


Ryan Comes

Thomas and Jean Walter Associate Professor of Physics, Auburn University

 <http://comes.auburn.edu/>

Education

- | | |
|---------------------|--|
| Aug 2008 – May 2013 | University of Virginia
<i>PhD, Engineering Physics</i> <ul style="list-style-type: none">• <i>Dissertation:</i> "Self-Assembled Epitaxial Multiferroic Oxide Nanostructures Grown by Pulsed Electron Deposition"• <i>Advisor:</i> Prof. Stuart Wolf |
| Aug 2004 – May 2008 | Carnegie Mellon University
<i>BS, Physics; BS, Electrical and Computer Engineering</i> <ul style="list-style-type: none">• <i>Honors:</i> University, Mellon College of Science, and College of Engineering Honors |

Work Experience

- | | |
|---------------------|---|
| Aug 2016 - Present | Auburn University
<i>Department of Physics</i> <ul style="list-style-type: none">• Thomas and Jean Walter Associate Professor, 2022-Present• Assistant Professor, 2016-2022; Thomas and Jean Walter Assistant Prof., 2020-2022 |
| Jul 2013 - Jul 2016 | Pacific Northwest National Laboratory
<i>Physical and Computational Sciences Directorate</i> <ul style="list-style-type: none">• Linus Pauling Distinguished Postdoctoral Fellow• <i>Mentor:</i> Dr. Scott Chambers |

Teaching Experience

- | | |
|---------------------|--|
| Aug 2016 - Present | Auburn University, Department of Physics
<i>Courses Taught</i> <ul style="list-style-type: none">• Physics 2 for Engineers and Honors Physics 2 (Introductory Level)• Physics of the World Around Us: Energy Sources and Storage (Intermediate Level)• Quantum Mechanics (Senior Level)• Solid State Physics (Graduate Level)• Group Theory for Solid State Physics (Graduate Level) |
| Aug 2012 - Dec 2012 | University of Virginia, School of Engineering and Applied Science Graduate Teaching Fellow
<i>Course Taught</i> <ul style="list-style-type: none">• Introductory Calculus for Engineers (Co-Instructor) |

University Service

- | | |
|--------------------|--|
| Aug 2016 - Present | Auburn University, Department of Physics
<i>Select Committees and Positions</i> <ul style="list-style-type: none">• Department of Physics, Undergraduate Program Officer, Aug 2023-Present• College of Sciences and Mathematics Curriculum Committee, Aug 2023-Present• College of Sciences and Mathematics Dean Search Committee, Aug 2022-Feb 2023• Graduate Admissions Committee, Nov 2020-Aug 2022• Physics Diversity, Equity, and Inclusion Committee, Member, Jun 2020-May 2022• Departmental Faculty Search Committee, 3x• Graduate Recruiting Committee, Member, Oct 2016-Aug 2022; Chair, Oct 2019-Aug 2022 |
|--------------------|--|

Research Grants Awarded

Total Value: \$3.3 million; As PI: \$2.7 million; To Comes' Group: \$2.1 million

- 2023
- Wencan Jin (PI) and **Ryan Comes**. “Studying magnetoelectric coupling in van der Waals/oxide thin film heterostructures” *Department of Defense, Air Force Office of Scientific Research, Condensed Matter Physics*. October 1, 2022-September 30, 2025. \$598,311.
- 2022
- **Ryan Comes** (PI) and Wencan Jin. “In Situ Studies of Charge Transfer Phenomena in Complex Oxide Heterostructures” *Department of Energy, Basic Energy Sciences, Synthesis and Processing Science*. October 1, 2022-September 30, 2025. \$749,728.
- 2021
- **Ryan Comes**. “CAREER: Topological Phenomena in 4d and 5d Complex Oxide Interfaces and Superlattices Grown by Hybrid Molecular Beam Epitaxy.” *National Science Foundation, Division of Materials Research, Ceramics*. May 1, 2021-April 30, 2026. \$651,110.
- 2020
- **Ryan Comes** (PI), Majid Beidaghi, Byron Farnum, Masoud Mahjouri-Samani, and Tae-Sik Oh. “MRI: Acquisition of a X-Ray Diffraction System for Materials Research in Alabama.” *National Science Foundation, Major Research Instrumentation program*. August 1, 2020-July 31, 2023. \$280,487.
 - **Ryan Comes**. “Metastable Oxides for High-Mobility and Spin-Orbit 2D Electronics.” *Air Force Office of Scientific Research, Young Investigator Program, GHz and THz Electronics*. January 1, 2020-December 31, 2023. \$448,790.
- 2018
- **Ryan Comes** (PI) and Byron Farnum. “Exploration of Electronic and Catalytic Behavior in Epitaxial Complex Oxide Films and Nanocomposites.” *National Science Foundation, Division of Materials Research, Solid State and Materials Chemistry*. July 1, 2018-June 30, 2022. \$531,981.

