



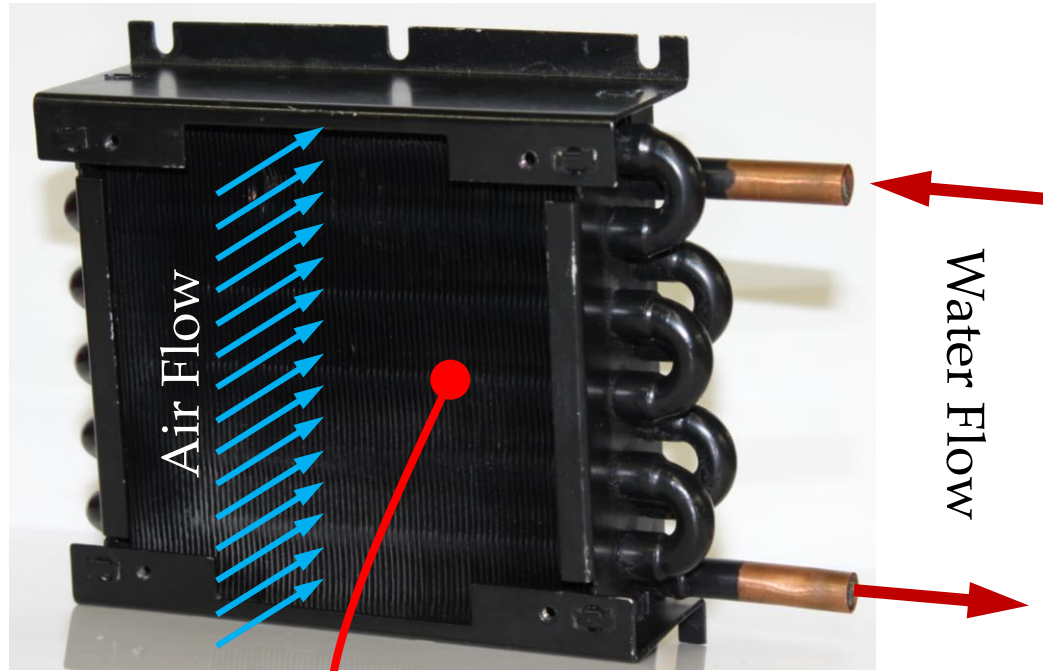
Jake Boxleitner

M.S. Mechanical Engineering

**Design, Modeling, and
Additive Manufacturing of
Air-Cooled Heat Exchangers**

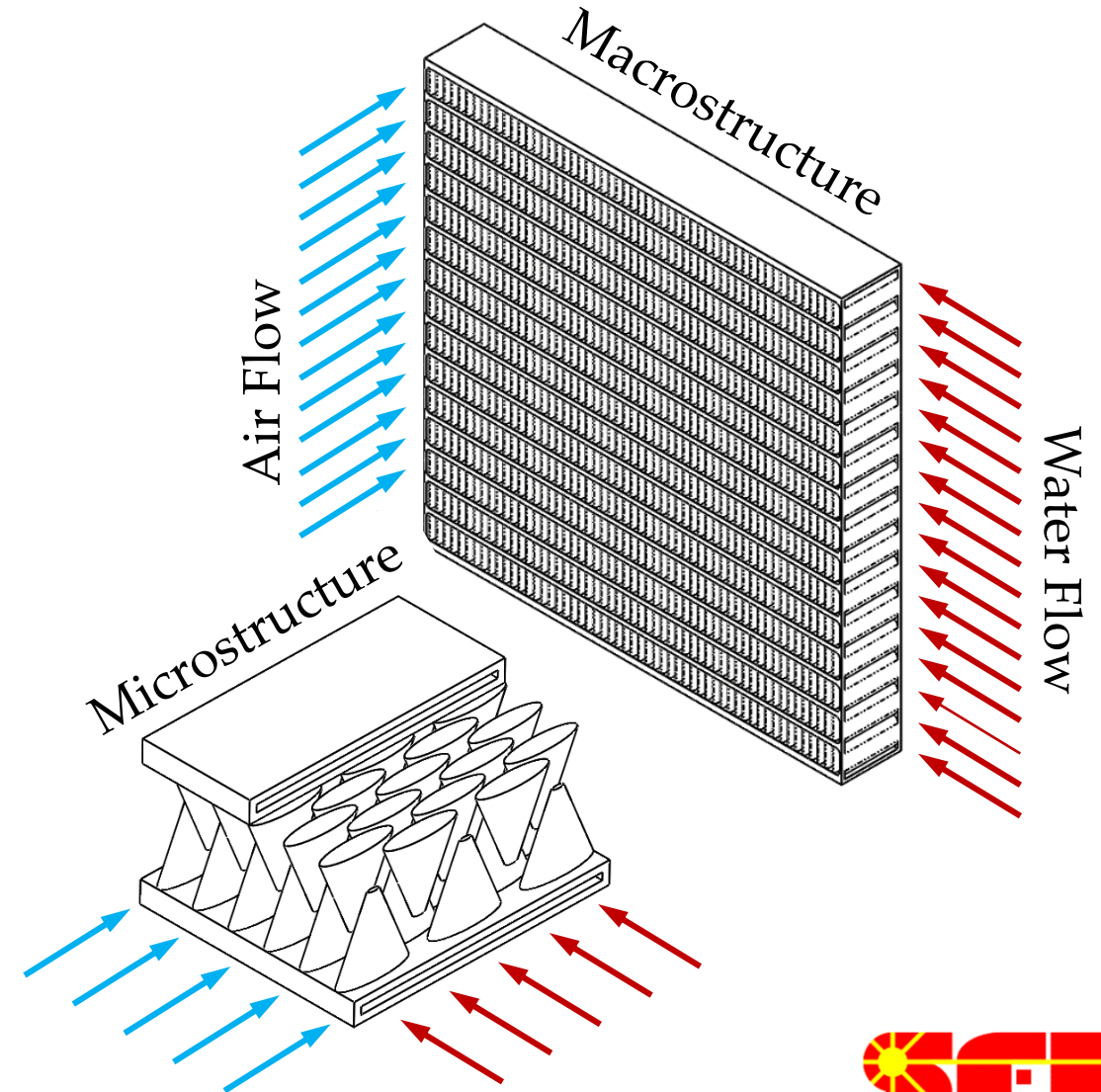
