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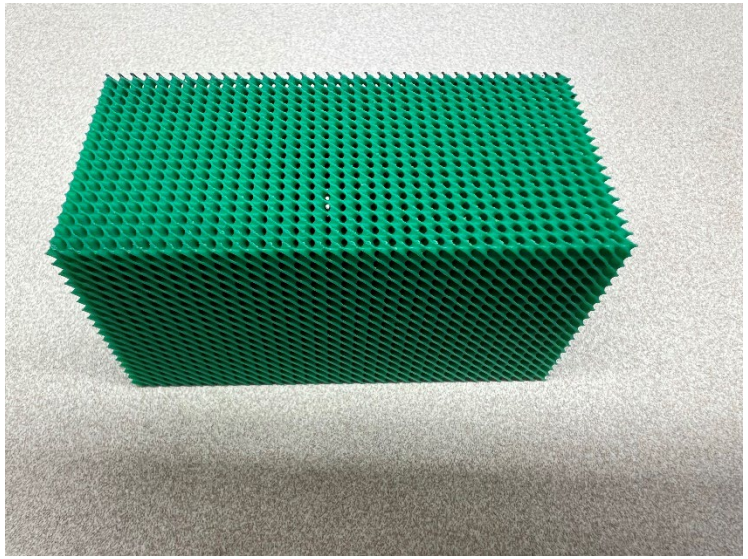
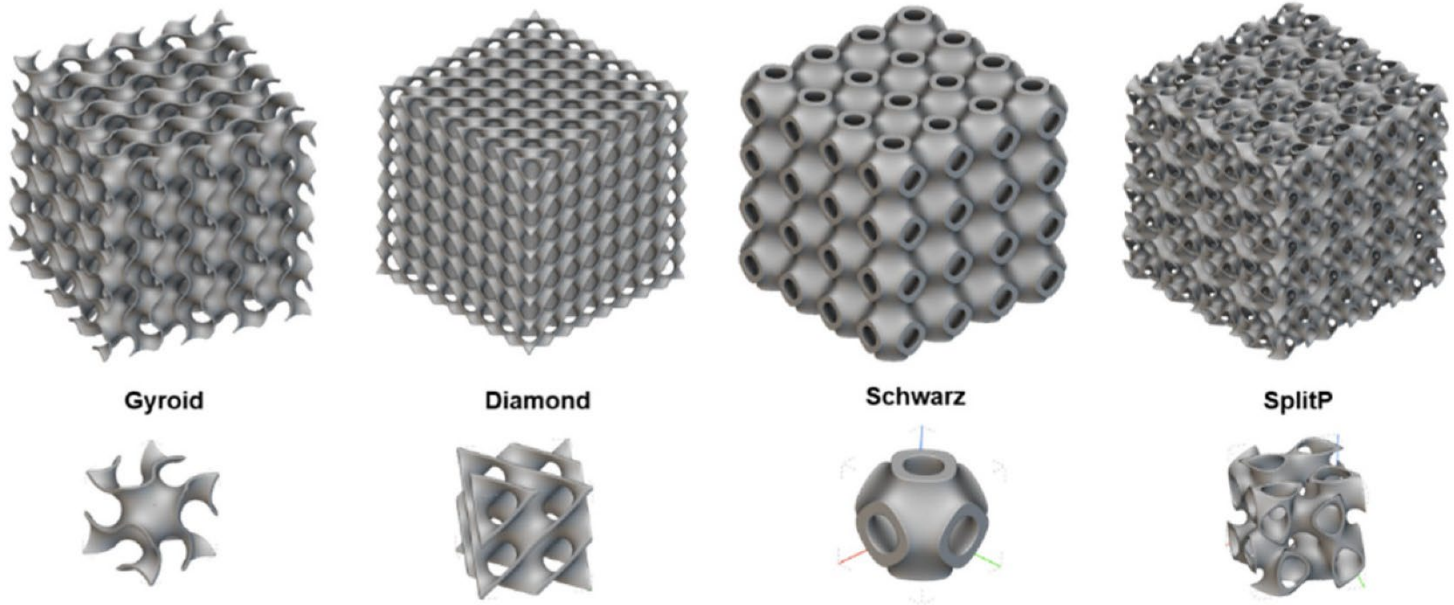
Project: Mechanical Performance and Optimization of TPMS Heat Exchange Structures
Advisor(s): Mark Anderson & Greg Nellis
Sponsor: INL, NASA - ACBC

SCIL
THL Thermal Hydraulics Laboratory

Background – TPMS heat exchange structures

- TPMS – triply periodic minimal surfaces
- 27 different TPMS structures many are bio-inspired and naturally occurring
- Increased heat transfer performance compared to traditional heat exchangers due to their high surface area to volume ratio and tortuous flow paths
- Optimal for mass critical applications





Project Goals

- Understand and optimize the TPMS structure's mechanical and thermal properties
- Manipulate the structure at various points in the heat exchanger to achieve different flow characteristics
- Measure the performance of a gas-to-gas heat exchange application
- Reduce the mass of the heat exchange structure