

Jakob D. Hamilton

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Education

Ph.D., *Mechanical and Industrial Engineering*

Rochester Institute of Technology, Rochester, NY (CGPA: 3.89/4.00)

Expected May 2023

M.S., *Industrial and Systems Engineering*

Rochester Institute of Technology, Rochester, NY (CGPA: 3.81/4.00)

Thesis title: Additive Manufacturing Materials: Fabrication of Aluminum Matrix Composites

Dec. 2019

B.S., *Engineering Science*

Wartburg College, Waverly IA (CGPA: 3.94/4.00)

Physics and Mathematics Minors

May 2018

Research Interests

Metal Additive Manufacturing, Directed Energy Deposition, Residual Stress, Mechanical Alloying

Technical Appointments

RTX Process Intern

May 2021 – Aug. 2021

Additive Manufacturing PCC | Raytheon Technologies Research Center | East Hartford, CT

- Designed hardware and software for laser powder bed fusion (LPBF) subsystem monitoring.
- Developed operation procedures and trained employees on in-house monitoring equipment.

UTC Process Intern

May 2019 – Aug. 2019

Additive Manufacturing Center of Expertise | United Technologies Research Center | East Hartford, CT

- Designed experiments to understand and predict spatter dynamics in LPBF.
- Collaborated to develop a model to predict spatter characteristics from process parameters.

MIT Summer Research Intern

June 2018 – Aug. 2018

Lincoln Laboratory | Massachusetts Institute of Technology | Lexington, MA

- Worked in a team to reverse-engineer and improve a micro-unmanned aerial vehicle (UAV).
- Taught additive manufacturing principles at MIT Beaver Works Summer Institute.

Academic Appointments

Graduate Teaching Assistant

Jan. 2021 – May 2021

3D Printing, Industrial and Systems Engineering, Rochester Institute of Technology

- Led laboratory activities to teach principles of Fused Filament Fabrication (FFF), Vat Photopolymerization (VP), and LPBF additive manufacturing technologies.
- Organized design and fabrication activities to leverage additive manufacturing capabilities.
- Assembled lab-level feedback and delivered laboratory improvements to future instructors.

Graduate Research Assistant**Aug. 2018 – Present***Industrial and Systems Engineering, Rochester Institute of Technology*

- Perform process parameter optimization for directed energy deposition (DED).
- Design and fabricate DED subsystems for monitoring and improved process capabilities.
- Collaborate across universities to enable DED-based remanufacturing of cast iron components.
- Characterize as-built and post-processed metals for residual stress, porosity, and strength.
- Design and develop additive manufacturing feedstock via mechanical and cryogenic alloying.
- Train undergraduate and graduate researchers on DED equipment and characterization.
- Present and publish work at technical meetings, journals, and conferences.

Graduate Teaching Assistant**Aug. 2019 – Dec. 2019***Computer Aided Design and Manufacturing, Industrial and Systems Engineering, Rochester Institute of Technology*

- Oversaw laboratory sessions and provided student feedback on CNC-based machining activities.
- Designed and performed small-batch part production on modern vertical machining centers.

Publications**Peer-Reviewed Journal Articles**

[1] X. Zhang, W. Shen, V. Suresh, **J.D. Hamilton**, L. Yeh, X. Jiang, Z. Zhang, Q. Li, B. Li, I.V. Rivero, H. Qin. In situ Monitoring of Direct Energy Deposition Via Structured Light System and its Application in Remanufacturing Industry. *Int. J. Adv. Manuf. Tech.* (2021). <https://doi.org/10.1007/s00170-021-07495-4>.

[2] **J.D. Hamilton**, S. Ramesh, O.L.A. Harrysson, C.D. Rock, I. V. Rivero, Cryogenic Mechanical Alloying of Aluminum Matrix Composites for Powder Bed Fusion Additive Manufacturing, *J. Compos. Mater.* (2020). <https://doi.org/10.1177/0021998320957698>.