Publications

 Google Scholar Profile

* indicates equal contributions

† indicates corresponding author(s)

Italic/bold text indicates a member of Films, Interfaces, and Nanostructures of Oxides Lab

- Pending
51. **Gemperline, P. T.**, Tang, C., Sterbinsky, G., Boebigner, M., Kiefer, B., Jin, W. & **Comes, R. B.**[†]. Epitaxial Strain Effects in SrHfO₃ Films Grown by Hybrid Molecular Beam Epitaxy. *In preparation* (2024).
 50. **Rimal, G., Tasnim, T.**, Ortiz, G. C., Giri, M., Vukelich, R., Sterbinsky, G., Hilton, D. J., Hwang, J. & **Comes, R. B.**[†]. Strain-dependent Transport in SrIrO₃ Epitaxial Films Grown by Metalorganic Molecular Beam Epitaxy. *In preparation* (2024).
 49. **Rimal, G. & Comes, R. B.**[†]. Development of Complex Oxide Quantum Materials via Molecular Beam Epitaxy. *Invited review, In preparation* (2024).
 48. Mahatara, S., **Comes, R. B.** & Kiefer, B.[†]. Enhanced Carrier Densities in Two-Dimensional Electron Gas Formed at BaSnO₃/SrTaO₃ and SrSnO₃/SrTaO₃ Interfaces. *Submitted for publication* (2024).

Publications

- 2023 | 47. **Paudel, R.**, Burton, A. R., Kuroda, M. A., Farnum, B. H. & **Comes, R. B.**[†]. Band-Engineered LaFeO₃-LaNiO₃ Thin Film Interfaces for Electrocatalysis of Water. *Journal of Vacuum Science and Technology A* **41**. doi:10.1116/6.0002987. eprint: <https://arxiv.org/abs/2207.07264> (Oct. 2023).
46. **Blanchet, M. D.**, Matthews, B. E., Spurgeon, S. R., Heald, S. M., Isaacs-Smith, T. & **Comes, R. B.**[†]. Jahn-Teller-driven Phase Segregation in Mn_xCo_{3-x}O₄ Spinel Thin Films. *Journal of Vacuum Science and Technology A* **41**, 052703. doi:10.1116/6.0002329 (Sept. 2023).
45. Budhathoki, S., Rai, A., Law, K. M., Nahar, R., Stewart, A., Ranjit, S., KC, S., Isaacs-Smith, T., Bikmukhametov, I., **Comes, R. B.**, Thompson, G. B., LeClair, P., Mewes, T. & Hauser, A. J.[†]. Co₂Fe(Ti_{0.5}Al_{0.5}) epitaxial thin films: Structural and magnetic properties of a Heusler alloy with Z-site transition metal Ti substitution. *Journal of Magnetism and Magnetic Materials* **582**, 170946. doi:10.1016/j.jmmm.2023.170946 (Sept. 2023).
44. Nair, S., Yang, Z., Lee, D., Guo, S., Sadowski, J., Johnson, S., Saboor, A., **Comes, R. B.**, Jin, W., Mkhoyan, K. A., Janotti, A. & Jalan, B.[†]. Engineering Metal Oxidation using Epitaxial Strain. *Nature Nanotechnology* **18**. doi:10.1038/s41565-023-01397-0 (May 2023).
- 2022 | 43. Sardar, A., Isaacs-Smith, T., Lawson, J., Asel, T., **Comes, R. B.**, Merrett, J. N. & Dhar, S.[†]. High conductivity β-Ga₂O₃ formed by hot ion implantation. *Applied Physics Letters* **121**, 262101. doi:10.1063/5.0127457 (Dec. 2022).
42. Chown, A., Yeasmin, H., **Paudel, R.**, **Comes, R. B.** & Farnum, B. H.[†]. Lithium Dependent Electrochemistry of p-Type Nanocrystalline CuCrO₂ Films. *ChemElectroChem* **9**, e202200825. doi:10.1002/celec.202200825 (Dec. 2022).
41. Mahatara, S.* , **Thapa, S.***, Paik, H., **Comes, R. B.**[†] & Kiefer, B.[†]. High Mobility Two-Dimensional Electron Gas at the BaSnO₃/SrNbO₃ Interface. *ACS Applied Materials and Interfaces* **14**, 45025–45031. doi:10.1021/acsmami.2c12195 (Oct. 2022).
40. **Thapa, S.**, **Provence, S. R.**, **Gemperline, P. T.**, **Battles, S.**, Heald, S. M., Kuroda, M. A. & **Comes, R. B.**[†]. Surface Stability of SrNbO_{3+δ} Thin Films Grown by Hybrid Molecular Beam Epitaxy. *APL Materials* **10**, 091112. doi:10.1063/5.0097699 (Sept. 2022).
39. Bredar, A. R.* , **Blanchet, M. D.***, Burton, A. R., Matthews, B. E., Spurgeon, S. R., **Comes, R. B.**[†] & Farnum, B. H.[†]. Oxygen Reduction Electrocatalysis with Epitaxially Grown Spinel MnFe₂O₄ and Fe₃O₄. *ACS Catalysis* **12**, 3577–3588. doi:10.1021/acscatal.1c05172 (Mar. 2022).
38. Burton, A. R.* , **Paudel, R.***, Matthews, B., Sassi, M., Spurgeon, S. R., Farnum, B. H. & **Comes, R. B.** Thickness Dependent OER Electrocatalysis of Epitaxial LaFeO₃ Thin Films. *Journal of Materials Chemistry A*. doi:10.1039/D1TA07142D (Jan. 2022).
37. Suyolcu, E., Christiani, G., **Gemperline, P. T.**, **Provence, S. R.**, Bussmann-Holder, A., **Comes, R. B.**, van Aken, P. A. & Logvenov, G.[†]. Engineering ordered arrangements of oxygen vacancies at the surface of superconducting La₂CuO₄ thin films. *Journal of Vacuum Science and Technology A* **40**, 013214. doi:10.1116/6.0001473 (Jan. 2022).

