
Robert G. Moore II

moorerg@ornl.gov | 865-440-4826

PROFESSIONAL EXPERIENCE

Director | INTERSECT Initiative | Oak Ridge National Laboratory | Oak Ridge, TN | 2023 to Present

- Interconnected Science Ecosystem (INTERSECT) is a 5-year, \$5M/year lab-wide initiative to develop a scalable ecosystem to enable interdisciplinary “self-driving” processes.
- This laboratory of the future vision couples theory, high performance computing, edge computing, data analysis, and experimental instruments to enable autonomous workflows that significantly accelerates scientific discovery.
- Develops initiative strategy and long-term planning to further the mission of ORNL and DOE.
- Provides project leadership to ensure interdisciplinary teams deliver impactful results.

Distinguished Staff Scientist | Oak Ridge National Laboratory | Oak Ridge, TN | 2023 to Present

- Leads research efforts in the development of quantum thin film materials for quantum computing and quantum sensing applications.
- Research focus is on the fundamental interplay between topology and correlated electron physics.
- Project leader for ORNL’s Quantum Science Center that focuses on developing topological quantum materials and includes diverse team spanning four institutions including two national labs and two universities.
- Drives efforts that bridges the gap between quantum material property and device functionality.

Staff Scientist | Oak Ridge National Laboratory | Oak Ridge, TN | 2019 to 2023

- Laboratory Strategic Hire for the development of Angle Resolved Photoemission Spectroscopy capabilities at lab.
- Oversee the development of He lamp and 11 eV laser based photoemission program coupled to multiple Molecular Beam Epitaxy systems.
- Drive research focusing on the electronic structure of quantum crystals and thin films.
- Mentor postdocs in the investigation of quantum materials.

Assistant Director | Stanford Institute for Materials and Energy Sciences – SLAC National Accelerator Laboratory | Menlo Park, CA | 2010 to 2019

- Serve as Scientific Advisor and Institutional Representative for the comprehensive renovation of 5K sq ft laboratory and 140K sq ft office space at SLAC National Accelerator Laboratory.
- Develop and maintain institutional operational and safety protocols for a 250+ person and \$20M+ institute operating within a Department of Energy National Lab environment.
- Assist researchers in standing up new programs within a high-profile laboratory.
- Institutional representative for internal and external scientific workshops and committees.

Staff Scientist | Stanford Institute for Materials and Energy Sciences – SLAC National Accelerator Laboratory | Menlo Park, CA | 2010 to 2019

- Lead research team focused on thin film growth with *in situ* Angle Resolved Photoemission Spectroscopy and Scanning Probe Microscopy / Spectroscopy characterization of quantum materials.
- Oversee development of \$2M+ suite of tools for novel thin growth with sample handling infrastructure compatible with advanced *in situ* techniques.
- Develop comprehensive software for system automation, data collection and analysis in the growth and characterization of thin films.
- Developed data extraction, mining and analysis software for femtosecond time resolved resonant soft x-ray adsorption spectroscopy experiments at the Linac Coherent Light Source
- Mentor postdocs and graduate students in the development and investigation of quantum materials.

Associate Staff Scientist | Stanford Synchrotron Radiation Lightsource - SLAC National Accelerator Laboratory | Menlo Park, CA | 2008 to 2010

- Served as lead scientist overseeing the operation and maintenance of the SSRL photoemission beamline endstation.

Robert G. Moore II

rgmooreii@gmail.com | 865-440-4826

- Designed and implemented complex software for system automation and data collection at the synchrotron based photoemission beamline.
- Mentored graduate students and external users in the use of the photoemission beamline and endstation.
- Fixed issues in a timely manner to maximize system uptime at a high-profile Department of Energy user facility.

Postdoctoral Research Associate | Stanford Synchrotron Radiation Lightsource - SLAC National Accelerator Laboratory | Menlo Park, CA | 2006 to 2008

- Collaborated with a multifaceted team to assist with operation and maintenance of SSRL photoemission beamline endstation.
- Trained and mentored graduate students on use of the photoemission beamline and endstation.
- Investigated bulk quantum materials utilizing Angle Resolved Photoemission Spectroscopy.

