

# JOHN S. COLTON

## Curriculum Vitae, Oct 2024

Associate Professor  
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## **Background**

### **Academic Positions**

- Associate Professor, Dept of Physics and Astronomy, Brigham Young University (Sep 2007 – present)
- Assistant Professor, Dept of Physics, University of Wisconsin-La Crosse (Aug 2003 – Aug 2007)
- Postdoctoral Research Fellow, Naval Research Laboratory in Washington D.C., Electronic Science and Technology Division, Electronic Materials Branch (Jan 2001 – Jul 2003)
  - Received competitive National Academies/National Research Council Research Associateship Award
  - Topic: Properties of electron spin in GaAs and the nitrogen-vacancy defect center in diamond, advisor Thomas Kennedy.

### **Education**

- University of California, Berkeley, CA, PhD in Condensed Matter Physics (2000); MA in Physics (1997)
  - Dissertation: “Selective excitation of the yellow and blue luminescence in *n*- and *p*-doped gallium nitride,” advisor Peter Yu.
- Brigham Young University, Provo, UT, BS in Physics and BS in Mathematics, *cum laude* (1994)

### **Research Statement**

- My research group studies the physics of semiconductor materials using primarily optical methods and with an emphasis on semiconductor nanostructures such as quantum wells and quantum dots. We use optical measurements to learn about electrons and their charge and spin interactions with other electrons and holes, with lattice vibrations (phonons), and with nuclei, for the purpose of better understanding the properties and limitations of these technologically important materials.

## **Research Activities**

### **External Research Grants (Funded)**

1. (active) “REU Site: Physics and Astronomy Research at Brigham Young University,” NSF Proposal, applied in Sep 2023, total amount funded \$631,764 for 2024-2027. NSF award number 2348770 (PI: Jean-Francois Van Huele; co-PI: John Colton).
2. “REU Site: Physics Research at Brigham Young University,” NSF Proposal, applied in Aug 2020, total amount funded \$370,586 for 2021-2024. NSF award number 2051129 (PI: Jean-Francois Van Huele; co-PI: John Colton).

3. "The effect of chemical substitutions on perovskite optical and optoelectronic properties," LANL Center for Integrated Nanotechnologies (CINT), applied in Mar 2022, proposal accepted in Jun 2022. Collaborative (non-monetary) user proposal, active through Dec 2023.
4. "REU Site: Physics Research at Brigham Young University," NSF Proposal, applied in Aug 2017, total amount funded \$480,194 for 2018-2021. NSF award number 1757998 (PI: Jean-Francois Van Huele; co-PI: John Colton).
5. "Structural analysis of  $Zn_3As_2$ ," Rapid Access Mail-In Powder Diffraction Proposal, Argonne National Lab, joint proposal with Stacey Smith (BYU Chemistry), applied in Jul 2019, proposal accepted in Jul 2019. Samples submitted in Aug 2019.
6. "REU Site: Physics Research at Brigham Young University," NSF award number 1461219, total amount funded \$454,548 for 2015-2018. (Original PI: Steve Turley; Original co-PI: Jean-Francois Van Huele. In Nov 2017 changed to PI: Jean-Francois Van Huele; co-PI: John Colton.)
7. "Solution deposition of CdTe for thin film photovoltaics," Utah Energy Research Triangle program, co-PIs Michael Scarpulla (University of Utah), Kristin Rabosky (Weber State University), total grant award \$125,000, BYU portion \$35,000, for Jan 2017 - Dec 2017.
8. "Semiconductor nanocrystals using ferritin as a template," Western Alliance to Expand Student Opportunities (WAESO) (for student Luis Perez), applied in Mar 2016, funded for \$1,378 for Jun 2016 – Aug 2016.
9. "Bioinorganic nanoparticles for improved solar and fuel cells," Utah Governor's Energy Leadership Scholars program (for student Cameron Olsen), applied in Aug 2015, funded for \$15,000 for Sep 2015 – Aug 2016.
10. "Semiconductor nanocrystals using ferritin as a template," Western Alliance to Expand Student Opportunities (WAESO) (for student Kevin Zenner), applied in Mar 2014, funded for \$1,378 for Jun 2014 – Aug 2014.
11. "Materials study for future layered photovoltaics using protein enclosed nanocrystals," Utah Governor's Energy Leadership Scholars program (for student Stephen Erickson), applied in Jan 2014, funded for \$15,000 for May 2014 – Apr 2015.
12. "Electron spin lifetimes in quantum dots and quantum wells," Western Alliance to Expand Student Opportunities (WAESO) (for student Matt Cullins), applied in Apr 2013, funded for \$2,256 for Jun 2013 – Aug 2013.
13. "Electron spin lifetimes in quantum dots," Western Alliance to Expand Student Opportunities (WAESO) (for student Christel Herlin Djaha Fodja), applied in Mar 2012, funded for \$2,256 for Jun 2012 – Aug 2012.
14. "Electrons in semiconductor quantum dots: spins and optics," NASA EPSCoR program, applied in Jun 2010, funded for \$25,000 (with \$25,000 matching) for Jul 2010 – Apr 2012.
15. " $T_2$  spin lifetime measurements in GaAs, AlGaAs, and InGaAs layers and quantum wells via optically detected electron spin echo," American Chemical Society Petroleum Research Fund Type G, submitted in Dec 2004 for \$35,000, funded for 2005-2007.
16. " $T_2$  measurements in GaAs, AlGaAs, and InGaAs layers and quantum wells via optically detected electron spin echo," Research Corporation Cottrell College Science Awards, submitted in Nov 2004 for \$31,218, funded for 2005-2007.
17. "RUI:  $T_2$  measurements in GaAs, AlGaAs, and InGaAs layers and quantum wells via optically detected electron spin echo," National Science Foundation, submitted in Oct 2004 for \$99,074, funded for 2005-2008.
18. "Electron spin  $T_1$  measurements in GaAs and related materials," Wisconsin Space Grant Consortium Research Infrastructure Program Proposal, applied in Feb 2004 for \$9,799, funded for summer of 2004.
19. "MRI: Acquisition of an optically detected electron spin echo system for  $T_2$  measurements in GaAs, AlGaAs, and InGaAs layers and quantum wells," NSF MRI Proposal, applied in Jan 2004 for \$307,907, funded for 2004-2008.

### Internal Grants (Funded)

1. "Understanding the Unique Chiral and Optoelectronic Properties of 2d Halide Perovskites," BYU College of Physical and Mathematical Sciences College High-Impact Research Program ("CHIRP") grant, applied in Oct 2023, funded for \$21,888 for Jan 2024 – Aug 2024.
2. "Exam incentives and student interviews in upper level physics electrodynamics and quantum mechanics classes," BYU College of Physical and Mathematical Sciences High-Impact Teaching Support ("HITS") grant, applied in Jan 2022, funded for \$5,170 for Jan 2022 – Dec 2022.
3. "Three Semiconductor Nanostructures: SiC for Spintronics, Ferritin for Solar Energy Harvesting, and Ge for Optoelectronics," BYU Office of Research and Creative Activities Mentoring Environment ("MEG") grant, applied in Oct 2015, funded for \$20,000 for Jan 2016 – Dec 2017.

4. "Electron and nuclear spins in self-assembled quantum dots," BYU Office of Research and Creative Activities Mentoring Environment ("MEG") grant, applied in Oct 2011, funded for \$20,000 for Jan 2012 – Jan 2014.
5. "Electron spins in semiconductor nanostructures," BYU Office of Research and Creative Activities Mentoring Environment ("MEG") grant, applied in Oct 2009, funded for \$20,000 for Jan 2010 – Jan 2012.
6. "Optical Study of Electron Spin in Semiconductors", BYU Office of Research and Creative Activities Mentoring Environment ("MEG") grant, applied in Nov 2007, funded for \$16,400 for Feb 2008 - Jan 2010.
7. "Spin Echo T<sub>2</sub> Measurements in GaAs Using Pulsed Light and Microwaves," UW-La Crosse Faculty Research Grant, applied in Oct 2003 for \$6,712, funded for summer of 2004.

## External Research Grant Applications (Not Funded)

1. "Understanding the Unique Chiral and Optoelectronic Properties of 2d Halide Perovskites," PI: John Colton; White paper submitted to DOE in May 2023; full proposal submitted Dec 2023 for \$612,432.
2. "Metal halide perovskites: exciton and spin properties," LANL Center for Integrated Nanotechnologies (CINT), applied in Sep 2023. Collaborative (non-monetary) user proposal. Collaborator moved, so proposed research became moot.
3. "Understanding the Unique Chiral and Optoelectronic Properties of Halide Perovskites through Multimodal Spectroscopic Approaches," PI: John Colton; NSF proposal, applied in Apr 2023 for \$798,251.
4. "Equipment: MRI: Track 2 Acquisition of a Multi-frequency Pulsed Electron Paramagnetic Resonance Spectrometer for Interdisciplinary Research," PI: Ming L. Tang; co-PIs: John Colton, Christoph Boehme, Natia Frank; NSF proposal, applied in Feb 2023 for \$2,455,700.
5. "Electrons and excitons in 2-dimensional metal-halide perovskites," Pre-proposal for Keck Foundation, submitted to BYU Keck grant coordinator in Dec 2021 for 5 years and \$500,000.
6. "Collaborative Research: Excited spins -- many-body coherence in molecular solids and nanostructures," collaboration between Gong Gu (U Tennessee Knoxville) and John Colton. Proposed amount: \$414,376. Submitted to NSF on 1 Nov 2019.
7. "Template Guided Assembly of Two-Dimensional Arrays of Electronic Spin Qubits," PI Gong Gu (University of Tennessee, Knoxville); co-PIs John Colton (BYU), Hongcai Joe Zhou (Texas A&M), Shengbai Zhang & Damien West (Rensselaer Polytechnic Institute), Weida Wu (Rutgers). Estimated Annual Budget Request: \$1M, BYU portion \$150,000. "Preproposal" submitted to DOE Funding Opportunity Announcement Number: DE-FOA-0002054, Topical area: Next-Generation Quantum Systems. Submitted in Feb 2019.
8. "A metal-organic framework for nanocrystals synthesized inside genetically modified ferritin for high solar energy conversion," Utah Governor's Energy Leadership Scholars program (for student Alessandro Perego), applied in Nov 2016 for \$15,000.
9. "Zeno Materials zinc oxide semiconductors", State of Utah USTAR proposal, applied in Oct 2016 for \$800,000 (list of key personnel: Gary Renlund, Chip Yeary, James Maddelone, Michael Mains, David Griffin, Bryon Tarvet, Jamie Phillips, David Look, David Allred, John Colton, Karine Chesnel, and Richard Vanfleet.)
10. "Collaborative Research: Direct Band Gap Germanium Quantum Wires," NSF Collaborative Proposal, applied in Nov 2015 for \$162,278 (PI: myself; in conjunction with linked proposals submitted by additional PIs: Paul Simmonds, Boise State Department of Physics, Material Science & Engineering, and Christian Ratsch, UCLA Department of Mathematics).
11. "Solar energy harvesting using organic/inorganic catalysts derived from ferritin-based nanoparticles," White paper submitted to Department of Energy through FOA # DE-FOA-0001204, Sep 2015, (PI: myself; co-PI: Richard Watt, BYU Dept of Chemistry and Biochemistry).
12. "Ferritin materials for solar energy harvesting and as catalysts for energy conversion," Utah Principle Energy Issues Program, applied in Aug 2015 for \$125,000 (PI: myself; co-PIs: R.K. Watt, BYU Dept of Chemistry and Biochemistry; Yujie Sun, Utah State University Dept of Chemistry and Biochemistry; Rajesh Menon, University of Utah Dept of Electrical and Computer Engineering).
13. "Fabrication of dye sensitized solar cells using Fe-, Mn- and Co-oxyhydroxide nanocrystals in ferritin as the dye," Utah Governor's Energy Leadership Scholars program (for student Alessandro Perego), applied in Aug 2015 for \$15,000.
14. "Solar energy harvesting using organic/inorganic catalysts derived from ferritin-based nanoparticles," White paper submitted to Air Force Office of Scientific Research through BAA # BAA-AFRL/AFOSR-2015-0001, May 2015, for \$450-540,000 (PI: myself; co-PI: Richard Watt, BYU Dept of Chemistry and Biochemistry). White papers submitted to the "Organic Materials Chemistry" and "Natural Materials, Systems, and Extremophiles" program areas.

