Darío Alejandro Arena

Contact Information

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Research Interests

- Magnetic ordering in layered metallic structures and oxide thin films with applications to spintronics and correlated electron physics.
- Spin dynamics broadly defined including GHz resonant phenomena, element-specific probes (x-ray and EUV), and ultrafast properties.
- Advanced spectroscopic and scattering probes of spin ordering in thin films and nanostructures, including x-ray absorption and diffraction, x-ray magnetic circular dichroism, and polarized neutron scattering.
- Growth / synthesis of ferrimagnetic thin films and nanoparticles.

Education

Rutgers, The State University of New Jersey, New Brunswick, NJ

Ph.D., Physics, January 2000

- Adviser: Professor Robert A. Bartynski

Williams College, Williamstown, MA
B.A. *cum laude*, Political Science, June 1986
concentration in Economics

Professional Appointments

Associate Professor of Physics, Univ. of South Florida 2015 - Present

Academic Editor, *AIP Advances, AIP Publishing* 2014 - Present
Editorial Focus: Condensed matter physics, specializing in magnetic materials.

Physicist, with tenure, BNL 2012 to 2015
Physicist, BNL 2010 to 2012
Associate Physicist, BNL 2008 to 2010
Assistant Physicist, Brookhaven National Lab. (BNL) 2006 to 2008
National Synchrotron Light Source (NSLS), Photon Sciences Dept., Brookhaven Nat. Lab. Spokesperson, Magnetic Materials Characterization Beam Line U4B, NSLS

Post-Doctoral Research Associate 2003 - 2006
National Synchrotron Light Source, Brookhaven National Laboratory
Research focus: Magnetization dynamics at GHz & THz frequencies.

Fellow, National Research Council 2001 - 2003
Naval Research Laboratory, Washington, D.C.
Stationed at National Synchrotron Light Source, Brookhaven National Lab. Research emphasis on novel magnetic materials.

Post-Doctoral Research Associate 2000 - 2001
Lawrence Livermore National Laboratory, Livermore, CA

Graduate Research Fellow 1993 - 1999
Rutgers University, New Brunswick, NJ

Honors

- Outstanding Undergraduate Teaching Award, University of South Florida, March 2022
- Granted Tenure, University of South Florida, 2022
- Fulbright Scholar (Core Program), Uppsala University, Sweden, 2018 - 2019
- Outstanding Faculty Award, University of South Florida, March 2019
- Granted Tenure, Brookhaven National Laboratory, 2012

Awards and Funding

1. "All Optical, Tunable THz Magnonic Devices – Supplemental," National Science Foundation award #1952957-Supplemental. Total award: $49,603. Grant Period: 1 Aril 2020 - 31 March 2023. Principal Investigator on project.
2. "All Optical, Tunable THz Magnonic Devices," National Science Foundation award #1952957. Total award: $374,998. Grant Period: 1 April 2020 - 31 March 2023. Principal Investigator on project; D. Karaiskaj (USF) co-PI.
3. "Understanding High Frequency Dynamics in Ferrimagnets," Fulbright Commission, U.S. Dept. of State. Total award: $45,840. Grant Period: 21 May 2018 - 20 July 2019.
4. "Exploring Ultrafast Spin Dynamics in Ferrimagnets with a University-Based Laser System," University of South Florida Nexus Initiative. Total award: $13,000.

