

HOLDEN HYER

CURRICULUM VITAE

PERSONAL INFORMATION

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EDUCATION

PhD, Materials Science and Engineering
2017-2020 University of Central Florida (UCF), Orlando, FL
Dissertation title was "Understanding solidification of select aluminum and magnesium alloys additively manufactured by laser powder bed fusion"
Advisor: Prof. YONGHO SOHN. yongho.sohn@ucf.edu
BS, Majored in Materials Engineering
2013-2017 New Mexico Institute of Mining and Technology (NMT), Socorro, NM
An emphasis in metallurgy. Graduated with highest honors. Advisor: Prof. BHASKAR MAJUMDAR. bhaskar.majumdar@nmt.edu

RESEARCH / WORK EXPERIENCE

Feb. 2021-Current
ORNL R&D Associate, OAK RIDGE
NATIONAL LABORATORY (ORNL), OAK RIDGE, TN
In the Nuclear Energy and Fuel Cycle Division, Nuclear Fuel Development Section, Fuel Cladding and Core Internals Group at ORNL. Current research includes additive manufacturing of embedded temperature and strain sensors, refractory metals such as Mo and W based alloys, high strength steels, Ni-based superalloys, Ti-6Al-4V, bulk metallic glasses, and thermoelectrics.
Reference: CHRISTIAN PETRIE petriecm@ornl.gov
Aug. 2017-Dec. 2020
UCF Graduate Research Assistant, UNIVERSITY OF CENTRAL FLORIDA (UCF), ORLANDO, FL
Explored atomization of metals for powder production and using our own atomized powders in additive manufacturing processes, such as laser powder bed fusion. Performed extensive work on a variety of alloy bases: Al, Mg, Fe, Ni, Ti, Zr, and Cu
Reference: YONGHO SOHN yongho.sohn@ucf.edu
2016-2019
LANL Student Researcher, LOS ALAMOS NATIONAL LABORATORY (LANL), LOS ALAMOS, NM
Explored induction melting of metallic alloys and thermal gradients of high-temperature casting crucibles. Part of research team investigating corrosion mechanisms to failure of radiological containers.
2015-2017
NMT Researcher, Various, MATERIALS ENGINEERING DEPARTMENT, NMT, SOCORRO, NM
Student reseracher, learning coach, and teaching assistant.
Reference: PROF. BHASKAR MAJUMDAR bhaskar.majumdar@nmt.edu

PROGRAMMATIC LEADERSHIP ROLES

	<i>2024-Current</i>	US Department of Energy (DOE), National Nuclear Security Administration (NNSA), Office of Defense Nuclear Nonproliferation (DNN)
<i>DNN</i>		Lead for exploring additively manufactured molybdenum fuel cans for improved packing density of fuel kernels and superior heat transfer efficiency.
	<i>2022-Current</i>	DOE Office of Nuclear Energy (NE), Advanced Materials and Manufacturing Technologies (AMMT) Program
<i>AMMT</i>		Lead for in-situ monitoring exploration for laser powder bed fusion. Additionally, supports thrusts related to qualification of additively manufactured SS316, Ni-based superalloys, and ODS steels.
	<i>2022-2024</i>	DOE NNSA Office of Material Management and Minimization's Molybdenum-99 Program
<i>Mo-99</i>		Lead for the additive manufacturing target design and mechanical testing target support, under the Northstar Medical Radioisotopes accelerator production.

HONORS AND AWARDS

	<i>2024</i>	Oak Ridge National Laboratory Laboratory Directed Research and Development (LDRD)
<i>Outstanding Team</i>		Award for best team in an LDRD.
	<i>2023</i>	International Metallographic Society Buehler Technical Paper Award
<i>Outstanding Publication</i>		Award for outstanding paper published in a society journal for that year.
	<i>2022</i>	International Metallographic Society Light Microscopy
<i>Outstanding Poster</i>		Award for outstanding poster used to communicate how metallography and microscopy was used to solve an engineering problem.
	<i>2017-2018</i>	University of Central Florida (UCF) Office Of Research Doctoral Fellowship
<i>Fellowship</i>		One year fellowship sponsored by the university's office of research.

