

Thomas Feldhausen

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Education

Georgia Institute of Technology, Atlanta, GA

Doctor of Philosophy in Mechanical Engineering (August 2020)

Department of Mechanical Engineering

Thesis Title: Development and Evaluation of Interfacial Structures for Hybrid Manufacturing

Advisor: Thomas Kurfess, P.E.

Kansas State University, Manhattan, KS

Master of Science in Mechanical Engineering (May 2017)

Department of Mechanical and Nuclear Engineering

Thesis Title: Connected Mechanical Engineering Curriculum Through a Fundamental Learning Integration Platform

Advisor: Bruce Babin

Kansas State University, Manhattan, KS

Bachelor of Science in Mechanical Engineering (May 2016)

Department of Mechanical and Nuclear Engineering

Magna Cum Laude

Experience

May 2019 – Present

Oak Ridge National Laboratory, Knoxville, TN

Staff Mechanical Engineer, Manufacturing Systems Research

- Leading \$4M technical research projects related to hybrid manufacturing
- Cultivating and managing multiple industrial collaborations related to Directed Energy Deposition
- Supporting machining research center at the Manufacturing Demonstration Facility
- Holder of Q-level federal security clearance

August 2018 – April 2019

Georgia Institute of Technology, Atlanta, GA

Graduate Research Assistant, Precision Machining Research Consortium

- Performed research related to hybrid manufacturing
- Collaborated with fellow team members to support digital manufacturing research
- Supported 5-axis machining operations at Advanced Manufacturing Pilot Facility

May 2016 – July 2018

Honeywell Federal Manufacturing and Technologies, Kansas City, MO

Engineer II, Department of Rubber, Plastics, and Hybrid Technology

- Supported process characterization and control for ongoing product production (W88 Alt 370) using Six Sigma tools
- Explored Direct Write technologies of polysiloxanes for new product development (W80-4)
- Implemented \$1.5M cost-saving solution to improve manufacturing yield by 12%

June 2017 – July 2017

Kansas State University, Manhattan, KS

Instructor, Department of Mechanical and Nuclear Engineering

- Taught Fluid Mechanics (ME 571) to a class of 30 engineering students
- Given very high “teacher effectiveness” rating from students (4.8+ / 5.0)

August 2016 – May 2017

Kansas State University, Manhattan, KS

Course Coordinator, Department of Mechanical and Nuclear Engineering

- Developed course content and lectures for Engineering Graphics (ME 212)
- Oversaw and managed twelve student instructors
- Supported ABET certification preparation

May 2015 – August 2015

Honeywell Federal Manufacturing and Technologies, Kansas City, MO

Student Intern III, Department of Rubber, Plastics, and Hybrid Technology

- Used additive manufacturing techniques such as stereolithography, fused deposition modeling, and selective laser sintering to fabricate trial fixtures used for mistake proofing processes
- Supported ongoing production of B61-12 polymer products

January 2014 – May 2016

Kansas State University, Manhattan, KS

Student Instructor, Department of Mechanical and Nuclear Engineering

- Taught Engineering Graphics (ME 212) to engineering students
- Course covers technical sketching, multi-view drawings, geometrical dimensioning and tolerancing, and an introduction to 3D CAD

May 2014 – August 2014

CNH Industrial, New Holland, PA

Vehicle Integration Design Engineer, Department of Case-IH Flagship Combines

- Designed mounting solutions for sensors specific to cleaning system applications as part of a quality and reliability initiative
- Supported cleaning suspension design and simulations
- Designed mock upper-chassis for the Clean Feeding Dynamics Lab test stand

January 2014 / January 2015

The Caplan Group, Frankfort, KS

Project Manager

- Developed an initial BIM model for a manufacturing plant in Belgium, Germany and a new manufacturing plant in Tijuana, Mexico
- Compiled a set of Quality Assurance Key Elements for a P&G plant in Iowa City, Iowa

Honors and Awards

National Academy of Engineering

- Selected attendee of The Grainger Foundation U.S. Frontiers of Engineering. September 2022. Held in Seattle, WA.
- Session organizer for 2023 EU-US Frontiers of Engineering Program. “Future Challenges in Additive Manufacturing”. Murray Hill, NJ.

The Society of Manufacturing Engineers

- The Society of Manufacturing Engineers Outstanding Young Manufacturing Engineer Award, 2022.
- The Society of Manufacturing Engineers, 30 under 30, 2022

National Nuclear Security Administration

- National Nuclear Security Administration Defense Program Award of Excellence, 2018.

Georgia Institute of Technology

- Georgia Institute of Technology President’s Fellowship, 2018.