Selected Teaching and Professional Activities

- Ph.D. Supervisor, University of South Florida (USF): six Ph.D. graduate students (two completed their Ph.D. degrees and are now employed in the field)
- Research Supervisor, Research Experience for Undergraduates (REU) @ USF: three REU students
- Research Supervisor, Undergraduate Research for Majors: six undergraduates
- Lead Organizer, Focus Topic Symposia Organizing Committee, 2022 APS March Meeting, GMAG Unit
- Member, Program Committee and Lead Organizer, Topical Category, 2022 MMM-Intermag Joint Meeting
- Member of Technical Committee, IEEE Magnetics Society, 2017 - Present
- Member, Focus Topic Symposia Organizing Committee, 2021 APS March Meeting, GMAG Unit
- Session Chair and Editor, Joint Intermag and Magnetism and Magnetic Materials Conference, 2019.
- Member, Outside Review Committee for Advanced Light Source DOE Triennial Review, 26-29 July 2021
- Member of Outside Review Committee, Critical Decision-2 Review of the Advanced Photon Source Upgrade (APS-U) project, Argonne, IL, 2018.
- Publications Chair, 12^{th} International Conference on Synchrotron Radiation Instrumentation (SRI2015), New York, NY July 6-10, 2015.

Refereed Publications

1. Corisa Kons, Kathryn L. Krycka, Joshua Robles, Nikolaos Ntallis, Manuel Pereiro, Manh-Huong Phan, Hariharan Srikanth, Julie A. Borchers, and **Darío A. Arena**, "Influence of Hard/Soft Layer Ordering on Magnetization Reversal of Bimagnetic Nanoparticles: Implications for Biomedical/Theranostic Applications," *ACS Applied Nano Materials,* DOI: 10.1021/acsanm.3c00510 (2023).
2. C. Klewe, P. Shafer, J. E. Shoup, C. Kons, Y. Pogoryelov, R. Knut, B. A. Gray, H.-M. Jeon, B. M. Howe, O. Karis, Y. Suzuki, E. Arenholz, **D. A. Arena**, and S. Emori, "Observation of coherently coupled cation spin dynamics in an insulating ferrimagnetic oxide," *Applied Physics Letters,* **122** (13) 132 (2023).

3. Chloe S Taylor, Marzieh Savadkoohi, Pawan Tyagi, Jenae E Shoup, **Dario A Arena**, Julie A Borchers, James Eckert, Daniel B Gopman, "Sputter Gas Damage in Nanolayered Pt/Co/Ir-based Synthetic Antiferromagnets for Top-Pinned Magnetic Tunnel Junctions," *ACS Applied Nano Materials,* **6** 131-139 (2023).

4. Amit Chanda, Derick DeTellem, Yen Thi Hai Pham, Jenae E. Shoup, Anh Tuan Duong, Raja Das, Sunglae Cho, Dmitri V. Voronine, M. Tuan Trinh, **Dario A. Arena**, Sarath Witanachchi, Hariharan Srikanth, and Manh-Huong Phan, "Spin Seebeck effect in iron oxide thin films: effects of phase transition, phase coexistence, and surface magnetism," *ACS Applied Materials and Interfaces,* **14** (11) 13468-13479 (2022).

5. Hengzhou Liu, M Tuan Trinh, Eleanor M Clements, Deepak Sapkota, Ling Li, Zachary Romestan, Soumya Bhat, Varun Mapara, Arup Barua, Samuel Langelund Carrera, Manh-Huong Phan, **Dario Arena**, Hariharan Srikanth, David Mandrus, Aldo H Romero, Denis Karaiskaj, "Elastically induced magnetization at ultrafast time scales in a chiral helimagnet," *Physical Review B,* **106** (3) 035103 (2022).

6. H. Liu, Agne Ciuciulkaite, Vassilios Kapaklis, D. Karaiskaj, and **D.A. Arena**, "Enhanced optical mode coherence in exchange coupled soft magnetic multilayers," *Journal of Applied Physics,* **131** (21) 213902 (2022).

7. H. Liu, E. Clements, L. Ling, Z. Romestan, S. Bath, V. Mapara, M.T. Trinh, M.-H Phan, **D.A. Arena**, H. Srikanth, D. mandrus, A. H. Romero, D. Karaiskaj "Elastically Induced Magnetization at Ultrafast Time Scales in a Chiral Helical Magnet," *Physical Review B,* **106** (3) 035103 (2022).