MEMBERSHIPS

<i>2021-Current</i>	American Nuclear Society
<i>2015-Current</i>	Minerals, Metals, and Materials Society (TMS)
<i>2015-Current</i>	ASM International
	Editorial board member for ASM's journal Metallography, Microstructure, and Analysis (2023-Current).
	On ASM's Emerging Professional Committee, Team Lead for the Data and Digital Content Subcommittee (2023-Current).

MENTORSHIP

ORNL	2024-Current	Post-Doc at Oak Ridge National Laboratory (ORNL)
		Currently responsible for mentoring a post-doc researching Ni-based superalloys and ODS steels or additive manufacturing.
	2023-2024	Student Interns at ORNL
		Hosted a summer intern in 2023 who returned for a second summer in 2024 before starting graduate school at the University of Tennessee.
NMT	2020-2024	Doctoral Committee Member New Mexico Mining Institute of Mining and Technology (NMT)
		Had the pleasure of being part of a doctoral committee for a now doctorate in materials science and engineering.
UCF	2017-2020	Graduate Students at the University of Central Florida (UCF)
		Mentored 5 masters students and 3 doctoral students during my time at UCF.
		Introduced, trained, and worked with 6 undergraduates working in the lab space in which I was lab manager and lab safety manager.

PRESENTATION SESSIONS

MiNES/NuMat	2023-2024	Nuclear Materials (NuMat) Conference & Materials in Nuclear Energy Systems (MiNES)
		Annual nuclear materials conferences. Attended the conference 2×, presenting multiple oral and poster presentations.
KOFST	2023	BrainLink X-Lab Day
		Invited speaker , attended a workshop on additive manufacturing in nuclear organized by the Korean Federation of Science and Technology Societies (KOFST).
ANS	2022-2024	American Nuclear Society (ANS) Annual Meeting
		Annual professional materials conference. Attended the conference 3×, presenting multiple oral presentations.
IMAT	2022-2024	American Society of Materials (ASM) International Materials, Applications, and Technologies (IMAT) Conference
		Annual professional materials conference. Attended the conference 3×, presenting multiple oral and poster presentations. Attends meetings for the editorial board of Metallography, Microstructure, and Analysis, as well as the ASM Emerging Professionals committee.
MS&T	2018-2020	Materials Science & Technology (MS&T)
		Annual professional materials conference. Attended the conference 3×, presenting multiple oral and poster presentations.
TMS	2017-2025	Minerals, Metals, and Materials Society (TMS) Conference
		Annual professional materials conference. Attended the conference 6×,

presenting multiple oral and poster presentations.

October 2016 Rio Grande Symposium for Advanced
Materials (RGSAM), Albuquerque, NM

RGSAM

Local symposium on materials science. First professional event, presented a poster.

JOURNAL PUBLICATIONS

ORNL

[31] Zhou, L., Yang, H., & **Hyer, H. C.** Controlling Mechanical Properties of Laser Powder Bed Fused AlSi10Mg through Manipulation of Laser Scan Rotation. (2025). *Materialia*. 102340.

[30] **Hyer, H. C.**, Massey, C.P., Chappell, J., Garrison, B., Parish, C., Seibert, R., Smith, K., & Nelson, A. High plasticity in refractory composite fabrication by ultrasonic additive manufacturing. (2025). *Composites Part B: Engineering*. 295:112051.

[29] **Hyer, H. C.** & Petrie, C.M. Distributed strain sensing using Bi-metallic coated fiber optic sensors embedded in stainless steel. (2024). *Additive Manufacturing*. 91:104355.

[28] **Hyer, H. C.**, Dryepondt, S., Su, Y. F., Yamamoto, Y., Pint, B. A., & Massey, C.P. Strength stability at high temperatures for additively manufactured alumina forming austenitic alloy (2024). *Scripta Materialia*. 253:116286.

