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EDUCATION

University of California, Davis (UC Davis), CA, USA
PhD, Physics
June 2012
Dissertation: "Computational Studies of Condensed Matter Systems: MnV_2O_4 and the 2D attractive Hubbard model with spin-dependent disorder"
Advisor: Prof. Sergey Savrasov

San Jose State University, San Jose, CA, USA
MS, Physics
August 2005

San Jose State University, San Jose, CA, USA
BS, Physics with minor in Math
May 2002

RESEARCH EXPERIENCE

Assistant Professor of Physics
Amrita Vishwa Vidyapeetham, Chennai, India: 11/2022 – 8/2023

Postdoctoral Research Associate
 Brown University: 10/2017 – 6/2020
 Supervisor: Prof. Brenda Rubenstein

1) Conducting computational physics research on the electronic structure of transition metal oxides and actinide compounds using methods such as density functional theory (DFT), full configuration interaction (FCI), and quantum monte-carlo (QMC).

2) I used custom physics codes to perform the research as well as wrote my own Python code to implement the Hartree-Fock algorithm of quantum chemistry.

Postdoctoral Research Associate
 University of Illinois at Chicago: 8/2015 – 12/2016

 Supervisor: Prof. Hyowon Park

1) Conducting computational physics research on the electronic structure of transition metal oxides using computational methods such as density functional theory (DFT) and charge self-consistent dynamical mean-field theory (DMFT).

2) Study of the structural and magnetic phase transitions in bulk and strained transition metal oxides.

Postdoctoral Research Associate
 University of Notre Dame: 1/2014 – 5/2015
 Supervisor: Prof. John Parkhill

1) Performed research on the electronic structure and molecular dynamics of photovoltaic materials, and non-radiative energy transfer in molecules using density functional theory, many-body excited state methods such as GW+BSE, and the Redfield equation.

2) Developed a method to propagate non-equilibrium electron and hole density matrices based on the Mukherjee-Kutzelnigg generalized normal ordering and the Redfield equation.

3) I wrote Python scripts to automate electronic structure job submissions to the HPC clusters, as well as for subsequent data collection for analysis.

Visiting Scholar
 UC Davis: 4/2013 – 12/2013
 Supervisor: Prof. Sergey Savrasov

Postdoctoral Scholar
 UC Davis: 4/2012 – 4/2013
 Supervisor: Prof. Sergey Savrasov

1) Investigating the electronic structure and computing exchange interactions of Uranium dioxide (UO_2).

2) Calculating spin-waves of UO_2 from a generalized Heisenberg model.

Graduate Student Researcher (GSR)
  UC Davis: 9/2008 – 12/2009 and 9/2011 – 3/2012

1) Performed computational physics research involving simulation of the electronic structure of materials and calculation of various physical properties using first-principles codes.

2) Calculated the exchange constants in magnetic materials using linear response; used the calculated parameters in a Heisenberg model and solved for the spin-waves of the materials.

3) Designed, implemented, tested, and used Fortran code to map the mean-field phase diagram of the 2D spin-dependent, disordered, attractive Hubbard model.

TEACHING EXPERIENCE

Assistant Professor of Physics
Amrita Vishwa Vidyapeetham, Chennai, India: 11/2022 – 8/2023

Teaching undergraduate courses in engineering physics and properties of materials

Visiting Lecturer
 Brown University: 9/2019 – 5/2020

Developed and taught the graduate level quantum mechanics and quantum chemistry courses in the Department of Chemistry at Brown University during the 2019 – 2020 academic year.

Teaching Assistant
UC Davis: 9/2005 - 8/2008 and 1/2010 – 8/2011

1) Taught lower-division undergraduate physics labs for science and engineering majors, and for life-science majors.

2) One-on-one interactions with students during lab and office hours to facilitate their understanding of concepts and improve their problem-solving abilities

3) Graded assignments for several undergraduate physics courses

4) Reader for upper-division physics courses: Classical Mechanics, Quantum Mechanics

5) Reader for graduate physics courses: Electricity and Magnetism, Mathematical Methods

PUBLICATIONS

1) A Combined First Principles Study of the Structural, Magnetic, and Phonon Properties of Monolayer CrI_3
Ref: https://doi.org/10.1063/5.0074848 – Published January 7, 2022

Authors: Daniel Staros, Guoxiang Hu, Juha Tiihonen, <u>Ravindra Nanguneri</u>, Jaron Krogel, M. Chandler Bennett, Olle Heinonen, Panchapakesan Ganesh, Brenda Rubenstein