8. Nikolaos Ntallis, Corisa Kons, Hariharan Srikanth, Manh-Huong Phan, **D.A. Arena**, Manuel Pereiro, "Macrospin model of an assembly of magnetically coupled core-shell nanoparticles," *Physical Review B,* **106** (10) 104402 (2022).

9. H. Liu, R. Knut, S. Saha, R.S. Malik, K. Jatkar, R. Stefanuik, J. Soderstom, J.S. Shoup, D. Khadka, T.R. Thappliya, S.X. Huang, A. Gupta, O. Karis, D. Karaiskaj, and **D.A. Arena**, "Optical and extreme UV studies of spin dynamics in metallic and insulating ferrimagnets," *Journal of Applied Physics,* **130** (24) 240901 (2021).

10. Justin M. Shaw, Ronny Knut, C.J. Armstrong, Sumanta Bhandary, Yaroslav Kvashnin, Danny Thonig, Erna K. Delczeg-Czirjak, Olof Karis, T.J. Silva, Eugen Weschke, Hans T. Nembach, Olle Eriksson, **Dario A. Arena**, "Quantifying spin-mixed states in ferromagnets," *Physical Review Letters,* **127** (20) 207201 (2021).

11. A. Chanda, J. E. Shoup, N. Schulz, **D. A. Arena**, H. Srikanth, "Tunable competing magnetic anisotropies and spin reconfigurations in ferrimagnetic Fe_{100-x} Gd_x alloy films," *Physical Review B,* **104** (9) 094404 (2021).

12. R. Knut, R.S. Malik, C. Kons, J.E. Shoup, F. Radu, C. Luo, Y.O. Kvashnin, A. Gupta, O. Karis, **D.A. Arena**, "Perpendicular and in-plane hole asymmetry in a strained $NiFe_2O_4$ film," *Journal of Physics: Condensed Matter,* **33** (22) 225801 (2021).

13. **D.A. Arena**, "Shining a Light on Hidden Spin Dynamics," *Physics,* **13** 151 (2020).

14. C. Kons, Manh-Huong Phan, Hariharan Srikanth, **D.A. Arena**, Zohreh Nemati, J.A. Borchers and K.L. Krycka, "Investigating spin coupling across a three-dimensional interface in core/shell magnetic nanoparticles," *Physical Review Materials,* **4** 034408 (2020).

15. J. E. Shoup, **D. A. Arena**, J. A. Borchers, B. J. Kirby, A. J. Caruana, C. J. Kinane, S. Langridge, M. Rogers, and O. Cespedes, "Structural studies of magnetic C60/Cu multilayers," *AIP Advances,* **10** 025312 (2020).

16. Yevgen Pogoryelov, Manuel Pereiro, Somnath Jana, Ankit Kumar, Serkan Akansel, Mojtaba Ranjbar, Danny Thonig, Daniel Primetzhofer, Peter Svedlindh, Johan Åkerman, Olle Eriksson, Olof Karis, and **Darío A. Arena**, "Nonreciprocal spin pumping damping in asymmetric magnetic trilayers," *Physical Review B,* **101** 054401 (2020).

17. David J. Keavney, Yongseong Choi, Martin V. Holt, Vojtech Uhlir, **Dario Arena**, Eric E. Fullerton, Philip J. Ryan, Jong-Woo Kim, "Phase Coexistence and Kinetic Arrest in the Magnetostructural Transition of the Ordered Alloy FeRh," *Nature - Scientific Reports,* **8** 1778 (2018).

18. Pegah M Hosseinpour, Félix Jiménez-Villacorta, Jing Liu, Badih A Assaf, Ian J McDonald, **Dario Arena**, Don Heiman, Latika Menon, Laura H Lewis, "Fe-incorporated TiO2 nanotube arrays: Electronic structure and magnetic response," *Physical Review B,* **98** 195145 (2018).