[27] **Hyer, H. C.**, Giuliano, D., & Petrie, C.M. Toward local core outlet temperature monitoring in gas-cooled nuclear reactors using distributed fiber-optic temperature sensors. (2023). *Applied Thermal Engineering*. 230:B.

[26] **Hyer, H. C.**, Carver, K., List, F.A., & Petrie, C.M. Embedding thermocouples in SS316 with laser powder bed fusion. (2023). *Smart Materials and Structures*. 32:02LT01.

[25] **Hyer, H. C.**, & Petrie, C. M. Effect of powder layer thickness on the microstructural development of additively manufactured SS316. (2022). *Journal of Manufacturing Processes*. 76:666-674.

[24] **Hyer, H. C.**, Sweeney, D. C., & Petrie, C. M. Functional fiber-optic sensors embedded in stainless steel components using ultrasonic additive manufacturing for distributed temperature and strain measurements. (2022). *Additive Manufacturing*. 52:102681.

UCF

[23] Huynh, T., Mehta, A., Graydon, K., Woo, J., Park, S., **Hyer, H.**, Zhou, L., Imholte, D.D., Woolstenhulme, N.E., Wachs, D.M., & Sohn, Y. Microstructural Development in Inconel 718 Nickel-Based Superalloy Additively Manufactured by Laser Powder Bed Fusion. (2022). *Metallography, Microstructure, and Analysis*. 11:88-107.

[22] Mehta, A., Zhou, L., **Hyer, H.**, Huynh, T., Lu, B., Graydon, K., Drobner, E.J., Park, S.H., & Sohn, Y. Microstructural characteristics and mechanical properties of additively manufactured Cu-10Sn alloys by laser powder bed fusion. (2022). *Materials Science and Engineering: A*. 838:142775.

[21] **Hyer, H.**, Mehta, A., Graydon, K., Kljestan, N., Knezevic, M., Weiss, D., D., McWilliams, B., Cho, K Sohn, Y High strength aluminum-cerium alloy processed by laser powder bed fusion. (2022). *Additive Manufacturing*, 52:102657.

[20] Mahmud, A., Huynh, T., Zhou, L., **Hyer, H.**, Mehta, A., Imholte, D. D., D.D., Woolstenhulme, N.E., Wachs, D.M., & Sohn, Y. Mechanical behavior assessment of Ti-6Al-4V ELI alloy produced by laser powder bed fusion. (2021). *Metals*. 11:1671.

