

Aaron J. Flood

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Education

- 2014–Present **Doctor of Philosophy in Mechanical Engineering,**
Missouri University of Science and Technology, Rolla, MO, 4.0/4.0.
Focusing on the Mathematical Simulation of Metal Additive Manufacturing
- 2010–2014 **Bachelors of Science in Mathematics,**
Bachelors of Science in Physics,
Pittsburg State University, Pittsburg, KS, 3.96/4.0.
Additionally earned a minor in Chemistry
Graduated Summa Cum Laude

PhD thesis

- Title **Methodology for parameter determination for simulation software.**
Advisor Dr. Fen Wen (Frank) Liou

Research Projects

- 2016-2018 **Additive Manufacturing Simulator,**
Department of Energy Small Business Innovation Research,
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 was flexible and able to simulate the main processes of metal additive manufacturing, namely powder bed, wire fed and blown powder.,
Phase I: This phase of the project was focused on a proof of concept and proving that this approach was viable and had potential to be commercialized.
Phase II: This phase of the project was focused on getting this software to market. This entailed verifying the results of the simulation, making it user friendly, and making it secure for the users.

2017-2018 **Optimized Build Plate Design Tool for Metal Laser Powder Bed Additive,**

United States Navy Small Business Technology Transfer,

In their attempt to leverage AM for producing part for the V-22 Osprey, the NAVY 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 determine proper part placement and orientation which will results in quality builds.,

Phase I: This phase of the project was a proof of concept for our solution. Our solution would identify part features then apply heuristics, developed from simulation and experimentation, to determine the best part orientation and placement within the build volume.

2016-2018 **Simulation of a laser wire deposition process for Ti-6Al-4V components,**
Center for Aerospace Manufacturing Technology,

This project was completed in junction with GKN Aerospace. The main focus this project was to determine the accuracy of the 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 was developed by the AM process. In addition, this project looked into way 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,** ME 4840.

Missouri University of Science and Technology

Work Experience

2014–Present **Graduate Research Assistant,**

Missouri University of Science and Technology.

Research, Develop, and Report on topics mutually selected with faculty advisor

2014–2016 **Football Video Board Operator,**

Pittsburg State University Athletics.

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 Athletics.

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.

2010 Summer **Custodial Specialist,**

Pittsburg State University.

Prepared and painted sites as instructed by my supervisor.

Academic Awards

- 2014-2017 **Chancellor's Fellowship.**
Awarded to domestic students who are admitted to doctoral programs with competitive GRE scores and GPA.
- 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, Undergraduate (5 Semesters).
Dean's Scholastic Honors, Undergraduate (3 Semesters).

Extracurricular Activities

- 2010-Present **Member of Knights of Columbus.**
The world's largest Catholic Fraternal Service Organization which helps the local community through financial means and service hours
- 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.**
I started as a youth in the Boy Scouts and worked through the ranks ultimately earning my Eagle, after which I served as an adult leader and a mentor to younger scouts

Publications

Aaron Flood, Wei Li, Frank Liou, and Todd Sparks. CAMT Final Report: Simulation of a laser wire deposition process for Ti6Al4V components List of Figures. Technical Report December, Center for Aerospace Manufacturing Technologies, 2016.

Aaron Flood and Frank Liou. Modeling of Powder Bed Processing – A Review. *2015 Annual International Solid Freeform Fabrication Symposium*, page 92, 2015.

Todd Sparks, Kenneth Fletcher, Aaron Flood, and Frank Liou. DOE SBIR Phase I Report Additive Manufacturing Simulator (AMS). Technical Report December, 2016.

References

- MST **Dr. Fen Wen (Frank) Liou,**
Bytnar Professor in Department of Mechanical and Aerospace Engineering.
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PINE **Todd Sparks**,
*Research and Development Director at Product Innovation and Engineering
(PINE) LLC.*
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PSU Athletics **Brad Wells**,
Director of Athletic Operations.
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