19. M. Golalikhani, Q. Lei, R.U. Chandrasena, L. Kasaei, H. Park, J. Bai, P. Orgiani , J. Ciston, G.E. Sterbinsky, **D.A. Arena**, P. Shafer, E. Arenholz, B.A. Davidson, A.J. Millis, A.X. Gray, X.X. Xi, "Nature of the metal-insulator transition in few-unit-cell-thick LaNiO3 films," *Nature Communications,* **9** 2206 (2018).

20. Michelle E Jamer, Yung Jui Wang, Gregory M Stephen, Ian J McDonald, Alexander J Grutter, George E Sterbinsky, **Dario A Arena**, Julie A Borchers, Brian J Kirby, Laura H Lewis, Bernardo Barbiellini, Arun Bansil, Don Heiman, "Compensated Ferrimagnetism in the Zero-Moment Heusler Alloy Mn3Al," *Physical Review Applied,* **7** 064036 (2017).

21. Nicholas F. Quackenbush, Hanjong Paik, Megan E. Holtz, Matthew J. Wahila, Jarrett A. Moyer, Stefan Barthel, Tim O. Wehling, **Dario A. Arena,**, Joseph C. Woicik, David A. Muller, Darrell G. Schlom, and Louis F. J. Piper, "Reducing orbital occupancy in VO2 suppresses Mott physics while Peierls distortions persist," *Physical Review B,* **96** 081103(R) (2017).

22. Ankit S. Disa, Alexandru B. Georgescu, James L. Hart, Divine P. Kumah, Padraic Shafer, Elke Arenholz, **Dario A. Arena**, Sohrab Ismail-Beigi, Mitra L. Taheri, Frederick J. Walker, Charles H. Ahn, "Control of hidden ground state order in NdNiO3 superlattices," *Physical Review Materials,* **1** (2) 024410 (2017). *Selected as an Editor's Choice article.*

23. Frances Hellman, Axel Hoffmann, Yaroslav Tserkovnyak, Geoffrey Beach, Eric Fullerton, Chris Leighton, Allan MacDonald, Dan Ralph, **Dario Arena**, Hermann Durr, Peter Fischer, Julie Grollier, Joseph Heremans, Tomas Jungwirth, Alexey Kimmel, Bert Kooplans, Ilya Krivorotov, Steven May, Amanda Petford-Long, James Rondinelli, Nitin Samarth, Ivan Schuller, Andrei Slavin, Mark Stiles, Oleg Tchernyshyov, Andre Thiaville, Barry Zink, "Interface-Induced Phenomena in Magnetism," *Review of Modern Physics,* **89** (2) 025006 (2017).

24. N. F. Quackenbush, H. Paik, M. J. Wahila, S. Sallis, M. E. Holtz, X. Huang, A. Ganose, B. J. Morgan, D. O. Scanlon, Y. Gu, F. Xue, L.-Q. Chen, G. E. Sterbinsky, C. Schlueter, T.-L. Lee, J. C. Woicik, J.-H. Guo, J. D. Brock, D. A. Muller, **D. A. Arena**, D. G. Schlom, and L. F. J. Piper, "Stability of the M2 phase of vanadium dioxide induced by coherent epitaxial strain," *Physical Review B,* **94** 085105 (2016).

25. Matthew J Wahila, Keith T Butler, Zachary W Lebens-Higgins, Christopher H Hendon, Abhishek S Nandur, Robert E Treharne, Nicholas F Quackenbush, Shawn Sallis, Katie Mason, Hanjong Paik, Darrell G Schlom, Joseph C Woicik, Jinghua Guo, **Dario A Arena**, Bruce E White, Graeme W Watson, Aron Walsh, Louis FJ Piper, "Lone-pair Stabilization in Transparent Amorphous Tin Oxides: A Potential Route to p-type Conduction Pathways," *Chemistry of Materials,* **28** 4706 (2016).

