Announcing the Final Examination of Patrick Tran for the degree of Master of Science

Time & Location: April 2, 2019 at 3:00 PM in Eng 1 288
Title: Investigation of Flow Field Structures in a Rectangular Channel with a Pin Fin Array

This study presents an experimental investigation of flow field and pressure loss on staggered pin fin array. Pin Fin arrays are used as turbulence promoters by inducing horseshoe and von Karman vortex structures in extruded surface-based heat exchangers, such as those found in the trailing edge or end wall of a turbine blade or electronic heat sinks. Turbulence is a large component that affects both the fluid and heat transfer dynamics used as a cooling mechanism for turbine blades. Increasing the levels of turbulence allows for higher levels of heat removal that can increase the efficiency of the heat exchanger or reduce the level of thermal and structural stress on the components, allowing for extended product life. A detailed study of the vortex shedding using a Particle Image Velocimetry (PIV) technique to measure flow field measurements using a closed loop vertical water tunnel. A time resolved PIV study for both steady and unsteady flow structures in the fully developed region of a pin fin array at multiple cross sections between pins performed. The pin fin array consists of circular pin fins with 8 rows of 7.5 pins in rectangular channel and was tested. Test conditions based on pin Reynolds number vary from 10,000 to 20,000. Performed is also supplemental Computation Fluid Dynamic (CFD) study is also for comparison with flow field.

Major: Mechanical Engineering

Educational Career:
Bachelor's of Mechanical Engineering, BS, 2016, University of Central Florida
Master's of Biomedical Engineering, MS, 2018, University of Central Florida

Committee in Charge:
Jayanta Kapat, Chair, Mechanical & Aerospace Engineering
Helen Huang, Mechanical & Aerospace Engineering
Samik Bhattacharya, Mechanical & Aerospace Engineering

Approved for distribution by Jayanta Kapat, Committee Chair, on March 20, 2019.

The public is welcome to attend.