

# Materials Science Lecture Seminar

Winter 2021

## Learning Nanoscale Interfacial and Transport Phenomena



### Assistant Professor Yoonjin Won

*Mechanical and Aerospace Engineering*

*University of California, Irvine*

**Friday, January 8, 2021, 10:00-11:00 a.m.**

**Zoom: Meeting ID 842 506 6501, Passcode 587901**

**Abstract:** Advances in thermal science bring transformational efficiency enhancements in energy, water, manufacturing processes, and electronics cooling by fundamentally manipulating thermal transport and interfacial phenomena across multiple length and time scales. Many times, thermal phenomena are naturally complex, and create dynamic changes in thermofluidic characteristics, which make it difficult to advance fundamental knowledge about thermal conversion physics and efficiency mechanisms. To gain fundamental to fully describe these phenomena, I will discuss three key technologies, in this talk: **1)** machine learning models that learn, understand, and predict dynamic thermal transport processes; **2)** new discoveries in interfacial phenomena under phase change conditions, from an atomistic perspective; and **3)** avenues to design functional thermal architectures that are widely employed as high-surface conduits for thermo-fluidic applications.

**Bio:** Dr. Won's overarching research goal is to gain fundamental insights into nanoscale transport and interfacial physics, centering on three keywords—data-driven approach, extreme computing, and materials design. The research efforts aim to bring transformational efficiency enhancements in energy, water, manufacturing processes, and electronics cooling by fundamentally manipulating liquid-solid-vapor interactions and transport phenomena across multiple length and time scales. Dr. Won is recognized with an NSF CAREER in 2018 and has also received several awards including the ASME EPPD Early Career Award 2018, The Emerging Innovation/Early Career Innovator of the Year 2020 from UCI Beall Innovation Center, ASME EPPD Women Engineer Award 2020, ASME ICNMM Outstanding Leadership Award 2019, UCI Samueli Career Development Fellowship, and numerous best paper and poster awards. The key papers are published in high impact journals including Small, Proceedings of National Academy of Science (PNAS), Advanced Functional Materials, and American Chemical Society (ACS). Additional details for Dr. Won's qualifications and research group are available online ([won.eng.uci.edu](http://won.eng.uci.edu)).

#### **Olivia A. Graeve, Ph.D.**

Professor, UC San Diego  
Department of Mechanical and  
Aerospace Engineering

#### **William J. Bowman, Ph.D.**

Assistant Professor, UC Irvine  
Department of Materials Science  
and Engineering

#### **Ioanna Kakoulli, Ph.D.**

Professor, UCLA  
Department of Materials Science  
and Engineering

**UC San Diego**  
Jacobs School of Engineering

  
**UCI Samueli**  
School of Engineering | Department of  
Materials Science  
and Engineering

 **UCLA Samueli**  
Materials Science & Engineering