26. Sumit Beniwal, X Zhang, Sai Mu, Ahmad Naim, Patrick Rosa, Guillame Chastanet, Jean-Francois Ltard, J Liu, George E Sterbinsky, **Dario A Arena**, Peter A Dowben, Axel Enders, "Surface-induced spin state locking of the [Fe (H2B (pz) 2) 2 (bipy)] spin crossover complex," *Journal of Physics: Condensed Matter,* **28** 206002 (2016).

27. Z. Lebens-Higgins, D. O. Scanlon, H. Paik, S. Sallis, Y. Nie, M. Uchida, N. F. Quackenbush, M. J. Wahila, G. E. Sterbinsky, Dario A. Arena, J. C. Woicik, D. G. Schlom, and L. F. J. Piper, "Direct Observation of Electrostatically Driven Band Gap Renormalization in a Degenerate Perovskite Transparent Conducting Oxide," *Physical Review Letters,* **116** 027602 (2016).

28. Eun-Mi Choi, Josée E. Kleibeuker, Thomas Fix, Jie Xiong, Christy J. Kinane, **Darío Arena**, Sean Langridge, Aiping Chen, Zhenxing Bi, Joon Hwan Lee, Haiyan Wang, Quanxi Jia, Mark G. Blamire, Judith L. MacManus-Driscoll, "Interface-Coupled BiFeO3/BiMnO3 Superlattices with Magnetic Transition Temperature up to 410 K," *Advanced Materials Interfaces,* **3** 1500597 (2016).

29. P. Warnicke, E. Stavitski, J.-S. Lee, A. Yang, X. Zuo, S. Zohar, W.E. Bailey, V.G. Harris, and **D. A. Arena**, "Direct observation of symmetry-specific precession in a ferrimagnet," *Physical Review B,* **92** 104402 (2015).

30. Nicholas F. Quackenbush, Hanjong Paik, Joseph C. Woicik, **Dario A. Arena**, Darrell G. Schlom, Louis F.J. Piper, "X-Ray Spectroscopy of Ultra-Thin Oxide / Oxide Heteroepitaxial Films: A Case Study of Single-Nanometer VO_2/TiO_2," *Materials,* **8** 5452 (2015).

31. Fatma Al MaMari, Timothy Moorsom, Gilberto Teobaldi, William Deacon, Thomas Prokscha, Hubertus Luetkens, Steve Lee, George E. Sterbinsky, **Dario A. Arena**, Donald A. MacLaren, Machiel Flokstra, Mannan Ali, May C. Wheeler, Gavin Burnell, Bryan J. Hickey, Oscar Cespedes, "Beating the Stoner criterion using molecular interfaces," *Nature,* **524** 7563 (2015).

32. Xin Zhang, Sai Mu, Guillaume Chastanet, Nathalie Daro, Tatiana Palamarciuc, Patrick Rosa, Jean-Francois Letard, Jing Liu, George E Sterbinsky, **Dario A Arena**, Céline Etrillard, Bohdan Kundys, Bernard Doudin, Peter A Dowben, "Complexities in the Molecular Spin Crossover Transition" *The Journal of Physical Chemistry C,* **119** 16293 (2015).

33. M.E. Jamer, B.A. Assaf, G.E. Sterbinsky, **D. Arena**, L.H. Lewis, A.A. Saul, G. Radtke, D. Heiman, "Antiferromagnetic phase of the gapless semiconductor V_3Al" *Physical Review B,* **91** 094409 (2015).

34. Jing Liu, Pegah M. Hosseinpour, Si Luo, Don Heiman, Latika Menon, **Dario A. Arena** and Laura H. Lewis, "TiO_2 nanotube arrays for photocatalysis: Effects of crystallinity, local order, and electronic structure," *J. Vac. Sci. Technol. A* **33**, 021202 (2015).

