Investigation of the Oxidation Growth Kinetics of La$_{0.67}$Ba$_{0.33}$MnO$_3$ and LaMnO$_3$ Perovskite Films using Atomic Force Microscopy (AFM) lithography MARC SCHNEIDER, MICHEAL EARLE, SANJAY ADHIKARI, MATT SNEIDER, KYLE HALL, RAJESWARI KOLAGANI, Towson University, DAVID SCHAEFER, Towson University — Manganese oxides doped with certain alkaline earth elements exhibit colossal magnetoresistance (CMR), which has great prospective applications in technological advancements. Our research is focused on the growth kinetics and electrical properties of LaMnO$_3$ and La$_{0.67}$Ba$_{0.33}$MnO$_3$. LaMnO$_3$, behaves as an antiferromagnetic insulator. However, if extra oxygen is incorporated in this material, an insulator-metal transition occurs and the transport characteristics of the material shift causing ferromagnetism. In this research AFM induced nano-lithography of the LaMnO$_3$ thin films is performed on samples of varying oxygen contents and compared to results of AFM induced nanolithography on La$_{0.67}$Ba$_{0.33}$MnO$_3$. The quality and reproducibility of nanostructures produced is heavily dependent on the bias voltage direction between the film and the AFM probe.

Marc Schneider
Towson University