

EDUCATION

University of California, Los Angeles (UCLA), Los Angeles, CA, USA 12/2017 - Present

Ph.D. candidate, Electrical and Computer Engineering

- ♦ Advisor: Dr. Rob N. Candler
- ♦ GPA: 4.0/4.0

University of California, Los Angeles (UCLA), Los Angeles, CA, USA 09/2015 - 12/2017

M.S. in Electrical Engineering

- ♦ Advisor: Dr. Rob N. Candler
- ♦ GPA: 3.92/4.0
- ♦ Thesis: "Controlling magnetization and strain at the micron-scale and below in strain-mediated composite multiferroic devices"

(Edward K. Rice Outstanding Masters Award; Distinguished Master's Thesis Award in Electrical Engineering)

Bryn Mawr College (BMC), Bryn Mawr, PA, USA 09/2011 - 05/2015

Magna Cum Laude, Honors in Physics

B.A. in Physics, Minor: Computer Science, French

- ♦ Advisor: Dr. Xuemei May Cheng
- ♦ GPA: 3.83/4.0 (cumulative), 3.96/4.0 (major)
- ♦ Thesis: "Magnetic and ferroelectric properties of epitaxial hexagonal rare earth ferrite thin films" (**Honor**)

PEER-REVIEWED JOURNAL PUBLICATIONS

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- [1] **Z. Xiao***, R. Lo Conte*, M. Goiriena, R. Chopdekar, C-H. Lambert, X. Li, S. Tiwari, A. Chavez, A. Barra, A. Scholl, K. Wang, S. Salahuddin, E. Arenholz, G. P. Carman, J. Bokor, R. N. Candler, "Tunable magneto-elastic effect in voltage-controlled exchange-coupled composite multiferroic microstructures", *ACS Appl. Mater. Interfaces* (2020).
- [2] **Z. Xiao***, R. Khojah*, M. Chooljian*, R. Lo Conte, J. D. Schneider, K. Fitzell, Y. Wang, R. Chopdekar, A. Scholl, J. Chang, G. P. Carman, J. Bokor, D. Di Carlo, and R. N. Candler, "Cytocompatible magnetostriuctive microstructures for nano- and microparticle manipulation on linear strain response piezoelectrics", *IOP Multifunctional Materials* 1, 014004 (2018)
- [3] **Z. Xiao**, R. Lo Conte, C. Chen, C-Y. Liang, A. Sepulveda, J. Bokor, G. P. Carman, R. N. Candler, "Bi-directional coupling in strain-mediated multiferroic heterostructures with magnetic domains and domain wall motion", *Scientific Reports* 8, 5270 (2018), Doi:10.1038/s41598-018-23020-2
- [4] R. Lo Conte, **Z. Xiao**, C. Chen, C. V. Stan, J. Gorchon, A. El-Ghazaly, M. E. Nowakowski, H. Sohn, A. Pattabi, A. Scholl, N. Tamura, A. Sepulveda, G. P. Carman, R. N. Candler, J. Bokor, "Influence of Nonuniform Micron-Scale Strain Distributions on the Electrical Reorientation of Magnetic Microstructures in a Composite Multiferroic Heterostructure," *Nano Lett.*, 2018, 18 (3), pp 1952–1961, DOI: 10.1021/acs.nanolett.7b05342
- [5] **Z. Xiao**, K. P. Mohanchandra, R. Lo Conte, T. Karaba, J. D. Schneider, A. Chavez, S. Tiwari, H. Sohn, M. E. Nowakowski, A. Scholl, S. H. Tolbert, J. Bokor, G. P. Carman, R. N. Candler, "Enhanced magnetoelectric coupling in a composite multiferroic system via interposing a thin film polymer", *AIP Advances* 8 (5), 055907 (2018), DOI: 10.1063/1.5007655
- [6] Y-C. Hsiao, R. Khojah, X. Li, A. Kundu, C. Chen, D. B. Gopman, A.C. Chavez, T. Lee, **Z. Xiao**, A. E. Sepulveda, R. N. Candler, G. P. Carman, D. Di Carlo, C. S. Lynch "Capturing Magnetic Bead-based Arrays Using Perpendicular Magnetic Anisotropy", *Applied Physics Letters* 115 (8), 082402 (2019)
- [7] C. Chen, J. Sablik, J. Domann, R. Dyro, J. Hu, S. Mehta, **Z. Xiao**, R. N. Candler, G. P. Carman, A. Sepulveda, "Voltage Manipulation of Magnetic Particle using Multiferroics", *Journal of Physics D: Applied Physics* (2019).
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SUBMITTED JOURNAL PUBLICATIONS

