

ERIC D. SWITZER

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PROFESSIONAL PREPARATION

- 2023 Doctor of Philosophy in Physics, University of Central Florida, *Advisor: T. S. Rahman*
- 2021 Master of Science in Physics, University of Central Florida, *Focus: Theoretical Physics*
- 2010 Bachelor of Science in Physics, Portland State University, *Minor: Mathematics*
- 2007 Associate of Arts, Portland Community College, *Specialization: Physics, Asian Studies*

PUBLICATIONS

1. Christina Schunke, Paul Schweer, Elric Engelage, Dave Austin, **Eric D. Switzer**, Talat S. Rahman, Karina Morgenstern, “Increased Selectivity in Photolytic Activation of Nanoassemblies Compared to Thermal Activation in On-Surface Ullmann Coupling.” *Accepted, ACS Nano* (2024).
2. Dave Austin, Ana Barragan, **Eric D. Switzer**, Sara Lois, Ane Sarasola, Duy Le, Talat S. Rahman, Lucia Vitali, “Topological states in a pseudo-kagomé lattice.” *In preparation* (2024).
3. Yunjun Cao, Dave Austin, **Eric D. Switzer**, Julien F. Rowen, Wolfram Sander, Talat S. Rahman, and Karina Morgenstern, “IETS as a probe to reveal the electronic coupling at a metal/organic interface.” *In preparation* (2024).
4. **Eric D. Switzer**, Xiao-Guang Zhang, Volodymyr Turkowski, Talat S. Rahman, “Mapping spin interactions from conductance peak splitting in Coulomb blockade.” *Physical Review B* **108**, 174438 (2023).
5. Yuri Alexeev, *et al.* (127 authors, including **Eric Switzer**), “Quantum-centric Supercomputing for Materials Science: A Perspective on Challenges and Future Directions.” *Preprint, arXiv:2312.09733* (2023).
6. **Eric D. Switzer**, Xiao-Guang Zhang, Talat S. Rahman, “Electronic control and switching of entangled spin state using anisotropy and exchange in the three-particle paradigm.” *Journal of Physics Communications* **6**, 075007 (2022).
7. Archit Dhingra, Xuedong Hu, Mario F. Borunda, Joe F. Johnson, Christian Binek, Jonathan P. Bird, Alpha T. N’Diaye, Jean-Pascal Sutter, Emilie Delahaye, **Eric D. Switzer**, Enrique Del Barco, Talat S. Rahman, and Peter A. Dowben, “Perspective: Molecular Transistors as Substitutes for Quantum Information Applications.” *Journal of Physics: Condensed Matter* **34**, 441501 (2022).
8. **Eric D. Switzer**, Xiao-Guang Zhang, Talat S. Rahman, “Anisotropy exchange resonance as a mechanism for entangled state switching.” *Physical Review A* **104**, 052434 (2021).

INVITED TALKS AND SYMPOSIA

Eric D. Switzer, Jacqueline Acres, Becker Sharif, LaNell Williams, Jorge A. Andujo, “*The Great Squeeze: The True Cost of Graduate School.*” American Physical Society March Meeting, invited symposium (2023).

Eric D. Switzer, “*Investigations of Resonances for Entangled State Switching.*” Institute of Basic Science, Center for Quantum Nanoscience, presented by Eric D. Switzer (2023).

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Eric D. Switzer, Xiao-Guang Zhang, Talat S. Rahman, “*Evolution of spin states in the three-particle spin model with full counting statistics.*” American Chemical Society Spring Meeting, presented by Eric D. Switzer (2022).

