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## RESEARCH EXPERIENCE

- September 2017 – Present*     **University of Massachusetts, Amherst**     Amherst, MA  
USDA National Needs Fellow (Department of Food Science, Sela Group)
- January 2016 – August 2017*     **University of California, Berkeley**     Berkeley, CA  
Staff Scientist (Department of Materials Science and Engineering, Martin, Ramesh, & Salahuddin Groups)
- Developed materials that exhibit strongly coupled magnetic and ferroelectric order parameters and ultra-low coercive fields for novel spin-based logic devices
  - Assessed new user research programs; coordinated research equipment purchases/maintenance; articulated best-practices for research programs; managed shared laboratory and research safety, training, and chemical inventories
- July 2014–December 2015*     **Lawrence Berkeley National Lab & University of California Berkeley**     Berkeley, CA  
Research Assistant (Materials Science Division/Department of Materials Science and Engineering, Martin Group)
- Determined effect of growth conditions on BiFeO<sub>3</sub> stoichiometry and demonstrated deterministic control of film chemistry from 7% bismuth-deficient to 6% bismuth-excess with compositional gradients from 1% to 6% across 100 nm
  - Optimized BiFeO<sub>3</sub> cation and anion ratio for best ferroelectric properties while minimizing leakage response in both bismuth-excess and bismuth-deficient regimes
- June 2012 – May 2014*     **University of Illinois at Urbana-Champaign**     Urbana, IL  
Graduate Research Assistant (Department of Materials Science and Engineering, Martin Group)
- Investigated potential for tunable exchange bias in thin film bilayers of epitaxial BiFeO<sub>3</sub> and spinel ferrites NiFe<sub>2</sub>O<sub>4</sub> and CoFe<sub>2</sub>O<sub>4</sub> with various strain states due to large lattice-mismatch between layers grown via pulsed laser deposition
- September 2011–May 2012*     **Oberlin College**     Oberlin, OH  
Honors Candidate Research Assistant (Department of Chemistry and Biochemistry, Oertel Laboratory)
- Demonstrated photocatalytic viability of defect pyrochlores through band-gap tailoring of defect pyrochlores K<sub>2</sub>Nb<sub>2</sub>O<sub>6</sub> grown via high-pressure solvo-thermal methods using ion-exchange to create tin(II)-doped K<sub>2</sub>Nb<sub>2</sub>O<sub>6</sub> and move band-gap energy into the visible wavelength regime with increased tin content
- January 2009–May 2012*     **Oberlin College**     Oberlin, OH  
Research Assistant (Department of Physics and Astronomy, Ijiri Laboratory)
- Determined the magnetic properties and magnetic spin structure of core-shell Fe<sub>3</sub>O<sub>4</sub> and MnO nanoparticles via polarized small angle neutron scattering performed at the National Institute of Standards and Technology
- June 2010–August 2011*     **Nanotech Innovations**     Oberlin, OH  
Research Consultant
- Optimized alignment and length of aligned multi-walled carbon nanotube grown on quartz substrates via metal-assisted chemical vapor deposition through precursor chemistry and concentration