- [19] Diaz Vallejo, N., Lucas, C., Ayers, N., Graydon, K., **Hyer, H.**, & Sohn, Y. Process Optimization and Microstructure Analysis to Understand Laser Powder Bed Fusion of 316L Stainless Steel. (2021). *Metals*. 11(5): 832.
- [18] Thapliyal, S., Shukla, S., Zhou, L., **Hyer, H.**, Agrawal, P., Komarassay, M., Sohn, Y., & Mishra, R. Design of Heterogeneous Structured Al Alloys with Wide Processing Window for Laser-Powder Bed Fusion Additive Manufacturing. (2021). *Additive Manufacturing*. 42:102002.
- [17] **Hyer, H.**, Zhou, L., Park, S., Huynh, T., Mehta, A., Thapliyal, Mishra, R., & Sohn, Y. Elimination of Extraordinarily High Cracking Susceptibility of Aluminum Alloy Fabricated by Laser Powder Bed Fusion. (2021). *Journal of Materials Science and Technology*. 103:50-58.
- [16] Mehta, A., Zhou, L., Huynh, T., Park, S., **Hyer, H.**, Song, S., Bai, Y., Imholte, D., Woolstenhulme, N., Wachs, D., & Sohn, Y. Additive Manufacturing and Mechanical Properties of the Dense and Crack Free Zr-Modified Aluminum Alloy 6061 Fabricated by the Laser Powder Bed Fusion. (2021). *Additive Manufacturing*. 41:101966.
- [15] **Hyer, H.**, Zhou, L., Liu, Q., Wu, D., Song, S., Bai, Y., McWilliams, B., Cho, K., & Sohn, Y. High Strength WE43 Microlattice Structures Manufactured by Laser Powder Bed Fusion. (2021). *Materialia*. 16:101067.
- [14] Park, T.H., Baek, M.S., **Hyer, H.**, Sohn, Y.H., Lee, K.A. Effect of Direct Aging on the Microstructure and Tensile Properties of AlSi10Mg Alloy Manufactured by Selective Laser Melting Process, *Materials Characterization*. 176:111113.
- [13] **Hyer, H.**, Zhou, L., Mehta, A., Park, S., Huynh, T., Song, S., Bai, Y., Cho, K., McWilliams, B., & Sohn, Y. (2020). Composition-Dependent Solidification Solidification Cracking of Aluminum-Silicon Alloys During Laser Powder Bed Fusion. (2021) *Acta Materialia*. 208:116698.
- [12] **Hyer, H.**, Newell, R., Matejczyk, D., Hsie, S., Anthony, M., Zhou, L., Kammerer, C., & Sohn, Y. (2020). Microstructural development in as-built and heat treated IN625 component additively manufactured by laser powder bed fusion. (2020) *Journal of Phase Equilibria and Diffusion*.
- [11] **Hyer, H.**, Zhou, L. Mehta, A., & Sohn, Y. Effects of Alloy Composition and Solid-State Diffusion Kinetics on Powder Bed Fusion Cracking Susceptibility. (2020) *Journal of Phase Equilibria and Diffusion*.
- [10] **Hyer, H.**, Zhou, L., Park, S., Gottsfritz, G., Benson, G., Tolentino, B., McWilliams, B., Cho, K., & Sohn, Y. Understanding the Laser Powder Bed Fusion of AlSi10Mg Alloy. (2020) *Metallography, Microstructure, and Analysis*. 9:484-502.
- [9] Zhou, L., Huynh, T., Park, S., **Hyer, H.**, Mehta, A., Song, S., Bai, Y., McWilliams, B., Cho, K., & Sohn, Y. Laser powder bed fusion of Al - 10 wt.%Ce alloys: microstructure and tensile property. (2020) *Journal of Materials Science*. 55:14611-14625.
- [8] Zhou, L., **Hyer, H.**, Thapliyal, S., Mishra, R. S., McWilliams, B., Cho, K., & Sohn, Y. Process-Dependent Composition, Microstructure, and Printability of Al-Zn-Mg and Al-Zn-Mg-Sc-Zr Alloys Manufactured by Laser Powder Bed Fusion. *Metallurgical and Materials Transactions A*, 1-13.
- [7] Kuliiev, R., Orlovskaya, N., **Hyer, H.**, Sohn, Y., Lugovy, M., Ha, D., ... & Conti, L. (2020). Spark Plasma Sintered B₄C—Structural, Thermal, Electrical and Mechanical Properties. *Materials*, 13(7), 1612.
- [6] **Hyer, H.**, Zhou, L., Benson, G., McWilliams, B., Cho, K., & Sohn, Y. (2020). Additive Manufacturing of Dense WE43 Mg Alloy by Laser Powder Bed Fusion. *Additive Manufacturing*, 101123.

- [5] Thapliyal, S., Komarasamy, M., Shukla, S., Zhou, L., **Hyer, H.**, Park, S., & Mishra, R. S. (2020). An integrated computational materials engineering-anchored closed-loop method for design of aluminum alloys for additive manufacturing. *Materialia*, 9, 100574.
- [4] Zhou, L., **Hyer, H.**, Park, S., Pan, H., Bai, Y., Rice, K. P., & Sohn, Y. (2019). Microstructure and mechanical properties of Zr-modified aluminum alloy 5083 manufactured by laser powder bed fusion. *Additive Manufacturing*, 28, 485-496.
- [3] Zhou, L., **Hyer, H.**, Park, S., Sohn, Y., Rice, K. P., & Chen, Y. (2019). Investigation of Microstructure and Dispersoids/Precipitates in Additively Manufactured Aluminum Alloys. *Microscopy and Microanalysis*, 25(S2), 328-329.
- [2] Yu, T., **Hyer, H.**, Sohn, Y., Bai, Y., & Wu, D. (2019). Structure-property relationship in high strength and lightweight AlSi10Mg microlattices fabricated by selective laser melting. *Materials & Design*, 182, 108062.
- [1] Zhou, L., Pan, H., **Hyer, H.**, Park, S., Bai, Y., McWilliams, B., & Sohn, Y. (2019). Microstructure and tensile property of a novel AlZnMgScZr alloy additively manufactured by gas atomization and laser powder bed fusion. *Scripta Materialia*, 158, 24-28.

