Erik Pfeif

PhD, PE

Sr. Consultant, Metallurgy

Dr. Erik Pfeif is a Senior Consultant at Engineering Systems Inc. (ESi) with over 15 years of experience in applied engineering, materials processing, and materials characterization. Dr. Pfeif specializes in welding metallurgy, metallurgical failure analysis, non-destructive evaluation, corrosion of materials, and physical metallurgy. Additionally, he has experience in assessment of manufacturing processes, small scale mechanical testing, government proposal writing, and experimental test stand development.

Before joining ESi, Dr. Pfeif spent most of his career conducting applied research and development of materials. He has worked on improving mineral processing technologies, metal additive manufacturing, systems design, and high-temperature superalloy development. He conducted research on government projects related to laser welding and thermophysical property measurement research at the National Institute of Standards and Technology. These experiences have provided Dr. Pfeif with experience in designing, developing, and testing the performance of diverse products, materials, and systems.

Education

PhD, Materials Science. Colorado School of the Mines, 2015

MS, Materials Science. Colorado School of the Mines, 2010

BS, Metallurgical & Materials Engineering, Colorado School of the Mines, 2008

Licenses & Certifications

- State of Colorado P.E. License No. 0066019

Positions Held

Engineering Systems Inc., Aurora, Illinois

- Sr. Consultant, August 2024 – Present

Disa Technologies, Westminster, Colorado

- Sr. Materials Engineer, January 2024 – August 2024

Contact Information

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ESi Denver

7265 South Revere Parkway
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Areas of Specialization

- Additive Manufacturing
- Corrosion of Materials
- Failure Analysis
- High Temperature Materials
- Lab and Industrial Testing
- Manufacturing
- Materials Characterization
- Materials Selection
- Mechanical Testing
- Metallurgical Analysis
- Metals
- Scanning Electron Microscopy
- Thermophysical Property Measurements
- Welding Metallurgy

3D Systems, San Diego, California

- Sr. Materials Engineer, August 2020 – November 2023

Johns Manville, Littleton, Colorado

- Sr. Metallurgical Engineer, December 2017 – March 2020

Professional Affiliations/Honors

International Institute of Welding, 2016 – Present

The Minerals Metals & Materials Society (TMS), 2017 – 2021

The American Welding Society, 2011 – 2014

Project Experience

Developed, validated, characterized and tested non-standard micro-tensile specimens from laser welding process.

Assisted in data collection in inspection of overhead power transmission line failure.

Failure analysis of weld-repaired stainless steel industrial pressure vessel.

Developed GMAW process parameter optimization for select welding processes

Performed first article inspection and quality control on castings.

Developed testing protocols and performed testing and analysis of novel laser powder bed fusion prototype system.

Design of prototype resin based ceramic laser printing system.

Publications

"Time-Resolved Absorptance and Melt Pool Dynamics During Intense Laser Irradiation of a Metal," B. J. Simonds, J. Sowards, J. Hadler, **E. A. Pfeif**, B. Wilthan, J. Tanner, J. Lehman, *Physical Review Applied*, Vol. 4, No. 10, pp. 044061, October 25, 2018.

"Dynamic and Absolute Measurements of Laser Coupling Efficiency During Laser Spot Welds," B. J. Simonds, J. W. Sowards, J. Hadler, **E. A. Pfeif**, B. Wilthan, J. Tanner, J. Lehman, *Procedia CIRP*, Vol. 74, pp. 632-635, 2018.

"Low-Cycle Fatigue Behavior of Fiber-Laser Welded, Corrosion-Resistant, High-Strength Low Alloy Sheet Steel," J. W. Sowards, **E. A. Pfeif**, M. J. Connolly, J. D. McColskey, S. L. Miller, B. J. Simonds, J. R. Fekete, *Materials & Design*, Vol. 121, pp. 393-405, May 05, 2017.

"Data Resources for Thermophysical Properties of Metals and Alloys, Part 1: Structured Data Capture from the Archival Literature," B. Wilthan, **E. A. Pfeif**, V. V. Diky, R. D. Chirico, U. R. Kattner, K. Kroenlein, *Calphad*, Vol. 56, pp. 126-138, March 2017.

"Fiber Laser Welding of Dual-Phase Galvanized Sheet Steel (DP590): Traditional Analysis and New Quality Assessment Techniques." S. Miller, **E. A. Pfeif**, A. Kazakov, E. Baumann, M. Dowell, *SPIE LASE*, 97410I-12, March 2016.

"Perspective: Data Infrastructure for High Throughput Materials Discovery," E. A. Pfeif, K. Kroenlein, *APL Materials*, Vol. 5, No. 4, pp. 053203, March 07, 2016.