15. "Ferritin nanoparticles for full spectrum light harvesting in photovoltaic and biomass oxidation applications," NSF proposal, applied in Oct 2014 for \$566,505 (co-PIs: myself and R.K. Watt, BYU Dept of Chemistry and Biochemistry).
16. "Solar energy harvesting via biomass oxidation with synthetic ferritin nanoparticles," White paper submitted to Air Force Office of Scientific Research Office through BAA # BAA-AFOSR-2014-0001, May 2014, for \$450,000 (PI: myself; co-PI: Richard Watt, BYU Dept of Chemistry and Biochemistry).
17. "Synthetic ferritin nanoparticles designed to harvest light for oxidizing biomass," NSF proposal, applied in Nov 2013 for \$594,505 (PI: myself; co-PI: Richard Watt, BYU Dept of Chemistry and Biochemistry).
18. "Spin-related investigations of quantum dots and quantum wells," NSF proposal, applied in Oct 2012 for \$361,514
19. "Electron and nuclear spins in self-assembled quantum dots," White paper submitted to Army Research Office through BAA # W911NF-07-R-0003-04, Nov 2011, for \$224,557.
20. "Electron and nuclear spins in self-assembled quantum dots," NSF proposal, applied in Oct 2011 for \$347,212.
21. "Optical and microwave control of electron spins in semiconductor nanostructures," NSF proposal, applied in Nov 2009 for \$371,299.
22. "Optical and microwave control of electron spins in semiconductor nanostructures," White paper submitted to Army Research Office through BAA # W911NF-07-R-0003-03, Dec 2009, for \$336,163.
23. "New GK-12 Math Circles for Math Achievement and Problem Solving," PI: David Wright; co-PIs: John Colton, Gregory Conner, Darrin Doud, Jessica Purcell; NSF proposal, applied in Jul 2009 for \$2,999,643.
24. "Electron Spin Dynamics in Semiconductor Nanostructures," NSF proposal, applied in Nov 2008 for \$296,648.
25. "RUI: T<sub>1</sub> measurements in GaAs, AlGaAs, and InGaAs Layers and Quantum wells via Time Resolved Polarization Spectroscopy," NSF proposal, applied in Dec 2003 for \$160,317.

## Books

1. "Two-Dimensional Metal Halide Perovskites: A Machine-Generated Literature Overview," ed. **J.S. Colton** and **K.R. Hansen**, Springer Nature, publication date Dec 11, 2024. ISBN 978-9819978298. See <https://www.barnesandnoble.com/w/two-dimensional-metal-halide-perovskites-john-s-colton/1144122319>

## Peer-reviewed Journal Articles

**Author indicators:** **undergraduate student** whom I mentored (research advisor); **graduate student** whom I mentored (committee chair or committee member)

1. (to be submitted imminently) "A Ferritin Photochemical Synthesis of Monodispersed Platinum and Palladium Nanoparticles," O. David Petrucci, **Matt Richards**, **Daniel Boyce**, **John S. Colton**, Richard K. Watt.
2. (to be submitted imminently) "Dimensionality Engineering in Quasi-1D Perovskites for Tunable Structural, Electronic, and Optical Properties," Yi Xie, Jack Morgenstein, **Kameron R. Hansen**, Heshan Hewa-Walpitage, **Carter M. Shirley**, Junxiang Zhang, Purusharth Amrut, Naidel A.M.S. Caturello, Sasa Wang, **Trigg Randall**, **Levi Homer**, **Garrett Davis**, Seth Marder, Zeev Vally Vardeny, **John S. Colton**, Volker Blum, David B. Mitzi.
3. (submitted, under review) "Dielectric Functions of Metal-Halide Perovskites: An Interdigitated Electrode-Based Approach," **C. Emma McClure**, **Kameron R. Hansen**, **Carter M. Shirley**, **Chapman Lindsay**, **John S. Colton**, Physical Review Applied.
4. "A Preliminary Study of Upper-Division Tutorials Explicitly Built on a Problem-Solving Framework," A.J. Mason, **J. Hecht**, **D. Baldwin-Bott**, D. Neilsen, and **J.S. Colton**, Proc. of the 2022 Physics Education Research Conference (PERC) in Boston, MA, 268-273 (2024). <https://doi.org/10.1119/perc.2024.pr.Mason>
5. "Stochastic Charge-Transfer Excitons in 2D Metal-Halide Perovskites," **K.R. Hansen**, **C.E. McClure**, M. Parker, Z. Xie, W. Nie, **J.S. Colton**, and L. Whittaker-Brooks, ACS Energy Letters 9, 1645-1653 (2024). <https://doi.org/10.1021/acseenergylett.3c02738>
6. "Measuring the exciton binding energy: learning from a decade of measurements on halide perovskites and transition metal dichalcogenides," **K.R. Hansen**, **J.S. Colton**, and L. Whittaker-Brooks, Advanced Optical Materials 2301659 (2023). <https://doi.org/10.1002/adom.202301659>
7. "Mechanistic Origins of Excitonic Properties in 2D Perovskites: Implications for Exciton Engineering," **K.R. Hansen**, C.Y. Wong, **C.E. McClure**, **B. Romrell**, L. Flannery, D. Powell, **K. Garden**, A. Berzansky, **M. Eggleston**, **D.J. King**, **C.M. Shirley**, M.C. Beard, W. Nie, A. Schleife, **J.S. Colton**, L. Whittaker-Brooks, Matter 6, 3463-3482 (2023). <https://doi.org/10.1016/j.matt.2023.07.004>

8. "Improving Performance in Upper-Division Electricity and Magnetism with Explicit Incentives to Correct Mistakes," A.J. Mason, **J.M. McCardell**, P.A. White, and **J.S. Colton**, Phys Rev PER 19, 020104 (2023). <https://doi.org/10.1103/PhysRevPhysEducRes.19.020104>
9. "Ruddlesden–Popper Perovskite Alloys: Continuous and Discontinuous Tuning of the Electronic Structure," **K.R. Hansen**, **B. Romrell**, **C.E. McClure**, **M. Eggleston**, A. Berzansky, J.W. Lin, **K. Garden**, L. Whittaker-Brooks, and **J.S. Colton**, J. Phys. Chem. C 2023, 127, 9344–9353. <https://doi.org/10.1021/acs.jpcc.3c01294>
10. "Reworking exam problems to incentivize improved performance in upper-division electrostatics," A.J. Mason and **J.S. Colton**, Proc. of the 2022 Physics Education Research Conference (PERC) in Grand Rapids MI, 298-303 (2022). <https://doi.org/10.1119/perc.2022.pr.Mason>
11. "Low Exciton Binding Energies and Localized Exciton-Polaron States in 2D Tin Halide Perovskites," **K.R. Hansen**, **C.E. McClure**, D. Powell, H.-C. Hsieh, L. Flannery, **K. Garden**, E.J. Miller, **D. King**, S. Sainio, D. Nordlund, **J.S. Colton**, L. Whittaker-Brooks, Advanced Optical Materials, 10, 2102698 (2022). <https://doi.org/10.1002/adom.202102698>.
12. "Franz-Keldysh and Stark Effects in Two-Dimensional Metal Halide Perovskites," **K.R. Hansen**, **C.E. McClure**, **J.S. Colton**, L. Whittaker-Brooks, PRX Energy 1, 013001 (2022). <https://doi.org/10.1103/PRXEnergy.1.013001>
13. "Machine Learning to Predict Quasi TE<sub>011</sub> Mode Resonances in Double Stacked Dielectric Cavities," **C. Lewis**, **J. Bryan**, **N. Schwartz**, **J. Hale**, **K. Fanning**, **J.S. Colton**, IEEE Transactions on Microwave Theory and Techniques 70, 2135-2146 (2022). <https://doi.org/10.1109/TMTT.2022.3145357>
14. "Use of machine learning with temporal photoluminescence signals from CdTe quantum dots for temperature measurement in microfluidic devices," **C. Lewis**, **J.W. Erikson**, D.A. Sanchez, **C.E. McClure**, G.P. Nordin, T.R. Munro, **J.S. Colton**, ACS Applied Nano Materials 3, 4045 (2020). <https://doi.org/10.1021/acsnm.0c00065>
15. "Optical constants of evaporated amorphous zinc arsenide (Zn<sub>3</sub>As<sub>2</sub>) via spectroscopic ellipsometry," **J.C. Stewart**, **M.N. Shelley**, **N.R. Schwartz**, **S.K. King**, **D.W. Boyce**, **J.W. Erikson**, D.D. Allred, and **J.S. Colton**, Optical Materials Express 9, 4677 (2019). <https://doi.org/10.1364/OME.9.004677>
16. "Lead sulfide quantum dots inside ferritin: synthesis and application to photovoltaics," **K.R. Hansen**, **J.R. Peterson**, **A. Perego**, **M. Shelley**, **C.R. Olsen**, **L.D. Perez**, **H.L. Hogg**, R.K. Watt, and **J.S. Colton**, Applied Nanoscience 8, 1687-1699 (2018). <https://doi.org/10.1007/s13204-018-0849-y>
17. "Tuning ferritin's band gap through mixed metal oxide nanoparticle formation," **C.R. Olsen**, **J.S. Embley**, **K.R. Hansen**, **A.M. Henrichsen**, **J.R. Peterson**, **J.S. Colton**, and R.K. Watt, Nanotechnology 28, 195604 (2017). <https://doi.org/10.1088/1361-6528/aa68b0>
18. "Permanganate-based synthesis of manganese oxide nanoparticles in ferritin," **C.R. Olsen**, **T.J. Smith**, **J.S. Embley**, **J.H. Maxfield**, **K.R. Hansen**, **J.R. Peterson**, **A.M. Henrichsen**, **S.D. Erickson**, D.C. Buck, **J.S. Colton**, and R.K. Watt, Nanotechnology 28, 195601 (2017). <https://doi.org/10.1088/1361-6528/aa68ae>
19. "Fabrication of dye sensitized solar cells using native and non-native nanocrystals in ferritin as the dye," **A. Perego**, **C. Olsen**, **J.R. Peterson**, **K. Hansen**, **J.S. Colton**, and R.K. Watt, J. Utah Academy of Sciences, Arts, & Letters 2016, 183 (2017). <http://www.utahacademy.org/wp-content/uploads/2015/01/JUASAL-2016-full-text-final-revised.pdf>
  - This paper won the "Outstanding Paper Award" in the Engineering category, and a figure from this paper was selected as the cover image of the journal.
20. "Electron spin coherence of silicon vacancies in proton-irradiated 4H-SiC," **J.S. Embley**, **J.S. Colton**, **K.G. Miller**, **M.A. Morris**, **M. Meehan**, **S.L. Crossen**, B.D. Weaver, E.R. Glaser, and S.G. Carter, Phys. Rev. B 95, 045206 (2017). <https://doi.org/10.1103/PhysRevB.95.045206>
21. "Resonance of complex cylindrically symmetric cavities using an eigenfunction expansion in empty cavity modes," **K.G. Miller**, **M. Meehan**, R.L. Spencer, and **J.S. Colton**, IEEE Trans. on Microwave Theory and Techniques 64, 3113 (2016). <http://dx.doi.org/10.1109/TMTT.2016.2598172>
22. "The physics of musical scales: theory and experiment," D. Durfee and **J.S. Colton**, Amer. J. of Physics 83, 835 (2015). <http://dx.doi.org/10.1119/1.4926956>
23. "Non-native Co-, Mn-, and Ti-oxyhydroxide nanocrystals in ferritin for high efficiency solar energy conversion," **S.D. Erickson**, **T.J. Smith**, L.M. Moses, R.K. Watt, and **J.S. Colton**, Nanotechnology 26, 015703 (2015). <http://dx.doi.org/10.1088/0957-4484/26/1/015703>
24. "Assemblies composed of oligothiophene-ruthenium complexes bound to CdSe nanoparticles," N. Bair, J.M. Hancock, C.J. Simonson, **S.W. Thalman**, **J.S. Colton**, M.C. Asplund, and R.G. Harrison, J. Lumin. 158, 501 (2015). <http://dx.doi.org/10.1016/j.jlumin.2014.10.056>