## PUBLICATIONS

- Gao, R., Reyes-Lillo, S.E., Xu, R., Dasgupta, A., Dong, Y., **Dedon, L.R.**, Kim, J., Saremi, S., Chen, Z., Serrao, C.R., Zhou, H., Neaton, J.B., Martin, L.W. Ferroelectricity in Pb<sub>1+x</sub>ZrO<sub>3</sub> Thin Films *Chem. Mater.* **2017**, Under Review.
- Damodaran, A.R., Pandya, S., Agar, J.C., Cao, Y., Vasudevan, R.K., Xu, R., Saremi, S., Li, Q., Kim, J., McCarter, M.R., **Dedon, L.R.**, Angsten, T., Balke, N., Jesse, S., Asta, M., Kalinin, S.V., Martin, L.W. Three-state ferroelectric switching and large electromechanical responses in PbTiO<sub>3</sub> thin films *Adv. Mater.* **2017**, Under Review.
- Damodaran, A.D., Pandya, S., Qi, Y., Hsu, S.-L., Nelson, C.T., Dasgupta, A., Ercius, P., Ophus, C., **Dedon, L.**, Agar, J.C., Lu, H., Zhang, J., Minor, A.M., Rappe, A.M., Martin, L.W. Large polarization gradients and temperature-stable responses in compositionally-graded ferroelectrics *Nature Comm.* **2017**, Accepted.
- Chen, Z., Chen, Z., Liu, Z.Q., Holtz, M.E., Li, C.J., Wang, X.R., Lü, W.M., Motapothula, M., Fan, L.S., Turcaud, J., **Dedon, L.R.**, Frederick, C., Xu, R., Gao, R., N'Diaye, A.T., Arenholz, E., Mundy, J.A., Venkatesan, T., Muller, D.A., Wang, L.W., Liu, J., Martin, L.W. Electronic Accumulation and Emergent Magnetism in LaMnO<sub>3</sub>/SrTiO<sub>3</sub> Heterostructures *Phys. Rev. Lett.* **2017**, Under Review.
- Chen, D., Nelson, C.T., Zhu, X., Serrao, C.R., Clarkson, J.D., Wang, Z., Gao, Y., **Dedon, L.R.**, Chen, Z., Yi, D., Zheng, D., Liu, J., Schlom, D.G., Ramesh, R. A strain driven antipolar-to-polar phase transition in La-doped BiFeO<sub>3</sub> films on Si *Adv. Mater.* **2017**, Under Review.
- Saremi, S., Xu, R., **Dedon, L.R.**, Mundy, J.M., Hsu, S.-L., Damodaran, A.R., Martin, L.W. [Ion Bombardment for Electric Isolation in Ferroelectric Thin Films](#) *Adv. Mater.* **2016**, 28, 10750.
- Brahlek, M., Zhang, L., Zhang, H.-T., Lapano, J., **Dedon, L.R.**, Martin, L.W., Engel-Herbert, R. Mapping growth windows in quaternary perovskite oxide systems by hybrid molecular beam epitaxy *Appl. Phys. Lett.* **2016**, 109, 101903.
- Dedon, L.R.**, Saremi, S., Chen, Z., Damodaran, A.D., Apgar, B.A., Gao, R., Martin, L.W. [Nonstoichiometry, Structure, and properties of BiFeO<sub>3</sub> Films](#) *Chem. Mater.* **2016**, 28, 5952.
- Tselev, A., Yu, P., Cao, Y., **Dedon, L.R.**, Martin, L.W., Kalinin, S.V., Maksymovych, P. [Microwave ac conductivity of domain walls in ferroelectric thin films](#) *Nature Comm.* **2016**, 7, 11630.
- Damodaran, A.R., Agar, J.C., Pandya, S., Chen, Z., **Dedon, L.R.**, Xu, R., Apgar, B., Saremi, S., Martin, L.W. [New modalities](#)

[of strain-control of ferroelectric thin films](#) *J. Phys.: Condens. Matter* **2016**, 28, 263001.

Bakaul, S.R., Serrao, C.R., Lee, M., Yeung, C.W., Sarker, A., Hsu, S-L., Yadav, A., **Dedon, L.R.**, You, L., Khan, A.I., Clarkson, J.D., Hu, C., Ramesh, R., Salahuddin, S. [Single Crystal Functional Oxides on Silicon](#) *Nature Comm.* **2016**, 7, 10547.

Agar, J.C., Damodaran, A.D., Okatan, M., Kacher, J., Gammer, C., Vasudevan, R., Pandya, S., **Dedon, L.**, Mangalam, R., Velarde, G., Jesse, S., Balke, N., Minor, A., Kalinin, S.V., Martin, L.W. [Highly-Mobile Ferroelectric Domain Walls in Compositionally-Graded Ferroelectric Thin Films](#) *Nature Materials* **2015**, 15, 549.

Yadav, A., Nelson, C., Hsu, S-L., Hong, Z., Clarkson, J., Schlepütz, C., Damodaran, A., Shafer, P., Arenholz, E., **Dedon, L.R.**, Vishwanath, A., Minor, A., Chen, L.Q., Scott, J., Martin, L.W., Ramesh, R. [Observation of Polar Vortices in Oxide Superlattices](#) *Nature* **2015**, 530, 198.

Zhang, H.T., **Dedon, L.R.**, Martin, L.W., Engel-Herbert, R. [Self-regulated Growth of LaVO<sub>3</sub> Thin Films by Hybrid Molecular Beam Epitaxy](#) *Appl. Phys. Lett.* **2015**, 106, 233102.