Publications

- 2021
36. Lapano, J., Pai, Y.-Y., Mazza, A., Zhang, J., Isaacs-Smith, T., **Gemperline, P.**, Zhang, L., Li, H., Lee, H. N., Miao, H., Eres, G., Yoon, M., **Comes, R. B.**, Ward, T. Z., Lawrie, B. J., McGuire, M., Moore, R. G., Nelson, C. T., May, A. & Brahlek, M.[†]. Self-regulated growth of candidate topological superconducting parkerite by molecular beam epitaxy. *APL Materials* **9**, 101110. doi:10.1063/5.0064746 (Oct. 2021).
35. **Thapa, S.**, **Provence, S. R.**, Jessup, D., Lapano, J., Brahlek, M., Sadowski, J. T., Reinke, P., Jin, W. & **Comes, R. B.**[†]. Correlating surface stoichiometry and termination in SrTiO₃ films grown by hybrid molecular beam epitaxy. *Journal of Vacuum Science & Technology A* **39**, 053203. doi:10.1116/6.0001159 (Sept. 2021).
34. Kaspar, T. C.[†], Spurgeon, S. R., Matthews, B. E., Bowden, M., Heald, S. M., Wang, L., Kelley, R., **Paudel, R.**, Isaacs-Smith, T., **Comes, R. B.**, Yin, X., Tang, C. S., Wee, A. T. & Chambers, S. A. Incorporation of Ti in epitaxial Fe₂TiO₄ thin films. *Journal of Physics: Condensed Matter* **31**, 314004. doi:10.1088/1361-648X/ac0571 (June 2021).
33. Blanchet, M. D., Heath, J. J., Kaspar, T. C., Matthews, B. E., Spurgeon, S. R., Bowden, M. E., Heald, S. M., Isaacs-Smith, T., Kuroda, M. A. & **Comes, R. B.**[†]. Electronic and structural properties of single-crystal Jahn–Teller active Co_{1+x}Mn_{2-x}O₄ thin films. *Journal of Physics: Condensed Matter* **33**, 124002. doi:10.1088/1361-648X/abd573 (Jan. 2021).
32. **Thapa, S.**^{*}, **Paudel, R.**^{*}, **Blanchet, M. D.**^{*}, **Gemperline, P. T.**^{*} & **Comes, R. B.**[†]. Probing surfaces and interfaces in complex oxide films via in situ X-ray photoelectron spectroscopy. *Journal of Materials Research* **36**, 26–51. doi:10.1557/s43578-020-00070-9 (Jan. 2021).
- 2020
31. **Provence, S. R.**[†], **Thapa, S.**, **Paudel, R.**, Truttmann, T., Prakash, A., Jalan, B. & **Comes, R. B.**[†]. Machine Learning Analysis of Perovskite Oxides Grown by Molecular Beam Epitaxy. *Physical Review Materials* **4**, 083807. doi:10.1103/PhysRevMaterials.4.083807 (Aug. 2020).
- 2019
30. Wang, Y., Zhang, J., Ni, Y., Chen, X., Mescall, R., Isaacs-Smith, T., **Comes, R. B.**, Kittiwatanakul, S., Wolf, S. A., Lu, J.[†] & Liu, M. Structural, transport, and ultrafast dynamic properties of V_{1-x}Nb_xO₂ thin films. *Physical Review B* **99**, 245129. doi:10.1103/PhysRevB.99.245129 (June 2019).
29. Kaspar, T. C.[†], Sushko, P. V., Spurgeon, S. R., Bowden, M. E., Keavney, D. J., **Comes, R. B.**, Saremi, S., Martin, L. & Chambers, S. A. Electronic Structure and Band Alignment of LaMnO₃/SrTiO₃ Polar/Nonpolar Heterojunctions. *Advanced Materials Interfaces* **6**, 1801428. doi:10.1002/admi.201801428 (Jan. 2019).
- 2018
28. Bredar, A. R., **Blanchet, M. D.**, **Comes, R. B.** & Farnum, B. H.[†]. Evidence and influence of copper vacancies in p-type CuGaO₂ mesoporous films. *ACS Applied Energy Materials* **2**, 19–28. doi:10.1021/acsaem.8b01558 (Dec. 2018).
27. Lin, S.-C.[†], Kuo, C.-T., **Comes, R. B.**, Rault, J. E., Rueff, J.-P., Nemšák, S., Taleb, A., Kortright, J. B., Meyer-Ilse, J., Gullikson, E., Sushko, P. V., Spurgeon, S. R., Gehlmann, M., Bowden, M. E., Plucinski, L., Chambers, S. A. & Fadley, C. S.[†]. Interface properties and built-in potential profile of a LaCrO₃/SrTiO₃ superlattice determined by standing-wave excited photoemission spectroscopy. *Physical Review B* **98**, 165124. doi:10.1103/PhysRevB.98.165124 (Oct. 2018).
26. Kaspar, T. C.[†], Hong, S., Bowden, M. E., Varga, T., Yan, P., Wang, C., Spurgeon, S. R., **Comes, R. B.**, Ramuhalli, P. & Henager, C. H. Tuning piezoelectric properties through epitaxy of La₂Ti₂O₇ and related thin films. *Scientific reports* **8**, 1–11. doi:10.1038/s41598-018-21009-5 (Feb. 2018).