Kansas State University

- Kansas State University Mechanical Engineering’s Most Outstanding Senior, 2016.
- Kansas State University Engineering Knight of St. Patrick, 2016.

Professional Associations

American Society of Mechanical Engineers, Member (2018 – Present)
Society of Manufacturing Engineers, Member (2017 – Present)
Tau Beta Pi, Member (2016 – Present)
Order of the Engineer, Member (2016 – Present)
American Society for Engineering Education, Member (2016 – 2017)
Steel Ring, Kansas State University Senior Engineering Honor Society, Member (2015-2016)

Major Positions

President– Steel Ring Senior Engineering Honor Society (KSU), 2015-2016.
President– Work to Win 4-H Club, 2011-2012.
Treasurer– Frankfort FFA Chapter, 2011-2012.
Secretary– Work to Win 4-H Club, 2008-2011.

Teaching Activities

Semester, Year	Course Number	Course Title	No. of Students
Summer 2017	ME 571 A	Fluid Mechanics	30
Spring 2017	ME 212 A-F	Engineering Graphics	253
Fall 2016	ME 212 A-D	Engineering Graphics	187
Spring 2016	ME 212 A	Engineering Graphics	48
Fall 2015	ME 212 D	Engineering Graphics	48
Spring 2015	ME 212 B	Engineering Graphics	45
Fall 2014	ME 212 C	Engineering Graphics	47
Spring 2014	ME 212 B	Engineering Graphics	42

Service

Professional Contributions

1. ASME Manufacturing Engineering Division Technical Committee Chair, 2022-2024.
2. REMADE Institute proposal reviewer for repair using additive manufacturing, 2021
3. Technical reviewer for NASA Early-Stage Innovations proposals, 2020.
4. Honeywell Federal Manufacturing and Technologies technical exchange with Kansas State University, Facilitating technical collaboration, 2016.
5. Kansas State University Mechanical Engineering Open House, Manhattan, KS, 2013-2015.

Conference Sessions Chaired

1. ASME, Manufacturing Science and Engineering Conference, Chaired Session on Hybrid Manufacturing, June 2023
2. ASME, Manufacturing Science and Engineering Conference, Chaired Session on Converging Manufacturing Techniques, June 2022

Community

3. Group Leader, Kansas City Middle School Engineering Program, Kansas City, MO, 2017-2018.
4. Grandview Middle School STEM Ignite, Kansas City, MO, 2018.
5. Backpack Drive, Harvesters Food Bank, Kansas City, MO, 2015.
6. Marshall County 4-H Project Leader, Frankfort, KS, 2012-2013.

Refereed Publications

Journal Papers Published or Accepted:

1. Elsayed, O., Venkata, K., Kersten, S., Vaughan, D., Masuo, C., Kim, M., Feldhausen, T., Saldana, C., Kurfess, T. (February, 2023). **Effects of Lead and Lean in Multi-Axis Directed Energy Deposition.** The International Journal of Advanced Manufacturing Technology
2. Feldhausen, T., Yelamanchi, B., Gomez, A., Saleeby, K., Fillingim, B., Post, B., Love, L., Cortes, P., MacDonald, E. (February 2023). **Embedding Ceramic Components in Metal Structures with Hybrid Directed Energy Deposition.** The International Journal of Advanced Manufacturing Technology
3. Heinrich, L., Feldhausen, T., Saleeby, K., Kurfess, T., Saldana, C. (December, 2022). **Build Plate Conduction Cooling for Thermal Management of Wire Arc Additive Manufactured Components.** The International Journal of Advanced Manufacturing Technology
4. Karandikar, J., Saleeby, K., Feldhausen, T., Kurfess, T., Schmitz, T., Smith, S. (December, 2022). **Evaluation of automated stability testing in machining through closed-loop control and Bayesian machine learning.** Journal of Mechanical Systems and Signal Processing

