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Engineering & Scientific Consulting

Joe Pauza V, Ph.D.

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Professional Profile

Dr. Pauza specializes in materials and metallurgical engineering. He has specific experience in additive manufacturing (AM), computational materials science, and microstructure design/optimization.

Dr. Pauza also has expertise in material evaluation and defect detection.

Additionally, Dr. Pauza is experienced with a variety of materials characterization techniques including optical microscopy (OM), scanning electron microscopy (SEM), computed tomography (CT), x-ray diffraction (XRD), and electron backscatter diffraction (EBSD).

Dr. Pauza completed his Ph.D. at Carnegie Mellon University in 2021. His doctoral thesis work focused on the development of novel microstructure modeling techniques with the ultimate goal of controlling crystallographic texture during fabrication of laser powder bed fusion (LPBF) AM aerospace parts to improve fatigue and creep performance. While pursuing his Ph.D., Dr. Pauza also worked on projects investigating lifing performance of AM titanium (i.e., Ti64) parts, residual stress development during AM builds, optimization of post-print heat treatments for AM nickel-based superalloys (i.e., IN718), and in-situ x-ray imaging of the AM process. Dr. Pauza has also worked with various shape memory alloys including Nitinol, NiTiHf, and CuAlMn for both biomedical and aerospace applications.

Academic Credentials & Professional Honors

Ph.D., Materials Science and Engineering, Carnegie Mellon University, 2021

M.S., Materials Science and Engineering, Carnegie Mellon University, 2019

B.S., Mechanical Engineering, Colorado School of Mines, 2017

Prior Experience

Graduate Research Internship, NASA Langley Research Center, 2019

Publications

J. G. Pauza and A. D. Rollett, "Simulation Study of Hatch Spacing and Layer Thickness Effects on Microstructure in Laser Powder Bed Fusion Additive Manufacturing using a Texture-Aware Solidification Potts Model" J. of Mater. Eng. and Perform. (2021).

J. G. Pauza, W. A. Tayon, and A. D. Rollett, "Computer Simulation of Microstructure Development in Powder-Bed Additive Manufacturing with Crystallographic Texture" Model. Simul. Mater. Sci. Eng. (2021).

R. Cunningham, C. Zhao, N. Parab, C. Kantzos, J. Pauza, K. Fezzaa, T. Sun, and A. D. Rollett, "Keyhole threshold and morphology in laser melting revealed by ultrahigh-speed x-ray imaging," *Science* (2019).

N. D. Parab, C. Zhao, R. Cunningham, L. I. Escano, B. Gould, S. Wolff, Q. Guo, L. Xiong, C. Kantzos, J. Pauza, K. Fezzaa, A. Greco, A. Rollett, L. Chen, and T. Sun, "High-speed Synchrotron X-ray Imaging of Laser Powder Bed Fusion Process," *Synchrotron Radiat. News* (2019).

R. Jiang, A. Mostafaei, J. Pauza, C. Kantzos, and A. D. Rollett, "Varied heat treatments and properties of laser powder bed printed Inconel 718," *Mater. Sci. Eng. A* (2019).

C. Kantzos, J. Pauza, R. Cunningham, S. P. Narra, J. Beuth, and A. Rollett, "An Investigation of Process Parameter Modifications on Additively Manufactured Inconel 718 Parts," *J. Mater. Eng. Perform.* (2018).

B. Amin-Ahmadi, J. G. Pauza, A. Shamimi, T. W. Duerig, R. D. Noebe, and A. P. Stebner, "Coherency strains of H-phase precipitates and their influence on functional properties of nickel-titanium-hafnium shape memory alloys," *Scr. Mater.* (2018).

B. Amin-Ahmadi, T. Gallmeyer, J. G. Pauza, T. W. Duerig, R. D. Noebe, and A. P. Stebner, "Effect of a pre-aging treatment on the mechanical behaviors of Ni50.3Ti49.7 – xHf_x (x ≤ 9 at.%) Shape memory alloys," *Scr. Mater.* (2018).

Presentations

J. Pauza, W. A. Tayon, A. D. Rollett. Investigating Crystallographic Texture Control Using Laser Powder-bed Fusion Additive Manufacturing. *Material Science and Technology 2020*, Virtual, November 03, 2020

J. Pauza, W. A. Tayon, A. D. Rollett. Connecting Process Parameters to Grain Structure of Parts Produced by Laser Powder-bed Fusion Additive Manufacturing Using a Monte Carlo Potts Model. *Material Science and Technology 2019*, Portland, OR, October 02, 2019

J. Pauza, A. D. Rollett. Microstructure Prediction in Additively Manufactured Inconel 718. *Material Science and Technology 2018*, Columbus, OH, October 16, 2018