Publications

- 2017
25. Spurgeon, S. R., Sushko, P. V., **Comes, R. B.** & Chambers, S. A.[†]. Dynamic Interface Rearrangement in LaFeO₃/n SrTiO₃ Heterojunctions. *Physical Review Materials* **1**, 063401. doi:10.1103/PhysRevMaterials.1.063401 (Nov. 2017).
 24. **Comes, R. B.**[†], Perea, D. E. & Spurgeon, S. R. Heterogeneous Two-Phase Pillars in Epitaxial NiFe₂O₄-LaFeO₃ Nanocomposites. *Advanced Materials Interfaces* **4**, 1700396. doi:10.1002/admi.201700396 (Aug. 2017).
 23. Stoerzinger, K. A.[†], **Comes, R. B.**, Spurgeon, S. R., Thevuthasan, S., Ihm, K., Crumlin, E. J. & Chambers, S. A.[†]. Influence of LaFeO₃ Surface Termination on Water Reactivity. *Journal of Physical Chemistry Letters* **8**, 1038–1043. doi:10.1021/acs.jpcllett.7b00195 (Mar. 2017).
 22. Chambers, S. A.[†], Du, Y., **Comes, R. B.**, Spurgeon, S. R. & Sushko, P. V. The effects of core-level broadening in determining band alignment at the epitaxial SrTiO₃ (001)/p-Ge (001) heterojunction. *Applied Physics Letters* **110**, 082104. doi:10.1063/1.4977422 (Feb. 2017).
 21. **Comes, R. B.**^{*†}, Spurgeon, S. R.^{*}, Kepaptsoglou, D. M., Engelhard, M. H., Perea, D. E., Kaspar, T. C., Ramasse, Q. M., Sushko, P. V. & Chambers, S. A.[†]. Probing the Origin of Interfacial Carriers in SrTiO₃-LaCrO₃ Superlattices. *Chemistry of Materials* **29**, 1147. doi:10.1021/acs.chemmater.6b04329 (Feb. 2017).
- 2016
20. **Comes, R. B.**[†] & Chambers, S. A.[†]. Interface Structure, Band Alignment, and Built-In Potentials at LaFeO₃/n-SrTiO₃ Heterojunctions. *Physical Review Letters* **117**, 226802. doi:10.1103/PhysRevLett.117.226802 (Nov. 2016).
 19. Xu, P., Ayino, Y., Cheng, C., Pribiag, V. S., **Comes, R. B.**, Sushko, P. V., Chambers, S. A. & Jalan, B.[†]. Predictive control over charge density in the two-dimensional electron gas at the polar-nonpolar NdTiO₃/SrTiO₃ interface. *Physical Review Letters* **117**, 106803 (Sept. 2016).
 18. **Comes, R. B.**[†], Spurgeon, S. R., Heald, S. M., Kepaptsoglou, D. M., Jones, L., Ong, P. V., Bowden, M. E., Ramasse, Q. M., Sushko, P. V. & Chambers, S. A.[†]. Interface-induced Polarization in SrTiO₃-LaCrO₃ Superlattices. *Advanced Materials Interfaces* **3**, 1500779. doi:10.1002/admi.201500779 (May 2016).
 17. **Comes, R. B.**[†], Kaspar, T. C., Heald, S. M., Bowden, M. E. & Chambers, S. A.[†]. Infrared Optical Absorption in Low-spin Fe²⁺-doped SrTiO₃. *Journal of Physics: Condensed Matter* **28**, 035901. doi:10.1088/0953-8984/28/3/035901 (Jan. 2016).
 16. Li, X., Ma, C. T., Lu, J., Devaraj, A., Spurgeon, S. R., **Comes, R. B.** & Poon, S. J.[†]. Exchange Bias and Bistable Magneto-Resistance States in Amorphous TbFeCo thin Films. *Applied Physics Letters* **108**, 012401. doi:10.1063/1.4939240 (Jan. 2016).
 15. Wang, Y.[†], **Comes, R. B.**, Wolf, S. A. & Lu, J. Threshold switching characteristics of Nb/NbO₂/TiN vertical devices. *IEEE Journal of the Electron Devices Society* **4**, 11–14. doi:10.1109/JEDS.2015.2503922 (Jan. 2016).