25. "Evolution of nano-junctions in piezoresistive nanostrand composites," R.A. Bilodeau, D.T. Fullwood, **J.S. Colton**, J.D. Yeager, A.E. Bowden, and **T. Park**, *Composites: Part B* 72, 45 (2015). <http://dx.doi.org/10.1016/j.compositesb.2014.11.028>
26. "Tuning the band gap of ferritin nanoparticles by co-depositing iron with halides or oxo-anions," **T.J. Smith**, **S.D. Erickson**, C.M. Orozco, A. Fluckiger, L.M. Moses, **J.S. Colton**, and R.K. Watt, *J. Mater. Chem. A* 2, 20782 (2014). <http://dx.doi.org/10.1039/C4TA04588B>
27. "Annealing-induced change in quantum dot chain formation mechanism," **T. Park**, **J.S. Colton**, J. Farrer, H. Yang, and D.J. Kim, *AIP Advances* 4, 127142 (2014). <http://dx.doi.org/10.1063/1.4905053>
28. "Growth and temperature dependent photoluminescence of InGaAs quantum dot chains," H. Yang, D.-J. Kim, **J.S. Colton**, **T. Park**, **A.M. Jones**, **S. Thalman**, **D. Smith**, **K. Clark**, **D. Meyer**, and **S. Brown**, *Applied Surface Science* 296, 8 (2014). <http://dx.doi.org/10.1016/j.apsusc.2013.12.176>
29. "Sensitive detection of surface- and size-dependent direct and indirect band gap transitions in ferritin," J.S. Colton, **S.D. Erickson**, **T.J. Smith**, and R.K. Watt, *Nanotechnology* 25, 135703 (2014). <http://dx.doi.org/10.1088/0957-4484/25/13/135703>
30. "Characterization of nickel nanostrand nanocomposites through dielectric spectroscopy and nanoindentation," M. Koecher, J. Yeager, **T. Park**, N. Mara, D. Fullwood, N. Hansen, and **J.S. Colton**, *Polymer Engineering & Science* 53, 2666 (2013). <http://dx.doi.org/10.1002/pen.23511>
31. "Long-lived electron spins in a modulation doped (100) GaAs quantum well," **J.S. Colton**, **D. Meyer**, **K. Clark**, **D. Craft**, **J. Cutler**, **T. Park**, and **P. White**, *J. Appl. Phys.* 112, 084307 (2012). <http://dx.doi.org/10.1063/1.4759320>
32. "Universal scheme for measuring the electron  $T_1$  in semiconductors and application to a lightly-doped n-GaAs sample," **J.S. Colton**, **K. Clark**, **D. Meyer**, **T. Park**, **D. Smith**, and **S. Thalman**, *Solid State Comm.* 152, 410 (2012). <http://dx.doi.org/10.1016/j.ssc.2011.11.045>
33. "Nuclear effects in Kerr rotation-detected magnetic resonance of electrons in GaAs," **B. Heaton**, **J.S. Colton**, **D.N. Jensen**, **M.J. Johnson**, and A.S. Bracker, *Solid State Comm.* 150, 244 (2010). <http://dx.doi.org/10.1016/j.ssc.2009.11.019>
34. "Resonant microwave cavity for 8.5-12 GHz optically-detected electron spin resonance with simultaneous nuclear magnetic resonance," **J.S. Colton**, **L.R. Wienkes**, *Rev. Sci. Instr.* 80, 035106 (2009). <http://dx.doi.org/10.1063/1.3095683>
35. "Anomalous magnetic field dependence of the  $T_1$  spin lifetime in a lightly-doped GaAs sample," **J.S. Colton**, **M.E. Heeb**, **P. Schroeder**, **A. Stokes**, **L.R. Wienkes**, A.S. Bracker, *Phys. Rev. B* 75, 205201 (2007). <http://dx.doi.org/10.1103/PhysRevB.75.205201>
36. "Dependence of optically oriented and detected electron spin resonance on donor concentration in n-GaAs," **J.S. Colton**, T.A. Kennedy, A.S. Bracker, D. Gammon, and J. Miller, *Solid State Comm.* 132, 613 (2004). <http://dx.doi.org/10.1016/j.ssc.2004.08.039>
37. "Microsecond spin-flip times in n-GaAs measured by time resolved polarization of photoluminescence," **J.S. Colton**, T.A. Kennedy, A.S. Bracker, and D. Gammon, *Phys Rev B* 69, 121307(R) (2004). [This paper was selected for publication in *Virtual J of Nanoscale Sci & Tech* 9, issue 13 (2004).] <http://dx.doi.org/10.1103/PhysRevB.69.121307>
38. "Long coherence times at 300K for nitrogen-vacancy center spins in diamond grown by chemical vapor deposition," T.A. Kennedy, **J.S. Colton**, J.E. Butler, R.C. Linares, and P.J. Doering, *Appl. Phys. Lett.* 83, 4190 (2003). <http://dx.doi.org/10.1063/1.1626791>
39. "Optically oriented and detected electron spin resonance in a lightly doped n-GaAs layer," **J.S. Colton**, T.A. Kennedy, A.S. Bracker, D. Gammon, and J.B. Miller, *Phys. Rev. B* 67, 165315 (2003). <http://dx.doi.org/10.1103/PhysRevB.67.165315>
40. "Spin lifetime measurements in MBE-grown GaAs epilayers," **J.S. Colton**, T.A. Kennedy, A.S. Bracker, and D. Gammon, *phys. stat. sol. (b)* 233, 445 (2002). [http://dx.doi.org/10.1002/1521-3951\(200210\)233:3%3C445::AID-PSSB445%3E3.0.CO;2-J](http://dx.doi.org/10.1002/1521-3951(200210)233:3%3C445::AID-PSSB445%3E3.0.CO;2-J)
41. "Single-qubit operations with the nitrogen-vacancy center in diamond," T.A. Kennedy, F.T. Charnock, **J.S. Colton**, J.E. Butler, R.C. Linares, and P.J. Doering, *phys. stat. sol. (b)* 233, 416 (2002). [This paper was selected for a Naval Research Laboratory "best paper" award.] [http://dx.doi.org/10.1002/1521-3951\(200210\)233:3%3C416::AID-PSSB416%3E3.0.CO;2-R](http://dx.doi.org/10.1002/1521-3951(200210)233:3%3C416::AID-PSSB416%3E3.0.CO;2-R)
42. "What determines the emission peak energy of the blue luminescence in highly Mg-doped p-GaN?" **J.S. Colton** and P.Y. Yu, *Appl. Phys. Lett.* 78, 2500 (2001). <http://dx.doi.org/10.1063/1.1367904>

43. "Selectively excited blue luminescence in heavily Mg-doped *p*-type GaN," **J.S. Colton** and P.Y. Yu, Proc. of the 11th International Semiconducting and Insulating Materials Conference (SIMC-XI), published by IEEE, pp. 11-14 (2000). <http://dx.doi.org/10.1109/SIM.2000.939188>
44. "Selective excitation and thermal quenching of the yellow luminescence of GaN," **J.S. Colton**, K.L. Teo, P.Y. Yu, P. Perlin, E.R. Weber, I. Grzegory and K. Uchida, Appl. Phys. Lett. 75, 3273 (1999). <http://dx.doi.org/10.1063/1.125322>
45. "Selective excitation of the yellow luminescence of GaN," **J.S. Colton**, P.Y. Yu, K.L. Teo, E.R. Weber, P. Perlin, I. Grzegory and K. Uchida, Physica B 273-274, 75 (1999). [http://dx.doi.org/10.1016/S0921-4526\(99\)00410-X](http://dx.doi.org/10.1016/S0921-4526(99)00410-X)
46. "An analysis of temperature dependent photoluminescence lineshapes in InGaN," K.L. Teo, **J.S. Colton**, P.Y. Yu, E.R. Weber, M.F. Li, W. Liu, K. Uchida, H. Tokunaga, N. Akutsu and K. Matsumoto, Appl. Phys. Lett. 73, 1697 (1998). <http://dx.doi.org/10.1063/1.122249>

## Non Peer-reviewed Journal Articles

1. "Spin lifetime measurements in semiconductors," **J.S. Colton**, **L.R. Wienkes**, and **M.E. Heeb**, Proceedings of the 15<sup>th</sup> Annual Wisconsin Space Conference, Wisconsin Space Grant Consortium (2005).

## Presentations

**Author indicators:** **undergraduate student** whom I mentored (research advisor); **graduate student** whom I mentored (committee chair or committee member)

## Invited colloquia, seminars, conference talks, and Education Week talks

1. "Stochastic Charge-Transfer Excitons in 2D Metal-Halide Perovskites," **J.S. Colton**, Electronic and Structural Dynamics in Hybrid Perovskites: Theory Meets Experiment, Telluride CO, Oct 2, 2024.
2. "Sound and Music: How Physics and Math Impact What We Hear," **J.S. Colton**, BYU Education Week, Brigham Young University, Provo UT, Aug 20, 2024.
3. "Hybrid Organic-Inorganic Semiconductor Research at BYU and NREL", **J.S. Colton**, BYU Department of Physics and Astronomy Colloquium, Provo UT, Nov 3, 2023.
  - o This talk was recorded and may be viewed here, <https://tinyurl.com/coltoncolloquium>
4. "What is Light?" **J.S. Colton**, BYU Education Week, Brigham Young University, Provo UT, Aug 24, 2023.
5. "Alloy-based tuning of the bandgap and exciton binding energy in perovskites," **J.S. Colton**, CHOISE research group seminar, National Renewable Energy Laboratory, Golden CO, Mar 24, 2023.
6. "Metal halide perovskites: what can be learned through electroabsorption?" **J.S. Colton**, Center for Integrated Nanotechnologies (CINT) seminar, Los Alamos National Laboratory, Los Alamos NM, Nov 1, 2022.
7. "What is Light?" **J.S. Colton**, BYU Education Week, Brigham Young University, Provo UT, Aug 18, 2022.
8. "Two-Dimensional Metal Halide Perovskites: A New Material for Solar Energy", **J.S. Colton**, **K. Hansen**, L. Whittaker-Brooks, **E. McClure**, **D. King**, Idaho State University Physics Department Colloquium, Virtual, Dec 6, 2021.
9. "Two-Dimensional Metal Halide Perovskites: A New Material for Solar Energy", **J.S. Colton**, **K. Hansen**, L. Whittaker-Brooks, **E. McClure**, **D. King**, Utah State University Physics Department Colloquium, Logan UT, Nov 16, 2021.
10. "Neural Networks and Machine Learning in Condensed Matter Physics Research: Two Examples," **J.S. Colton**, Abstract J06.01, Four Corners Section of the American Physical Society Meeting, Virtual, Oct 9, 2021.
11. "Quantum supremacy... is it real? is it important? What is it?" **John S. Colton**, *The Dixie Forum*, Dixie State University, St. George, UT, Dec 3, 2019.
  - o This talk was recorded and may be viewed here, <https://tinyurl.com/dixiestatetalk>.
12. "Ferritin-based nanocrystals for solar energy harvesting", **J.S. Colton**, R. Watt, **J. Embley**, **S. Erickson**, **K. Hansen**, **D. Henrichsen**, **H. Hogg**, **C. Olsen**, **A. Perego**, **R. Peterson**, **M. Shelley**, Utah Valley University Physics Department Colloquium, Orem UT, Mar 27, 2018.
13. "Ferritin-based nanocrystals for solar energy harvesting", **J.S. Colton**, R. Watt, **J. Embley**, **S. Erickson**, **K. Hansen**, **D. Henrichsen**, **H. Hogg**, **C. Olsen**, **A. Perego**, **R. Peterson**, **M. Shelley**, BIT's 4th Annual World Congress of Smart Materials, Osaka, Japan, Mar 8, 2018.