- [1] **Z. Xiao***, R. Khojah*, K. P. Mohanchandra*, M. Goiriena, R. Chopdekar, G. P. Carman, J. Bokor, D. Di Carlo, R. N. Candler, "Programmable Single Domain Magnetoelastic Terfenol-D Micromagnets For Single-cell Manipulation" (Manuscript in preparation 2020)
- [2] M. Goiriena, **Z. Xiao**, A. El-Ghazaly, C. Stan, J. Chaterjee, A. Ceballos, A. Pattabi, R. Lo Conte, F. Hellman, R. N. Candler, J. Bokor, "Influence of the BaTiO₃ crystallinity on the electric-field induced switching of perpendicular magnetization" (Manuscript under review)

CONFERENCE PUBLICATIONS

- [1] **Z. Xiao**, R. Lo Conte, M. Goiriena, R. V. Chopdekar, X. Li, S. Tiwari, C-H. Lambert, S. Salahuddin, G. P. Carman, K. Wang, J. Bokor, R. N. Candler, "Electric-field controlled magnetic reorientation in exchange coupled CoFeB/Ni bilayer microstructures", **The 18th International Conference on Micro and Nanotechnology for Power Generation and Energy Conversion Applications (PowerMEMS)**, 2018, ***1/8 Best Paper Finalists**.
- [2] A. Abiri, X. Guan, Y. Dai, A. Tao, **Z. Xiao**, E. P. Dutson, R. N. Candler, W. S. Grundfest, "Depressed-Membrane Pneumatic Actuators for Robotic Surgery", **38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society**, 2016
- [3] Y. Dai, O. Paydar, A. Abiri, **Z. Xiao**, X. Guan, S. Liu, A. Tao, E. P. Dutson, W. S. Grundfest, R. Candler, "Miniature Multi-Axis Force Sensor for Haptic Feedback System in Robotic Surgery", **38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society**, 2016

CONFERENCE PRESENTATIONS

- [1] **Z. Xiao**, R. Lo Conte, M. Goiriena, R. V. Chopdekar, X. Li, C-H. Lambert, S. Tiwari, A. T. N'Diaye, P. Shafer, A. Chavez, A. Barra, G. P. Carman, S. Salahuddin, K. Wang, E. Arenholz, J. Bokor, and Rob N. Candler, "Electric-field controlled, exchange-coupled bilayer microstructures with tunable magnetoelastic effect", Magnetics and Magnetic Materials Conference, Las Vegas, CA, USA, 2019; The 40th International Conference on Vacuum Ultraviolet and X-ray Physics, San Francisco, USA, 2019.
- [2] **Z. Xiao**, R. Khojah, M. K. Panduranga, M. Goiriena-Goikoetxea, R.V. Chopdekar, A. N'Diaye, R. Lo Conte, E. Arenholz, J. Bokor, G. P. Carman, D. Di Carlo and R. N. Candler, "Single Domain Magnetoelastic Terfenol-D Microdisks for Particle and Cell Manipulation", Joint Intermag-MMM Conference, Washington DC, USA, 2019, ***Best Student Presentation Award Winner**.
- [3] **Z. Xiao**, R. Lo Conte, M. Goiriena, R. V. Chopdekar, X. Li, S. Tiwari, C.-H. Lambert, S. Salahuddin, G. P. Carman, K. Wang, J. Bokor and Rob N. Candler, "Electric-field controlled magnetic reorientation in exchange coupled CoFeB/Ni bilayer microstructures", PowerMEMS Conference, Daytona Beach, FL, USA IOP Conference Series, 2018.
- [4] **Z. Xiao**, R. Lo Conte, C. Chen, C. Stan, J. Gorchon, A. El-Ghazaly, M. Nowakowski, H. Sohn, P. Akshay, A. Scholl, T. Nobumichi, A. Sepulveda, G. Carman, J. Bokor and R. N. Candler, "Effect of Non-Uniform Micron-Scale Strain Distributions on the Electrical Reorientation of Magnetic Micro-Structures in a Composite Multiferroic Heterostructure" Advanced Light Source Cross-Cutting Review, Berkeley Lab, CA, USA, 2017. **(Invited)**
- [5] **Z. Xiao**, M.K. Panduranga, R. Lo Conte, H. Sohn, J. Bokor, G. Carman, and R.N. Candler, "Enhancement of coupling efficiency of ferroelectric to magnetoelastic thin film via interposing thin film polymer," Annual Conference on Magnetism and Magnetic Materials (MMM), Pittsburgh, PA, USA, 2017.
- [6] **Z. Xiao**, C. Liang, G. Carman and R.N. Candler, "Modeling of domain wall motion in multiferroic heterostructures", Annual Conference on Magnetism and Magnetic Materials (MMM), New Orleans, LA, USA, 2016.
- [7] **Z. Xiao**, X. Wang, Y. Liu, X. Xu, W. Wang, D. Keavney, and X. M. Cheng, "Magnetic Properties of hexagonal HoFeO₃ thin films", American Physics Society Mid-Atlantic Meeting, University Park, PA, USA, 2014.
- [8] **Z. Xiao**, X. Wang, Y. Liu, S. G. E. te Velthuis, D. Rosenmann, R. Divan, and X. M. Cheng, "Magnetization Reversal of Patterned Disks with Perpendicular Magnetic Anisotropy", American Physical Society, March Meeting, Baltimore, MD, USA, 2013.

