Department of Mechanical Engineering Seminar

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Steinman Hall Room 254 (Conference Room)

Unlocking Gas Turbine Efficiency: Advancement in Large Eddy Simulation for Heat Transfer Optimization

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ABSTRACT

This presentation will explore the application of Large Eddy Simulation (LES) in addressing gas turbine heat transfer challenges. In order to achieve heightened cycle efficiencies by operating turbine blades at temperatures surpassing the thermal limits of materials, active cooling of the blades becomes imperative. This entails the creation of intricate cooling passages within the blade, with cooling air injected onto the outer surface to establish an insulating film. The intricate interplay of flow dynamics and heat transfer involved in this process is not accurately captured by Reynolds-Averaged Navier-Stokes Simulation (RANS). Throughout this presentation, we aim to shed light on instances where LES successfully predicted local heat transfer distributions or turbulence levels that were inadequately captured by RANS. Furthermore, we'll delve into how LES provided insights into information that proved challenging to obtain through experiments alone.

BIO

Joon Ahn has received his B.S. (1997), M.S. (1999), and Ph.D. (2003) degrees from Seoul National University, Korea. While in school, his research topic was mainly heat transfer in gas turbines. After graduation, he worked as a postdoctoral researcher at the University of Tokyo, Japan, for two years (2004-2006), mainly conducting turbulence control research. In 2006, he was appointed as a senior researcher at the Korea Institute of Energy Research (KIER) and conducted research on cogeneration and industrial boilers for four years. He has been a professor at Kookmin University in Seoul, South Korea since 2010. His research interests include heat transfer and combustion problems in energy systems.