14. "Quantum dots inside ferritin to harvest solar energy," **K. Hansen, J. Colton**, R. Watt, P. Minson, **J.R. Peterson, A. Perego**, Brigham Young University Physics Department colloquium, Provo UT, Sep 7, 2016.
15. "Optically-measured electron spin lifetimes and spin relaxation in GaAs and SiC", **J.S. Colton**, EMN (Energy, Material, & Nanotechnology) Meeting on Quantum Communication & Quantum Imaging, Berlin, Germany, Aug 25, 2016.
16. "The physics of musical scales: theory and experiment", D. Durfee and J. S. Colton (co-presenters), Brigham Young University Physics Department colloquium, Provo UT, Feb 24, 2016.
17. "Ferritin-based semiconductor nanocrystals for solar energy harvesting," **J.S. Colton**, University of Utah Materials Science and Engineering Graduate Seminar, Salt Lake City UT, Jan 13, 2016.
18. "Quantum dots and quantum wells: optical, structural, and spin properties," **J.S. Colton**, University of Utah Materials Science and Engineering Graduate Seminar, Salt Lake City UT, Oct 24, 2012.
19. "Lightly-doped GaAs: a decade of spin lifetimes and spin resonance," **J.S. Colton**, Condensed Matter Group seminar, Physics Department, Washington University in St. Louis, St. Louis MO, Mar 8, 2011.
20. "Lightly-doped GaAs: a decade of spin lifetimes and spin resonance," **J.S. Colton**, Physics Department Colloquium, Idaho State University, Pocatello ID, Jan 24, 2011.
21. "Lightly-doped GaAs: a decade of spin lifetimes and spin resonance," **J.S. Colton**, Condensed Matter Group seminar, Physics Department, University of Utah, Salt Lake City UT, Nov 2, 2010.
22. "Quantum computing and electron spins in semiconductors," **J.S. Colton**, Utah Valley University Physics Department Colloquium, Orem UT, Mar 25, 2009.
23. "Electron spin in GaAs," **J.S. Colton**, Brigham Young University Physics Department Theory Group seminar, Provo UT, Feb 26, 2008.
24. "Quantum computing and electron spins in semiconductors," **J.S. Colton**, Brigham Young University Physics Department Colloquium, Provo UT, Feb 7, 2007
25. "Spin lifetime measurements in n-GaAs," **J.S. Colton, M.E. Heeb, P. Schroeder, A. Stokes, and L.R. Wienkes**, talk to the Condensed Matter Physics group at U.W. Madison's Physics Department, Madison, WI, Oct 13, 2006.
26. "Microsecond spin-flip times for localized donors in GaAs," **J.S. Colton**, APS March Meeting, Los Angeles, CA, Mar 2005.
27. "The NV center in diamond as a model qubit," T.A. Kennedy, F.T. Charnock, **J.S. Colton**, J.E. Butler, R.C. Linares, and P.J. Doering, Gordon Research Conference: Point Defects in Semiconductors, Colby-Sawyer College, New London, NH, Jul 2002.
28. "Single-qubit operations with the nitrogen-vacancy center in diamond," T.A. Kennedy, F.T. Charnock, **J.S. Colton**, J.E. Butler, R.C. Linares, and P.J. Doering, 275th WE Heraeus Seminar, Hardware Concepts for Quantum Computing, Bad Honnef, Germany, May 2002.

### Contributed conference presentations

1. "Designing and Testing Upper-division Electromagnetism Tutorials," **J. Hecht, D. Baldwin-Bott**, D.W. Neilsen, **J.S. Colton**, A.J. Mason, Abstract AF-01, 2024 AAPT Summer Meeting, Boston MA, Jul 8, 2024.
2. "Investigating a Problem-Solving Theoretical Framework in Upper-division Electromagnetism Tutorials: Data from Focus Groups, Self-Assessments, and End-of-Semester Surveys," A.J. Mason, **J. Hecht, D. Baldwin-Bott**, D.W. Neilsen, **J.S. Colton**, Poster MON-POS-M-PER412, 2024 AAPT Summer Meeting, Boston MA, Jul 8, 2024.
3. "Building a Better Mousetrap: A Preliminary Study of Upper-Division Tutorials Explicitly Built on a Problem-Solving Framework," A.J. Mason, **J. Hecht, D. Baldwin-Bott**, D.W. Neilsen, **J.S. Colton**, Poster B56, 2024 Physics Education Research Conference (PERC), Boston MA, Jul 10, 2024.
4. "Understanding and Engineering Excitonic Properties in 2d Metal Halide Perovskites," **J.S. Colton, K.R. Hansen**, C.Y. Wong, **C.E. McClure, B. Romrell, M. Eggleston, D.J. King, C.M. Shirley**, A. Schleife, L. Whittaker-Brooks, Abstract QT03.07.06, Materials Research Society Spring Meeting, Seattle, WA, Apr 25, 2024.
5. "Engineering of the Exciton Binding Energies in 2D Metal Halide Perovskites," **C.M. Shirley, K.R. Hansen, C.E. McClure, M. Eggleston, B. Romrell, D.J. King**, L. Whittaker-Brooks, C. Wong, A. Schleife, **J.S. Colton**, Abstract K01.10, American Physical Society March Meeting, Minneapolis, MN, Mar 5, 2024.
6. "Implementation of Physics Tutorials in Upper-Division Physics," **J. Hecht, D. Baldwin-Bott**, D. Neilsen, A. Mason, **J.S. Colton**, Brigham Young University Student Research Conference, Provo UT, Feb 24, 2024.



7. "Optical Rotation of THz Light," **S. Whipple**, Y. Dong, M. Beard, **J. Colton**, APS Conferences for Undergraduate Women in Physics (CUWiP), Montana State University, Bozeman MT, Jan 20, 2024
8. "Effect of Cation Structure on the Optical and Electronic Properties of Ruddlesden Popper Phase Tin Halide Perovskites," H. Pruet, S. Parkin, R. Scheidt, K. Pedersen, Y. Dong, **J.S. Colton**, M.C. Beard, K.R. Graham, MRS Fall Meeting, Boston MA, Nov 2023.
9. "Correlation Between Dielectric Constants and Exciton Binding Energies in 2D Metal Halide Perovskites," **C. Shirley, K.R Hansen, C.E. McClure, L.K. Homer, T. Randall, I.R. Burkholder**, A. Schleife, C. Wong, **J.S. Colton**, Abstract S1.05, Four Corners Section of the American Physical Society Meeting, Logan UT, Oct 21, 2023.
10. "Effects of metal halide perovskite composition on exciton binding energy," **T. Randall, K.R Hansen, C.E. McClure, B. Romrell, C. Shirley, D. King, L.K. Homer, S. Jeppson, M. Eggleston, J.S. Colton**, Abstract N1.07, Four Corners Section of the American Physical Society Meeting, Logan UT, Oct 21, 2023.
11. "Correlation of Band-gap and Exciton Binding Energies in Metal-Halide Perovskites," **L.K. Homer, T. Randall, C. Shirley, K.R Hansen, J.S. Colton**, Abstract J1.05, Four Corners Section of the American Physical Society Meeting, Logan UT, Oct 20, 2023.
12. "A Symmetry Mode Analysis of Metal Halide Perovskites," **I.R. Burkholder, K.R Hansen, J.S. Colton**, B.J. Campbell, Abstract E1.03, Four Corners Section of the American Physical Society Meeting, Logan UT, Oct 20, 2023.
13. "Framework-based Problem Solving Tutorials for Upper-division Electromagnetism," A. Mason, **D. Baldwin-Bott, G. Miller, J.S. Colton**, Abstract G03-04, 2023 AAPT Summer Meeting, Sacramento CA, Jul 18, 2023.
14. "Focus Group Analysis of Upper-Division Electromagnetic Quadrupole Tutorial," **D. Baldwin-Bott, A. Mason, J. Colton**, Abstract T04, 2023 AAPT Summer Meeting, Sacramento CA, Jul 18, 2023.
15. "Alloy-based tuning of the bandgap and exciton binding energy in perovskites," **J.S. Colton, K. Hansen, M. Eggleston, C.E. McClure, B. Romrell, C. Shirley**, L. Whittaker-Brooks, Abstract Y41.01, American Physical Society March Meeting, Las Vegas, NV, Mar 10, 2023.
16. "Ion migration in 2D and 3D Metal Halide Perovskites studied using Electrochemical Impedance Spectroscopy on an Interdigitated Electrode Geometry," **C.E. McClure, K. Hansen, C. Lindsay, C. Shirley, J.S. Colton**, Abstract Y41.03, American Physical Society March Meeting, Las Vegas, NV, Mar 10, 2023.
17. "Screening of the Electron-Hole Interaction in Two-Dimensional Perovskites," **K. Hansen, J.S. Colton, C.E. McClure**, A. Schleife, C. Wong, L. Whittaker-Brooks, Abstract Y41.02, American Physical Society March Meeting, Las Vegas, NV, Mar 10, 2023.
18. "Measuring the Exciton Binding Energy of Hybrid Organic-Inorganic Perovskites," **M. Eggleston, B. Romrell, C. Shirley, K. Hansen**, W. Nie, **J.S. Colton**, Abstract A46.07, American Physical Society March Meeting, Las Vegas, NV, Mar 6, 2023.
19. "Machine Learning to Predict Quasi TE<sub>011</sub> Mode Resonance of Dielectric Resonators in Free Space," **D.J. King, J.S. Colton**, Abstract D47.06, American Physical Society March Meeting, Las Vegas, NV, Mar 6, 2023.
20. "Metal halide perovskites: what can be learned through electroabsorption?" **J.S. Colton**, BYU Condensed Matter Group seminar, Physics Department, Brigham Young University, Provo UT, Nov 2, 2022.
21. "Reworking exam problems to incentivize improved performance in upper-division electrodynamics," A.J. Mason and **J.S. Colton**, 2022 Physics Education Research Conference (PERC), Grand Rapids MI, Jul 14, 2022.
22. "Precise Exciton Binding Energies in Two-Dimensional Metal Halide Perovskites", **J.S. Colton, K. Hansen, C.E. McClure**, L. Whittaker-Brooks, Abstract F69.02, American Physical Society March Meeting, Chicago IL, Mar 15, 2022.
23. "Developing Exciton Tunability in Two-Dimensional Metal-Halide Perovskites", **K. Hansen, J.S. Colton, C.E. McClure**, L. Whittaker-Brooks, Abstract F69.03, American Physical Society March Meeting, Chicago IL, Mar 15, 2022.
24. "Dielectric Spectroscopy on 2D and 3D Metal Halide Perovskites Using an Interdigitated Electrode Geometry", **C.E. McClure, K. Hansen, J.S. Colton**, Abstract F69.03, American Physical Society March Meeting, Chicago IL, Mar 15, 2022.
25. "Dielectric spectroscopy on 2D and 3D metal halide perovskites using an interdigitated electrode geometry", **C.E. McClure, K. Hansen, D. King, J.S. Colton**, Brigham Young University Student Research Conference, Provo UT, Mar 5, 2022.
  - o This talk won a "Best in session" award.
26. "LabVIEW Automation of Experimental Equipment", **B. Romrell, M. Murdock, J.S. Colton** Brigham Young University Student Research Conference, Provo UT, Mar 5, 2022.