35. Hyojung Yoon, Aoran Xu, George E. Sterbinsky, **Dario A. Arena**, Ziying Wang, Peter W. Stephens, Ying Shirley Meng and Kyler J. Carroll, "In situ non-aqueous nucleation and growth of next generation rare-earth-free permanent magnets," *Physical Chemistry Chemical Physics,* **17** 1070-1076 (2015).

36. Si Luo, Thuy-Duong Nguyen-Phan, Aaron C. Johnston-Peck, Laura Barrio, Shawn Sallis, **Dario A. Arena**, Shankhamala Kundu, Wenqian Xu, Louis F. J. Piper, Eric A. Stach, Dmitry E. Polyanskiy, Etsuko Fujita, Jose A. Rodriguez, and Sanjaya D. Senanayake, "Hierarchical Heterogeneity at the CeO_x-TiO_2 Interface: Electronic and Geometric Structural Influence on the Photocatalytic Activity of Oxide on Oxide Nanostructures,' *Journal of Physical Chemistry C,* **119** 5, 2669-2679 (2015).

37. A.S. Disa, D.P. Kumah, A. Malashevich, H. Chen, **D.A. Arena**, E.D. Specht, S. Ismail-Beigi, F.J. Walker, C.H. Ahn, "Orbital engineering in symmetry breaking polar heterostructures," *Physical Review Letters,* **114** 026801 (2015) *(selected as a PRL Editors' Suggestion and a Science Magazine Editor's Choice).*

38. R.C. Temple, A.P. Mihai, **D.A. Arena**, C.H. Marrows, "Ensemble Magnetic Behavior of Interacting CoFe Nanoparticles," *Frontiers in Physics,* **3** 52 (2015).

39. M. E. Jamer, B. A. Assaf, G. E. Sterbinsky, **D. A. Arena** and D. Heiman, "Atomic moments in Mn2CoAl thin films analyzed by X-ray magnetic circular dichroism," *Journal of Applied Physics,* **116** 213914 (2014).

40. C. J. Kinane, M. Loving, M. A. de Vries, R. Fan, T. R. Charlton, J. S. Claydon, **D. A. Arena,** F. Maccherozzi, S. S. Dhesi, D. Heiman, C. H. Marrows, L. H. Lewis, and Sean Langridge, "Observation of a temperature dependent asymmetry in the domain structure of a Pd doped FeRh epilayer," *New Journal of Physics,* **16** 113073 (2014).

41. Divine P. Kumah, Andrei Malashevich, Ankit S. Disa, **Dario A. Arena**, Frederick J. Walker, Sohrab Ismail-Beigi, and Charles H. Ahn, "Effect of Surface Termination on the Electronic Properties of $LaNiO_3$ Films," *Physical Review Applied,* **2** 054004 (2014).

42. Eun-Mi Choi, Thomas Fix, Ahmed Kursumovic, Christy J. Kinane, **Dario Arena**, Suman-Lata Sahonta, Zhenxing Bi, Jie Xiong, Li Yan, Jun-Sik Lee, Haiyan Wang, Sean Langridge, Yong-Min Kim, Albina Y. Borisevich, Ian MacLaren, Quentin M. Ramasse, Mark G. Blamire, Quanxi Jia, and Judith L. MacManus-Driscoll, "Room temperature Ferrimagnetism and Ferroelectricity in Strained, Thin Films of $BiFe_{0.5}Mn_{0.5}O_3$" *Advanced Functional Materials,* DOI: 10.1002/adfm.201401464 2014.

43. J. F. Pulecio, S.D. Pollard, P. Warnicke, **D. A. Arena** and Y. Zhu, "Symmetry Breaking of Magnetic Vortices before Edge Annihilation," *Applied Physics Letters,* **105** 132403 (2014). *[Selected as Cover Article and Featured Article for issue].*

44. C. A. F. Vaz, J. A. Moyer, **D. A. Arena,** C. H. Ahn, and V. E. Henrich, "Magnetic and electronic structure of ultrathin $La_{1-x}Sr_xMnO_3$ films at half doping," *Physical Review B,* **90** 02441 (2014).

