

Aaron J. Flood



Education

- 2014–Present **Doctor of Philosophy in Mechanical Engineering,**
Missouri University of Science and Technology, Rolla, MO
Focusing on the Mathematical Modeling and Simulation of Metal Additive Manufacturing
- 2010–2014 **Bachelors of Science in Mathematics,**
Bachelors of Science in Physics,
Pittsburg State University, Pittsburg, KS
Additionally earned a minor in Chemistry, Graduated Summa Cum Laude

PhD Thesis

- Title **Methodology for parameter determination for simulation software,**
Advisor: Dr. Feuwen (Frank) Liou

Research Projects

- 2016-2019 **Additive Manufacturing Simulator,**
Department of Energy Small Business Innovation Research, Phase I and Phase II
This project was in response to the Department of Energy's call for greater utilization of high Performance Computing (HPC) solutions in engineering. PINE developed a new simulation environment which is flexible and able to simulate the main processes of metal additive manufacturing, namely powder bed, wire fed and blown powder.
- 2017-2018 **Optimized Build Plate Design Tool for Metal Laser Powder Bed Additive,**
United States Navy Small Business Technology Transfer, Phase I and Phase II
In their attempt to leverage AM for producing part for aircrafts, the NAVY has turned to the powder bed process. This process has many inherent problems which result in the inability to reliably produce quality parts. The focus of this project was to develop methods for automatically determine proper part placement and orientation which will results in the highest quality builds
- 2016-2018 **Simulation of a laser wire deposition process for Ti-6Al-4V components,**
Center for Aerospace Manufacturing Technology,
This project is in junction with GKN Aerospace. The main focus this project is to determine the accuracy of the AM simulation and develop methodology for increasing its accuracy. This accuracy analysis began with the thermal simulation of the simulation and then moved onto the final parts profile which is developed by the AM process. In addition, this project is looking into ways of increasing the efficiency of the simulation by focusing on the utilization of a GPU instead of a CPU

Teaching Experience

- 2014-2017 **Mechanical Instrumentation Lab,**
Missouri University of Science and Technology: ME 4840,
Course Instructor: Mitchell Cottrell

Work Experience

- 2014-Present **Graduate Research Assistant,**
Missouri University of Science and Technology, Rolla, MO
Research, Develop, and Report on topics mutually selected with faculty advisor
- 2017-Present **Senior R&D Engineer,**
Product Innovation and Engineering (PINE) LLC., St. James, MO
As a part of the NAVY STTR team I helped develop the automation algorithms and software tools used to generate a build plate layout tool for powder bed AM
- 2014-2016 **Football Video Board Operator,**
Pittsburg State University, Pittsburg, KS
For all football games at Pittsburg State University, I prepared the game-day script, assisted in preparing the stadium for the game, and was the productions director.
- 2010-2014 **Assistant to the Director of Athletic Operations,**
Pittsburg State University, Pittsburg, KS
I helped the Director of Operations with every aspect of his job. Many times I was given a task and student employees to manage to accomplish the task at hand. In addition, I was given many major responsibilities on game-days.

Academic Awards

- 2014-2017 **Chancellor's Fellowship,**
Awarded to graduate students based on undergraduate GPA and GRE scores.
- Spring 2016 **Academy of Mechanical and Aerospace Engineers Graduate Teaching Assistant Award,**
Academy of Mechanical and Aerospace Engineers recognizes one graduate teaching assistant as an outstanding teaching assistant. Their selection is based on student evaluations submitted at the end of the semester
All A Scholastic Honors,
Pittsburg State University, Undergraduate (5 Semesters)
- Dean's Scholastic Honors,**
Pittsburg State University, Undergraduate (3 Semesters)

Extracurricular Activities

- 2010-Present **Member of Knights of Columbus,**
- 2012-Present **Member of Kappa Mu Epsilon,**
National Mathematics honor Society

- 2012-Present **Member of Phi Kappa Phi,**
A national honor society for the top ten percent of the graduating class of 2014
- 2005-2014 **Boy Scouts of America,**

Presentations

- Oct. 2017 **3-D Metal Printing and Simulation,**
PSU Math Honor Day Keynote Speaker,
- Nov. 2016 &
2017 **Simulation of a laser wire deposition process for Ti-6Al-4V components,**
Center for Aerospace Manufacturing Technology, Year End Review,
- Aug. 2017 **Review of AM simulation validation techniques,**
Solid Freeform Fabrication Symposium Oral Presentation,
- April 2017 **Simulation of a laser wire deposition process for Ti-6Al-4V components,**
Center for Aerospace Manufacturing Technology, Mid-Term Report,
- Feb. 2016 &
2017 **Additive Manufacturing: Towards Efficient and Accurate Simulations,**
Chancellor Fellowship Poster Session,
- Aug. 2015 **Modeling of Powder Bed Processing-A Review,**
Solid Freeform Fabrication Symposium Poster Presentation,

Publications

Aaron Flood and Frank Liou. *3D Printing*, chapter Modeling and Simulation of Metal AM, page Accepted. IntechOpen, 2018.

Aaron Flood and Frank Liou. Review of AM Simulation Validation Techniques. *Journal of Mechanics Engineering and Automation*, 8(2):Accepted, 2018.

Aaron Flood and Frank Liou. Review of AM Simulation Validation Techniques. In *Proceedings of the 28th Annual International Solid Freeform Fabrication Symposium*, pages 963–971, 2017.

Aaron Flood and Frank Liou. Modeling of Powder Bed Processing – A Review. In *Proceedings of the 26th Annual International Solid Freeform Fabrication Symposium*, pages 1118–1128, 2015.

Kenneth K. Fletcher, Todd E. Sparks, Aaron Flood, and Frank Liou. A SOA Approach to Improve Performance of Metal Additive Manufacturing Simulation. In *Proceedings - 2017 IEEE 1st International Conference on Cognitive Computing, ICCC 2017*, pages 140–143. IEEE, jun 2017.