"Characterization of Nitrogen Effects in High Energy Density Weldments of Nitronic 40 Stainless Steel," E. A. Pfeif, Ph.D. Thesis, Colorado School of Mines, 2015.

"Quantitative Assessment of Thermal Diffusion Using NDE," C. T. Howard, **E. A. Pfeif,** J. M. Porter, B. Mishra, D. L. Olson, *AIP Conference Proceedings,* Vol. 1511, No. 1, pp. 1143-1149, 2013.

"Use Of Segregation as A Weld Design Opportunity," E. A. Pfeif, C. Howard, S. Tate, S. Liu, B. Mishra, D. L. Olson, In Trends in Welding Research 2012: Proceedings of the 9th International Conference. ASM International, 2012.

"Submerged Eddy Current Method of Hydrogen Content Evaluation of Zircaloy-4 Fuel Cladding" E. A. Pfeif, Z. Jones, A. N. Lasseigne, K. Koenig, K. Krzywosz, E. V. Mader, D. L. Olson, AIP Conference Proceedings, Vol. 1335, No. 1, pp. 1168-1175, 2011.

"Characterization of Hydrogen Content in Zircaloy-4 Nuclear Fuel Cladding," E. A. Pfeif, A. N. Lasseigne, K. Krzywosz, E. V. Mader, B. Mishra, D. L. Olson, AIP Conference Proceedings, Vol. 1211, No. 1, pp. 1317-1324, 2010.

"Assessment of the State of Precipitation in Aluminum Casting A356. 2 Alloy Using Nondestructive Microstructure Electronic Property Measurements," P. Kiattisaksri, P. J. Gibbs, K. Koenig, **E. A. Pfeif**, A. N. Lasseigne, P. F. Mendez, D. L. Olson, AIP Conference Proceedings, Vol. 1211, No. 1, pp. 1285-1292, 2010.

"Development of Submerged In-Situ Non-Destructive Evaluation of Hydrogen in Zircaloy Fuel Cladding," E. A. Pfeif, M.S. Thesis, 2010.

"The Impact of Peak Shock Stress on the Microstructure and Shear Behavior of 1018 Steel," L. M. Dougherty, E. K. Cerreta, **E. A. Pfeif**, C. P. Trujillo, G. T. Gray, Acta Materialia, Vol. 18, No. 55, pp. 6356-6364, 2007.

Presentations

"ThermoML—An XML Storage and Exchange Standard for Thermophysical and Thermochemical Data," E. A. Pfeif, K. Kroenlein, B. Wilthan, V. V. Diky, European Thermophysical Properties Conference., Graz, Austria, 2017.

"A Free Online NIST/TRC Resource for Thermophysical Property Data of Metals and Alloys," B. Wilthan, V. V. Diky, A. Kazakov, **E. A. Pfeif,** S. Townsend, K. Kroenlein, European Thermophysical Properties Conference, Graz, Austria, 2017.

"Welding Solidification Fundamentals," E. A Pfeif, AWS Weld the Rockies Symposium, 2016.

"Exploring Methods for Producing Standard Reference Data for Calibration of Numerical Welding Simulations," J. W. Sowards, **E. A. Pfeif**, B. Wilthan, K. Kroenlein, B. Simonds, Fabtech Professional Program, Las Vegas, NV, 2016.

"Development of a Dynamically Evaluated Thermodynamic Database for Metallurgical Systems," E. A. Pfeif, B. Wilthan, V. V. Diky, K. Kroenlein, A. Kazakov, Trends in Welding, Tokyo, Japan, 2016.

"Effects of Nitrogen on Strength of Fiber and Electron Beam Weld Metal," E. A. Pfeif, D. Javernick, S. Liu, Trends in Welding Symposium, Tokyo, Japan, 2016.

"Progress on Implementation of Dynamic Thermodynamic Database for Metallic Systems," E. A. Pfeif, B. Wilthan, V. V. Diky, K. Kroenlein, A. Kazakov, Asian Thermophysical Properties Conference, Tokyo, Japan. 2016.

"Comparison of Longitudinal Mechanical Properties of Nitronic 40 Electron Beam Welded and Laser Beam Welds," E. A. Pfeif, C. Cady, M. Mataya, D. L. Olson, D. Javernick, C. Liu, S. Liu, Fabtech Professional Program, Atlanta, GA, 2014.

"The Need for Thermodynamics Databases for Metallurgical Systems," E. A. Pfeif, World Materials Research Institute Forum—Young Scientists Workshop, Boulder, CO, 2014.

"Effect of Mn and N Vaporization During Laser Beam Welding of 12Cr6Ni9Mn Weldment Mechanical Properties," E. A. Pfeif, M. Mataya, D. L. Olson, C. Cady, S. Liu, Fabtech Professional Program Chicago, IL, 2013.