Exponent®
Engineering & Scientific Consulting

Nancy Huang, Ph.D.

Associate | Metallurgical and Corrosion Engineering
Menlo Park
+1-650-688-6762 | nhuang@exponent.com

Professional Profile

Dr. Huang is a materials engineer with expertise in metallurgy, materials characterization, mechanical testing, failure analysis, and additive manufacturing (AM). She uses a range of characterization techniques to evaluate materials, including optical microscopy, profilometry, scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDS), electron backscatter diffraction (EBSD), X-ray diffraction (XRD), X-ray computed tomography (XCT), microhardness measurements, and mechanical (tension and compression) testing. She is also proficient in finite element modeling to simulate mechanical loading and quantitative image analysis.

Prior to joining Exponent, Dr. Huang completed her Ph.D. at the Pennsylvania State University. Her work focused on improving the properties of additively manufactured components for structural applications via processing optimization and post-processing thermal treatments, where she identified root causes for mechanical failure through fractography and microstructural analyses. During this time, she gained extensive experience in working with stainless steel, aluminum, and titanium alloys fabricated using binder jetting or laser powder bed fusion AM. As part of her interdisciplinary and collaborative research, she also characterized the linkages between non-destructive evaluation signals (ultrasound and XCT) with microstructural features and mechanical properties to identify regions of potential failure.

Academic Credentials & Professional Honors

Ph.D., Material Science and Engineering, Pennsylvania State University, 2025

B.S., Applied Physics, Binghamton University (SUNY), 2020

NASA Pennsylvania Space Grant Consortium Graduate Fellowship, 2023 & 2024

Robert E. Newnham Award for Research Excellence, Pennsylvania State University, 2023

Sigma Pi Sigma, Binghamton University, 2020

Prior Experience

Intern, Oak Ridge National Lab, 2024

Publications

Huang N, Furton ET, Mundada YA, Beese AM. Identifying fracture location in additively manufactured samples based on defect characteristics: Demonstration using AlSi10Mg. Additive Manufacturing 2025; 104935.

Luo Q, Huang N, Bartles DL, Simpson TW, Beese AM. Harnessing of in situ processing data to predict

mechanical properties of laser powder bed fusion AlSi10Mg. Journal of Intelligent Manufacturing 2025.

Huang N, Simpson TW, Beese AM. Effect of sample thickness and heat treatment on microstructure and mechanical properties of Ti-6Al-4V fabricated using laser powder bed fusion. Materials Science and Engineering: A 2025; 922:147637.

Huang N, Luo Q, Bartles DL, Simpson TW, & Beese AM. Effect of heat treatment on microstructure and mechanical properties of AlSi10Mg fabricated using laser powder bed fusion. Materials Science and Engineering: A 2024; 895:146228.

Luo Q, Huang N, Fu T, Wang J, Bartles DL, Simpson TW, Beese AM. Dataset of process-structure-property feature relationships for AlSi10Mg material fabricated using laser powder bed fusion additive manufacturing. Data in Brief 2024; 53:110130.

Abdelatty MY, Umar A, Khinda GS, Cadwell RJ, Levy JA, Huang N, Weerawarne DL, Alhendi M, Miller SM, Poliks MD. The role of surface roughness on the electrical behavior of flexible and stretchable screen-printed silver ink on Kapton substrate. Flexible and Printed Electronics 2023; 8(4):045010.

Huang N, Cook OJ, Argüelles AP, Beese AM. Review of process–structure–property relationships in metals fabricated using binder jet additive manufacturing. Metallography, Microstructure, and Analysis 2023; 12:883-905.

Luo Q, Huang N, Fu T, Wang J, Bartles DL, Simpson TW, Beese AM. New insight into the multivariate relationships among process, structure, and properties in laser powder bed fusion AlSi10Mg. Additive Manufacturing 2023; 77:103804.

Huang N, Cook OJ, Smithson RLW, Argüelles AP, Beese AM. Investigation of the effects of stress triaxiality and porosity on failure behavior of binder jetted 316 stainless steel infiltrated with bronze. JOM 2023; 75(6):1941-1952.

Cook OJ, Huang N, Smithson RLW, Kube CM, Beese AM, Argüelles AP. Uncovering microstructural heterogeneities in binder jet printed SS316L through ultrasonic testing and X-ray computed tomography. Materials Characterization 2023; 197:112697.

Huang N, Cook OJ, Warner JD, Smithson RLW, Kube CM, Argüelles AP, Beese AM. Effects of infiltration conditions on binder jet additively manufactured stainless steel infiltrated with bronze. Additive Manufacturing 2022; 59:103162.

Cook OJ, Huang N, Smithson RLW, Kube CM, Beese AM, Argüelles AP. Ultrasonic characterization of porosity in components made by binder jet additive manufacturing. Materials Evaluation 2022; 80(4):37-44.

Huang N, Cook OJ, Smithson RLW, Kube CM, Argüelles AP, Beese AM. Use of ultrasound to identify microstructure-property relationships in 316 stainless steel fabricated with binder jet additive manufacturing. Additive Manufacturing 2022; 51:102591.

Alhendi M, Umar A, Abbara EM, Cadwell RJ, Huang N, Weerawarne DL, Borgesen P, Iannotti J, Stoffel N, Poliks MD. A comparative study of aerosol jet printing on polyimide and liquid crystal polymer substrates for RF applications. 2020 IEEE 70th Electronic Components and Technology Conference 2020; 1579-1585.

Presentations

Huang N, Luo Q, Bartles DL, Simpson TW, Beese AM. Effects of post-processing heat treatments on microstructure and mechanical properties of PBF-LB AlSi10Mg. Conference presentation, ASTM International Conference on Advanced Manufacturing, Atlanta, GA, 2024.

Huang N, Simpson TW, Beese AM. Effects of thermal conditions and post-processing heat treatments on microstructure-property relationships of Ti-6Al-4V fabricated via laser powder bed fusion. Conference presentation, MS&T, Pittsburgh, PA, 2024.

Huang N, Cook OJ, Smithson RLW, Kube CM, Argüelles AP, Beese AM. Effect of post-processing on porosity, secondary phases, and mechanical behavior of binder jet fabricated stainless steels. Conference presentation, MS&T, Columbus, OH, 2023.

Huang N, Cook OJ, Smithson RLW, Kube CM, Argüelles AP, Beese AM. Linkage of microstructural features and mechanical properties of binder jet fabricated 316 stainless steel through ultrasonic measurements. Conference presentation, AMBench, Bethesda, MD, 2022.

Huang N, Cook OJ, Warner JD, Smithson RLW, Kube CM, Argüelles AP, Beese AM. Investigating the effects of infiltration conditions on the microstructure and mechanical properties of binder jet fabricated stainless steel/bronze through ultrasonic testing. Conference presentation, 33rd Annual International Solid Freeform Fabrication Symposium, Autin, TX, 2022.

Huang N, Levy JA. SEM image analysis of laser sintered aerosol jet printed silver nanoparticulate structures. Poster presentation, 31st Annual Electronics Packaging Symposium, Schenectady, NY, 2019.

Huang N. Effects of laser sintering silver nanoparticle ink on resistance and surface roughness. Poster presentation, 30th Annual Electronics Packaging Symposium, Binghamton, NY, 2018.

Peer Reviews

Progress in Additive Manufacturing