東京大学 THE UNIVERSITY OF TOKYO

GMSI Graduate Program for Mechanical Systems Innovation

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Nanoscale Thermal Challenges in Electronics

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Date: Friday, 1 Mar. 2019, 14:30-15:30
Venue: Faculty of Engineering Bldg. 2, 3F, 31A

Abstract:
With rapidly decreasing feature sizes along "Moore's law" and the associated increase in power density, heat dissipation is arguably the most important problem facing electronic chips today. The thermal conduction comprises multi-stage challenges from devices into the substrate, and the propagation is further impeded by transistors and neighboring interconnects as principles break down at the length scale. In this talk, I will discuss the impact of interface orientations on the reflection of thermal energy carriers. A combination of experiments and *ab-initio* simulations shows ballistic nature of phonon transport, which are further confined with limited line-of-sight. The second part of this talk will investigate the transmission of heat carriers across sidewall interfaces, which are a dominant areal fraction in highly scaled nanostructures, such as interconnects. The experiments discover a dissimilarity in the transmission of energy carriers depending on the orientation of interfaces relative to the principal plane. The last section of this presentation will introduce a concept of solid-state fin structures, which enhances thermal transport across interfaces, which is particularly important cryogenic computing systems.

Bio:
Dr. Woosung Park is an Assistant Professor at the Department of Mechanical Systems Engineering of Sookmyung Women's University. He received a B.S. in Mechanical and Aerospace Engineering from Seoul National University in 2010, a M.S. and a Ph.D. in Mechanical Engineering with a minor in Electrical Engineering at Stanford University in 2017. Prior to joining Sookmyung Women's University in 2018, he worked as a postdoctoral scholar in Mechanical Engineering at Stanford University. His research spans energy conversion and dissipation in electronics, high energy applications, and renewable energy systems.

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