Publications

- 2015
14. **Comes, R. B.[†]**, Xu, P., Jalan, B. & Chambers, S. A.[†]. Band alignment of epitaxial SrTiO₃ thin films with (LaAlO₃)_{0.3}-(Sr₂AlTaO₆)_{0.7} (001). *Applied Physics Letters* **107**, 131601. doi:10.1063/1.4932063 (Sept. 2015).
 13. **Comes, R. B.[†]**, Smolin, S. Y., Kaspar, T. C., Gao, R., Apgar, B. A., Martin, L. W., Bowden, M. E., Baxter, J. B. & Chambers, S. A.[†]. Visible light carrier generation in co-doped epitaxial titanate films. *Applied Physics Letters* **106**, 092901. doi:10.1063/1.4913930 (Mar. 2015).
 12. **Comes, R. B.[†]**, Siebein, K., Lu, J. & Wolf, S. A.[†]. Microstructural Effects of Chemical Island Templating in Patterned Matrix-Pillar Oxide Nanocomposites. *CrystEngComm* **17**, 2041–2049. doi:10.1039/C5CE00025D (Mar. 2015).
 11. Wang, Y.[†], **Comes, R. B.**, Kittiwatanakul, S., Wolf, S. A. & Lu, J. Epitaxial niobium dioxide thin films by reactive-biased target ion beam deposition. *Journal of Vacuum Science & Technology A* **33**, 021516. doi:10.1116/1.4906143 (Mar. 2015).
 10. Steiner, M. A.[†], **Comes, R. B.**, Floro, J. A., Soffa, W. A. & Fitz-Gerald, J. M. L¹ ordering: Evidence of L₁₀-L₁₂ hybridization in strained Fe_{38.5}Pd_{61.5} epitaxial films. *Acta Materialia* **85**, 261–269. doi:10.1016/j.actamat.2014.11.036 (Feb. 2015).
- 2014
9. **Comes, R. B.[†]**, Sushko, P. V., Heald, S. M., Colby, R. J., Bowden, M. E. & Chambers, S. A.[†]. Band-Gap Reduction and Dopant Interaction in Epitaxial La,Cr Co-doped SrTiO₃ Thin Films. *Chemistry of Materials* **26**, 7073–7082. doi:10.1021/cm503541u (Dec. 2014).
- 2013
8. Steiner, M. A., **Comes, R. B.**, Floro, J. A., Soffa, W. A., Fitz-Gerald, J. M.[†] & Smentkowski, V. S. Strain induced microstructural and ordering behaviors of epitaxial Fe_{38.5}Pd_{61.5} films grown by pulsed laser deposition. *Journal of Vacuum Science & Technology A* **31**, 050824. doi:10.1116/1.4819376 (Aug. 2013).
 7. Liu, H., **Comes, R. B.**, Pei, Y., Lu, J. & Wolf, S. A. Structural, magnetic, and nanoscale switching properties of BiFeO₃ thin films grown by pulsed electron deposition. *Journal of Vacuum Science & Technology B* **31**, 032801. doi:10.1116/1.4802924 (May 2013).
 6. **Comes, R. B.[†]**, Gu, M., Khokhlov, M., Liu, H., Lu, J. & Wolf, S. A. Electron molecular beam epitaxy: Layer-by-layer growth of complex oxides via pulsed electron-beam deposition. *Journal of Applied Physics* **113**, 023303. doi:10.1063/1.4774238 (Jan. 2013).
- 2012
5. **Comes, R. B.[†]**, Liu, H., Khokhlov, M., Kasica, R., Lu, J. & Wolf, S. A. Directed self-assembly of epitaxial CoFe₂O₄-BiFeO₃ multiferroic nanocomposites. *Nano Letters* **12**, 2367–2373. doi:10.1021/nl3003396 (May 2012).
 4. **Comes, R. B.[†]**, Khokhlov, M., Liu, H., Lu, J. & Wolf, S. A. Magnetic anisotropy in composite CoFe₂O₄-BiFeO₃ ultrathin films grown by pulsed-electron deposition. *Journal of Applied Physics* **111**, 07D914. doi:10.1063/1.3676413 (Apr. 2012).
 3. **Comes, R. B.[†]**, Gu, M., Khokhlov, M., Lu, J. & Wolf, S. A. Microstructural and domain effects in epitaxial CoFe₂O₄ films on MgO with perpendicular magnetic anisotropy. *Journal of Magnetism and Magnetic Materials* **324**, 524–527. doi:10.1016/j.jmmm.2011.08.033 (Feb. 2012).
- 2010
2. **Comes, R. B.**, Terrell, E. J. & Higgs, C. F.[†]. Pad Deflection-Based Model of Chemical-Mechanical Polishing for Use in CAD IC Layout. *IEEE Transactions on Semiconductor Manufacturing* **23**, 121–131. doi:10.1109/TSM.2009.2039182 (Feb. 2010).
 1. Terrell, E. J., **Comes, R. B.** & Higgs, C. F.[†]. Analysis of feature-scale wear in chemical mechanical polishing: modeling and experiments. *Tribology Letters* **37**, 327–336. doi:10.1007/s11249-009-9524-5 (Feb. 2010).