Cross-Flow Air-Cooled Heat Exchanger Design

Traditionally Heat Exchanger



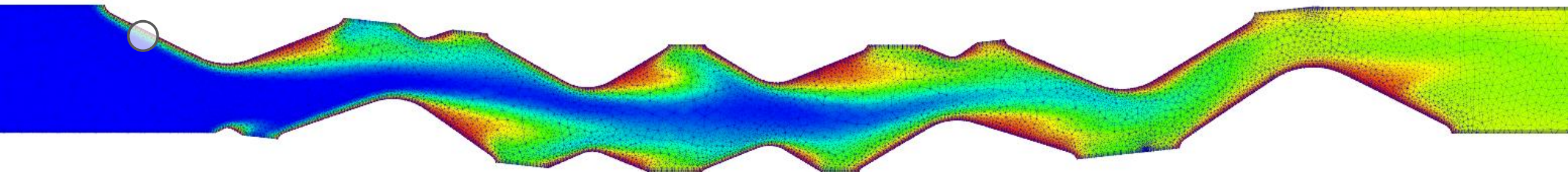
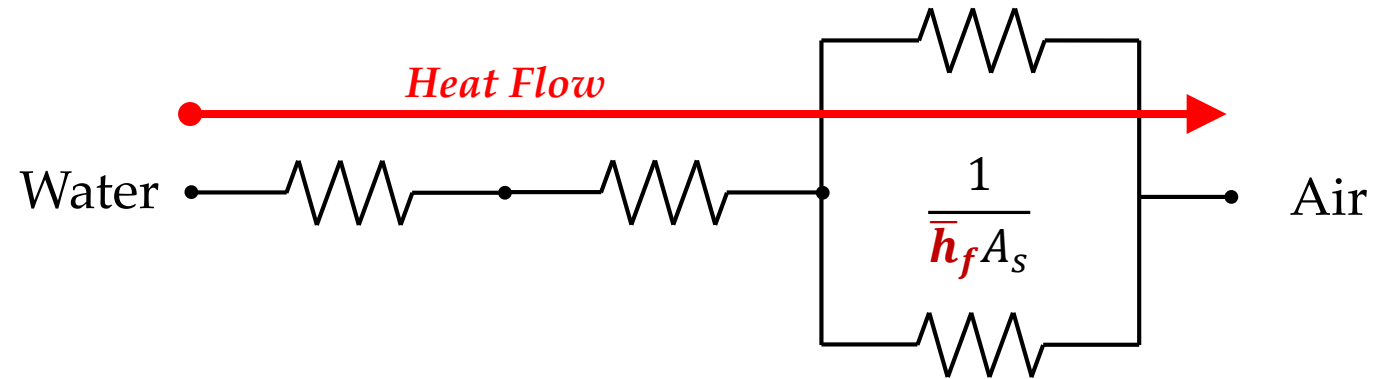
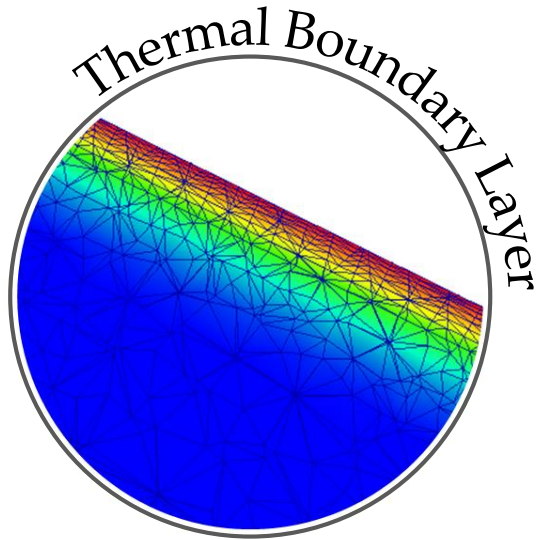
Copper Tubes and Aluminum Fins