27. “Experimentally Determining the Cause of High Dielectric Measurements of Perovskites at Low Frequency”, **S. Jeppson, C.E. McClure, J.S. Colton**, Brigham Young University Student Research Conference, Provo UT, Mar 5, 2022.
28. “Testing the Optical Properties of Perovskite and ZnCuInS/ZnS Quantum Dots for Use in Optical and Microfluidic Environments,” **D. King, J.S. Colton, C.E. McClure**, D. Sanchez, Abstract E03.05, Four Corners Section of the American Physical Society Meeting, Virtual, Oct 8, 2021.
29. “Dielectric spectroscopy on 2D and 3D metal halide perovskites using an interdigitated electrode geometry,” **C.E. McClure, K. Hansen, J.S. Colton**, Abstract E06.02, Four Corners Section of the American Physical Society Meeting, Virtual, Oct 8, 2021.
30. “Simulating the Electroabsorption Spectrum of 2D Perovskite Multiple Quantum Wells,” **K. Hansen, C.E. McClure, J.S. Colton**, L. Whittaker-Brooks, Abstract E06.03, Four Corners Section of the American Physical Society Meeting, Virtual, Oct 9, 2021.
31. “Rework and Recall: Exam Pfalluinerformance in Upper-division Electromagnetism,” A. Mason, **J.S. Colton, J. Martin**, Abstract PS.E-MO-11.07, 2021 AAPT Summer Meeting, Virtual, Aug 2, 2021.
32. “Neural network temperature predictions based on the optical properties of quantum dots,” **J.S. Colton, C. Lewis, J.W. Erikson, C.E. McClure**, D. Sanchez, **J. Bryan, M. Iraca**, G.P. Nordin, T.R. Munro, Abstract V60.04, American Physical Society March Meeting, Virtual, Mar 18, 2021.
33. “Machine Learning with Temperature Sensing Quantum Dots Data,” **M. Iraca, C.E. McClure, J. Bryan, C. Lewis, J.S. Colton**, Abstract A36.09, American Physical Society March Meeting, Virtual, Mar 15, 2021.
34. “Zinc oxide nanoparticle growth in ferritin,” **S. King, J.S. Colton**, R. Watt, **C. Lindsay, C. Lewis, K. Hansen**, Brigham Young University Student Research Conference, Provo UT, Feb 27, 2021.
35. “Neural network temperature predictions based on the optical properties of quantum dots,” **E. McClure**, D. Sanchez, **J. Bryan, M. Iraca, J. Erikson, C. Lewis**, T. Munro, **J.S. Colton**, Brigham Young University Student Research Conference, Provo UT, Feb 27, 2021.
  - This talk won a “Best in Session” award.
36. “Predicting Microwave Cavity Resonances through Machine Learning,” **N. Schwartz, J.S. Colton**, Brigham Young University Student Research Conference, Provo UT, Feb 27, 2021.
37. “Predicting the TE011 Resonant Mode of Cylindrically Symmetric Resonant Cavities,” **K. Fanning, N. Schwartz, C. Lewis, J.S. Colton**, Brigham Young University Student Research Conference, Provo UT, Feb 27, 2021.
38. “Machine Learning with Quantum Dots”, **M. Iraca, J.S. Colton, J. Bryan, E. McClure, C. Lewis**, American Physical Society Conference for Undergraduate Women in Physics (APS CUWiP), virtual conference, Jan 23, 2021.
39. “Evaluating Explicit Incentives to Correct Mistakes in Upper-Division Electromagnetism,” A. Mason, **J.S. Colton**, American Association of Physics Teachers Winter Meeting, Jan 9-12, 2021.
40. “Predicting Microwave Cavity Resonances through Machine Learning”, **N. Schwartz, C. Lewis, K. Fanning, J.S. Colton**, Four Corners Section of the American Physical Society Meeting, virtual conference, Oct 23-24, 2020.
41. “Machine Learning with Quantum Dots”, **M. Iraca, J.S. Colton, J. Bryan, E. McClure, C. Lewis**, Four Corners Section of the American Physical Society Meeting, virtual conference, Oct 23-24, 2020.
  - This talk won a “Best in Conference” award.
42. “Neural network temperature predictions based on the optical properties of quantum dots”, **E. McClure**, D. Sanchez, **J. Bryan, M. Iraca, J. Erikson, C. Lewis**, T. Munro, **J. Colton**, Four Corners Section of the American Physical Society Meeting, virtual conference, Oct 23-24, 2020.
  - This talk won a “Best in Conference” award.
43. “CdTe nanoparticles as temperature sensors via machine learning of optical properties,” **J.S. Colton, J.W. Erikson, C. Lewis, C.E. McClure**, D. Sanchez, T. Munro, Abstract G20.04, American Physical Society March Meeting, Denver, CO, Mar 3, 2020. (Due to covid precautions this conference was cancelled; speakers were invited instead to record and post their talks for public download and discussion, which I did.)
44. “Synthesis of P-type Zinc Oxide Thin Films,” **S. King, J.S. Colton**, D.D. Allred, G. Renlund, **N. Schwartz, C.E. McClure, J. Erikson**, Brigham Young University Student Research Conference, Provo UT, Feb 29, 2020.
45. “Thin Film Characterization through SEM Analysis,” **N. Schwartz, S. King, D. Boyce, J.C. Stewart, M. Shelley, J.S. Colton**, Brigham Young University Student Research Conference, Provo UT, Feb 29, 2020.
46. “Optical Properties of Rhodamine B and Cadmium Telluride as Temperature Sensors,” **C.E. McClure, J. Erikson, C. Lewis, H. Hogg, K. Watson**, T Munro, **J.S. Colton**, Brigham Young University Student Research Conference, Provo UT, Feb 29, 2020.

47. "Neural Network Approximations for CdTe Temperature Sensors," **C. Lewis, C.E. McClure, J. Erikson, J.S. Colton**, T. Munro, Brigham Young University Student Research Conference, Provo UT, Feb 29, 2020.
48. "Optical Study of CdTe Quantum Dots for use in Temperature Sensors," **J. Erikson, C.E. McClure, C. Lewis, J.S. Colton**, T. Munro, Brigham Young University Student Research Conference, Provo UT, Feb 29, 2020.
49. "The Crystal Structure of Zn<sub>3</sub>As<sub>2</sub>," **L.S. Harris, J.S. Colton**, S.J. Smith, B.J. Campbell, Four Corners Section of the American Physical Society Meeting, Embry-Riddle Aeronautical University, Prescott, AZ, Oct 11, 2019.
50. "Optical Study of CdTe Quantum Dots for use in Temperature Sensors", **J. Erikson, C.E. McClure, C. Lewis, J.S. Colton**, T. Munro, Four Corners Section of the American Physical Society Meeting, Embry-Riddle Aeronautical University, Prescott, AZ, Oct 11, 2019.
51. "The Structure of Zn<sub>3</sub>As<sub>2</sub>," **J.S. Colton, L. Harris**, S. Smith, B. Campbell, BYU Condensed Matter Group seminar, Physics Department, Brigham Young University, Provo UT, Sep 19, 2019.
52. "Challenges and Opportunities for a Joint REU-RET Program at BYU," J.-F. Van Huele, **J.S. Colton**, H. Peterson, Abstract PST3A13, American Association of Physics Teachers Summer Meeting, Provo, UT, Jul 24, 2019.
53. "RF Magnetron Sputtering of Arsenic Doped P-type Zinc Oxide," **M. Shelley, J.S. Colton**, D.D. Allred, G. Renlund, **J.R. Peterson, J.C. Stewart, J. Erikson, S. King, C.E. McClure**, Brigham Young University Student Research Conference, Provo UT, Mar 23, 2019.
54. "Zinc Arsenide: Properties and Behavior in Thermal Evaporation," **N. Schwartz, J.S. Colton**, D.D. Allred, **J.C. Stewart, M. Shelley, S. King, D. Boyce**, Brigham Young University Student Research Conference, Provo UT, Mar 23, 2019.
55. "Optical properties of Rhodamine B as a temperature sensor," **C.E. McClure, J. Erikson, H. Hogg, K. Watson**, T. Munro, **J.S. Colton**, Brigham Young University Student Research Conference, Provo UT, Mar 23, 2019.
56. "Photoluminescence Lifetime Measurements in CdTe Quantum Dots," **J. Erikson, C.E. McClure, J.S. Colton**, T. Munro, Brigham Young University Student Research Conference, Provo UT, Mar 23, 2019.
57. "Examining Zinc Arsenide and Zinc Oxide Thin Films Through X-Ray Diffraction," **S. King, J.S. Colton**, D.D. Allred, G. Renlund, **J. Erikson, C.E. McClure, N. Schwartz, M. Shelley, J.C. Stewart**, Brigham Young University Student Research Conference, Provo UT, Mar 23, 2019.
58. "Synthesis of Hydrogen Gas Utilizing Ferritin-Bound Platinum Nanoparticles," **C. Lindsay, D. Boyce, M. Richards, J.S. Colton**, Brigham Young University Student Research Conference, Provo UT, Mar 23, 2019.
59. "Finding the optical constants of zinc arsenide by spectroscopic ellipsometry," **J.C. Stewart, J.S. Colton, N. Schwartz, M. Shelley, S. King**, D.D. Allred, Brigham Young University Student Research Conference, Provo UT, Mar 23, 2019.
60. "Characterization of Platinum Nanoparticles Utilized in Photocatalytic Hydrogen Synthesis," **D. Boyce, J.S. Colton, M. Richards**, Brigham Young University Student Research Conference, Provo UT, Mar 23, 2019.
61. "Ferritin-bound Platinum Nanoparticles in Hydrogen Production," **M. Richards, D. Boyce, C. Lindsay, J.S. Colton**, R.K. Watt, Brigham Young University Student Research Conference, Provo UT, Mar 23, 2019.
62. "Temperature Sensing via Photoluminescence Lifetimes of Rhodamine B," **K. Watson, C.E. McClure, J. Erikson, H. Hogg, J.S. Colton**, T. Munro, Abstract V23.07, American Physical Society March Meeting, Boston, MA, Mar 7, 2019.
63. "Producing p-ZnO via rf magnetron sputtering onto a thin evaporated layer of Zn<sub>3</sub>As<sub>2</sub>," **J. Colton, J. Erikson, M.N. Shelley, J.C. Stewart, C.E. McClure, S. King, N. Schwartz**, D.D. Allred, G. Renlund, Abstract H33.06, American Physical Society March Meeting, Boston, MA, Mar 5, 2019.
64. "Characterization of Platinum Nanoparticles Utilized in Photocatalytic Hydrogen Synthesis," **D. Boyce, J.S. Colton, M. Richards**, Abstract B47.04, American Physical Society March Meeting, Boston, MA, Mar 4, 2019.
65. "Optical Properties of Rhodamine B as a Temperature Sensor," **C. Emma McClure, James Erikson, Heather Hogg, Katelyn Watson**, Troy Munro, John Colton, American Physical Society Conference for Undergraduate Women in Physics (APS CUWiP), Utah State University, Logan, UT, Jan 19, 2019.
  - This poster presentation won 3rd place in the poster session.
66. "Platinum Nanoparticles as Catalysts in Hydrogen Production," **M. Richards, D. Boyce, C. Lindsay, J.S. Colton**, R. Watt, Four Corners Section of the American Physical Society Meeting, Salt Lake City, UT, Oct 12, 2018.
67. "Optical Characterization of Zinc Oxide Thin Film Semiconductors," **J. Erikson, J.S. Colton**, G. Renlund, D. Allred, **M. Shelley, C. Stewart, E. McClure, S. King**, Four Corners Section of the American Physical Society Meeting, Salt Lake City, UT, Oct 12, 2018.
  - This talk won a "Best in session" award.

