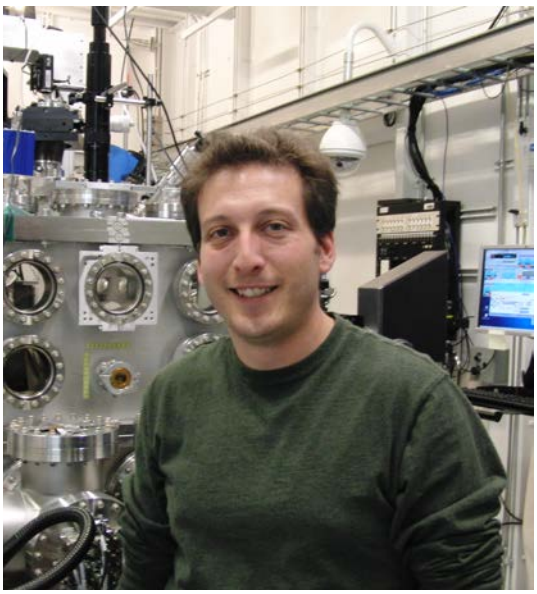

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Research Summary:

Current research activity focuses on the use of nanoscale x-ray diffraction microscopy as a probe of local structural physics in materials. This is associated with multiple related areas: observation of nanoscale phase phenomena in active materials, observation of unique material behavior of nanoscale objects, and observation of emergent critical dynamics in engineered mesoscale material systems.

Selected Recent Publications:

Quantitative nanoscale imaging of lattice distortions in epitaxial semiconductor heterostructures using nanofocused x-ray Bragg projection ptychography. S. O. Hruszkewycz, M. V. Holt, C. E. Murray, J. Bruley, J. Holt, A. Tripathi, O.G. Shpyrko, I. McNulty, M. J. Highland, and P. H. Fuoss, *Nano Lett*. 12(10): 5148-5154 (2012)

Structural Consequences of Ferroelectric Nanolithography. Ji Young Jo, Pice Chen, Rebecca J. Sichel, Seung-Hyub Baek, Ryan T. Smith, Nina Balke, Sergei V. Kalinin, Martin V. Holt, Jorg Maser, Kenneth Evans-Lutterodt,| Chang-Beom Eom, and Paul G. Evans, *Nano Lett*. 11, 3080–3084 (2011)

Dynamic fluctuations and static speckle from critical x-ray scattering in SrTiO3. M. Holt, M. Sutton, P. Zschack, H. Hong, and T.-C. Chiang, *Phys. Rev. Lett*. **98**, 065501 (2007)

Microstructure of ferroelectric domains in BaTiO3 observed via X-ray microdiffraction. M. Holt, Kh. Hassani, and M. Sutton, *Phys. Rev. Lett.* **95**, 085504 (2005)