

THE MATERIALS SCIENCE AND ENGINEERING DEPARTMENT  
FALL COLLOQUIUM SERIES PRESENTS:

# Saniya LeBlanc

Associate Professor, Mechanical & Aerospace Engineering  
George Washington University



## *A Holistic Approach to Energy:*

### *Connecting Materials, Manufacturing, Systems, and Technoeconomics*

The LeBlanc Lab takes a multi-pronged approach to developing next-generation energy solutions. This talk will give an overview of projects from three aspects of our work: novel materials and manufacturing approaches for solid-state energy conversion, energy system analysis and management, and technoeconomic frameworks to evaluate emerging technologies. Our most active project aims to integrate manufacturing and system design for thermoelectric devices, solid-state devices that directly convert heat into electricity. With laser-based additive manufacturing, we explore the formation of nano- to meso-scale structures during rapid melting and resolidification of semiconductor materials. When applied to thermoelectric materials, this technique could facilitate unprecedented geometries and architectures, material-to-device integration, and large-area processing that enable multifunctional materials for power generation and thermal management applications. In a new project starting this year, we will extend our work on improving the energy efficiency of power generation systems by creating energy management techniques for district energy systems (community energy systems that span multiple buildings). The project will investigate the impact combined heat and power, renewable electricity generation, and electricity and thermal storage have on the cost, reliability, and resilience of district energy systems. Finally, our ongoing work in technoeconomics allows us to define performance metrics that inform the market penetration potential and externalities (e.g., costs and benefits) of future energy technologies. The talk will conclude with a discussion of our educational programs, namely the Nanotechnology and Energy Fellows Programs, that engage students in real-world, hands-on materials, manufacturing, and energy projects.

**Saniya LeBlanc** is an associate professor in the Department of Mechanical & Aerospace Engineering at The George Washington University. Her research goals are to create next-generation energy conversion technologies with advanced materials and manufacturing techniques. Previously, she was a research scientist at a startup company where she created research, development, and manufacturing characterization solutions for thermoelectric technologies and evaluated the potential of new power generation materials. Dr. LeBlanc also served in Teach for America and taught high school math and physics in Washington, DC. Dr. LeBlanc obtained a PhD in mechanical engineering with a minor in materials science at Stanford University where she was a Diversifying Academia Recruiting Excellence fellow, a Sandia Campus Executive fellow, and a National Science Foundation Graduate Research fellow. She was a Churchill Scholar at University of Cambridge where she received an MPhil in engineering, and she has a BS in mechanical engineering from Georgia Institute of Technology. In 2018, the American Society of Engineering Education named Dr. LeBlanc one of its “20 Under 40 High-achieving Researchers and Educators,” and she received the National Science Foundation CAREER award in 2020.

**Tuesday, September 29 • 4 pm CT • Zoom**

[Required Registration Link](#)

*Questions? Contact [Kristina.lugo@northwestern.edu](mailto:Kristina.lugo@northwestern.edu).*