

# Electrodeposition of Multilayered Co/Cu Nanowires

Liwen Tan, Bethanie J. H. Stadler (PI), Chris Leighton (PI), Paul Crowell (PI)  
Electrical & Computer Eng, Physics, Chemical Eng & Materials Science  
University of Minnesota

TEM of Co/Cu  
multilayered nanowire.  
100 nm

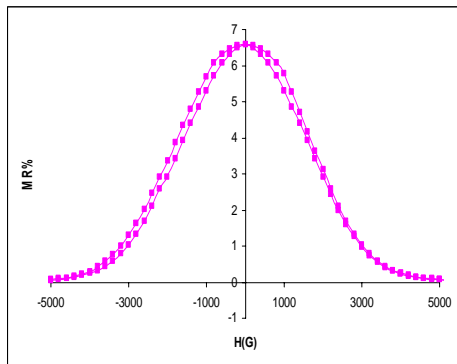
## Motivation:

- ◆ Measure Giant Magnetoresistance in Co/Cu Nanowires
- ◆ Understand Reversal Mechanisms

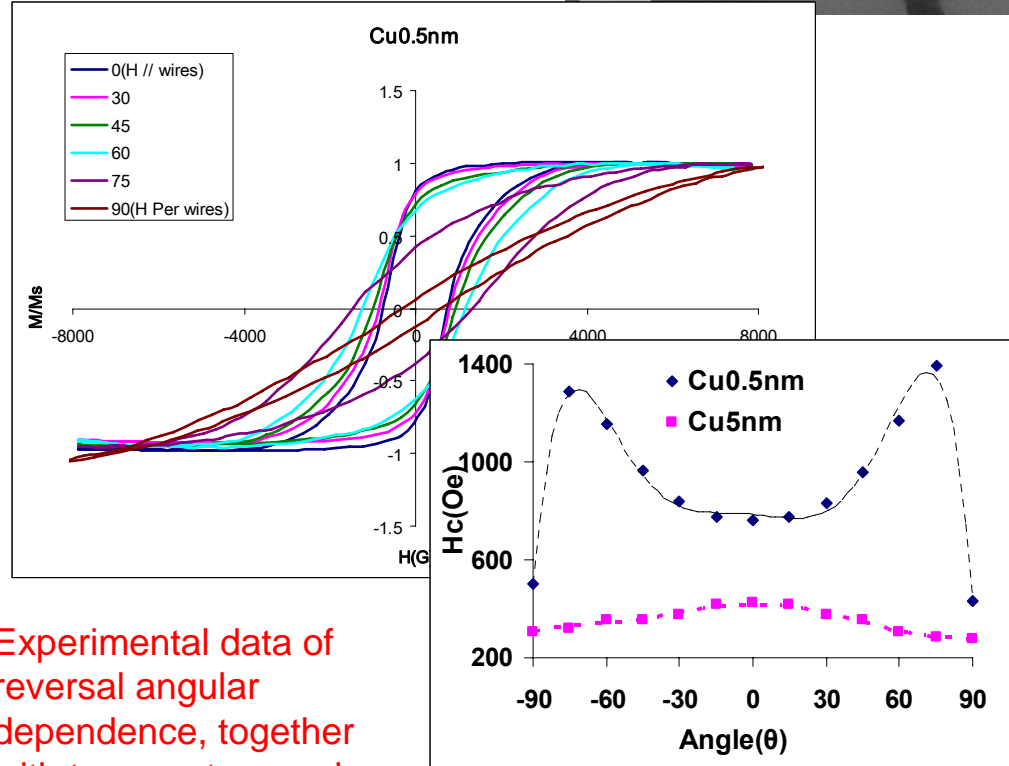
## Experiment:

- ◆ Fabricate multilayered Co/Cu nanowires in ordered alumina template
- ◆ Control the thickness of Co and Cu layers and crystallography of Co layers
- ◆ Study the temperature and thickness dependence of GMR in multilayered Co/Cu nanowires

GMR of  
Co(5nm)/Cu(5nm)  
multilayered  
nanowire at room  
temperature



## Results:



Experimental data of reversal angular dependence, together with temperature and perpendicular magnetization data, is enabling the various theoretical mechanisms of reversal in 1-D systems to be verified.

- L. Tan and B.J.H. Stadler, "Fabrication and Magnetic Behavior of Co/Cu Multilayered Nanowires," *J. Materials Research* **21** no.11 2870-2875 (2006).
- J. Zou, X. Qi, L. Tan, B.J.H. Stadler, "Nanoporous Silicon with Long-Range-Order using Imprinted Anodic Alumina Etch Masks," *Applied Physics Letters* **89**, 093106 (2006).