US Naval Submarine Officer | United States Navy - USS Alaska SSBN 732 | Bangor, WA | 1994 - 2000

- Managed daily and tactical operations of a nuclear powered ballistic missile submarine.
 - Oversaw operational divisions as Communications, Chemistry and Radiological Controls and Reactor Controls.
-

EDUCATION / PROFESSIONAL DEVELOPMENT

Ph.D. | Physics | University of Tennessee | Knoxville, TN | 2006

Master's Degree | Physics | University of Washington | Seattle, WA | 2002

Bachelor's Degree | Mechanical Engineering | Tennessee Technological University | Cookeville, TN | 1994

Research Profile – ARPES / MBE / STM / STS / XAS / XPS / LEED-IV / RHEED / XRD / HREELS / INS

Technical Profile – Windows / UNIX / LINUX / LabVIEW / Solid Edge / Matlab / Octave / Igor / QuantumEspresso / COMSOL / Fortran / C++ / Python / Office / OpenOffice / LaTeX

AWARDS / HONORS

2018 - Invited Public Lecture - Perimeter Institute for Theoretical Physics Public Lecture Series

2016 - Invited Public Lecture - SLAC Public Lecture Series

2012 - Finalist - DPG Gerhard Ertl Young Investigator Award

2006 - Fowler-Marion Outstanding Graduate Student Award

2002 - 2006 - Tennessee Advanced Materials Laboratory Fellowship

2003 - Materials Research Society Poster Award - "Surface Phase Transitions of Layered Perovskite $\text{Ca}_{2-x}\text{Sr}_x\text{RuO}_4$ "

1998 - 2000 - Qualified Engineer on Naval S8G Nuclear Reactor with two Navy and Marine Corp Achievement Medals

SELECTED PUBLICATIONS

(Total Pubs: 99; High Impact Journals: 45; Citations: >9900; h-index: 49; i10-index: 71)

- **R. G. Moore**, Jiandi Zhang, V. B. Nascimento, R. Jin, Jiandong Guo, G. T. Wang, Z. Fang, D. Mandrus, E. W. Plummer, "A surface-tailored, purely electronic, Mott metal-to-insulator transition," **Science** 318, 615 (2007).
 - **R. G. Moore**, V. B. Nascimento, Jiandi Zhang, J. Rundgren, R. Jin, D. Mandrus, E. W. Plummer, "Manifestations of broken symmetry: The surface phases of $\text{Ca}_{2-x}\text{Sr}_x\text{RuO}_4$," **Phys. Rev. Lett.** 100, 066102 (2008).
 - **R. G. Moore**, V. Brouet, R. He, D. H. Lu, N. Ru, J. -H. Chu, I. R. Fisher, Z. -X. Shen, "Fermi surface evolution across multiple charge density wave transitions in ErT_3 ," **Phys. Rev. B** 81, 073102 (2010).
 - Y. L. Chen, J. -H. Chu, J. G. Analytis, Z. K. Liu, K. Igarashi, H. -H. Kuo, X. L. Qi, S. K. Mo, **R. G. Moore**, D.H. Lu, M. Hashimoto, T. Sasagawa, S. C. Zhang, I. R. Fisher, Z. Hussain, Z. -X Shen, "Massive Dirac Fermion on the surface of a magnetically doped topological insulator," **Science** 329, 659 (2010).
-