Invited Conference Presentations

- | | |
|--------|--|
| Future | 11. <i>Emergent Properties in SrIrO₃ Heterostructures Grown by Metalorganic MBE</i> , MRS Spring Meeting 2024. Apr. 2024. |
| | 10. <i>TBD</i> , American Physical Society March Meeting 2024. Mar. 2024. |
| 2023 | 9. <i>Interfacial Phenomena in 4d and 5d Transition Metal Oxides Grown by Metal-organic MBE</i> , 37th North American Conference on Molecular Beam Epitaxy, Workshop on Quantum Materials Epitaxy. Sept. 2023. |
| | 8. <i>In Situ Studies of Charge Transfer Phenomena in Complex Oxide Heterostructures</i> , 2023 Synthesis and Processing Science Principal Investigators' Meeting. July 2023. |
| | 7. <i>Hybrid MBE Growth of Metastable SrNbO₃ for High Mobility 2DEGs</i> , Fusion Conference, 5th Functional Oxide Thin Films for Advanced Energy and Information Technology Conference. Feb. 2023. |
| 2022 | 6. <i>Engineering Metastable 4d and 5d Complex Oxide Films for Emergent Interfacial Phenomena by Hybrid Molecular Beam Epitaxy</i> , ACERS Electronic Materials and Applications. Jan. 2022. |
| 2020 | 5. <i>Structural and Electronic Phenomena in Jahn-Teller Active Mn Spinel Thin Films</i> , ACERS Electronic Materials and Applications. Jan. 2020. |
| 2019 | 4. <i>Surface and Interface Studies of Complex Oxides Grown by Hybrid MBE</i> , Fusion Conferences, 4th Functional Oxide Thin Films for Advanced Energy and Information Technology Conference. July 2019. |
| 2018 | 3. <i>Surface and Interface Defects in SrTiO₃ Polar/Non-Polar Heterostructures</i> , Gordon Research Conference on Defects in Semiconductors. Aug. 2018. |
| 2017 | 2. <i>Measuring Built-in Electric Fields in Oxide Heterostructures with X-rays</i> , ACERS Electronic Materials and Applications. Jan. 2017. |
| 2016 | 1. <i>Interfacial Engineering and Characterization in Polar/Non-Polar Oxide Heterostructures</i> , 83rd Annual Meeting of the Southeastern Section of the American Physical Society. Nov. 2016. |

Invited Seminars

- | | |
|------|---|
| 2023 | 27. <i>MBE-grown 4d and 5d Oxide Heterostructures for Electronic and Quantum Systems</i> , New Mexico State University, Department of Physics. Oct. 2023. |
| | 26. <i>Band-Engineered Oxide Heterostructures: A Platform for Electronic, Energy, and Quantum Systems</i> , Baylor University, Department of Physics, Virtual. May 2023. |
| | 25. <i>Band-Engineered Oxide Heterostructures: A Platform for Electronic, Energy, and Quantum Systems</i> , University of Arizona, Department of Materials Science and Engineering. Mar. 2023. |
| | 24. <i>Band-Engineered Oxide Heterostructures: A Platform for Electronic, Energy, and Quantum Systems</i> , Virginia Tech, Department of Materials Science and Engineering. Feb. 2023. |
| 2022 | 23. <i>Interfacial Band Engineering of Oxide Heterostructures for Electronic, Energy, and Quantum Systems</i> , Clemson University, Department of Materials Science and Engineering. Apr. 2022. |
| | 22. <i>Interfacial Band Engineering of Oxide Heterostructures for Electronic, Energy, and Quantum Systems</i> , Louisiana State University, Department of Physics. Mar. 2022. |
| | 21. <i>Interfacial Band Engineering of Oxide Heterostructures for Electronic, Energy, and Quantum Systems</i> , University of Cincinnati, Department of Physics, Virtual. Feb. 2022. |