Easterday, C.C., **Dedon, L.R.**, Zeller, M., Oertel, C.M. [Helical  \$\infty^1\$  \[Pb<sub>2</sub>O\] Chains in Polymorphs of Pb<sub>2</sub>O\(C<sub>6</sub>H<sub>5</sub>COO\)<sub>2</sub>](#) *Cryst. Growth Des.* **2014**, 14, 2048.

Krycka, K.L., Booth, R.A., Hogg, C.R., Ijiri, Y., Borchers, J.A., Chen, W.C., Watson, S.M., Laver, M., Gentile, T.R., **Dedon, L.R.**, Harris, S., Rhyne, J.J., Majetich, S.A. [Core-Shell Magnetic Morphology of Structurally Uniform Magnetite Nanoparticles](#). *Phys. Rev. Lett.* **2010**, 104, 207203.

Krycka, K.L., Borchers, J.A., Booth, R.A., Hogg, C.R., Ijiri, Y., Chen, W.C., Watson, S.M., Laver, M., Gentile, T.R., Harris, S., **Dedon, L.R.**, Rhyne, J.J., Majetich, S.A. [Internal magnetic structure of magnetite nanoparticles at low temperature](#). *J. Appl. Phys.* **2010**, 107, 09B525.

## SELECT PRESENTATIONS

**Dedon, L.R.**, Damodaran, A., Apgar, B.A., Martin, L.W. Stoichiometry Control of Properties in Epitaxial BiFeO<sub>3</sub> Thin Films (Materials Research Society Fall Meeting, Boston, MA. 2015) Poster presentation.

Pandya, S., Agar, J., Damodaran, A., **Dedon, L.R.**, Xu, R., Mangalam, V., Karthik, J., Martin, L.W. Novel Routes to Strain Engineer Domain Structures and Properties in Epitaxial Pb(Zr<sub>1-x</sub>Ti<sub>x</sub>)O<sub>3</sub> Thin Films (Materials Research Society Spring Meeting, San Francisco, CA. 2015) Poster presentation.

Oertel, C.M., Easterday, C.C., **Dedon, L.R.**, Zeller, M. Synthesis and Polymorphism of Lead Oxide Benzoate. (Gordon Research Conference on Solid State Chemistry, New London, NH. 2012) Poster presentation.

**Dedon, L.R.**, Greenfield, J., Oertel, C. (American Chemical Society Meeting in Miniature, Oberlin, OH. 2012) Ion Exchange Synthesis of Niobium and Tantalum Pyrochlores. Oral presentation.

**Dedon, L.R.**, Ijiri, Y., Booth, R., Krycka, K., Borchers, J.A., Chen, W.C., Watson, S., Rhyne, J.J., Majetich, S.A. (American Physical Society March Meeting, Boston, MA. 2012) Polarized small angle neutron scattering of MnO/Mn<sub>3</sub>O<sub>4</sub> nanocrystals. Oral presentation.

## EDUCATION

### University of Illinois at Urbana-Champaign

Urbana, IL

MS in Materials Science and Engineering, May 2014  
Overall GPA: 3.68/4.0

### Oberlin College

Oberlin, OH

BA in Chemistry and Physics with Honors in Chemistry, June 2012  
Overall GPA 3.38/4.0 Major GPA 3.42/4.0

## AWARDS

December 2015

**Best Poster Nominee at the 2015 Materials Research Society Fall Meeting**

May 2012

**Inducted into Sigma Xi Honor Society**

May 2012

**American Chemical Society 2012 Undergraduate Award in Inorganic Chemistry**

March 2012

**Award for Excellent Undergraduate Presentation at the 2012 Meeting-in-Miniature of the Cleveland Section of the American Chemical Society**

May 2011–May 2012

**Oberlin College Dept. of Chem and Biochem Honors Candidate**

May 2011

**Oberlin College Dept. of Physics and Astronomy Honors Candidate**

## TEACHING AND MANAGEMENT EXPERIENCE

January 2013–July 2015

**University of Illinois at Urbana-Champaign/  
University of California Berkeley**

Urbana, IL/Berkeley, CA

Martin Group Safety Officer

- Ensured adherence to University and State safety guidelines
- Managed chemical waste accumulation and disposal
- Maintained chemical hygiene plans and standard operating procedures

September 2013–May 2014

**University of Illinois at Urbana-Champaign**

Urbana, IL

Materials Laboratory Head TA

- Trained other teaching assistants in lab procedures
- Updated experiment design to streamline and improve experimental procedures and covered material
- Graded lab reports for technical writing quality and analysis