5. Feldhausen, T., Kannan, R., Saleeby, K., Haley, J., Kurfess, R., Bourdages, D., Nandwana, P. (October, 2022). **Performance of discontinuity-free components produced by additive turning computer aided manufacturing strategy.** Journal of Materials Processing Technology
6. Knapp, G., Gussev, M., Shyam, A., Feldhausen, T., Plotkowski, A. (September, 2022). **Microstructure, deformation and fracture mechanisms in Al-4043 alloy produced by laser hot-wire additive manufacturing.** Journal of Additive Manufacturing
7. Feldhausen, T., Saleeby, K., Heinrich, L., Burl, A., Post, B., MacDonald, E., Saldana, C., Love, L. (May, 2022). **Review of Computer-Aided Manufacturing (CAM) Strategies for Hybrid Directed Energy Deposition.** Journal of Additive Manufacturing
8. Kannan, R., Feldhausen, T., Saleeby, K., Nandwana, P. (2022, April). **Effect of humidity of build chamber in hybrid manufacturing systems on part performance.** Journal of Manufacturing Letters.
9. Feldhausen, T., Kannan, R., Raghavan, N., Saleeby, K., Kurfess, T., Nandwana, P. (2022, January). **Investigation of interfacial structures for hybrid manufacturing.** Journal of Materials Letters.
10. Feldhausen, T., Saleeby, K., Kurfess, T. (2021, May). **Spinning the digital thread with hybrid manufacturing.** Journal of Manufacturing Letters.
11. Kannan, R., Nandwana, P., Feldhausen, T. (2021, April). **Comparing the deformation mechanism in 316 L stainless steel fabricated by hybrid and additive manufacturing.** Journal of Materials Letters.
12. Feldhausen, T., Raghavan, N., Saleeby, K., Love, L., Kurfess, T. (2021, April). **Mechanical Properties and Microstructure of 316L Stainless Steel Produced by Hybrid Manufacturing.** Journal of Materials Processing Technology.
13. Saleeby, K., Feldhausen, T., Love, L., Kurfess, T. (2020, November). **Rapid Retooling for Emergency Response with Hybrid Manufacturing.** Journal of Smart and Sustainable Manufacturing Systems.

Conference Proceedings:

1. Kurfess, R., Saleeby, K., Feldhausen, T., Fillingim, B., Hart, J., Hardt, D. (2022, August). **Towards Directed Energy Deposition of Metals Using Polymer-Based Supports: Porosity of 316L Stainless Steel Deposited on Carbon-Fiber-**

- Reinforced ABS.** 2022 International Solid Freeform Fabrication Symposium. Austin, TX.
2. Heinrich, L., Feldhausen, T., Saleeby, K., Saldana, C., Kurfess, T. (2022, June). **Analysis of Conduction Cooling Strategies for Wire Arc Additive Manufacturing.** 2022 Manufacturing Science and Engineering Conference. West Lafayette, IN.
 3. Alexander, Z., DeVol, N., Emig, M., Saleeby, K., Feldhausen, T., Kurfess, T., Fu, K., Saldana, C. (2022, June). **Support Vector Machines for Classification of Direct Energy Deposition Standoff Distance for Improved Process Control.** 2022 Manufacturing Science and Engineering Conference. West Lafayette, IN.
 4. Kurfess, R., Kannan, R., Feldhausen, T., Saleeby, K., Hart, J., Hardt, D. (2022, June). **Towards Directed Energy Deposition of Metals Using Polymer-Based Supports: Hardness of 316L Stainless Steel Deposited on Carbon-Fiber-Reinforced ABS.** 2022 Manufacturing Science and Engineering Conference. West Lafayette, IN.
 5. Feldhausen, T., Kannan, R., Saleeby, K., Fillingim, K., Kurfess, R., Nandwana, P., Post, B. (June 2022). **Hybrid Manufacturing Approaches for the Production and Repair of Industrial Tooling.** 2022 Advances in Additive Manufacturing with Powder Metallurgy. Portland, OR.
 6. Zhang, J., Saleeby, K., Feldhausen, T., Bi, S., Plotkowski, A., Womble, D. (2021, September). **Self-Supervised Anomaly Detection via Neural Autoregressive Flows with Active Learning.** Neural Information Processing Systems 2021 Workshop on Deep Generative Models and Downstream Applications. Virtually Held.
 7. Heinrich, L., Feldhausen, T., Saleeby, K., Saldana, C., Kurfess, T. (2020, September). **Prediction of Thermal Conditions of DED with FEA Metal Additive Simulation.** 2021 Manufacturing Science and Engineering Conference. Virtually Held.
 8. Saleeby, K., Feldhausen, T., Love, L., Kurfess, T. (2020, November). **System Level Control for Deposition Toolpaths in Hybrid Manufacturing.** Proceedings of ASTM's International Conference of Additive Manufacturing (ICAM) 2020. Virtually Held.
 9. Saleeby, K., Feldhausen, T., Kurfess, T., Love, L. (2020, September). **Production of Medium-Scale Metal Additive Geometry with Hybrid Manufacturing Technology.** 2020 Manufacturing Science and Engineering Conference. Virtually Held.