CONFERENCE PRESENTATIONS

1. **Eric D. Switzer**, Ángel Rodríguez, Nicolás Lorente, Sergiy Zhuk, Niall Robertson, Oles Shtanko, Martin Mevissen, Nathan Keenan, Bibek Pokharel, “*Pathway to Quasi-2D Time Crystals Using NISQ Hardware.*” Optics, Electronics and Magnetism in 2D Materials Workshop, to be presented by Eric D. Switzer (2024).
2. **Eric D. Switzer**, Ángel Rodríguez, Nicolás Lorente, Sergiy Zhuk, Niall Robertson, Oles Shtanko, Martin Mevissen, Nathan Keenan, Bibek Pokharel, “*Quasi-2D Time Crystals on NISQ Hardware: Challenges & Opportunities.*” 4th Quantum Matter International Conference, to be presented by Eric D. Switzer (2024).
3. **Eric D. Switzer**, Jose Reina-Gálvez, Christoph Wolf, Geza Giedke, Nicolás Lorente, Talat S. Rahman, “*Entangled State Generation and Coherence in STM-ESR Geometries Using Quantum Master Equations.*” American Physical Society March Meeting, presented by Eric D. Switzer (2024).
4. **Eric D. Switzer**, Talat S. Rahman, “*Next-Generation Qubits: A Theoretical Framework for Atomic and Molecular Tripartite Qubits.*” Academy of Science, Engineering & Medicine of Florida Annual Meeting, presented by Eric D. Switzer (2023).
5. **Eric D. Switzer**, Xiao-Guang Zhang, Volodymyr Turkowski, Talat S. Rahman, “*Conductance Peak Splitting in the Coulomb Blockade as Signature of Spin Interactions.*” American Physical Society March Meeting, presented by Eric D. Switzer (2023).
6. Duy Le, **Eric D. Switzer**, Peter A. Dowben, Talat S. Rahman, “*Electronic Transport Properties of a Graphene-Supported Spin Crossover $Fe[H_2B(Pz)_2]_2(bipy)$ Complex Through Gold Electrodes: An Ab Initio Study.*” American Physical Society March Meeting, presented by Eric D. Switzer (2023).
7. **Eric D. Switzer**, Xiao-Guang Zhang, Talat S. Rahman, “*DJ Resonances: Conditions for Anisotropy and Exchange-Driven Entangled State Switching in a Three Coupled Spin Particle Model.*” American Physical Society March Meeting, presented by Eric D. Switzer (2022).
8. **Eric D. Switzer**, Xiao-Guang Zhang, Talat S. Rahman, “*Resonance conditions for entangled state switching and simulated EPR spectra in a three coupled spin particle model.*” 61st Sanibel Symposium, poster by Eric D. Switzer (2022).
9. **Eric D. Switzer**, Xiao-Guang Zhang, Talat S. Rahman, “*Anisotropy-Exchange Resonances as a Mechanism for Entangled State Switching for Two Coupled $S = 1$ Magnetic Particles,*” 17th International Conference on Molecule-based Magnetism, University of Manchester, presented by Eric D. Switzer (2021).
10. Joshua Forer, Daniel P. Oleynik, **Eric D. Switzer**, “*Remote Delivery of Introductory Physics Labs Using the SCALE-UP Approach During the COVID-19 Transition Period.*” American Association of Physics Teachers Summer Meeting, presented by Joshua Forer (2020).
11. **Eric D. Switzer**, Aniket Bhattacharya, “*Scaling relations for the continuum limit from collisions between nanoclusters and rough surfaces.*” American Physical Society March Meeting, presented by Eric D. Switzer (2019).

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SELECTED AWARDS, HONORS, AND DISTINCTIONS

- 2024 National Research Council / National Institute of Standards and Technology Postdoctoral Fellowship Recipient
- 2024 Chair, Ultrafast Dynamics from Electron-Phonon Interactions II Session (APS 2024)
Division of Computational Physics, American Physical Society
- 2023 Order of Pegasus
The most prestigious and significant award a student can attain at the University of Central Florida
- 2023 U.S. Congressional Visit Day and APS Leadership Meeting Guest
On behalf of APS@UCF, American Physical Society
- 2023 Chair, Quantum Many Body Systems & Methods Session (APS 2023)
Division of Computational Physics, American Physical Society
- 2022 IBM-Zerner Graduate Student Award
Sanibel Symposium
- 2022 Student of the Year Award
Physics Department, University of Central Florida
- 2022 Chair, Electronic Structure Methods Session (APS 2022)
Division of Computational Physics, American Physical Society
- 2020 Honorable Mention for Excellence by a Graduate Teaching Assistant
College of Sciences, University of Central Florida
- 2020 Physics Teaching Assistantship Award
Physics Department, University of Central Florida
- 2019 Physics Teaching Assistantship Award
Physics Department, University of Central Florida
- 2018 NASA Florida Space Grant Consortium Award: “*The Bouncing Barrier Problem in Planet Formation.*” PI: Dr. Aniket Bhattacharya, Co-PI: Dr. Joshua Colwell
- 2009 Civil Air Patrol Most Motivated Cadet Award
Air Force ROTC Detachment 695, University of Portland
- 2007 Asian Studies Focus Award
Portland Community College

GRANTS AND FELLOWSHIPS

- 2024 GERA Workshop Travel Grant (APS 2024)
Topical Group on Energy Research & Applications, American Physical Society
- 2023 GERA Workshop Travel Grant (APS 2023)
Topical Group on Energy Research & Applications, American Physical Society
- 2023 College of Graduate Studies Presentation Fellowship (APS 2023)
University of Central Florida
- 2023 Student Government Association Travel Grant (APS 2023)
University of Central Florida
- 2022 GERA Workshop Travel Grant (APS 2022)
Topical Group on Energy Research & Applications, American Physical Society

