



# Gunnar Maples

Masters of Science

Mechanical Engineering

ME B1229

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**Experimental characterization of the performance of a Direct Metal Laser Sintered (DMLS) Heat Exchanger.**

# Why should you care?



Improvements in computational skill and power has developed new opportunities for optimization. Dr. Xiaoping Qian at the University of Wisconsin-Madison has been working with Dr. Greg Nellis and Dr. Dan Thoma to develop such an optimization program.

The program optimizes the geometry of the heat exchanger for the fluid Reynolds number and thermal loads with the constraint of the Direct Metal Laser Sintering (DMLS) additive manufacturing process. It can also include structural loading constraints. This means highly complex, effective, and previously unobtainable geometries can now be built.

No one will use this software unless the heat exchanger design can be experimentally tested and validated against the software's assumptions. That is why I am here! I will test these heat exchangers and quantify their performance.





# These are my personal objectives:

- Build and validate the experimental setup to ensure accurate and repeatable measurements.
- Test and analyze different printed heat exchangers. I will compare these results with the software's assumptions.
- Learn more about the additive printing process.