68. "Finding the optical constants of zinc arsenide ( $Zn_3As_2$ ) via spectroscopic ellipsometry," **J.C. Stewart, J.S. Colton, M.N. Shelley**, D.D. Allred, Four Corners Section of the American Physical Society Meeting, Salt Lake City, UT, Oct 12, 2018.
69. "Characterization of Platinum Nanoparticles Utilized in Photocatalytic Hydrogen Synthesis," **D. Boyce, J.S. Colton, M. Richards**, Four Corners Section of the American Physical Society Meeting, Salt Lake City, UT, Oct 13, 2018.
70. "Electrical Conductivity of Monolayer Films of Ferritin Molecules," **A. Perego, C. Lewis, J. Colton**, R. Davis, Brigham Young University Student Research Conference, Provo UT, Mar 3, 2018.
71. "Temperature Dependence of Photoluminescence Lifetime for Rhodamine B and Cadmium Telluride," **A. Gruszkiewicz, J. Colton, H. Hogg**, Brigham Young University Student Research Conference, Provo UT, Mar 3, 2018.
72. "Synthesis and Characterization of Zinc Oxide Nanoparticles in Ferritin," **C. Lewis, A. Perego, J. Colton**, R. Watt, Brigham Young University Student Research Conference, Provo UT, Mar 3, 2018.
73. "Characterization of ZnO Thin Films by Ellipsometry," **C. Stewart, J. Colton**, G. Renlund, D. Allred, **R. Peterson, M. Shelley, J. Erikson**, Brigham Young University Student Research Conference, Provo UT, Mar 3, 2018.
74. "Platinum Ferritin Nanoparticles in Hydrogen Production," **D. Boyce, M. Richards, J. Colton**, Brigham Young University Student Research Conference, Provo UT, Mar 3, 2018.
75. "Temperature Dependence of Photoluminescence Lifetime for Cadmium Telluride Nanoparticles and Rhodamine B," **H. Hogg, A. Gruszkiewicz, J. Colton**, Brigham Young University Student Research Conference, Provo UT, Mar 3, 2018.
76. "Electrical Characterization of ZnO Semiconductor Thin Films," **J. Erikson, J. Colton**, G. Renlund, D. Allred, **R. Peterson, M. Shelley, C. Stewart**, Brigham Young University Student Research Conference, Provo UT, Mar 3, 2018.
77. "Arsenic-doped Zinc Oxide Thin Film Growth by RF Magnetron Sputtering," **M. Shelley, J. Colton**, G. Renlund, D. Allred, **R. Peterson, C. Stewart, J. Erikson**, Brigham Young University Student Research Conference, Provo UT, Mar 3, 2018.
78. "Photoluminescence study of arsenic-doped zinc oxide thin films," **J.R. Peterson, J.S. Colton**, G.M. Renlund, D.D. Allred, **M. Shelley, J. Erikson, C. Stewart**, Brigham Young University Student Research Conference, Provo UT, Mar 3, 2018.
79. "ODMR: Computation and Experiment," **S.L. Crossen, J.S. Colton**, Four Corners Section of the American Physical Society Meeting, Fort Collins, CO, Oct 21, 2017.
80. "Magnetron Sputtering of Arsenic-Doped Zinc Oxide Thin Films," **M.N. Shelley, J.S. Colton**, G. Renlund, D. Allred, **J.R. Peterson, C. Stewart, J. Erikson**, Four Corners Section of the American Physical Society Meeting, Fort Collins, CO, Oct 20, 2017.
81. "Photoluminescence of arsenic-doped zinc oxide thin films," **J.R. Peterson, M. Shelley, J.S. Colton**, G.M. Renlund, Four Corners Section of the American Physical Society Meeting, Fort Collins, CO, Oct 20, 2017.
82. "Tunability and Stability of Lead Sulfide Quantum Dots in Ferritin," **J.R. Peterson, J.S. Colton, K. Hansen, M. Shelley, A. Perego, C. Olsen**, and **L. Perez**, Abstract L27.04, American Physical Society March Meeting, New Orleans, LA, Mar 15, 2017.
83. "Nanocrystals Inside Ferritin Inside Photovoltaic Cells," **K. Hansen, J. Colton**, R. Watt, **J.R. Peterson, C. Olsen, A. Perego, L. Perez**, and **H. Longstaff**, Abstract L25.03, American Physical Society March Meeting, New Orleans, LA, Mar 15, 2017.
84. "Electron Spin Coherence of Silicon Vacancies in Proton-Irradiated 4H-SiC," **J.S. Colton, J. Embley, K.G. Miller, M.A. Morris, M. Meehan, S. Crossen**, B.D. Weaver, E.R. Glaser, and S.G. Carter, Abstract H48.11, American Physical Society March Meeting, Baltimore MD, Mar 14, 2017.
85. "Efficiency of Dye-Sensitized Solar Cells Using Ferritin-Encapsulated Quantum Dots With Various Staining Methods," **L. Perez, J.S. Colton, K. Hansen, J.R. Peterson**, Abstract C12.03, American Physical Society March Meeting, New Orleans, LA, Mar 13, 2017.
86. "Electron Spin Coherence in Silicon Carbide," **S.L. Crossen, J. Colton**, Brigham Young University Student Research Conference, Provo UT, Mar 4, 2017.
87. "Fabrication of Dye-Sensitized Solar Cells Using Nanocrystals in Ferritin as the Dye," **A. Perego, K. Hansen, J. R. Peterson, J. Colton**, R. Watt, Brigham Young University Student Research Conference, Provo UT, Mar 4, 2017.



88. "Tunability and Stability of Lead Sulfide Quantum Dots," **J.R. Peterson, J.S. Colton, K. Hansen, M. Shelley, A. Perego, C. Olsen, L. Perez**, Brigham Young University Student Research Conference, Provo UT, Mar 4, 2017.
89. "Synthesis of Platinum Nanoparticle Coated Ferritin for Photocatalytic Water Splitting," **A. Henrichsen, D. Petrucci, J. Colton, R. Watt, C. Olsen**, Brigham Young University Student Research Conference, Provo UT, Mar 4, 2017.
90. "Characterizing PbS, PbSe, and MoS<sub>2</sub> Quantum Dots in Ferritin," **H. Longstaff, J. Colton, R. Watt, K. Hansen, J.R. Peterson, M. Shelley**, Brigham Young University Student Research Conference, Provo UT, Mar 4, 2017.
91. "Zinc Oxide Sputtering and Optical Properties," **M. Shelley, J.R. Peterson**, G. Renlund, **J. Colton**, D. Allred, Brigham Young University Student Research Conference, Provo UT, Mar 4, 2017.
92. "The Physics of Musical Scales," D. Durfee and **J. Colton**, Life, the Universe, and Everything conference, Provo UT, Feb 2017.
93. "Electron Spin Coherence in Silicon Carbide," **S.L. Crossen, J. Colton, J. Embley**, Joint Meeting of the Four Corners and Texas Sections of the American Physical Society, Las Cruces, NM, Oct 22, 2016.
94. "Using Ferritin Quantum Dots to Harvest Solar Energy," **K. Hansen, J. Colton, R. Watt, P. Minson, J.R. Peterson, A. Perego, C. Olsen**, Joint Meeting of the Four Corners and Texas Sections of the American Physical Society, Las Cruces, NM, Oct 22, 2016.
95. "Lead Sulfide Quantum Dot Band Gap Investigations," **J.R. Peterson, J.S. Colton, K. Hansen, L. Perez, C. Olsen**, Joint Meeting of the Four Corners and Texas Sections of the American Physical Society, Las Cruces, NM, Oct 21, 2016.
96. "Harvesting Solar Energy Using Bioinorganic Nanoparticles," **C. Olsen, J. Embley, A. Perego, J. Colton**, and R. Watt, Utah Energy Summit, Governor's Energy Development Summit, Salt Lake City UT, May 25, 2016.
  - This poster was selected to be part of the Harold B. Lee Library's exhibit on mentored research, and was on display in the library from Aug 2016 – approx. Oct 2016.
97. "Fabrication of Dye Sensitized Solar Cells Using Native and Non-Native Nanocrystals in Ferritin as the Dye," **A. Perego, J. Colton**, and R. Watt, AIChE Rocky Mountain Regional Conference, Tucson AZ, Apr 2, 2016.
  - This talk won 2<sup>nd</sup> place in the paper competition.
98. "Synthesis of Platinum Nanoparticle Coated Ferritin for Photocatalytic Water Splitting," **A. Henrichsen, J. Colton, R. Watt, and C. Olsen**, Brigham Young University Student Research Conference, Provo UT, Mar 19, 2016.
99. "Electron Spin Coherence in Silicon Carbide," **S. Crossen, J. Colton**, and **J. Embley**, Brigham Young University Student Research Conference, Provo UT, Mar 19, 2016.
100. "Measuring Semiconductor Band Gaps with Spectroscopy," **J.R. Peterson** and **J. Colton**, Brigham Young University Student Research Conference, Provo UT, Mar 19, 2016.
101. "Lead Sulfide (PbS) Quantum Dots inside Ferritin," **K. Hansen, J. Colton, R. Watt, and C. Olsen**, Brigham Young University Student Research Conference, Provo UT, Mar 19, 2016.
102. "Fabrication of Dye Sensitized Solar Cells Using Native and Non-Native Nanocrystals in Ferritin as the Dye," **A. Perego, J. Colton**, and R. Watt, Brigham Young University Student Research Conference, Provo UT, Mar 19, 2016.
103. "Measurement of Spin Coherence Times in Proton-Irradiated 4H-SiC," **J. Embley, J. Colton, S. Carter, M. Morris, K. Miller, and M. Meehan**, Brigham Young University Student Research Conference, Provo UT, Mar 19, 2016.
  - This talk won a "Best in session" award.
104. "Bio-Inorganic Nanoparticles for Improved Solar Energy Harvesting," **C. Olsen, J. Embley, K. Hansen, J.R. Peterson, A. Henrichsen, A. Perego, J. Colton**, and R. Watt, Brigham Young University Student Research Conference, Provo UT, Mar 19, 2016.
  - This talk won a "Best in session" award.
105. "Measurement of Spin Coherence Times in Proton-Irradiated 4H-SiC," **J. Embley, J. Colton, S. Carter, M. Morris, K. Miller, and M. Meehan**, Abstract Y5.14, American Physical Society March Meeting, Baltimore MD, Mar 18, 2016.
106. "Cavities for electron spin resonance: predicting the resonant frequency," **J. Colton, K. Miller, R. Spencer, and M. Meehan**, Abstract V46.06, American Physical Society March Meeting, Baltimore MD, Mar 17, 2016.
107. "Temperature dependence of electron spin coherence in 4H-SiC," **M. Morris, J. Colton, J. Embley**, and S. Carter, Abstract B2.06, Joint Fall Meeting of the APS and AAPT New England Sections, Hanover, NH, Nov 7, 2015.