Invited Seminars

- | | |
|------|--|
| 2021 | <ol style="list-style-type: none">20. <i>New Approaches to Atomic Scale Oxide Films Synthesis for Electronic and Energy Applications</i>, University of South Alabama, Department of Physics, Virtual. Oct. 2021.19. <i>New Approaches to Atomic Scale Oxide Films Synthesis for Electronic and Energy Applications</i>, Oakland University, Department of Physics, Virtual. Apr. 2021.18. <i>New Approaches to Atomic Scale Oxide Films Synthesis for Electronic and Energy Applications</i> University of Virginia, Department of Materials Science and Engineering, Virtual. Mar. 2021. |
| 2020 | <ol style="list-style-type: none">16. <i>Engineering Oxide Thin Films at the Atomic Level for New Electronic and Energy Applications</i> Alabama A&M, Department of Physics. Feb. 2020.15. <i>Engineering Oxide Thin Films at the Atomic Level for New Electronic and Energy Applications</i> University of Georgia, Department of Physics. Jan. 2020. |
| 2019 | <ol style="list-style-type: none">14. <i>Engineering Oxide Thin Films at the Atomic Level for New Electronic and Energy Applications</i> Clemson University, Department of Physics. Sept. 2019.13. <i>Atom-by-Atom Engineering of Oxide Thin Films and Nanocomposites via Molecular Beam Epitaxy</i> University of Cincinnati, Department of Materials Science and Engineering. Apr. 2019.12. <i>Atom-by-Atom Engineering of Oxide Thin Films and Nanocomposites via Molecular Beam Epitaxy</i> Augusta University, Department of Physics. Mar. 2019. |
| 2018 | <ol style="list-style-type: none">11. <i>Atom-by-Atom Engineering of Oxide Thin Films and Nanocomposites via Molecular Beam Epitaxy</i> University of Alabama-Huntsville, Department of Physics. Nov. 2018.10. <i>Atom-by-Atom Engineering of Oxide Thin Films and Nanocomposites via Molecular Beam Epitaxy</i> Tuskegee University, Department of Physics. Oct. 2018. |
| 2017 | <ol style="list-style-type: none">9. <i>Atom-by-Atom Engineering of Oxide Thin Films and Nanocomposites via Molecular Beam Epitaxy</i> University of Alabama, Department of Physics. Oct. 2017.8. <i>Atom-by-Atom Engineering of Oxide Thin Films and Nanocomposites via Molecular Beam Epitaxy</i> University of Alabama-Birmingham, Department of Physics. Apr. 2017. |
| 2016 | <ol style="list-style-type: none">7. <i>Engineering Electronic and Optical Properties in Oxides by Design</i> Lehigh University, Department of Materials Science and Engineering. Mar. 2016.6. <i>Controlling Band Structure in Complex Oxide Thin Films with Dopants and Interfaces</i> Auburn University, Department of Physics. Feb. 2016. |
| 2015 | <ol style="list-style-type: none">5. <i>Engineering Band Structure in SrTiO₃ Thin Films with Dopants and Interfaces</i> Naval Research Laboratory, Physics of Electronic Materials Branch. Oct. 2015.4. <i>Engineering Band Structure in SrTiO₃ Thin Films with Dopants and Interfaces</i> University of Idaho, Department of Chemical Engineering and Materials Science. Apr. 2015. |
| 2012 | <ol style="list-style-type: none">3. <i>Growth and Patterning of Epitaxial Multiferroic Nanocomposites Using Pulsed Electron Deposition</i> Argonne National Laboratory, Materials Science Division. Nov. 2012.2. <i>Epitaxial Multiferroic Nanocomposites: PED Growth and EBL Patterning</i> Oak Ridge National Laboratory, Materials Science and Technology Division. Sept. 2012.1. <i>Directed Self-Assembly of Epitaxial Multiferroic Nanocomposites</i> Argonne National Laboratory, Materials Science Division. Feb. 2012. |

Mentorship

Ph.D. Students Supervised	<ul style="list-style-type: none">• Mohamed Kandil, Auburn University, Department of Physics, Aug 2023-Present, Co-advised with Prof. Wencan Jin• Tanzila Tasnim, Auburn University, Department of Physics, Jan 2022-Present• Brian Opatosky, Auburn University, Department of Physics, Jan 2022-Present• Bhavesh Ramkorun, Auburn University, Department of Physics, Aug 2021-Present, Co-advised with Prof. Edward Thomas• Jibril Ahammad, Auburn University, Department of Physics, Aug 2021-Present• Patrick Gemperline, Auburn University, Department of Physics, Aug 2018-Present• Rajendra Paudel, Ph.D. Auburn University, Department of Physics, Aug 2017-Aug 2022; Now with Micron• Suresh Thapa, Ph.D. Auburn University, Department of Physics, Aug 2017-May 2022; Now with Intel• Miles Blanchet, Ph.D. Auburn University, Department of Physics, Aug 2016-May 2022; Now with GlobalFoundries
M.S. Students Supervised	<ul style="list-style-type: none">• Uchenna Ubeh, M.S. Auburn University, Department of Physics, Aug 2016-May 2019; Pursuing Ph.D. in Physics at University of Houston
Postdocs Supervised	<ul style="list-style-type: none">• Dr. Gaurab Rimal, Dec 2022-Aug 2023; Now Assistant Prof, Western Michigan University Physics• Dr. Sydney Provence, Jan 2019-March 2021; Now with Tignis, Inc.• Dr. Shalinee Chikara, Jan 2017-Aug 2019; Now with National High Magnetic Field Lab, Florida State University
Undergraduate Researchers Supervised	<ul style="list-style-type: none">• Reid Markland, Sep 2021-Present• Sydney Battles, Sep 2021-May 2023; Now pursuing M.S. in Physics at Auburn University• Michael Demos, Jan 2020-May 2021; Now pursuing Ph.D. in Physics at University of Kentucky• Faith Tiller, Sep 2018-May 2019; Now with Booz Allen Hamilton• Will Bowers, Jan 2017-May 2020; Now with Trimble Maps as software engineer
REU Students Supervised	<ul style="list-style-type: none">• Zoe Adams, May 2023-Jul 2023; Co-advised with Byron Farnum through Auburn CASE REU• Kennedi Banks, May 2022-Jul 2022; Co-advised with Byron Farnum through Auburn CASE REU• Brandon Dye, May 2021-Jul 2021; Co-advised with Byron Farnum through Auburn CASE REU• Elyssa Roeder, Jun 2018-Aug 2018; Auburn Physics REU, Now pursuing Ph.D. in Physics at Florida State University• Patrick Gemperline, Jun 2017-Aug 2017; Auburn Physics REU, Now pursuing Ph.D. in Physics at Auburn University

