powder Bed Fusion 316L. Poster presentation, 1st Annual MMRI Symposium, University of Michigan, Ann Arbor, MI, 2021.

Trombley ML, Shi Q, Birnbaum AJ, Allison JE. Effect of Thickness on Ultrasonic Fatigue Behavior of 316L Stainless Steel Made by Powder Bed Fusion Additive Manufacturing. Poster presentation, TMS 150th Annual Meeting & Exhibition, online, 2021.

Warteman ML, Messing T, Tackett RJ. Synthesis and Characterization of Strontium-Doped Lanthanum Manganate for Applications in Temperature-Controlled Magnetic Fluid Hyperthermia. Presentation, Michigan Academy of Science, Arts, and Letters Annual Conference, Alma, MI, 2019.

Warteman ML, Messing T, Tackett RJ. Synthesis and Characterization of Strontium-Doped Lanthanum Manganate for Applications in Temperature-Controlled Magnetic Fluid Hyperthermia. Poster presentation. Kettering University Annual Homecoming Faculty and Student Poster Presentation, Flint, MI, 2018.