ACCEPTED RESEARCH PROPOSALS

- [1] "Electrical control of magnetization in epitaxial FeGa on PMN-PT single crystal"
Peer-Reviewed Beamtime Proposal, ALS, LBNL, Berkeley, CA, 2017
- [2] "Probing magnetic behavior in magnetostrictive composite microstructures for multiferroics applications"
ALS Doctoral Fellowship Proposal (Selected), ALS, LBNL, Berkeley, CA, 2018
- [3] "Electrically-controlled magnetization and strain profile in highly magnetostrictive microstructures"
Peer-Reviewed Beamtime Proposal, ALS, LBNL, Berkeley, CA, 2019

AWARDS/HONORS

- 2019 CESASC Scholarship -- Anna and John Sie Foundation Scholarship**, Los Angeles, CA 04/2019
- Best Student Presentation Award Winner**, 2019 Joint MMM-Intermag Conference, Washington, DC 01/2019
- ♦ Awarded to 1 out of 5 finalists selected by the committee. The conference, sponsored by IEEE Magnetics, includes a wide range of topic on magnetism and magnetic materials and has historically drawn more than 1800 conference registrants, of which more than 500 are students.
- Edward K. Rice Outstanding Masters Award**, UCLA Henry Samueli School of Engineering 03/2019
- ♦ The award honors the achievements of distinguished master's students of academic year (2017-18) who have demonstrated academic and research excellence, leadership, and service to the school, university or community.
- Best Paper Award Finalist (1/8)**, 2018 PowerMEMS Conference, Daytona, FL 12/2018
- ♦ Selected as 1 of the 8 finalists for the Best Paper Award at the 18th International Conference on Micro and Nanotechnology for Power Generation and Energy Conversion Applications.
- ALS Doctoral Fellowship in Residence**, ALS, LBNL 2018 - 2019
- ♦ Awarded to 10 students internationally annually to conduct doctoral research with scientists onsite.
- ALS Cross-cutting Review Travel Grant**, ALS, LBNL 06/2017
- ♦ Invited to present a poster on the effect of strain distribution on magnetism study.
- Distinguished Master's Thesis Award**, Electrical & Computer Engineering, UCLA 2017- 2018
- ♦ Award to 1 master's student from the Physical and Wave Electronics track each year.
- Department Fellowship**, Department of Electrical Engineering, UCLA 2015 - 2016
- Big Data Fellowship**, Center for Science of Information (soihub.org) 2015
- LILAC Summer Internship Funding**, Bryn Mawr College 06/2014 – 08/2014
- Science Horizons Research Fellowship (1/5)**, Howard Hughes Medical Institute/ BMC 2013

RESEARCH EXPERIENCE

- Graduate Researcher, Sensors and Technology Laboratory, UCLA, CA** 09/2015 - Present
Advisor: Dr. Rob N. Candler
- Project: Micro- and nanoscale multiferroic motor for 3D particle printing and cell sorting applications*
- ♦ Designed, fabricated and tested magnetoelastic microstructures on ferroelectrics as the motor prototypes.