JOURNAL ARTICLES IN PREPARATION

ORNL

- [2] **Hyer, H.**, Dryepondt, S., Muth, T., & Nash, J. (2025). An Engineering Perspective on Evaluating Mechanisms Governing Ductility in Pure Mo. *International Journal of Refractory Metals and Hard Materials*
- [1] **Hyer, H.**, Cinbiz, N.M., Hsin, W., Zach, M., & Johnson, B. (2025). Rapid Solidification Effects in Additively Manufactured Si and SiGe Compositions. *Materials Horizons*

CONFERENCE ARTICLES

ORNL

- [10] **Hyer, H.**, Dryepondt, S., Muth, T. R., & Nash, J., Accelerating the Scalability of PrintCast Structures Using High Pressure Die Casting. North American Die Casting Association: Die Casting Congress & Exposition (2024).
- [9] **Hyer, H.**, Ziabari, A., Dryepondt, S., Splitter, D., & Sant, F. J. Processing-Microstructure-Tensile Performance Nexus in Pure Molybdenum. Transactions of the American Nuclear Society, 131(1), 578-581 (2024).
- [8] Dryepondt, S., **Hyer, H.**, List, F., Taller, S., Ziabari, A., Feng, Y.F., & Snow, Z. Microstructure and Mechanical Properties of Ni-Based Alloys Fabricated by Laser Powder Bed Fusion. Advances in Materials Technology for Power Plants (Vol. 84871, pp. 159-170). ASM International (2024).
- [7] Massey, C., **Hyer, H.**, Godfrey, A., Kendall, J., Dryepondt, S., & Ziabari, A. On the Applicability of Miniature High-Throughput Scoping Specimens to Prototypic Laser Powder Bed Fusion 316HSS Component Geometries. Transactions of the American Nuclear Society, 130(1), 707 (2024).
- [6] **Hyer, H.**, Giuliano, D., & Petrie, C. Demonstrating Distributed Fiber-Optic Temperature Sensors in a Simulated Gas-Cooled Reactor Outlet. Transactions of the American Nuclear Society (2023).
- [5] **Hyer, H.** & Petrie, C. Embedded Sensors for Monitoring Additively Manufactured Nuclear Components. Transactions of the American Nuclear Society (2022).
- [4] Ferree, C. R., Godfrey, A., **Hyer, H.**, & Petrie, C. Evaluation of Thermocouples Embedded Using Additive Manufacturing. American Nuclear Society Annual Meeting. (2022).

[3] Ferrell, W., Houser, J., **Hyer, H.**, & Petrie, C. Methods to Evaluate Embedded Sensor Performance for the Transformational Challenge Reactor. American Nuclear Society Annual Meeting. (2021).

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[2] Zhou, L., **Hyer, H.**, Park, S., Sohn, Y., Rice, K. P., & Chen, Y. (2018). Investigation of Microstructure and Dispersoids/Precipitates in Additively Manufactured Aluminum Alloys. *Microscopy and Microanalysis*. 2019 Aug;25(S2):328-9.

LANL

[1] Reeves K., Smith P., Stone T., Karns .T, Duque J., Narlesky J., Stroud M. A., **Hyer H.**, Wilson Jr K. (2018). Lifetime Extension of the Stainless-Steel Components of the SAVY-4000 Storage Container-18572. WM Symposia, Inc., PO Box 27646, 85285-7646 Tempe, AZ (United States).

