



Spring 2021 Mechanical Engineering Distinguished Speaker Series

Dr. Ranga Pitchumani

George R. Goodson Professor

Advanced Materials and Technologies Laboratory

Department of Mechanical Engineering | Virginia Tech

<https://amtl.me.vt.edu>

Date and time: April 15 2021 @ 3:30 PM

Venue: Online Zoom

<https://virginiatech.zoom.us/j/83740378653?pwd=bk9ibGgxU2d5MXRqZnNXtjRGakxTdz09>

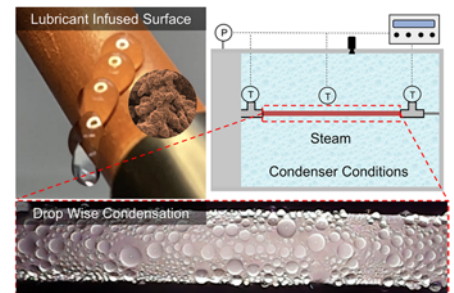
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TEXTURED NONWETTING SURFACES FOR POWER PLANT CONDENSERS

ABSTRACT

Steam condensation is a significant part of thermoelectric power generation worldwide, whose efficiency is directly tied to condensation heat transfer effectiveness. In recent years, there has been a flurry of research reports on textured superhydrophobic and liquid infused porous surfaces that promise fantastic enhancements in surface phenomena such as condensation, drag reduction, convection heat transfer, corrosion and fouling. Most of these studies, however, are conducted on model surfaces or in a narrow range of conditions that don't directly scale to practical systems. This talk will present viable approaches for creating textured superhydrophobic and liquid infused nonwetting surfaces on engineering materials that are scalable in practice. Through systematic experimental and theoretical studies, conditions and applications where nonwetting surfaces are useful will be delineated. Focusing on application to power plant condensers, we will journey from the microstructure to the system level techno-economic considerations to understand the extent of improvements in performance and leveled cost of condensers enabled by textured nonwetting surfaces.



Speaker Biography



Dr. Pitchumani is the George R. Goodson Professor in the Department of Mechanical Engineering at Virginia Tech. He received the Ph.D. degree in Mechanical Engineering from Carnegie Mellon University, and was with the University of Connecticut prior to joining Virginia Tech. Dr. Pitchumani served as the Department Head at the University of Connecticut and as the Associate Department Head for Research at Virginia Tech. From 2011–2015, Dr. Pitchumani served in an invitational role as the Chief Scientist for the SunShot Initiative at the U.S. Department of Energy, where he defined bold national goals for achieving cost-competitive solar energy technologies and their ubiquitous integration into the electric grid. He set the science and technology directions for the programs, established funding priorities, directed a team of program managers, technical, financial and support personnel, and oversaw the solar research and development programs at the Industry, National Laboratories and Universities.

During his tenure, he was responsible for the launching of over \$250M in new initiatives toward the SunShot goal of bringing the cost of solar-generated electricity down to grid parity, which was accomplished three years ahead of target in 2017. He is the Editor-in-Chief of the flagship journal *Solar Energy*, and serves on the editorial boards of other journals in the areas of energy and materials science. Dr. Pitchumani has served on the Advisory Board for the Australian Renewable Energy Agency (ARENA) and as the U.S. representative on the Executive Committee of the International Energy Agency. He is the author of over 240 articles and is an inventor on 3 patents or disclosures. For his career accomplishments, Dr. Pitchumani was recognized by his alma mater, the Indian Institute of Technology, Bombay, as a Distinguished Alumnus in 2016. He is a Fellow of the ASME and has won many professional awards including the Hoyt Clark Hottel Award from the American Solar Energy Society and, earlier in his career, the Young Investigator Award from the Office of Naval Research.

Host: Dr. Danesh Tafti