- ♦ Simulated and demonstrated both the time-dependent strain and magnetization behavior in multiferroic heterostructures with finite element analysis (FEA). Highlighted the necessity of bi-directional coupling in modeling the multiferroics heterostructure.
- ♦ Led and conducted experiments (authored proposals) in the Lawrence Berkeley National Laboratory. Collaborated with researchers from UCLA, UC Berkeley, Berkeley Lab and Cornell University.
- ♦ Modelled and analyzed data with Python, MATLAB, OriginLab of the beamline experiment results.

User, Advanced Light Source (ALS), Lawrence Berkeley National Lab (LBNL), CA 05/2016 - Present

- ♦ Characterized strain-induced anisotropy in magnetoelastic arrays via synchrotron x-ray spectroscopy.
- ♦ Imaged and analyzed quantitatively magnetic contrast in devices via x-ray photoemission electron microscopy.
- ♦ Carried out x-ray microdiffraction experiments to map strain profile variation versus electric field.
- ♦ Studied the correlation between magnetism and strain in the multiferroic devices at microscale.
- ♦ Processed x-ray microdiffraction data at the National Energy Research Scientific Computing Center.

Doctoral Fellowship in Residence, ALS, LBNL, CA 10/2018 – 09/2019

Advisor: Dr. Elke Arenholz & Dr. Alpha T. N'Diaye

- ♦ Conducted synchrotron x-ray beamline experiments for various projects, built experiment tools, processed and analyzed spectroscopy and image data with Python, ImageJ, OriginLab and joined beamline maintenance with beamline scientists.
- ♦ Organized monthly ALS lab safety circle for graduate students and postdocs. Invited speakers from different disciplines in the Berkeley Lab.

Research Assistant, Nanomaterials and Spintronics Lab, BMC, PA 09/2014 - 08/2016

Advisor: Dr. Xuemei May Cheng

Project: Magnetization reversal of magnetic disks with Perpendicular Magnetic Anisotropy

Project: Characterization of perovskite $\text{La}_{(1-x)}\text{Sr}_x\text{MnO}_3$ hexagonal LuFeO_3 and HoFeO_3 magnetic thin films

Research Assistant, Department of Physics and Astronomy, Rutgers University, NJ 06/2014-08/2014

- ♦ Examined the ferroelectricity of hexagonal LuFeO_3 and HoFeO_3 via piezoelectric force microscope. Incorporated the homemade PFM system to an atomic force microscope.

Center of Nanoscale Materials, Argonne National Laboratory, IL 05/2013-08/2013

- ♦ Designed and fabricated a photomask using photolithography and etching, and microstructures on chips for magnetization reversal and magnetic bubble domain study.

OUTREACH/ TEACHING/ MENTORING EXPERIENCE

Undergraduate Research Program (Mentor 3 UCLA undergraduate students) 2020

REU/REM (Research Experience for Undergraduate, and Mentored 3 undergraduates) Summer 2019

High School Outreach at Lawndale High School, CA 2016 - 2018

- ♦ Developed curriculum and co-taught interdisciplinary classes to 200 students at Lawndale High School in Centinela Valley High School District, Los Angeles.
- ♦ Coordinated with high school science teachers to revise curriculum.

Participant, 2018 Southern MESA Advisor Regional Training, CA 08/ 2018

- ♦ Presented at 2018 Southern MESA Advisor Regional Training (SMART) to high school science teachers and introduced the modules we developed. Engaged in conversations with educational directors from universities and high schools to discuss novel approaches to bring frontier science researches to high school students.