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- 2022 College of Graduate Studies Presentation Fellowship (ACS 2022)
University of Central Florida
- 2022 Student Government Association Travel Grant (ACS 2022)
University of Central Florida
- 2020 College of Graduate Studies Presentation Fellowship (APS 2020)
University of Central Florida
- 2020 Student Government Association Travel Grant (APS 2020)
University of Central Florida
- 2019 College of Graduate Studies Presentation Fellowship (APS 2019)
University of Central Florida
- 2019 Student Government Association Travel Grant (APS 2019)
University of Central Florida

RESEARCH AND TEACHING EXPERIENCE\

2023 – 2024 **Postdoctoral Scholar**

University of Central Florida (Orlando, Florida)

Research on modeling localized surface plasmon resonances, simulations of pulsed electron spin resonance with scanning tunneling microscopy (STM-ESR), spin and charge transport in spin-crossover molecules, ground and excited state studies of spin defects in bulk hexagonal boron nitride using *ab initio* methods (density functional theory and time-dependent density functional theory), and simulations of many-body localization on quantum computing architectures.

2024 **Long-Stay Visiting Researcher**

Donostia International Physics Center (Donostia / San Sebastián, Spain)

Research on the simulations of many-body localization in two-dimensional arrays on noisy intermediate-scale quantum (NISQ) hardware, and investigation of the mechanism behind the decoherence of entanglement in STM-ESR.

2023 **Long-Stay Visiting Researcher**

Donostia International Physics Center (Donostia / San Sebastián, Spain)

Research development of tools for the BASQ-IBM quantum computer and simulations of many-body localization on NISQ hardware in one-dimensional lattices.

2023 **Long-Stay Visiting Researcher**

Center for Quantum Nanoscience (Seoul, South Korea)

Research on determining conditions for optimized entanglement in STM-ESR, and appropriate pulse schemes to generate entanglement.

2020 – 2023 **Graduate Research Associate**

University of Central Florida (Orlando, Florida)

Research on spin and charge transport and tunneling in molecular magnets in partnership with the Center for Molecular Magnetic Quantum Materials, a U.S. Department of Energy Basic Energy Sciences-funded Energy Frontier Research Center at the University of Florida.

2020 – 2022 **Graduate Student Tutor – Classical and Quantum Mechanics**

University of Central Florida

Tutored graduate students on advanced concepts in classical mechanics and quantum mechanics.

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2020 [Lab Coordinator / Graduate Trainer – Physics I Lab with Calculus](#)

University of Central Florida

Coordinated and designed content for laboratory activities while training and managing 8 graduate students on conducting lab/recitation activities, impacting over 700 undergraduate students. Advised leadership during 2020 CoVID in-person-to-online transition.

2019 [Graduate Trainer and Teaching Assistant – Physics I Lab with Calculus](#)

University of Central Florida

Trained 7 graduate students on lab/recitation activities while conducting a lab section, impacting over 650 undergraduate students.

2018 – 2019 [Teaching Assistant – Physics I Lab](#)

University of Central Florida

Facilitated lab/recitation activities, collaborated on syllabus, met with students upon request, and graded all submitted work.

2007 [Teaching Assistant – Calculus I Lab](#)

Portland Community College (Portland, Oregon)

Facilitated lab/recitation activities, met with students upon request.

PROFESSIONAL SERVICE AND LEADERSHIP EXPERIENCE

2021 – 2023 [Early Career Network Representative, M²QM](#)

Center for Molecular Magnetic Quantum Materials

Sole representative of Energy Frontier Research Center to the wider Department of Energy Basic Energy Science Early Career Network. Led, developed, facilitated, and participated in a variety of workshops aimed at developing early career scientists.

2020 – 2023 [Founder and Chair, APS Chapter at University of Central Florida](#)

American Physical Society

Founded organization with a substantial working budget donated by the American Physical Society and faculty sponsor. Led a team of motivated officers with the goal of improving the student experience, providing targeted career resources, and executing on impactful community projects.

2022 [Facilitator and Developer, “Science Communication” Summer Workshop](#)

Center for Molecular Magnetic Quantum Materials

Facilitated workshop for early career scientists on developing a communication plan for their research to inform the general public.

2022 [Committee Member, “Branching Out: Exploring Diverse Career Paths” Webinar](#)

Early Career Club, Center for Molecular Magnetic Quantum Materials

Planned, coordinated, and fielded questions for the public webinar with other committee members.

2022 [Planning Team Member, “Launching Your Career After Graduate School” Webinar](#)

Department of Energy, Basic Energy Sciences, Early Career Network

Planned public webinar logistics and functioned as point of contact for webinar speakers with other Early Career Network members.

2019 – 2020 [Vice-President, Graduate Society of Physics Students](#)

University of Central Florida

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Led registration of organization as a 501(c)(3) to encourage donations. Represented organization in key department committees.