10. Thien, A., Feldhausen, T., Saldana, C., Kurfess, T. (2020, September). **IOT Devices and Applications for Wire-Based Hybrid Manufacturing Machine Tools**. 2020 Manufacturing Science and Engineering Conference. Virtually Held.
11. DeWitte, L., Feldhausen, T., Saldana, C., Kurfess, T. (2020, September). **Initial Process Planning of a Hybrid Multi-Tasking Platform**. 2020 Manufacturing Science and Engineering Conference. Virtually Held.
12. Saleeby, K., Feldhausen, T., Kurfess, T., Love, L. (2020, July). **Feedback Control of Hybrid Manufacturing Processes with Infrared Thermal Measurements and Low-Cost Sensors**. International Symposium on Flexible Automation. Chicago, IL.
13. Pranievicz, M., Feldhausen, T., Kersten, S., Berez, J., Jost, E., Kurfess, T., Saldana, C. (2019, August). **Integrated Hardfacing of Stellite-6 Using Hybrid Manufacturing Process**. 2019 Solid Freeform Fabrication Symposium. Austin, TX.
14. Feldhausen, T., Hirani, A., King, W., Lynn, R., Kurfess, T. (2019, June). **Conceptualization and Design of a Low-Cost MTConnect-Enabled Refractometer for Coolant Health Monitoring**. 2019 Manufacturing Science and Engineering Conference. Erie, PA.
15. Feldhausen, T. A., Babin, B. R., Dringenberg, E. A. (2017, June). **Connected Mechanical Engineering Curriculum Through a Fundamental Learning Platform**. 2017 ASEE Annual Conference & Exposition. Columbus, OH.
16. Feldhausen, T. A., Babin, B. R. (2017, September). **Engineering Graphics Hands-on Vise Project**. 2017 ASEE Midwest Section Conference.

Other Publications:

1. Saleeby, K., Feldhausen, T. Section on Research and Development at Oak Ridge National Laboratory (2022, March). **Wohlers Report 2022; Additive Manufacturing and 3D Printing State of the Industry**.

Patents

1. Wilson, D., McNay, J., McGrath, A., Reckers, T., Feldhausen, T., Saleeby, K., Hattori, S., Koike, S., Onji, M. **Additive Manufacturing Machine**. U.S. Patent Application Publication US 2022/0274202 A1. Filed September, 2022
2. Karandikar, J., Saleeby, K., Smith, S., Feldhausen, T., Schmitz, T. **Stability Boundary and Optimal Stable Parameter Identification in Machining**. U.S. Patent Application Publication US 2022/0161381 A1. Filed May, 2022
3. Kim, S., Hassen, A., Lindahl, J., Love, L., Kunc, V., Feldhausen, T. **System and Method for Simulation-Assisted Additive Manufacturing**. U.S. Patent Application Publication US 2022/0088881 A1. Filed March, 2022

Presentations and Invited Talks

1. **University of Texas Rio Grande Valley.** Seminar. Additive Turning, A 21st Century Advanced Manufacturing Strategy with 1960's G-Code Technology. Edinburg, TX. July 2022
2. **Kansas State University.** Seminar. G-Code, Providing the Backbone of 21st Century Advanced Manufacturing with 1960s Technology. Manhattan, KS. May 2022.
3. **The Georgia Institute of Technology.** Seminar. G-Code, Providing the Backbone of 21st Century Advanced Manufacturing with 1960s Technology. Atlanta, GA. March 2022.
4. **Advanced Manufacturing & Repair for Gas Turbines.** Seminar. Fabrication and Repair of Industrial Gas Turbine Engine Components using Hybrid Manufacturing Processes. Virtually Held. October 2021.
5. **SAMPE neXus.** Invited Speaker. Manufacturing of Structures with Composite Materials and Advanced Processes. Virtually Held. July 2021
6. **International Manufacturing Technology Show Spark.** Invited Speaker. Rapidly Producing and Repairing Dies. Virtually Held. March 2021
7. **Autodesk University.** Invited Panelist. Meet Oak Ridge National Lab and Autodesk Manufacturing Experts. Virtually Held. November 2020.
8. **American Society for Precision Engineering Summer Topical Meeting Advancing Precision in Additive Manufacturing.** Conference Speaker. Distortion Monitoring and Control for Directed Energy Deposition. Virtually Held. July 2020.
9. **Advanced Manufacturing & Repair for Gas Turbines.** Seminar. Fabrication and Repair of Industrial Gas Turbine Engine Components using Hybrid Manufacturing Processes. Charlotte, NC. March 2020.
10. **Keynote Speaker at Mazak's Discover 2019.** Hot Wire Deposition Development. Florence, KY. November 2019.
11. **Kansas State University.** Seminar. Connected Mechanical Engineering Curriculum Through a Fundamental Learning Integration Platform. Manhattan, KS. April 2017.
12. **Kansas State University Leadership Banquet.** Speaker. Manhattan, KS. April 2016.
13. **Kansas State University Open House Opening Ceremony.** Speaker. Manhattan, KS. April 2016.