# IDEA Exchange Lecture Series:
# MRAM: Magnetoresistive Random Access Memory Hardware Research at IBM

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Abstract:

By using the spin quantum degree of freedom of the electron, Spin-Transfer Torque Magnetoresistive Random Access Memory (STT-MRAM) taps into a whole new realm of scaling and manipulation of magnetism. As the deluge of new data in this "Big Data" era continues to increase, we need to find new ways to cope with the volume and speed with which this data is being created. STT-MRAM offers some unique and exciting potential for scaling to higher densities than other memories while limiting how much power is necessary to make that happen. This talk will introduce MRAM as an embedded memory technology and how it can be used to help further AI-inspired designs for future specialized processor designs.

Bio:

Eric R. Evarts received a B.S. degree in Physics and Computer Science from Brandeis University in 2006. He received his M.S. degree in 2008 and Ph.D. degree in Physics in 2011 from Carnegie Mellon University. At CMU, he focused on developing conductive atomic force microscopy (C-AFM) as a rapid characterization technique for nanofabricated magnetic tunnel junction (MTJ) nanopillars under the guidance of Sara Majetich. From 2011 until 2016, Eric worked at the National Institute of Standards and Technology (NIST) in Boulder, CO as both a National Research Council (NRC) Postdoctoral Fellow and a University of Colorado PREP Research Faculty member. At NIST, he specialized in growing low resistance-area product MTJ films that he fabricated into MRAM and other spintronic devices such as spin-torque oscillators. In 2017, Eric joined IBM Research as a Research Staff Member and one of the early members of the Albany MRAM research team. His focus continues to be understanding the device physics and engineering limitations of nanoscale spintronic devices. He has authored or coauthored more than 15 peer reviewed journal articles, 1 book chapter, and personally delivered over 30 presentations on magnetic nanoparticles, MRAM, spin-torque oscillators, and other spintronic devices.