2) First principles calculations of the electric field gradient tensors of Ba_2NaOsO_6, a Mott insulator with strong spin orbit coupling
Ref: Journal of Physics: Condensed Matter, **32** 405802 – Published July 3, 2020
Authors: Rong Cong, <u>Ravindra Nanguneri</u>, Brenda M. Rubenstein, V. F. Mitrovic

3) Evidence from first-principles calculations for orbital ordering in Ba_2NaOsO_6: A Mott insulator with strong spin-orbit coupling
Ref: Physical Review B 100, 245141 – Published 24 December 2019
Authors: Rong Cong, <u>Ravindra Nanguneri</u>, Brenda M. Rubenstein, V. F. Mitrovic

4) DFT+DMFT study of spin-charge-lattice coupling in covalent $LaCoO_3$
Ref: Physical Review B 101, 195125 – Published 13 May 2020
Authors: Hyowon Park, <u>Ravindra Nanguneri</u>, Anh T. Ngo

5) Ferromagnetism and Charge Order from a Frozen Electron Configuration
Ref: Physical Review Letters 120, 197201 – Published 8 May 2018
Authors: G. E. Sterbinsky, <u>Ravindra Nanguneri</u>, J. X. Ma, J. Shi, E. Karapetrova, J. C. Woicik, H. Park, J.-W. Kim, and P. J. Ryan

6) How Electronic Dynamics with Pauli Exclusion Produces Fermi-Dirac Statistics
Ref: Journal of Chemical Physics 142, 134113 – published 7 April 2015
Authors: Triet Nguyen, <u>Ravindra Nanguneri</u>, John Parkhill

7) Relaxation Between Bright Optical Wannier Excitons in Perovskite Solar Absorber $CH_3NH_3PbI_3$
Ref: arXiv:1411.1110v1 [cond-mat.mtrl-sci]
Authors: <u>Ravindra Nanguneri</u>, John Parkhill

8) Anisotropic multipolar exchange interactions in systems with strong spin-orbit coupling
Ref: Physical Review B **90**, 045148 - published 31 July 2014
Authors: S.-T. Pi, <u>Ravindra Nanguneri</u>, S. Y. Savrasov

9) Calculation of Multipolar Exchange Interactions in Spin-Orbit Coupled Systems
Ref: Physical Review Letters 112, 077203 - published 20 February 2014
Authors: S.-T. Pi, <u>Ravindra Nanguneri</u>, S. Y. Savrasov

10) Exchange constants and spin waves of the orbital ordered, non-collinear spinel MnV_2O_4
Ref: Physical Review B **86**, 085138 - published 24 August 2012
Authors: <u>Ravindra Nanguneri</u>, S. Y. Savrasov

11) Gapless inhomogeneous superfluid phase with spin-dependent disorder
Ref: New Journal of Physics **15,** 023023 – published 15 February 2013
Authors: M. Jiang, Ravindra Nanguneri, N. Trivedi, G. G. Batrouni, R. T. Scalettar

12) Interplay of Superconductivity and Spin-Dependent Disorder
Ref: Physical Review B **85**, 134506 – published 9 April 2012
Authors: Ravindra Nanguneri, M. Jiang, T. Cary, G. G. Batrouni, R. T. Scalettar

TECHNICAL SKILLS

Electronic Structure codes: VASP, LMTO, Quantum Espresso, Q-Chem, Berkeley GW, YAMBO, DFT+DMFT, Wannier90, QMCpack
Programming languages: Python, R, Java, C/C++, MATLAB, Fortran, Mathematica
Data analysis tools: Excel, Pandas, NumPy, SciPy, Matplotlib, Seaborn, Scikit-Learn
Databases: SQL, PostgreSQL

GRADUATE COURSES

Classical Mechanics, Mathematical Methods,
Electromagnetic Theory, Quantum Mechanics,
Statistical Mechanics, Condensed Matter Physics,
Superconductivity, Quantum Magnetism,
Quantum Field Theory, Particle Physics,
Computational Physics, Numerical Methods

PROFESSIONAL AFFILLIATIONS

American Physical Society, 2019 – 2020

PROFESSIONAL REFERENCES

Brenda Rubenstein, Professor; Brown University; Email:
brenda_rubenstein@brown.edu;
Phone: +1 603 661-2160

Hyowon Park, Professor; University of Illinois at Chicago; Email: hyowon@uic.edu ;
Phone: +1 312 996-8913

Sergey Savrasov, Professor; University of California, Davis; Email:
sysavrasov@ucdavis.edu; Phone: +1 530 902-6391

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Richard Scalettar, Professor; University of California, Davis; Email: rtscalettar@ucdavis.edu; Phone: +1 530 752-9706