45. Javier Pulecio, Peter Warnicke, Shawn Pollard, **Dario Arena**, and Yimei Zhu "Coherence and Modality of Driven Interlayer Coupled Magnetic Vortices," *Nature Communications,* **5** 3760 (2014).

46. Ronny Knut, Peter Svedlindh, Oleg Mryasov, Klas Gunnarsson, Peter Warnicke, **D. A. Arena**, Matts Björck, Andrew J. C. Dennison, Anindita Sahoo, Sumanta

Mukherjee, D. D. Sarma, Sari Granroth, Mihaela Gorgoi, and Olof Karis, "Interface characterization of Co_2MnGe/Rh_2CuSn Heusler multilayers," *Physical Review B,* **88** 134407 (2013).

47. A. S. Disa, D. P. Kumah, J. H. Ngai, E. D. Specht, **D. A. Arena**, F. J. Walker and C. H. Ahn, "Phase diagram of compressively strained nickelate thin films," *APL Materials,* **1** 032110 (2013).

48. W. E. Bailey, C. Cheng, R. Knut, O. Karis, S. Auffret, S. Zohar, D. Keavney, P. Warnicke, J-S Lee and **D. A. Arena,** "Detection of microwave phase variation in nanometrescale magnetic heterostructures," *Nature Communications,* **4** 2025 (2013).

49. J.A. Moyer, D.P. Kumah, C.A.F. Vaz, **D.A. Arena** and V.E. Henrich, "Role of epitaxial strain on the magnetic structure of Fe-doped $CoFe_2O_4$," *Journal of Magnetism and Magnetic Materials*, **345**, 180 (2013).

50. M. Loving, F. Jimenez-Villacorta, B. Kaeswurm, **D.A. Arena**, C.H. Marrows and L.H. Lewis, "Structural evidence for stabilized ferromagnetism in epitaxial FeRh nanoislands," *Journal of Physics D: Applied Physics,* **46** 162002 (2013).

51. P. Warnicke, R. Knut, E. Wahlström, O. Karis, W. E. Bailey, and **D.A. Arena**, "Exploring the accessible frequency range of phase-resolved ferromagnetic resonance detected with x-rays," *Journal of Applied Physics* 113 033904 (2013).

52. J.A. Moyer, C.A. Vaz, D.P. Kumah, **D.A. Arena**,V.E. Henrich, "Enhanced magnetic moment in ultrathin Fe-doped $CoFe_2O_4$ films," *Physical Review B* 86 (17):174404, (2012).

53. S. D. Pollard, L. Huang, K. S. Buchanan, **D.A. Arena**, Y. Zhu, "Direct Dynamic Imaging of Non-Adiabatic Spin Torque Effects," *Nature Communications,* **3**, 1028, doi:10.1038/ncomms2025 (2012).

54. S. Kundu, J. Ciston, S. Senanayake, **D. A. Arena**, E. Fujita, D. Stacchiola, L. Barrio, R. Navarro, F. Rufino, J. Rodriguez, "Exploring the Structural and Electronic Properties of Pt/Ceria- Modified TiO_2 and its Photo-Catalytic Activity for Water Split-Ting Under Visible Light," *Journal of Physical Chemistry C*, 116 (26) 14062-14070 (2012).

55. F. Macià, P. Warnicke, D. Bedau, M.Y. Im, P. Fischer, **D.A Arena**, A.D. Kent, "Perpendicular magnetic anisotropy in ultrathin Co— Ni multilayer films studied with ferromagnetic resonance and magnetic x-ray microspectroscopy," *Journal of Magnetism and Magnetic Materials,* 324 (22) 3629-3632 (2012).