PROFESSIONAL REPORTS

ORNL

[24] Dryepondt, S., **Hyer, H.**, Ziabari, A., McMurtrey, M. D., Monson, A., Mulholland, M., & Patterson, T. Evaluation of Directed Energy Deposition and Laser Powder Bed Fusion Nickel-Based Alloys Process Application Envelopes Based on Performance, Process Economics, Supply Chain Risks, and Reactor-Specific Targeted Components (No. ORNL/TM-2024/3604). (2024). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[23] Birri, A., Sweeney, D. C., **Hyer, H. C.**, Schreiber, B., Cakmak, E., & Petrie, C. M. Quantifying the operational envelope for single-point and distributed acoustic sensors for microreactor applications (No. ORNL/TM-2024/3524). (2024). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[22] Byun, T. S., Collins, D., **Hyer, H.**, Lin, Y. R., Epps, K., & Krogh, K. Mechanical Performance of Additively Manufactured ODS 316L and 316H Stainless Steels (No. ORNL/TM-2024/3538). (2024). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[21] Dryepondt, S., Taller, S., Snow, Z., **Hyer, H.**, Ziabari, A., & Su, Y. F. Complete Optimization of LPBF Ni-Based Alloys Down-Selected from FY23 Candidate Materials Including, Thermodynamic Modeling, Sample Fabrication and Microstructure Characterization (No. ORNL/TM-2024/3464). (2024). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[20] **Hyer, H. C.**, Schreiber, B. J., Sweeney, D. C., & Petrie, C. M. Evaluation of In-Situ AM Process Monitoring Techniques and Potential for Detecting Process Anomalies and Undesirable Microstructures (No. ORNL/TM-2024/3465). (2024). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[19] Seibert, T. G., Massey, C., Hoelzer, D. T., Yamamoto, Y., Dryepondt, S., **Hyer, H.**, ... & Kendall, J. Nanostructured Alumina Forming Austenitic Alloy (NAFA) production using mechanical alloying and high-temperature consolidation (No. ORNL/TM-2024/3292). (2024). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[18] Le Coq, A., Russell, N., Howard, R., **Hyer, H.**, Dryepondt, S., Taylor, C., ... & Massey, C. Status report on HFIR irradiation of optimized alumina forming alloys (No. ORNL/TM-2024/3309). (2024). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[17] Hoelzer, D. T., Massey, C., Byun, T. S., & **Hyer, H.** Progress on Producing an ODS Ferritic Alloy by High Deformation Processing of Reactive Powders (No. ORNL/TM-2023/3113). (2023). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[16] Massey, C., Hoelzer, D. T., Yamamoto, Y., Seibert, T. G., Dryepondt, S., **Hyer, H.**, ... & Zach, M. Progress on Design and Production of Oxide

