

## POSTDOC POSITION AT THE *UNIVERSITY OF PENNSYLVANIA* Department of Materials Science and Engineering

Seeking a postdoctoral fellow in the area of;

**Nanowire Phase Change Memory-*in situ* TEM studies of the phase change process.**

The project would involve studying nanoscale phase transitions in confined geometries via *in situ* electron microscopy studies to observe the critical processes that lead to field-induced phase change phenomena. Using chemical composition and size-controlled nanowires, structural phase transitions will be studied. The scope of this project involves nanowire growth, characterization, device fabrication, electrical measurements, *in situ* electron microscopy and theory/simulations. Candidates with PhD in any area of science and engineering can apply. However, people with a strong background in phase change memory devices and other device related areas will be preferred.



Please contact via email ([riteshag@seas.upenn.edu](mailto:riteshag@seas.upenn.edu)) with a copy of your resume.

### Key References:

- Y. Jung, S.W. Nam, and R. Agarwal, "High Resolution Transmission Electron Microscopy Study of Electrically-Driven Phase Change Phenomena in  $\text{Ge}_2\text{Sb}_2\text{Te}_5$  Nanowires", *Nano Letters*, 11, 1364 (2011).
- M. Mitra, Y. Jung, and R. Agarwal, "Extremely Low Drift of Resistance and Threshold Voltage in Amorphous Phase Change Nanowire Devices", *Applied Physics Letters*, 96, 222111 (2010)
- Y. Jung, C.-Y. Yang, S.-H. Lee and R. Agarwal, "Phase-Change Ge-Sb Nanowires: Synthesis, Memory Switching, and Phase-Instability", *Nano Letters*, 9, 2013 (2009).
- Y. Jung, S.-H. Lee, D.-K. Ko, and R. Agarwal\*, "Size-dependent surface-induced heterogeneous nucleation driven phase-change in  $\text{Ge}_2\text{Sb}_2\text{Te}_5$  nanowires", *Nano Letters*, 8, 3303 (2008).
- Y. Jung, S.-H. Lee, A. T. Jennings, and R. Agarwal\*, "Core-Shell Heterostructured Phase Change Nanowire Multi-state Memory", *Nano Letters*, 8, 2056 (2008)
- S.-H. Lee, Y. Jung and R. Agarwal, "Highly-scalable nonvolatile and ultra-low power phase-change nanowire memory", *Nature Nanotechnology*, 2, 626 (2007).