Peer-Reviewed Conference Proceedings

[1] X. Zhang, W. Shen, V. Suresh, **J. Hamilton**, L. Yeh, X. Jiang, Z. Zhang, Q. Li, B. Li, I.V. Rivero, H. Qin, In-situ Monitoring of Direct Energy Deposition via Structured Light System and its Application in Remanufacturing Industry, *SME North American Manufacturing Research Conference* (2021).

[2] **J.D. Hamilton**, I. V. Rivero, Recycling Aluminum Chips: Production of Additive Manufacturing Powder through Cryomilling, *IISE Annual Conference* (2020).

[3] **J.D. Hamilton**, S. Sorondo, A. Greeley, B.E. Kahn, P. Cyr, D. Cormier, I.V. Rivero, Hybrid Manufacturing: Influence of Directed Energy Deposition Parameters on Microstructure and Layer Adhesion of Stainless Steel 316L, *Heat Treating Society Conference and Exhibition* (2019).

Poster and Conference Presentations**2021 North American Research Conference****June 2021**

X. Zhang, W. Shen, V. Suresh, **J.D. Hamilton**, L. Yeh, X. Jiang, Z. Zhang, Q. Li, B. Li, I.V. Rivero, H. Qin, *In-situ Monitoring of Direct Energy Deposition via Structured Light System and its Application in Remanufacturing Industry*

2021 IISE Annual Conference and Expo**May 2021**

J.D. Hamilton, S. Sorondo, X. Zhang, B. Li, H. Qin, I.V. Rivero, *Effects of Directed Energy Deposition Parameters on Bond Strength between Stainless Steel Deposition and Cast Iron Substrate*

2021 IISE Annual Conference and Expo**May 2021**

S. Sorondo, **J.D. Hamilton**, A. Greeley, I.V. Rivero, *Substrate Core Attribute's Effect on Density and Distortion of Directed Energy Deposition of Stainless Steel 316L Components*

2020 Materials Science and Technology Annual Meeting **November 2020**
J.D. Hamilton, S. Sorondo, A. Greeley, D. Cormier, I.V. Rivero, *Residual Stress Mitigation of Additive Manufactured Stainless Steel 316L Components through Directed Energy Deposition Inclusion of SiC Particles*

2020 IISE Annual Conference and Expo **November 2020**
J.D. Hamilton, I.V. Rivero, *Recycling Aluminum Chips: Production of Additive Manufacturing Powder through Cryomilling*

2019 RIT Graduate Showcase **November 2019**
J.D. Hamilton, I.V. Rivero, *Quantification of Statistical Error Components Derived from X-ray Diffraction Residual Stress Measurements Fabricated using Additive Manufacturing*

2019 Heat Treating Society Conference and Exhibition **October 2019**
J.D. Hamilton, S. Sorondo, A. Greeley, B.E. Kahn, P. Cyr, D. Cormier, I.V. Rivero, *Hybrid Manufacturing: Influence of Directed Energy Deposition Parameters on Microstructure and Layer Adhesion of Stainless Steel 316*

2019 Materials Science and Technology Annual Meeting **September 2019**
J.D. Hamilton, O.L.A. Harrysson, C.D. Rock, I.V. Rivero, *Additive Manufacturing Alloys: Influence of Powder Preparation Method in Aluminum Matrix Composites*

2019 Solid Freeform Fabrication Symposium **August 2019**
J.D. Hamilton, S. Sorondo, A. Greeley, D. Cormier, I.V. Rivero, *Hybrid Manufacturing: Role of Contoured Geometries in Directed Energy Deposition of Stainless Steel 316L*

2019 IISE Annual Conference and Expo **May 2019**
J.D. Hamilton, I.V. Rivero, *Additive Manufacturing Alloys: Reinforcement Homogeneity Determination of Aluminum Matrix Composites*

2019 TMS Annual Meeting and Exhibition **March 2019**
J.D. Hamilton, M. Tung, O.L.A. Harrysson, S. Gupta, I.V. Rivero, C.D. Rock, *Additive Manufacturing Alloys: Fabrication of Aluminum Matrix Composites*