**ABSTRACT**

Recent advances in the field of additive manufacturing (AM) have widened the design space for complex convective cooling designs. Using additive manufacturing allows for increasingly small and complex geometries to be fabricated with little increase in time or cost. The opportunity for gas turbine designers, in particular, is to exploit the use of additive manufacturing in re-thinking cooling schemes for components. However, high surface roughness levels result when using laser powdered bed fusion, which is a common additive manufacturing technique. The inherent roughness, in fact, can be used to enhance convective heat transfer beyond that of engineered cooling designs, but comes with a pressure drop penalty. One dictating parameter that influences the surface roughness is the particular build direction. The build direction not only influences the surface roughness, but also affects whether it is possible to meet the design intent of the component, component shape and, ultimately, the resulting heat transfer and pressure loss characteristics of the component. This seminar will provide insights on the effects of the build direction on microchannels that are often used to cool gas turbine airfoils.

**BIOGRAPHY**

Karen A. Thole holds the title of Distinguished Professor in the Department of Mechanical Engineering at the Pennsylvania State University. She is a Fellow of both ASME and AIAA. At Penn State, Dr. Thole is the Director of the Steady Thermal Aero Research Turbine (START) Lab, which has been recognized by two gas turbine companies as a center of excellence in turbine heat transfer and aerodynamics. She has published over 300 archival papers and advised 80 dissertations and theses with many of those students now working in the gas turbine industry. For Dr. Thole’s technical contributions, she has been recognized by ASME’s George Westinghouse Medal and AIAA’s Air Breathing Propulsion Award. She holds two degrees in Mechanical Engineering from the University of Illinois at Urbana-Champaign and a PhD from the University of Texas at Austin.