

# MSE SEMINAR

February 16, 2018

113 McBryde Hall

3:30 – 4:30 PM

Refreshments at 3:00 PM

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Graduate Student

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## “Nanopillars with E-field accessible multi-state magnetization with giant magnetization changes in self-assembled BFO-CFO/PMN-PT heterostructures”

### ABSTRACT

We have deposited self-assembled BiFeO<sub>3</sub>-CoFe<sub>2</sub>O<sub>4</sub> (BFO-CFO) thin films on (100)-oriented SrRuO<sub>3</sub>-buffered Pb(Mg<sub>1/3</sub>Nb<sub>2/3</sub>)<sub>0.62</sub>Ti<sub>0.38</sub>O<sub>3</sub> (PMN-38PT) single crystal substrates. These heterostructures were used for the study of real-time changes in the magnetization with applied DC electric field ( $E_{DC}$ ). With increasing  $E_{DC}$ , a giant magnetization change was observed along the out-of-plane (easy) axis. The induced magnetization changes of the CFO nanopillars in the BFO/CFO layer were about  $\Delta M/M_{rDC} = 93\%$  at  $E_{DC} = -3kV/cm$ . A giant converse magnetoelectric (CME) coefficient of  $1.3 \times 10^{-7}$  s/m was estimated from the data. By changing  $E_{DC}$ , we found multiple ( $N \geq 4$ ) unique possible values of a stable magnetization with memory on the removal of the field.

### BIOSKETCH

Xiao Tang is a Ph.D. student in Dr. Viehland's Group. He graduated from Jilin University with a bachelor of engineering in Materials Science and Engineering in 2012. After graduating, he joined Material Science and Engineering Department of University of Florida and got his Master's of science degree in 2014. In Virginia Tech, he focuses on the research of piezoelectric and magnetostrictive materials, which can be widely used in the semiconductors, memory/logic devices, and sensors. Other than the research work, he also is a Graduate Teaching Assistant in MSE department, working with Dr. Staley for lab supervision and senior design projects.