108. "Fabrication of dye sensitized solar cells using Fe-, Mn-, and Co-oxyhydroxide nanoparticles in ferritin as the dye," **A. Perego, J.S. Colton**, and R.K. Watt, AIChE Annual Meeting, Salt Lake City UT, Nov 2015.
109. "Fabrication of dye sensitized solar cells using Fe-, Mn-, and Co-oxyhydroxide nanoparticles in ferritin as the dye," **A. Perego, J.S. Colton**, and R.K. Watt, Four Corners Section of American Physical Society Meeting, Tempe AZ, Oct 17, 2015.
  - This talk won a "Best talk by undergraduate" award.
110. "Spin-echo measurements from vacancies in silicon carbide (SiC)," **M. Meehan, K. Miller**, and **J. Colton**, Brigham Young University Student Research Conference, Provo UT, Mar 21, 2015.
111. "Temperature and sample dependence of spin echo in SiC," **K. Miller**, **J. Colton**, S. Carter, Brigham Young University Student Research Conference, Provo UT, Mar 21, 2015.
112. "Tunable band gaps of nanocrystals encapsulated by the protein ferritin," **S. Erickson, T. Smith, C. Olsen, J. Embley**, R. Watt, and **J. Colton**, Brigham Young University Student Research Conference, Provo UT, Mar 21, 2015.
  - This talk won a "Best in session" award.
113. "Manganese nanoparticle synthesis in ferritin," **C. Olsen, T. Smith, J. Embley, S. Erickson, J. Maxfield, J. Colton**, and R. Watt, Brigham Young University Student Research Conference, Provo UT, Mar 21, 2015.
114. "Electrochemical analysis of metal oxide nanoparticles in ferritin," **J. Embley, J. Colton**, R. Watt, **T. Smith, C. Olsen, S. Erickson**, and **J. Maxfield**, Brigham Young University Student Research Conference, Provo UT, Mar 21, 2015.
  - This talk won a "Best in session" award.
115. "Experiencing the Physics of Intonation with Temperament Studio," D.S. Durfee, **J.S. Colton**, and C. Lee, American Association of Physics Teachers ID-UT Section Meeting, Snow College, Ephraim UT, Mar 14, 2015.
116. "Ferritin-based nanocrystals for solar energy harvesting," **J.S. Colton**, S.D. Erickson, C. Olsen, J. Embley, R.K. Watt, and **T.J. Smith**, Abstract L34.09, American Physical Society March Meeting, San Antonio TX, Mar 4, 2015.
117. "Electron spin lifetimes in  $1e14\text{ cm}^{-2}$  proton irradiated SiC," **K. Miller, J.S. Colton**, and S. Carter, Abstract F31.05, American Physical Society March Meeting, San Antonio TX, Mar 3, 2015.
118. "Ferritin-based nanocrystals as potential solar cells," **J.S. Colton** and **S.D. Erickson**, Condensed Matter Group seminar, Physics Department, Brigham Young University, Provo UT, Feb 5, 2015.
119. "Optically detected magnetic resonance of silicon vacancies in SiC," **K. Miller, J. Colton**, and S. Carter, Four Corners Section of American Physical Society Meeting, Orem UT, Oct 18, 2014.
120. "Tunable band gaps of protein enclosed nanocrystals for high efficiency solar energy conversion," **S.D. Erickson, T.J. Smith**, R.K. Watt, and **J.S. Colton**, Four Corners Section of American Physical Society Meeting, Orem UT, Oct 17, 2014.
121. "Oxidation-reduction potential of iron encapsulated by ferritin," **J. Embley, J. Colton**, R. Watt, **T. Smith, C. Olsen, K. Zenner**, and **S. Erickson**, Four Corners Section of American Physical Society Meeting, Orem UT, Oct 17, 2014.
122. "Natural product self-healing solar cell for efficient electron or hydrogen conversion," **T.J. Smith, S.D. Erickson**, D Petrucci, **J.S. Colton**, and R.K. Watt, COMS and Nano-Utah Meeting, Salt Lake City UT, Oct 2014.
123. "Materials study for 3rd generation solar cells using protein enclosed nanocrystals," **S. Erickson, T. Smith, C. Olsen, J. Colton**, and R. Watt, Governor's Energy Development Summit, Salt Lake City UT, Jun 4, 2014.
124. "Tunable band gaps of ferritin enclosed nanoparticles," **S. Erickson, T. Smith, C. Olsen, J. Embley, J. Colton**, and R. Watt, Brigham Young University Student Research Conference, Provo UT, Mar 15, 2014.
125. "Predicting cavity resonance for electron spin resonance (ESR)," **K. Miller, J. Colton**, and R. Spencer, Brigham Young University Student Research Conference, Provo UT, Mar 15, 2014.
126. "Redox potentials of metal oxides encapsulated by ferritin," **J. Embley, J. Colton**, R. Watt, **T. Smith, S. Erickson** and **C. Olsen**, Brigham Young University Student Research Conference, Provo UT, Mar 15, 2014.
127. "Aging analysis of metal-oxide cores in Ferrin," **C. Olsen, J. Colton, S. Erickson**, R. Watt, and **T. Smith**, Brigham Young University Student Research Conference, Provo UT, Mar 15, 2014.
128. "Configuration of equipment using low temperatures," **M. Meehan** and **J. Colton**, Brigham Young University Student Research Conference, Provo UT, Mar 15, 2014.
129. "Natural product self-healing solar cell for efficient electron or hydrogen conversion," **T.J. Smith, S.D. Erickson**, D. Petrucci, R.K. Watt, and **J.S. Colton**, Nano and Giga Challenges in Electronics, Photonics and Renewable Energy (NGC2014), Arizona State University, Tempe, Arizona, Mar 10-14, 2014.

130. "Band gap variations in ferritin-templated nanocrystals," **J.S. Colton, S. Erickson**, R.K. Watt, and **T.J. Smith**, Abstract L50.11, American Physical Society March Meeting, Denver CO, Mar 4, 2014.
131. "Band gap measurements and tunability of ferritin enclosed nanocrystals," **S. Erickson, T.J. Smith, J.S. Colton**, and R.K. Watt, Abstract L50.12, American Physical Society March Meeting, Denver CO, Mar 4, 2014.
132. "Tunable band gaps of protein enclosed nanoparticles," **S. Erickson, T. Smith, J. Colton**, and R. Watt, Utah Conference on Undergraduate Research (UCUR), Provo UT, Feb 28, 2014.
133. "Creating a mathematical model to represent the variable electrical conductivity in nanocomposites," A. Bilodeau, **T. Park**, D.T. Fullwood, J. Merrill, T. Remington, **J.S. Colton**, and A.E. Bowden, Utah Conference on Undergraduate Research (UCUR), Provo UT, Feb 28, 2014.
134. "Properties of protein-based ferrihydrite nanoparticles," **S.D. Erickson, T.J. Smith**, R.K. Watt, and **J.S. Colton**, Four Corners Section of American Physical Society Meeting, Denver CO, Oct 18, 2013.
135. "Long-lived electron spins in a modulation doped (100) GaAs quantum well," **J.S. Colton, D. Meyer, K. Clark, D. Craft, J. Tanner, T. Park**, and **P. White**, Abstract W18.06, American Physical Society March Meeting, Baltimore MD, Mar 2013.
136. "Studies of electron spin in GaAs quantum dots," **D. Craft, J.S. Colton, T. Park**, and **P. White**, Abstract A46.04, American Physical Society March Meeting, Baltimore MD, Mar 2013.
137. "Characterization of epitaxially-grown InGaAs quantum dot chains using transmission electron microscopy," **T. Park, J.S. Colton**, J. Farrer, and H. Yang, Abstract C20.05, American Physical Society March Meeting, Baltimore MD, Mar 2013.
138. "Measuring electron spin lifetimes in gallium arsenide", **D. Craft, J.S. Colton, T. Park, D. Meyer**, and **K. Clark**, Brigham Young University Spring Research Conference, Provo UT, Mar 9, 2013.
  - This talk won a "Best in session" award.
139. "Control of equipment through object-oriented programming," **S. Erickson, K. Miller**, and **J.S. Colton**, Brigham Young University Spring Research Conference, Provo UT, Mar 9, 2013.
140. "Photoluminescence lifetimes in cadmium telluride," **P. White, J.S. Colton, T. Park**, and R. Perkins, Brigham Young University Spring Research Conference, Provo UT, Mar 9, 2013.
141. "Characterization of epitaxially-grown InGaAs quantum dot chains using transmission electron microscopy," **T. Park, J.S. Colton**, J. Farrer, and H. Yang, Brigham Young University Spring Research Conference, Provo UT, Mar 9, 2013.
142. "Characterizing InGaAs quantum dot chains," **T. Park, J.S. Colton**, J. Farrer, **K. Clark, D. Meyer, S. Thalman**, and H. Yang, , Four Corners Section of American Physical Society Meeting, Socorro NM, Oct 26, 2012.
143. "Application of Birefringent Filters in converting pulsed lasers to continuous wave mode," **K. Clark** and **J.S. Colton**, Brigham Young University Spring Research Conference, Provo UT, Mar 17, 2012.
144. "Measuring electron spin lifetimes in gallium arsenide," **D. Craft, J.S. Colton, T. Park, D. Meyer**, and **K. Clark**, Brigham Young University Spring Research Conference, Provo UT, Mar 17, 2012.
  - This talk won a "Best in session" award.
145. "Anomalous spin lifetimes in 14 nm GaAs quantum well," **D. Meyer, J.S. Colton, D. Craft, K. Clark, J. Cutler**, and **T. Park**, Brigham Young University Spring Research Conference, Provo UT, Mar 17, 2012.
146. "Dielectric constant measurements to determine gap distance," **J. Cutler, T. Park**, M. Koecher, **J.S. Colton**, and D. Fullwood, Brigham Young University Spring Research Conference, Provo UT, Mar 17, 2012.
147. "Characterization of quantum dot chains using transmission electron microscopy," **T. Park, J.S. Colton**, J. Farrer, and H. Yang, Abstract J17.13, American Physical Society March Meeting, Boston MA, Feb 2012.
148. " $T_1$  spin lifetimes in  $n$ -doped quantum wells and dots," **J.S. Colton, T. Park, K. Clark, J. Cutler, D. Craft, D. Meyer**, and **P. White**, Abstract B14.11, American Physical Society March Meeting, Boston MA, Feb 2012.
149. "Electron and nuclear spins in self-assembled quantum dots," **J.S. Colton**, Condensed Matter Group seminar, Physics Department, Brigham Young University, Provo UT, Dec 6, 2011.
150. "Photoluminescence spectroscopy and transmission electron microscopy imaging of InGaAs quantum dot chains," **T. Park, K. Clark, D. Meyer, A. Perry, S. Thalman, J.S. Colton**, H. Yang, Four Corners Section of American Physical Society Meeting, Tucson AZ, Oct 22, 2011.
151. "Universal scheme for optically-detected  $T_1$  measurements and application to an  $n = 3E14 \text{ cm}^{-3}$  GaAs sample," **J.S. Colton, T. Park, K. Clark, D. Craft, J. Cutler, D. Meyer, D. Smith**, and **S. Thalman**, Abstract A15.4, American Physical Society March Meeting, Dallas TX, Mar 2011.
152. "Using photoluminescence spectroscopy and transmission electron microscopy for observing GaAs quantum dots," **T. Park, K. Clark, D. Smith, S. Thalman, J.S. Colton**, H. Yang, Brigham Young University Spring Research Conference, Provo UT, Mar 19, 2011.

