

## Future of Semiconductors: A Co-Design Approach in Materials, Devices, and Systems

**Tuesday, April 23, 2024**  
**2:00 pm – 3:00 pm**  
**Olin 202**

Reception to follow in Olin 204  
3:00 pm – 3:30 pm



### **Dr. Payman Zarkesh-Ha**

Director of Center for High Technology Materials, Professor of  
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**ABSTRACT:** Semiconductor industry has improved beyond imagination over the past 50 years. Today, AMD's MI300X GPU has the largest transistor count with totaling 153 billion transistors built on TSMC's 5 nm process. This improvement of eight-orders in magnitude of added capability (transistor count) is unheard of in any other industry worldwide. Although the semiconductor industry has made significant efforts over the years to get over hurdles while scaling transistors, we are now reaching the physical limits of silicon, where a transistor contains only a few silicon atoms. The question is now "What is the future of semiconductor over the next 50 years?" The objective of this talk is to address this question by building a research team to develop a co-design scheme that will pave the way to the creation of a novel synthetic material using semiconductor nanowires in a reconfigurable neuromorphic integrated circuit that can potentially be a revolutionary breakthrough in semiconductor industry by breaking the existing physical limits in integrated circuits.

**BIOGRAPHY:** Dr. Payman Zarkesh-Ha is a Professor in the Electrical & Computer Engineering Department and Director of Center for High Technology Materials at the University of New Mexico. He received M.S. and Ph.D. degrees in electrical and computer engineering from Sharif University, Tehran, Iran, in 1994 and Georgia Institute of Technology, Atlanta, GA, in 2001, respectively. Prior to joining University of New Mexico in 2006, he was a senior research engineer with LSI Logic Corporation, Milpitas, CA; where he worked on interconnect architecture design for the next ASIC generations. His research interests are statistical modeling of nanoelectronic devices and systems, design for manufacturability, low-power and high-performance VLSI designs. He has published over 100 refereed papers and holds 20 issued patents in this field.