Pushing the Boundaries – High Frequency Magnetic Devices

Speaker: **Amal El-Ghazaly, Cornell University**

electron devices society

Cornell University
School of Electrical and Computer Engineering

Abstract :

This seminar presents an overview of magnetic materials in their uses across the frequency spectrum as well as the challenges of engineering new, versatile magnetic devices that can push the boundaries of high frequency magnetic operation while also providing high tunability to meet the ever-broadening application demands of the future.

The talk will begin by describing various magnetic materials and the parameters for which they are designed in order to meet the specifications of common device applications in power conversion, communications, and sensing. Next, some tricks will be discussed for how reliable high frequency magnetic materials can be produced and well as some completely new avenues being explored for manipulating magnetic materials to improve their high frequency response. Finally, to address versatility, magnetoelectric (magnetic and piezoelectric) heterostructures will be presented to provide tunable composite properties. These concepts of high frequency operation and tunability, together, can enable the design of materials for broadly versatile devices for future electronics.

Bio:

Amal El-Ghazaly is an assistant professor in the department of electrical and computer engineering at Cornell University. Her work combines magnetism, ferroelectricity, and optics to create tunable, versatile electronic systems for telecommunications, sensing and actuation. Prior to joining Cornell in 2019, she was a postdoctoral research fellow at the University of California Berkeley, where she was awarded the University of California President's Postdoctoral Fellowship in 2017. Her postdoctoral research explored new possibilities for ultrafast all-electrical switching of magnetic nanodots for faster and more energy-efficient computer memories. She earned a Ph.D. in electrical engineering from Stanford University, where she was funded by both NSF and NDSEG graduate research fellowships as well as the Stanford DARE fellowship until her graduation in 2016. Her Ph.D. research focused on radio frequency devices using magnetic and magnetoelectric thin-film composites for tunable wireless communications. She received her B.S. and M.S. degrees in electrical and computer engineering from Carnegie Mellon University in 2011.

Virtual Talk

Friday, April 2nd, 2021

Talk begins: **12:00pm**

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School of ECE,
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Partially funded by GPSAFC

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