56. J. A. Moyer, D. Kumah, C. A. F. Vaz, **D.A. Arena**, V. E. Henrich, "Epitaxial strain induced changes in the cation distribution and resistivity of Fe-doped $CoFe_2O_4$," *Applied Physics Letters*, 101, 021907 (2012).

57. J. P. Morgan, C. J. Kinane, T. R. Charlton, A. Stein, C. Sanchez-Hanke, **D. A. Arena**, S. Langridge, and C. H. Marrows, "Magnetic hysteresis of an artificial square ice studied by in-plane Bragg x-ray resonant magnetic scattering," *AIP Advances 2*: 022163, 2012.

58. J.-S. Lee, **D.A. Arena**, T.S. Santos, C.S. Nelson, S.I. Hyun, J.H. Shim, C.-C. Kao, "Controlling competing interactions at oxide interfaces: Enhanced anisotropy in $La_{0.7}Sr_{0.3}MnO_3$ films via interface engineering," *Physical Review B* 85 (23): 235125, 2012.

59. D. Ciudad, Z.C. Wen, A.T. Hindmarch, E. Negusse, **D.A. Arena**, X.F. Han, C.H. Marrows "Competition between cotunneling, Kondo effect, and direct tunneling in discontinuous high-anisotropy magnetic tunnel junctions,' *Physical Review B* 85 (21), 214408, 2012.

60. JA Moyer, CAF Vaz, **DA Arena**, D. Kumah, E. Negusse, and VE Henrich. "Magnetic structure of Fe-doped $CoFe_2O_4$ probed by x-ray magnetic spectroscopies." *Physical Review B*, 84(5):054447, 2011.

61. JS Lee, CC Kao, TS Santos, E. Negusse, and **DA Arena**. "Reversed remanent magnetic configuration in epitaxial $La_{1-x}Sr_xMnO_3$ films." *Journal of Physics D: Applied Physics*, 44:245002, 2011. *[Selected a science highlight for the Center for Nanoscale Materials, Argonne National Lab]*

62. EN Yitamben, TC Lovejoy, AB Pakhomov, SM Heald, E. Negusse, **D. Arena**, FS Ohuchi, and MA Olmstead. "Correlation between morphology, chemical environment, and ferromagnetism in the intrinsic-vacancy dilute magnetic semiconductor Cr-doped Ga_2Se_3/Si(001)." *Physical Review B*, 83(4):045203, 2011.

63. JA Moyer, CAF Vaz, E. Negusse, **DA Arena**, and VE Henrich. "Controlling the electronic structure of $Co_{1-x}Fe_{2+x}O_4$ thin films through iron doping." *Physical Review B*, 83(3):035121, 2011.

64. J.S. Lee, **DA Arena**, P. Yu, CS Nelson, R. Fan, CJ Kinane, S. Langridge, MD Rossell, R. Ramesh, and C.C. Kao. "Hidden magnetic configuration in epitaxial $La_{1-x}Sr_xMnO_3$ films." *Physical review letters*, 105(25):257204, 2010. *[Selected a science highlight for the National Synchrotron Light Source, Brookhaven National Lab and also a Science and Technology Highlight, Department of Energy PULSE Newsletter].*

65. J.S. Lee, E. Vescovo, **DA Arena**, C.C. Kao, J.M. Beaujour, AD Kent, H. Jang, J.H. Park, and J.Y. Kim. "Longitudinal and transverse magnetization components in thin films: A resonant magnetic reflectivity investigation using circularly polarized soft x-rays." *Applied Physics Letters*, 96:042507, 2010.

66. AT Hindmarch, V. Harnchana, E. Negusse, **DA Arena**, AP Brown, RMD Brydson, CH Marrows, et al. "Magnetostructural influences of thin Mg insert layers in crystalline CoFeB/MgO/CoFeB magnetic tunnel junctions." *Applied Physics Letters*, 97:252502, 2010.

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