Honors and Awards

- | | |
|------|---|
| 2021 | <ul style="list-style-type: none">• <i>National Science Foundation</i>, CAREER Award• <i>Journal of Materials Research</i>, Early Career Scholars in Materials Science Prize for best paper in early career scholars issue |
| 2020 | <ul style="list-style-type: none">• <i>Journal of Physics: Condensed Matter</i>, Emerging Leaders, Invited original research paper• <i>Air Force Office of Scientific Research</i>, Young Investigator Award• <i>Auburn University, Department of Physics</i>, Society of Physics Students Most Outstanding Professor |
| 2019 | <ul style="list-style-type: none">• <i>Fusion Conferences</i>, 4th Functional Oxide Thin Films for Advanced Energy and Information Technology Conference, Emerging Young Investigator Award |
| 2017 | <ul style="list-style-type: none">• <i>Southeastern Conference</i>, SEC Faculty Travel Grant |
| 2013 | <ul style="list-style-type: none">• <i>Pacific Northwest National Laboratory</i>, Linus Pauling Distinguished Postdoctoral Fellow• <i>Materials Research Society</i>, Graduate Student Silver Award, Spring Meeting |
| 2012 | <ul style="list-style-type: none">• <i>University of Virginia</i>, Department of Materials Science and Engineering, Doris Kuhlmann-Wilsdorf Outstanding Graduate Student Award• <i>University of Virginia</i>, School of Engineering and Applied Sciences, Engineering Research Symposium, First Place |
| 2010 | <ul style="list-style-type: none">• <i>Army Research Office</i>, National Defense Science and Engineering Graduate Fellowship |
| 2009 | <ul style="list-style-type: none">• <i>National Science Foundation</i>, Graduate Research Fellowship Program, Honorable Mention |
| 2008 | <ul style="list-style-type: none">• <i>University of Virginia</i>, School of Engineering and Applied Sciences, Dean's Fellow• <i>University of Virginia</i>, Vice President of Research and Graduate Studies, Fellowship Enhancement• <i>Carnegie Mellon University</i>, Phi Beta Kappa |
| 2007 | <ul style="list-style-type: none">• <i>Carnegie Mellon University</i>, Tau Beta Pi, Engineering Honors |
| 2006 | <ul style="list-style-type: none">• <i>Carnegie Mellon University</i>, Eta Kappa Nu, Electrical Engineering Honors |

Service to Research Community

Peer Review

- Journal referee for *Nature Materials*, *Nature Communications*, *Science Advances*, *Proceedings of the National Academy of Sciences*, *Physical Review Letters*, *Physical Review B*, *Physical Review Materials*, *Nano Letters*, *ACS Nano*, *Chemistry of Materials*, *Advanced Materials*, *Advanced Functional Materials*, *Applied Physics Letters*, *APL Materials*, *Journal of Vacuum Science and Technology*, and others.
- *National Science Foundation*, Division of Materials Research ad hoc and panel reviewer
- *Department of Energy*, Basic Energy Science, Proposal reviewer
- *Air Force Office of Scientific Research*, Proposal reviewer

Service to Research Community

Conference
Organization

American Physical Society

- *Conference for Undergraduate Women in Physics 2023*: Co-organizer for Auburn site
- *March Meeting 2019*: Focus Session Organizer and Session Chair, Complex Oxide Interfaces and Heterostructures
- *Southeastern Section of the APS 2017*: Session Organizer and Chair, Emerging Thin Film Materials and Interfaces
- *March Meeting 2017*: Focus Session Organizer and Session Chair, Complex Oxide Interfaces and Heterostructures

American Ceramics Society

- *Electronic Materials and Applications 2020*: Symposium Co-organizer, “Complex oxide and chalcogenide semiconductors”; Session chair: “Low Dimensional Systems”
- *Electronic Materials and Applications 2019*: Lead Symposium Organizer, “Complex oxide and chalcogenide semiconductors”; Session chair: “Oxide Semiconductors”
- *Electronic Materials and Applications 2018*: Symposium Co-organizer, “Complex oxide and chalcogenide semiconductors: Research and applications”; Session chair: “Multifunctional nanocomposites”

American Vacuum Society

- *North American Conference on Molecular Beam Epitaxy, 2023*: Program Committee

International Workshop on Oxide Electronics

- *28th International Workshop on Oxide Electronics, 2022*: Co-organizer