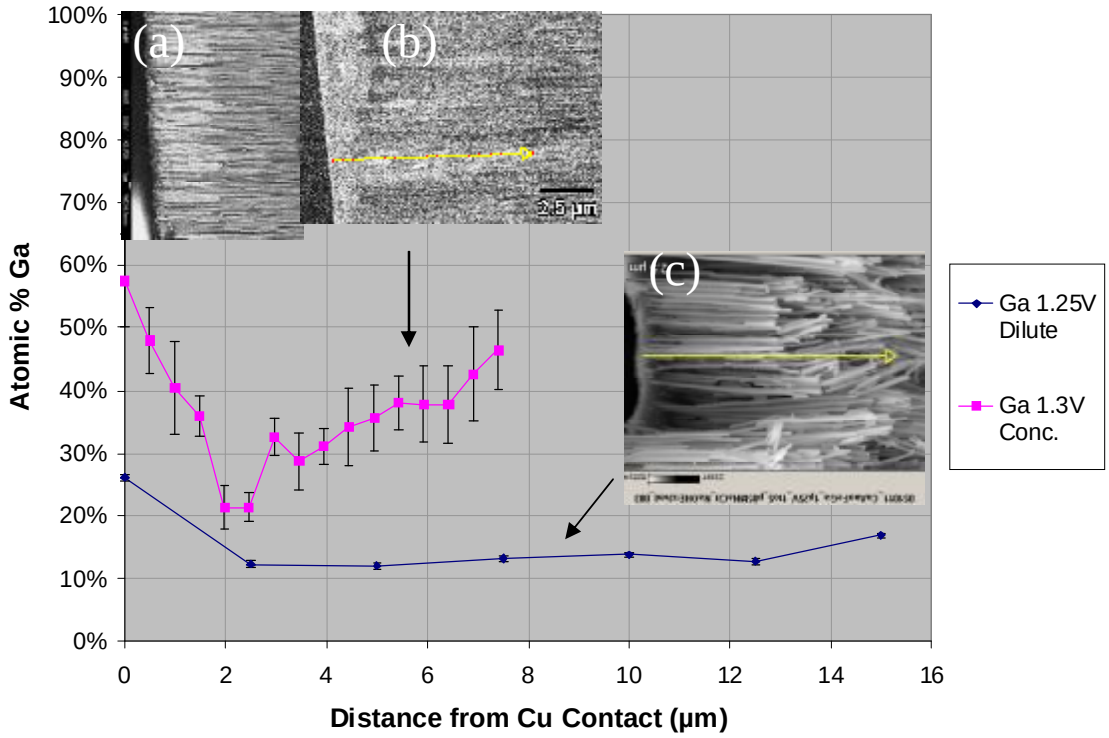
Magnetostrictive Nanowires for Acoustic Sensing

Patrick D. McGary and Bethanie J. H. Stadler
Dept. of Electrical and Computer Engineering, University of Minnesota

- **Motivation:** Use electrochemical deposition to fabricate biologically inspired artificial cilia transducers.
- **Applications:** Sensors for acoustics, ultrasound, chemistry, flow.
- **Conclusions:**
  - Recipes for the multi-valent Galfenol (Fe-Ga) have been defined and optimized
  - Concentration gradients exist in the nanowires with concentrated solutions and poor reference electrode placement
  - More dilute Fe-Ga solutions showed a stable stoichiometry and a smaller composition gradient.

EDS Ga composition vs. nanowire length from two Fe-Ga nanowire specimens



- **Publications:**
  - P.D. McGary, B. J. H. Stadler, J. Appl. Phys. **97**, 10R503-6 (2005).
  - P.D. McGary, L. Tan, B. J. H. Stadler, P. R. Downey, A. B. Flatau, (Invited), accepted J. Appl. Phys.
  - B.J.H.Stadler, N.h. Kim, L.W. Tan, J. Zou, K. Kelchner, R.K Cobian **(Invited)** *MRS Proceedings* I6.3 (2005).