Teaching Assistant, Bryn Mawr College, PA

2014-2015

- ♦ Courses: Discrete Mathematics (CS), Introduction to Physics for PostBacs (Physics), Calculus (Math)

Outreach with Society of Physics Students, Bryn Mawr Chapter

2013 - 2014

- ♦ Invited bimonthly local K-12 and high school student to college physics classrooms. Organize lab events to get students involved in a variety of experiments.
- ♦ Attended regional CATlyst STEM outreach conference and events at Swarthmore college. Co-taught mini lectures on nanotechnology to K-12 students. Special emphasis has been placed on broadening the participation of female students in science and engineering.

Professional Memberships

- ♦ Student Member: American Physics Society (APS), IEEE Magnetics Society, Society of Physics Students
- ♦ Member/User: Nanoelectronics Research Facility at UCLA, California Nano Systems Institute (CNSI), Center for High Frequency Electronics at UCLA, Nanofabrication Facility at Molecular Foundry, Advanced Light Source, Lawrence Berkeley National Lab (LBNL)

LEADERSHIP EXPERIENCE

Advanced Light Source, Lawrence Berkeley National Laboratory, CA:

Monthly Lab Safety Circle for Postdoc and Students (Organizer, invite speakers, host meetings)

2018 - 2019

Center for Translational Applications of Nanoscale Multiferroics (TANMS), CA:

TANMS Education Program for Los Angeles High School

2016 - 2018

- ♦ Collaborated with university professors, graduate students and high school teacher to design a new high school curriculum and teacher professional development project.
- ♦ Developed science module to incorporate into high school physics curriculum to promote students' interest in
- ♦ Featured in <http://newsletter.tanms-erc.org/>

Bryn Mawr College, PA:

Undergraduate Representative for Faculty Search Committee, Department of Physics

2015

President/ Vice President/ Treasurer, Society of Physics Students, Bryn Mawr Chapter

2012 - 2015

- ♦ Organized and facilitated bi-weekly club meeting, on campus physics activities, and outreach programs.

French to English Translator/ Vocal Contributor, WorldPulse.com

2013 - 2014

- ♦ Translated and commented on blog posts on behalf of Congolese women to bring them a global voice and build them a global network of support.

Student Member, Beyond the Borders: Global Vision Panel

2014

- ♦ Engaged in a variety of conversations and presentations on cultural diversity with a cohort of students from different socioeconomic and cultural backgrounds.

Volunteer, AFAHO (African Family Health Organization), Philadelphia, PA

2016 - 2018

- ♦ Facilitated weekly community discussion with French speaking immigrants in English and French to assisted them in adapting to the new environment, and preparing for new jobs.

Student Coordinator, Member, Leadership Empowerment & Advancement Program, BMC

2011 - 2012

- ♦ Selected into a cohort of 16; Planned and coordinated weekly meeting with school leadership counselor; Organized Moodle online learning platform; Collected feedback and communicated with school administrators.

Campus Ambassador, Asian Women's Leadership University Project

2012

- ♦ Assisted AWLU project which aimed to provide top liberal arts college education to Asian Women; Raised awareness of accessible high education for women in developing countries through posters, flyers and meetings on campus.

PROFESSIONAL EXPERIENCE

Session Chair, The 40th International Conference on Vacuum Ultraviolet and X-ray Physics, San Francisco, USA, 2019.

Undergraduate Representative, Bryn Mawr College Physics Department Faculty Search Committee, PA, USA, 2015.

PROFESSIONAL SKILLS

Programming/ Software skills	Python (proficient), Java (proficient), C (prior experience), R (prior experience), SQL, MATLAB, LaTeX, OriginLab, L-edit, ImageJ, COMSOL Multiphysics (Finite Element Analysis), mumax3, AutoCAD, Machine Learning, Deep Learning
Experimental Tools & NanoFab	MOKE, Vibrating Sample Magnetometer, Photoemission Electron Microscopy, Magnetic Force Microscopy, Atomic Force Microscopy, X-ray Spectroscopy, Ferromagnetic resonance spectrometer Superconducting quantum interference device, Electron Beam Lithography, Photolithography, Metal Evaporation/Sputtering, Dry Etching, Scanning Electron Microscopy
Language	English (Fluent), Chinese (Fluent), French (Limited working proficiency), German (Elementary proficiency)