Robert G. Moore II

rgmooreii@gmail.com | 865-440-4826

- J. J. Lee, F. T. Schmitt, **R. G. Moore**, I. M. Vishik, Y. Ma, Z. -X. Shen, “Intrinsic ultrathin topological insulators grown via molecular beam epitaxy characterized by in-situ angle resolved photoemission spectroscopy,” **App. Phys. Lett.** 101, 013118 (2012).
- F. Lin, D. Nordlund, T. -C. Weng, D. Sokaras, K. M. Jones, R. B. Reed, D. T. Gillaspie, D. G. J. Weir, **R. G. Moore**, A. C. Dillon, R. M. Richards, C. Engrakul, “Origin of electrochromism in high-performing nanocomposite nickel oxide,” **ACS App. Mater. & Interface** 5, 3643 (2013).
- Y. Zhang, T. -R. Chang, B. Zhou, Y. -T. Cui, H. Yan, Z. K. Liu, F. Schmitt, J. Lee, **R. G. Moore**, Y. Chen, H. Lin, H. -T. Jeng, S. -K. Mo, Z. Hussain, A. Bansil, Z. -X. Shen, “Direct observation of the transition from indirect to direct bandgap in atomically thin epitaxial MoSe₂,” **Nature Nanotech.** 9, 111 (2014).
- J. J. Lee*, F. T. Schmitt*, **R. G. Moore***, S. Johnston, Y. -T. Cui, W. Li, M. Yi, Z. K. Liu, M. Hashimoto, Y. Zhang, D. H. Lu, T. P. Devereaux, D. -H. Lee, Z. -X. Shen, “Significant T_c enhancement in FeSe films on SrTiO₃ due to interfacial mode coupling,” **Nature** 515, 245 (2014) (* Equal contributions)
- S. N. Rebec, T. Jia, C. Zhang, M. Hashimoto, D. -H. Lu, **R. G. Moore**, Z. -X. Shen, “Coexistence of replica bands and superconductivity in FeSe monolayer films,” **Phys. Rev. Lett.** 118, 067002 (2017).
- S. N. Rebec, T. Jia, H. Sohail, M. Hashimoto, D. -H. Lu, Z. -X. Shen, **R. G. Moore**, “Dichotomy of the photo induced 2-dimensional electron gas on SrTiO₃ surface terminations,” **Proc. Natl. Acad. Sci.** 116, 16687 (2019).
- J. Lapano, O. Dyck, A. R. Lupini, W. Ko, H. Li, H. Miao, H. N. Lee, A. P. Li, M. Brahlek, S. Jesse, **R. G. Moore**, “van der Waals epitaxy growth of Bi₂Se₃ on a freestanding monolayer graphene membrane: Implications for layered materials and heterostructures,” **ACS Appl. Nano Mater.** 4, 7607 (2021).
- **R. G. Moore**, Q. Lu, H. Jeon, X. Yao, T. Smith, Y. Y. Pai, M. Chilcote, H. Miao, S. Okamoto, A. P. Li, S. Oh, M. Brahlek, “Monolayer superconductivity and tunable topological electronic structure at the Fe(Te,Se)/Bi₂Te₃ interface,” **Adv. Mater.** 2210940 (2023).

SELECTED INVITED TALKS

- “Manifestations of Broken Symmetry: The Surface Phases of Ca_{2-x}Sr_xRuO₄.” Yonsei University and Seoul National University, Seoul Korea, September, 2008.
 - “New Chapters to a Classic Textbook Problem: The Multiple CDWs of RTe₃.” Stanford Synchrotron Radiation Lightsource and Linear Coherent Light Source Users Meeting, Menlo Park, CA, October, 2008.
 - “Bulk Insulators with Metallic Surfaces: Ca_{2-x}Sr_xRuO₄ and Bi₂Se₃.” ICAM Workshop on Novel Emergent Phenomena Created by Spatial Confinement, Baton Rouge, LA, October, 2010.
 - “Disentangling the Degrees of Freedom of a Charge Density Wave in Momentum, Temperature and Time.” DPG Spring Meeting as part of Gerhard Ertl Young Investigator Award, Berlin, Germany, April, 2012.
 - “Growth and *in situ* Investigation of the Electronic Structure of Low Dimensional Transition-Metal Complexes” In Situ Studies of Inorganic Transition-Metal Complexes Workshop, Stanford Synchrotron Radiation Lightsource and Linear Coherent Light Source Users Meeting, Menlo Park, CA, October, 2014.
 - “Significant T_c Enhancement in FeSe Films on SrTiO₃ due to Interfacial Mode Coupling” APS March Meeting, San Antonio, TX, March, 2015.
 - “A Material World: A Renaissance at the Atomic Scale” SLAC Public Lecture, Menlo Park, CA, September, 2016 (online: <https://www.youtube.com/user/SLAC>).
 - “Building a Future From the Atoms Up” Perimeter Institute for Theoretical Physics Public Lecture, Waterloo, Canada, April, 2018 (online: <https://www.youtube.com/user/PIOutreach>).
-