Dispersion-Strengthened Alumina-Forming Austenitic Alloys for Nuclear Applications (No. ORNL/TM-2023/3102). (2023). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[15] Russell, M., Butcher, T., Petrie, C., Byun, T. S., Joslin, C., Marquez Rossy, A., ... & **Hyer, H.** Oak Ridge National Laboratory Compilation of AMMT Quality Assurance Procedures (No. ORNL/TM-2023/3058). (2023). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[14] Birri, A., Sweeney, D. C., **Hyer, H. C.**, Schreiber, B., & Petrie, C. M. Development of Optical Fiber-Based Sensors for Nuclear Microreactor Structural Health Monitoring (No. ORNL/TM-2023/2984). (2023). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[13] Byun, T. S., Collins, D., Fillingim, B., Feldhausen, T., textbfHyer, H., Lin, Y. R., ... & Hanson, K. Downselection and Basic Properties of Additively Manufactured ODS Alloys (No. ORNL/TM-2023/3033). (2023). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[12] Birri, T., Sweeney, D., **Hyer, H.**, & Petrie, C. Development, Testing, and Validation of Fabry-Pérot Cavity Acoustic Sensors for Microreactor Applications. (2023). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[11] **Hyer, H.C.**, Sweeney, D. C., & Petrie, C. M. Summary of Methodology for Mitigating Risks Associated with Licensing and Qualifying AM Nuclear Materials (No. ORNL/TM-2023/2851). (2023). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[10] **Hyer, H.C.** Status of Additive Manufacturing Capabilities for Processing Refractory Alloys Under the Mo-99 Program (No. ORNL/TM-2022/2721). (2022). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[9] **Hyer, H.C.** Small Punch Testing of Molybdenum-99 Targets (No. ORNL/TM-2022/2663).. (2022). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[8] Birri, A., Sweeney, D. C., **Hyer, H.C.**, & Petrie, C. M. Status update on the development of transducers and bonding techniques for enabling acoustic measurements of damage in microreactor components (No. ORNL/TM-2022/2629). (2022). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[7] **Hyer, H.C.**, Sweeney, D. C., Petrie, C. M., Hartvigsen, J. L., Sellers, Z. D., Unruh, T. C., & Phero, T. L. Performance of Microreactor Test Article with Embedded Sensors during Testing in the Single Primary Heat Extraction and Removal Emulator (No. ORNL/TM-2022/2619). (2022). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[6] **Hyer, H.C.**, Carver, K., List, F., Petrie, C. Embedding Sensors in 3D Printed Metal Structures. (2021). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[5] **Hyer, H.C.**, Sweeney, D., Petrie, C. Characterization of Embedded Sensors in Stainless Steel Test Articles and Design/Planning for MAGNET Testing. (2021). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[4] Petrie, C.M., Schrell, A., **Hyer, H.**, Richardson, D., Vasudevamurthy, G. Performance of Embedded Sensors in 3D Printed SiC. (2021). Oak Ridge National Lab. (ORNL), Oak Ridge, TN (United States): Medium: ED.

[3] Reeves, K. P., Karns, T., Stone, T. A., Narlesky, J. E., **Hyer, H.C.**, Smith, P. H., & Gaunt, A. J. (2018). Evaluating Corrosion Effects on the Stainless Steel

Components of the SAVY-4000/Hagan Nuclear Material Storage Containers (No. LA-UR-18-25709). Los Alamos National Lab.(LANL), Los Alamos, NM (United States).

[2] Stroud, M. A., Hill, M. A., Tokash, J. C., Forsyth, R. T., & **Hyer, H.C.** (2017). Residual Stresses in SAVY 4000 and Hagan Container Bodies (No. LA-UR-17-28658). Los Alamos National Lab.(LANL), Los Alamos, NM (United States).

[1] **Hyer, H.C.**, Duque, J., Smith, P. H., & Stroud, M. A. (2017). Effects of Laser Etching on the Corrosion Susceptibility of SAVY 4000 and Hagan Containers (No. LA-UR-17-28647). Los Alamos National Lab.(LANL), Los Alamos, NM (United States).

COMPUTER SKILLS

<i>Programming</i>	Python, Maple, Labview, Daisylab (Labview alternative)
<i>Word Processing</i>	Microsoft Office, Origin & Kaleidagraph (graphing tool), Minitab (design of experiments), L ^A T _E X
<i>Crystallography/ Materials</i>	Jade, Highscore, PowderCell, ThermoCalc
<i>CAD/3D Printing</i>	SolidWorks, Creo Parametric, Magics, NetFabb, QuantAM, Peregrine, PhaseMonitoring
<i>Microscopy/Image Analysis</i>	ImageJ, Digital Micrograph, TIA Microscopy, OIM
<i>Fiber-Optic</i>	Luna OBR, Luna ODiSI, Luna 3D Viz

