

# Jakob D. Hamilton

Doctoral Student | Rochester, New York, USA

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## *Permanent Address*

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## *Temporary Address*

72 Adams Street, Lower  
Rochester, NY 14608

## Education

**Ph.D.**, *Mechanical and Industrial Engineering*

**Expected May 2023**

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

*Dissertation title: High Carbon Steel Repair Through Directed Energy Deposition and Ancillary Processing Modes*

**M.S.**, *Industrial and Systems Engineering*

**Dec. 2019**

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

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

**B.S.**, *Engineering Science*

**May 2018**

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

Physics and Mathematics Minors

## 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.
- Perform manual and CNC machining (milling, turning, grinding) for prototype fabrication.
- 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] **J.D. Hamilton**, S. Sorondo, B. Li, H. Qin, I.V. Rivero, *Mechanical Behavior of Bimetallic Stainless Steel and Gray Cast Iron Repaired via Directed Energy Deposition Additive Manufacturing*. J. Manuf. Process. (under review). (2022).
- [2] **J.D. Hamilton**, S. Sorondo, A. Greeley, X. Zhang, D. Cormier, B. Li, H. Qin, I.V. Rivero, *Property-structure-process relationships in dissimilar material repair with directed energy deposition: Repairing gray cast iron using stainless steel 316L*. J. Manuf. Process. (2022).  
<https://doi.org/10.1016/j.jmapro.2022.06.015>.
- [3] E. Weflen, **J.D. Hamilton**, S. Sorondo, O.L.A. Harrysson, M. Frank, I.V. Rivero, *Evaluating Interlayer Gaps in Friction Stir Spot Welds for Rapid Tooling Applications*, IISE Trans. (2021).
- [4] 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>.
- [5] **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

**2022 Solid Freeform Fabrication Symposium** **July 2022**  
**J.D. Hamilton**, I.V. Rivero, *Visualization of Melt Pool Stability for Wire- and Powder-based Directed Energy Deposition Repair of Gray Cast Iron*

**2022 IISE Annual Conference and Expo** **May 2022**  
**J.D. Hamilton**, S. Sorondo, I.V. Rivero, *In-situ Visualization of Gas Escapement Phenomenon in Laser Cladding on Gray Cast Iron*

**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***