[[1]](#footnote-1)

**Title:**

Harnessing the Promise of Nanomaterials for Future Electronic Devices

**Abstract:**

Recent advances in the field of two-dimensional (2D) materials have generated significant interest in using layered materials in electronic devices and sensors. Over the past decade, many new 2D materials have emerged, expanding research opportunities in 2D materials and their device applications. To better understand these novel material systems, studying them through modeling and simulation is crucial, as the current understanding of 2D materials and devices is still limited due to many barriers in direct experiments. This talk will highlight how engineering and optimization processes can tap into the potential of nanomaterials in developing future electronic devices.

During this presentation, I will discuss three key topics: (a) multi-level simulation for nanoelectronics, (b) strain engineering, and (c) negative capacitance (NC) devices. I will demonstrate how strain engineering and thickness manipulation can alter the electronic bands of 2D materials and improve their device performance. Additionally, I will introduce a state-of-the-art computational framework for NC device simulations, explain its basic operation principles, and discuss device design strategies for optimizing performance for various target applications.

**Speaker:**

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**Bio:**

Dr. Youngki Yoon is an Associate Professor in the Department of Electrical and Computer Engineering at the University of Waterloo in Waterloo, Ontario, Canada. He obtained his B.E. degree in Metallurgical Engineering from Korea University in Seoul, Korea in 1999, followed by his M.S. and Ph.D. degrees in Electrical and Computer Engineering from the University of Florida in Gainesville, FL, USA in 2005 and 2008, respectively. Following this, he worked as a Postdoctoral Researcher at the University of California, Berkeley from 2009 to 2013. At the University of Waterloo, Dr. Yoon served as the Director of the Nanotechnology Engineering undergraduate program from 2018 to 2020. His area of research focuses on the modeling and simulation of emerging and exploratory devices. In recognition of his research contributions, Dr. Yoon has received several prestigious awards, including the Early Researcher Award from the Government of Ontario and the WIN Research Leader Award. He has also served on the Institute of Electrical and Electronics Engineers (IEEE) Electron Devices Society (EDS) Technical Committee in Nanotechnology.

1. [↑](#footnote-ref-1)