2019 – 2020 **Sports Coach: Youth Baseball**

North Orlando Kiwanis Little League

Coached a group of children on the fundamentals of baseball, emphasizing competitiveness, teamwork, and personal growth. Managed roster and operations.

2018 – 2019 **Sports Coach: Youth Soccer and Baseball**

I9 Sports

Coached a group of younger children on the soccer and baseball basics. Encouraged parent participation to boost morale and development.

2015 – 2016 **Sports Manager and Coach: Soccer**

AvMed, Inc.

Managed inter- and intra- company soccer teams to promote wellness and improve morale. Scheduled scrimmages and oversaw recruitment and communication efforts. Coached employee associates on the fundamentals of soccer, tips for employee wellness, and building a competitive spirit.

2013 – 2014 **American Heart Association Heart Walk Team Captain**

AvMed, Inc.

Recruited employee associates for AHA Heart walk activities. Led donation drive and communication program to promote awareness of heart disease in vulnerable populations.

2011 – 2013 **Sunday School Teacher: Youth**

Westminster Presbyterian Church

Taught and supervised groups of children during service.

RELATED WORK EXPERIENCE

2014 – 2019 **Project Manager, Lead Learning Business Partner**

SantaFe HealthCare (Gainesville, Florida)

Project manager for the standup of the SantaFe Management Services company. Consolidated HR operations across seven healthcare-related entities statewide. Chair and organizer of quarterly management meetings. Developer and facilitator of leadership and management development programs.

2012 – 2014 **Senior Learning Consultant, Service Desk Technician Level II**

AvMed, Inc. (Gainesville, Florida)

Change-management and organizational culture facilitator. Regulatory and management training developer and facilitator. Department statistician, data expert, course designer, and marketing material developer. Project manager for company-wide workstation deployment.

2011 – 2012 **Customer Service Engineer, Information Services Technician**

Digital Broadcast (Gainesville, Florida)

Trained broadcast engineers and master controller operators. Optimized and maintained a unique laboratory for development of new Broadcast and Broadcast over IP technology.

2005 – 2010 **Floor Manager, Service and Technical Support Specialist**

CSNW: The Mac Store (Beaverton, Oregon)

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Designed and taught pro-consumer and business level software/hardware lesson plans, based around benefits and usage of the Apple platform. Trained and assisted new employees with technical support and service.

2007 [Geology Field Assistant](#)

Dr. Michael Cummings, Portland State University (Portland, Oregon)

Research activities in the Chemult and Tea Table quadrangles in Oregon, focusing on the study and mapping of geological formations. Assisted professor in collecting mineral samples and statistical data.

RELATED VOLUNTEER EXPERIENCE

2024 [Assistant Coach, Recreational and Competitive Travel Teams, North Orlando Kiwanis Little League](#)

Orlando, FL

Coached and mentored players for both an 11U recreational baseball team and 10U competitive travel baseball team, leading to a division championship win for the 10U team.

2024 [Proposal Reviewer, Summer Undergraduate Research Fellowship, University of Central Florida](#)

Orlando, FL

Reviewed STEM-focused research proposals designed and conducted by undergraduate researchers in partnership with faculty mentors.

2024 [Judge, Student Scholar Symposium, University of Central Florida](#)

Orlando, FL

Judged undergraduate scholar presentations, with a focus on quality of research methodology, presentation of rules, and potential impact to the field.

2022 [Volunteer Tutor, American Physical Society BRIDGE Program Graduate Students](#)

Orlando, FL

Tutored on advanced level topics such as graduate quantum mechanics and classical mechanics to underrepresented groups and minorities, with the aim of increasing representation post-candidacy.

2022 [Volunteer Representative, University of Central Florida Table, APS March Meeting Graduate Fair](#)

Chicago, IL

Represented University of Central Florida at the conference, answering questions and offering resources to interested undergraduate students.

2022 [Teach-In Volunteer, Baldwin Park Elementary School](#)

Orlando, FL

Inspired elementary school-age children on STEM topics, with a focus on the role of creativity and exploration in uncovering new phenomena.

2022 [Little League Scorekeeper Volunteer, North Orlando Kiwanis Little League](#)

Orlando, FL

Score keeper for sponsored season games and Wooden Bat tournament.

2019 [Volunteer Chaperone, Physics Career Exploration Day, University of Central Florida](#)

Orlando, FL

Guided groups of high-school students and their parents around the department's labs and pre-planned science activities.

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2019 Volunteer Representative, Physics Department Table, University of Central Florida Graduate Fair
Orlando, FL

Represented the department at the fair, answering questions and offering resources to interested undergraduate students.

PROFESSIONAL MEMBERSHIPS

- APS (American Physical Society)
- AAPT (American Association of Physics Teachers)
- ACS (American Chemical Society)