Additively Manufactured Heat Exchanger



Heat Exchanger Modeling

- Utilization of Computational Fluid Dynamics (CFD) and numerical optimization methods to investigate intricate geometries that aim reduce airside convection resistance at minimal hydraulic penalty.

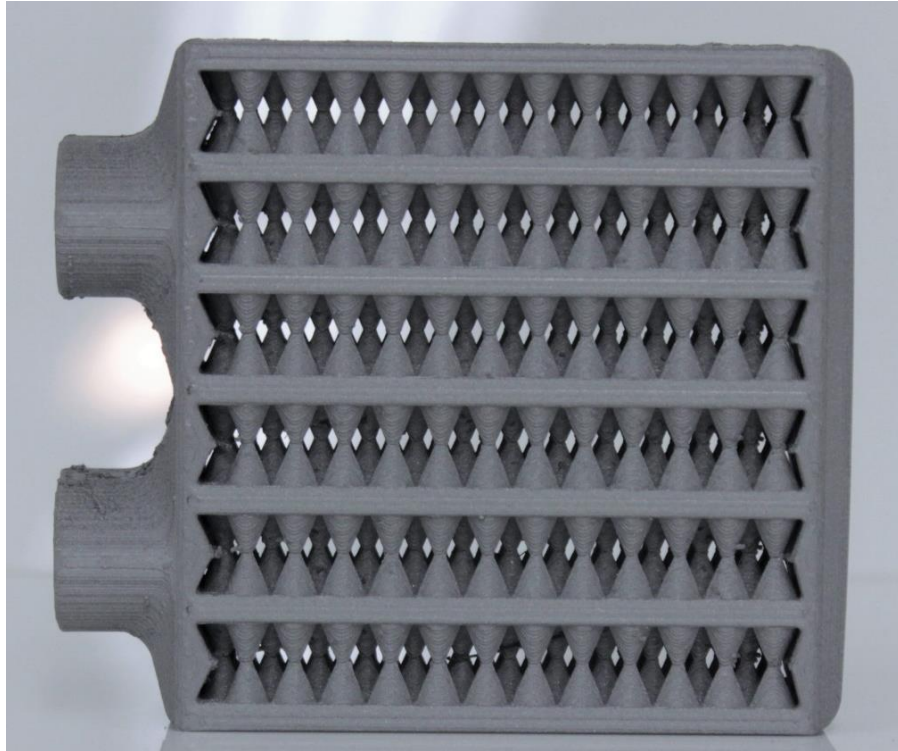


Air Side Microstructure Static Temperature



Additive Manufacturing

- Composite polymer printing using Fused Filament Fabrication (FFF)
- Metal printing using Selective Laser Melting (SLM)



Aluminum-Filled-Polycarbonate
Tapered-Pin-Fin Heat Exchanger



17-4 Stainless-Steel Airfoil Heat
Exchanger