Exponent®
Engineering & Scientific Consulting

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Professional Profile

Dr. Anderson has an interdisciplinary background in mechanical and materials engineering, focusing on the fatigue and fracture behavior of materials. Through her expertise of solid mechanics, analytical modeling, and experimental characterization, Dr. Anderson serves clients from multiple industries, including manufacturing, energy, aerospace, rail, and consumer products. At Exponent, she has also assisted clients with the analysis of machine safety investigations.

Prior to joining exponent, Dr. Anderson extensively studied the fatigue behavior of additively manufactured metals. Additive manufacturing, or 3D printing, is a rapidly emerging advanced manufacturing technology that is changing the landscape of metal fabrication. In this process, parts are fabricated layer by layer, often following 3D model data, allowing for more intricate designs without the need for subsequent subtractive machining techniques. Dr. Anderson has experience in additive manufacturing process development, optimization, and standardization.

Dr. Anderson's doctoral research focused on predicting the fatigue response of both additively manufactured and friction stir welded metals to increase the safety and reliability of the cryogenic fuel tanks on NASA's current generation launch vehicle. More specifically, her Ph.D. work developed a microstructure-sensitive fatigue model to enable the certification of a novel additive manufacturing technology at NASA. Additionally, during her studies she helped increase the efficiency and operational lifetime of several coal fueled power plants through material and component characterization, modeling, and simulation of land-based turbines.

Dr. Anderson has extensive experience in advanced manufacturing techniques; mechanical testing via servohydraulic load frames including cryogenic and thermomechanical fatigue; finite element modeling (FEA) with Abaqus; metallography; data acquisition; and the use of various codes, standards, and specifications including ASTM, ANSI, and ASME. She is also a member of ASTM Committee E08 on Fatigue and Fracture.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, University of Alabama, 2021

M.S.E., Mechanical Engineering, University of Alabama, 2019

B.S., Mechanical Engineering, University of Alabama, 2017

Alabama Space Grant Consortium Graduate Fellowship, 2020, 2019, 2018

American Society for Testing and Materials (ASTM) International Graduate Scholarship Award, 2018

American Society for Testing and Materials (ASTM) Committee E08 Student Presentation Award, 2018

Pi Tau Sigma Engineering Honor Society, 2016

Prior Experience

Advanced Manufacturing Research Associate, Southern Research Institute, 2020-2021.

Mechanical Testing Intern, Jacobs under the direction of NASA Marshall, 2018.

Professional Affiliations

American Society for Testing and Materials (ASTM)

American Society of Mechanical Engineers (ASME)

Society of Woman Engineers (SWE)

Publications

Anderson-Wedge K, Barlow JZ, Daniewicz SR. Fatigue crack growth resistance of additive friction stir deposited AA6061. International Journal of Fatigue, under review.

Anderson K. SLS Production Friction Stir Plugs by Additive Friction Stir Deposition AA2219. Ph.D. Dissertation, University of Alabama, 2021.

Anderson-Wedge K, Avery D, Daniewicz SR, Allison P, Sowards J, Jordon B, Amaro R. Characterization of the fatigue behavior of additive friction stir deposition AA2219. International Journal of Fatigue, 2021 January; 142.

Anderson-Wedge K, Stubblefield G, Zhu N, Burford E, Long B, Daniewicz SR, Allison P, Sowards J, Rodriguez O, Amaro RL. Characterization of the Evolution of 2219-T87 Aluminum as a Function of the Friction Stir Welding Process. International Journal of Fatigue, 2021 January; 142.

Anderson K. Characterization of the Evolution of 2219-T87 Aluminum as a Function of the Friction Stir Welding Process. Master's Thesis, University of Alabama, 2019.

Anderson K and Daniewicz SR. Statistical Analysis of the Influence of Inclusion Levels on Fatigue Life Using a Gumbel Distribution. International Journal of Fatigue, 2018 July; 112:78-83.

Cauthen C, Anderson K, Avery D, Baker A, Daniewicz SR, Jordon J. Fatigue crack nucleation and microstructurally small crack growth mechanisms in high strength aluminum alloys. International Journal of Fatigue, 2020 November, 140

Nezhadfar P, Anderson-Wedge K, Daniewicz SR, Phan N, Shao S, Shamsaei N. Improved high cycle fatigue performance of additively manufactured 17-4 PH stainless steel via in-process refining micro-/defect-structure. Additive Manufacturing, 2020. 36.

Nezhadfar P, Burford E, Anderson-Wedge K, Zhang B, Shao S, Daniewicz SR, Shamsaei N. Fatigue crack growth behavior of additively manufactured 17-4 PH stainless steel: Effects of build orientation and microstructure. International Journal of Fatigue, 2019. 123:168-179.

Presentations

Anderson-Wedge K, Daniewicz SR, Amaro R. SLS Production Friction Stir Plugs by Additive Friction Stir Deposition. Materials Science and Technology (MS&T), Portland, OR, 2019.

Anderson-Wedge K, Daniewicz SR, Sowards J, Rodriguez O, Amaro RL. Characterizing the Evolution of 2219-T87 Aluminum as a Function of the Friction Stir Welding Process. International Conference on Fatigue Damage of Structural Materials, Hyannis, MA, 2018.

Anderson-Wedge K, Daniewicz SR, Sowards J, Rodriguez O, Amaro RL. Characterizing the Evolution of 2219-T87 Aluminum as a Function of the Friction Stir Welding Process. American Society for Testing Materials (ASTM), Washington D.C., 2018.

Anderson K, Nezhadfar P, Burford E, Daniewicz SR, Shamsaei N. Fatigue Behavior of Additively Manufactured 17-4 PH Stainless Steel. American Society for Testing Materials (ASTM), Atlanta, GA, 2017.

Anderson K and Daniewicz SR. Statistical Analysis of the Influence of Inclusion Levels on Fatigue Life Using a Gumbel Distribution. American Society for Testing Materials (ASTM), Atlanta, GA, 2017.