MACHINERY AND EQUIPMENT EXPERIENCE

<i>Additive Manufacturing</i>	Have logged over 500 hours of hands on experience with a SLM Solutions 125 HL Laser Powder Bed Fusion System and Renishaw AM250-400 Laser Powder Bed Fusion System . Expertise includes processing a wide range of alloys including Ti-, Al-, Mg-, Cu-, Fe-, Ni-, Si-, Zr-, Mo-, and W-based alloys. Also worked with a Fabrisonic Ultrasonic Additive Manufacturing System , welding and build parts from Al-, Cu-, and Fe-based alloys.
<i>Powder Production</i>	Along with an understanding of laser powder bed fusion, expertise includes working with a Dong-Yang Induction Furnace Gas Atomization Unit to produce powders of self-batched alloys. Addiitonal experience with a Amazement rePowder Ultrasonic Atomization Unit .
<i>Cold Spray</i>	Worked on the technical side of a cold spraying facility that utilized a XRC Motoman Arc-Welding Robot . Worked with spraying various alloys such as pure Fe, pure Mo, Ti-6Al-4V, and SS316L& SS304L.
<i>Heat Treatment</i>	Batched and produced various alloys with RF Induction Furnaces, Arc Furnaces for utilization of new alloys in materials testing. Also used various Muffle and Tube Furnaces for homogenization and heat treatment of metals.
<i>Mechanical Testing</i>	Employed both MTS and Instron Tensile-Compressive Testing Machines to test and analyze various samples ranging from Al- and Mg-alloys to Mo- and Fe-based alloys.
<i>Hardness/ Indentation</i>	Performed various hardness tests on bulk metallic and ceramic samples utilizing a Hysitron TI Premier Nanoindenter as well as worked with various Vickers, Rockwell, and Knoop Hardness Testers .
<i>Microscopy</i>	Microscopy skills include over 2,000 hours logged on utilizing and analyzing data from Optical Microscopy, Scanning Electron Microscopy (SEM), Focused Ion Beam (FIB), and Transmission Electron Microscopy (TEM) .

<i>Spectroscopy</i>	Along with processing and mechanical testing, further skills including working with and analyzing spectra generated by various spectroscopy methods such as UV-Vis Spectroscopy, Fourier Transform Infrared Spectroscopy (FTIR), Raman Spectroscopy, X-Ray Diffraction (XRD), and Neutron Diffraction.
<i>Thermal Analysis</i>	Thermal analysis techniques worked with previously include utilizing Linseis Dilatometer, Differential Thermal Analysis (DTA), Thermalgravimetric Analysis (TGA), and Differential Scanning Calorimetry (DSC).
<i>Magnetic Susceptibility</i>	Performed extensive magnetic susceptibility and resistivity tests for varying temperatures and applied magnetic fields utilizing a SQUID Magnetometer for various paramagnetic and ferromagnetic semi-conductors.
<i>Fiber-Optics</i>	Worked with preparing, handling, strain coupling, and interrogating fiber-optics. Luna OBR, ODiSI, and Hyperion Interrogation Systems.
<i>Welding</i>	Previous certification in stick flat, uphill, and overhead welding utilizing Miller and Lincoln Arc Welders.

LAB / SHOP EXPERIENCE

<i>Welding</i>	Previously worked to certify on flat and uphill welding. Some experience in overhead welding. Worked with SMAW, MIG, and TIG. Understanding in proper set-up and welding procedures.
<i>Machining</i>	Hands on experience with basic machining equipment such as lathes, steel saws, band saws, table saws, and mills. Other sectioning equipment include abrasive wheel saws, plasma cutters, diamond saws, and chop saws.
<i>Laboratory Etiquette</i>	Experienced in most laboratory settings. Includes: working with glassware, fume hoods, open flames, acids and bases, and solvents. Can demonstrate basic knowledge with lab procedures such as wearing proper PPE, consulting safety data sheets (SDS), controlling chemical spills and waste, etc.
<i>Metallography</i>	Extensive hands-on experience in metallographic preparation starting from proper sectioning of samples to producing scratch-free mirror surface finishes. Worked with polishing Ti-, Mo-, W-, Al-, Mg-, Cu-, Fe-, and Ni-based alloys. Most difficult material to polish, near pure Cu.
<i>Heat Treatment</i>	Understanding includes oxidation characteristics of metals and choosing proper atmosphere or inert environments to carry out heat treatments. Moreover, have carried out heat treatment optimizations for Fe-, Ni-, Al-, and Mg-based alloys, comparing differences in microstructural observations and mechanical properties.
<i>Interests</i>	Aerial Arts · Cooking · Hiking · Baseball · Playing with the dogs

January 31, 2025