



College of Engineering
Department of
Mechanical & Industrial Engineering

The Robert W. Courter Seminar Series

3:00-4:00pm, Friday, October 27th, 2023

PFT 1263

**The Key Role of Heat Transfer Analysis in
Energy Systems Research**

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Heat transfer plays a significant role in many applications. In this presentation, an overview of heat transfer applications based research problems are presented. The goal is to communicate how important heat transfer is and the need for measurements in evaluation of design solutions. Thermal design involves a combination of analytical, computational, and experimental tools. Detailed analytical, computational, and experimental techniques are combined to problem specific unique solutions. Problems in gas turbines, electronic cooling, thermoelectric generation are presented with interested heat transfer measurements and their impact in those problems. Some of these solutions will demonstrate the complexity of the problem and the approach to a solution. Problems in gas turbines, electronic cooling, thermoelectric generation are presented with interested heat transfer measurements and their impact in those problems. Some of these solutions will demonstrate the complexity of the problem and the approach to a solution. Some examples include power electronic power control unit cooling, rotating turbine airfoil channels, thermoelectric generator heat exchangers, impingement cooling, gas turbine combustor liner cooling, among other problems. Detailed experimental and computational analysis to understand and solve the given problem using heat transfer fundamentals will be presented. Some of the problems also involve optimized solutions that focus on the design and manufacturing constraints.

***Dr. S. V. Ekkad** is the Department Head and RJ Reynolds Professor in the Mechanical & Aerospace Engineering Department at North Carolina State University since September 2017. He previously served as the Associate Vice President for Research Programs at Virginia Tech. He also held the title of Rolls-Royce Commonwealth Professor for Aerospace Propulsion Systems at Virginia Tech. He was also the Founder and Director of the Rolls-Royce University Technology Center for Advanced System Diagnostics at Virginia Tech, one of 30 centers around the world, prior to joining NC State. He was in the Mechanical Engineering department at Virginia Tech from August 2007 to September 2017 after 9 years at LSU and 2 years at Rolls-Royce Allison Engine Company in Indianapolis. He received his Ph.D. from Texas A&M University and M.S. from Arizona State University. He has over 25 years of experience in heat transfer related research. He has published over 250 journal & conference articles, three patents and co-authored a book and three book chapters.