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Novel engineered surfaces for energy and health applications

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Abstract

Surfaces are omnipresent. The interaction of any material or object or being, either living or non-living, with its surrounding environment is through a surface, e.g., the interaction of an electronic or heat sink surface with a coolant, the interaction of surfaces with virus particles or infectious aerosols, the interaction of filtration surfaces with particulates in air and water, or the interaction of human skin or a water desalination surface with its surrounding environment.

Depending on the application, surfaces can be engineered and tailored to achieve specific functionality for altering the physical phenomena and performance. In this presentation, on-going research on one such engineered functional surface will be presented. Its bulk micro-manufacturing approach, robustness, and application to three practical challenges of societal impact will be discussed:
(1) pushing the current limit of heat dissipation for the boiling of liquids,
(2) increasing freshwater production rate in thermal desalination of highly saline water, and
(3) inactivation of viruses (SARS-CoV-2) on surfaces.

Bio sketch

Krishna Kota is an Associate Professor in the Department of Mechanical and Aerospace Engineering at the New Mexico State University (NMSU). Prior to joining NMSU, he worked as a Research Scientist in the Enabling Physical Technologies Research Division at Bell Labs and as a Postdoctoral Research Fellow at the Georgia Institute of Technology. He obtained a Doctor of Philosophy in Mechanical Engineering from the University of Central Florida in the year 2008. His research interests are in fundamentally studying the interactions between tailored and engineered surfaces and their surrounding thermal, fluidic, and particulate environments at all length scales. Through this research, his group has demonstrated notable performance benefits and societal impact in the areas of energy and thermal management, health, and extended space transportation. His research was/is funded (>$5.6 million as a PI/Co-PI) by AFOSR, AFRL, DOE, MDA, NASA, NMSGC, NMSU, NM-WRRI, NSF, Sandia, USBR, and industry. He is the author/co-author of three invited book chapters, three published technical reports, and 50+ peer-reviewed publications in journals and conference proceedings and delivered 15 invited talks including plenary and keynote lectures. He is the inventor/co-inventor on five U.S. patents. He served/serves as a reviewer of grant proposals submitted to NSF, DOE, The US National Academies, and NSERC (Canada). He serves on the editorial boards of the journals Fluids and Frontiers in Mechanical Engineering, and as a peer-reviewer for 27 international journals. He also served/serves in the roles of technical program chair, regional scientific committee member, associate editor of proceedings, symposium organizer, topic chair, session chair/co-chair, reviewer, and judge for student posters at international conferences. He is a member of ASME, ASEE, and a senior member of AIAA. He is the recipient of four NMSU faculty awards and numerous student awards, scholarships, and honors including a University Gold Medal as an undergraduate student for achieving the highest GPA in the university system.

Department of Mechanical Engineering, Edward E. Whitacre Jr. College of Engineering
Friday, Feb 11, 2022
2:00 – 3:00 PM
In person: ME South 205
Online: https://texastech.zoom.us/j/94591486607?pwd=MHhsSnJyM2RJQjl1ZmdsWkZuVExrQT09
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