153. "Photoluminescent properties of InGaAs quantum dot structures," **K. Clark, J.S. Colton, M. Guerron, D. Smith, S. Thalman**, and H. Yang, Brigham Young University Spring Research Conference, Provo UT, Mar 19, 2011.
154. "Photoluminescence lifetimes of InGaAs quantum dots," **Scott Thalman** and **J.S. Colton**, Brigham Young University Spring Research Conference, Provo UT, Mar 19, 2011.
155. "Lightly-doped GaAs: a decade of spin lifetimes and spin resonance - part 2," **J.S. Colton**, Condensed Matter Group seminar, Physics Department, Brigham Young University, Provo UT, Jan 10, 2011.
156. "Lightly-doped GaAs: a decade of spin lifetimes and spin resonance - part 1," **J.S. Colton**, Condensed Matter Group seminar, Physics Department, Brigham Young University, Provo UT, Dec 7, 2010.
157. "Photoluminescent properties of InGaAs quantum dot structures," **K. Clark, J.S. Colton, M. Guerron, D. Smith, S. Thalman**, and H. Yang, Abstract L2.3, Four Corners Section of American Physical Society Meeting, Ogden UT, Oct 16, 2010.
158. "Photoluminescent lifetime measurements of indium gallium arsenide quantum dot structures using time-correlated single photon counting," **S. Thalman, J.S. Colton**, and H. Yang, Abstract L2.3, Four Corners Section of American Physical Society Meeting, Ogden, UT, Oct 16, 2010.
159. "Photoluminescence of indium gallium arsenide quantum dots and dot-chains," **A.M Jones, J.S. Colton, S. Thalman, D. Smith, S. Brown**, Brigham Young University Spring Research Conference, Provo UT, Mar 20, 2010.
160. "Time-correlated Single Photon Counting," **S. Thalman, J.S. Colton, A.M Jones, S. Brown, D. Smith**, Brigham Young University Spring Research Conference, Provo UT, Mar 20, 2010.
161. "Taming the magnet," **D. Smith, J.S. Colton, S. Brown**, Brigham Young University Spring Research Conference, Provo UT, Mar 20, 2010.
162. "Optically-detected electron spin resonance of self-assembled InAs quantum dots," J.S. Colton, **A.M. Jones, S. Brown, D. Smith, S. Thalman**, and **K. Clark**, Abstract B35.2, American Physical Society March Meeting, Portland, OR, Mar 2010.
163. "Optical and microwave control of electron spins in semiconductor nanostructures – part 2," **J.S. Colton**, Brigham Young University Physics Department Condensed Matter Group seminar, Provo UT, Dec 10, 2009.
164. "Optical and microwave control of electron spins in semiconductor nanostructures – part 1," **J.S. Colton**, Brigham Young University Physics Department Condensed Matter Group seminar, Provo UT, Dec 3, 2009.
165. "Optically-detected magnetic resonance studies of n-GaAs," **J.S. Colton, B. Heaton, M. Johnson, D. Jensen, A. Jones, S. Brown**, Abstract Y22.7, American Physical Society March Meeting, Pittsburgh, PA, Mar 2009.
166. "Nuclear effects in the optically-detected magnetic resonance of electron spins in n-GaAs," **B. Heaton, J.S. Colton, M. Johnson, D. Jensen, A. Jones, S. Brown**, Abstract Y22.8, American Physical Society March Meeting, Pittsburgh, PA, Mar 2009.
167. "Nuclear effects on electron spin resonance in gallium arsenide," **A. Jones, J.S. Colton, B. Heaton, M. Johnson, D. Jensen, S. Brown**, Abstract S1.126, American Physical Society March Meeting, Pittsburgh, PA, Mar 2009.
168. "Nuclear spin polarization effects on electron spin resonances," **B. Heaton, J.S. Colton**, Texas and Four Corners Sections of American Physical Society Joint Meeting, El Paso, TX, Oct 17, 2008.
  - o This talk won a "Best talk by an undergraduate" conference award.
169. "Electron-nuclear interactions in lightly-doped GaAs, studied through optically-detected magnetic resonance (ODMR)," **J.S. Colton, L. Wienkes, A. Gierke, S. Allemann**, and A.S. Bracker, Abstract X33.4, American Physical Society March Meeting, New Orleans, LA, Mar 2008.
170. "Research on electron spin in GaAs," **J.S. Colton**, Brigham Young University Physics Department Condensed Matter Group seminar, Provo UT, Oct 31, 2007.
171. "Investigations of spin lifetimes in semiconductors," **L.R. Wienkes** and **J.S. Colton**, National Conference on Undergraduate Research (NCUR), Dominican University, San Rafael, CA, Apr 2007.
172. "Development of an 8-12 GHz variable frequency microwave resonant cavity for optically-detected magnetic resonance (ODMR) of GaAs-related semiconductors," **J.S. Colton, L.R. Wienkes, L.R. Oestreich**, and **P.M. Schroeder**, Abstract V12.10, American Physical Society March Meeting, Denver, CO, Mar 2007.
173. "Electron  $T_1$  spin lifetimes in a  $1 \times 10^{15} \text{ cm}^{-3}$  n-GaAs sample," **J.S. Colton, M.E. Heeb, P. Schroeder, A. Stokes**, and **L.R. Wienkes**, Abstract V20.6, APS March Meeting, Baltimore, MD, March 2006.
174. "Electron spin lifetime measurements in semiconductors," **J.S. Colton, L.R. Wienkes**, and **M.E. Heeb**, Wisconsin Space Conference, Madison WI, Aug 2005.
175. "Spin lifetimes and excitation mechanisms in lightly n-type GaAs," T.A. Kennedy, **J.S. Colton**, M. Scheibner, A.S. Bracker, and D. Gammon, DARPA QUIST meeting, Chicago IL, May 2004.



176. "Spin relaxation and microsecond spin-flip times in lightly doped GaAs," **J.S. Colton**, T.A. Kennedy, A.S. Bracker, and D. Gammon, APS March Meeting, Montreal, Canada, Mar 2004.
177. "Spin dephasing in lightly doped GaAs," T.A. Kennedy, **J.S. Colton**, M. Scheibner, A.S. Bracker, and D. Gammon, APS March Meeting, Montreal, Canada, Mar 2004.
178. "Spin resonance and spin-flip times in n-GaAs layers", T.A. Kennedy, **J.S. Colton**, A.S. Bracker, D. Gammon, and J.B. Miller, Spintech II, International Conference and School on Semiconductor Spintronics and Quantum Information Technology, Brugge, Belgium, Aug 2003.
179. "Room-temperature operation of the NV-center qubit in CVD diamond," T.A. Kennedy, **J.S. Colton**, J.E. Butler, R. Linares, and P. Doering, Spintech II, International Conference and School on Semiconductor Spintronics and Quantum Information Technology, Brugge, Belgium, Aug 2003.
180. "Coherence and spin-flip lifetimes in lightly n-doped GaAs structures," **J.S. Colton**, T.A. Kennedy, A.S. Bracker, and D. Gammon, DARPA QUIST meeting, Beverly Hills CA, Jun 2003.
181. "Electron spin resonance in n-GaAs heterostructures with optical polarization and optical detection," **J.S. Colton**, T.A. Kennedy, D. Gammon, A.S. Bracker, J.B. Miller, J.G. Tischler, and A.L. Efros, APS 2003 March Meeting, Austin TX, Mar 2003.
182. "Lifetimes and control of electron spin in GaAs structures," **J.S. Colton**, T.A. Kennedy, A.L. Efros, and D. Gammon, DARPA QUIST meeting, Cambridge MA, Sep 2002.
183. "Analysis of large single crystal CVD diamond," J.E. Butler, T.A. Kennedy, **J.S. Colton**, S. Qadri, R. Linares, and P. Doering, International Conference on New Diamond Science and Technology (ICNDST-8), Melbourne, Australia, July 2002.
184. "Analysis of large single crystal CVD diamond," J.E. Butler, T.A. Kennedy, **J.S. Colton**, S. Qadri, R. Linares, and P. Doering, 2002 DeBeers Diamond Conference, Oxford, England, July 2002.
185. "Spin lifetime measurements in MBE-grown GaAs epilayers," **J.S. Colton**, T.A. Kennedy, A.S. Bracker, and D. Gammon, 275th WE Heraeus Seminar, Hardware Concepts for Quantum Computing, Bad Honnef, Germany, May 2002.
186. "A model qubit using optics and microwaves with the NV-center in diamond," T.A. Kennedy, F.T. Charnock, and **J.S. Colton**, 32nd Winter Colloquium on the Physics of Quantum Electronics, Snowbird, UT, Jan 2002.
187. "Spin polarization of trions and excitons in a GaAs quantum well," **J.S. Colton**, T.A. Kennedy, F.T. Charnock, D. Gammon, A.S. Bracker, and J.G. Tischler, First International Conference on Spintronics and Quantum Information Technology (Spintech-I), Maui, Hawaii, May 2001.
188. "Confinement-enhanced spin splitting in Mn-doped ZnSe nanocrystals," T.A. Kennedy, F.T. Charnock, A.L. Efros, **J.S. Colton**, Nan Yao, and D.J. Norris, First International Conference on Spintronics and Quantum Information Technology (Spintech-I), Maui, Hawaii, May 2001.
189. "Spin polarization in Si-doped GaAs layers and quantum wells," T.A. Kennedy, F.T. Charnock, **J.S. Colton**, D. Gammon, J.G. Tischler, and A.S. Bracker, APS 2001 March Meeting, Seattle, WA, March 2001.
190. "Selectively excited blue luminescence in heavily Mg-doped p-type GaN," P.Y. Yu and **J.S. Colton**, 11th International Semiconducting and Insulating Materials Conference (SIMC-XI), Canberra, Australia, Jul 2000.
191. "Selective excitation of the blue luminescence of Mg-doped GaN," **J.S. Colton** and P.Y. Yu, APS March Meeting, Minneapolis MN, Mar 2000.
192. "Selective excitation of the yellow luminescence of GaN," **J.S. Colton**, P.Y. Yu, K.L. Teo, E.R. Weber, P. Perlin, I. Grzegory and K. Uchida, 1999 International Conference on Defects in Semiconductors (ICDS-20), July 1999.
193. "Selective excitation of donor-acceptor complexes responsible for the yellow luminescence of GaN," **J.S. Colton**, K.L. Teo, P.Y. Yu, P. Perlin, E. Weber, I. Grzegory, and K. Uchida, APS March Meeting, Atlanta GA, Mar 1999.

## University Activities

### Teaching

#### Classes taught at BYU (2007-current)

- **PS 100, Physical Science:** Fall 2020
- **Physics 105, General Physics 1:** Fall 2007, Fall 2008, Fall 2009, Fall 2013, Fall 2014

- **Physics 123, Introduction to Waves, Optics, and Thermodynamics, for Physics Majors and Minors:** Fall 2010, Winter 2011, Fall 2011, Fall 2012
- **Physics 191, Introduction to Physics Careers and Research 1:** Fall 2015, Fall 2016, Fall 2017
- **Physics 230, Computational Physics Lab 1:** Fall 2012, Winter 2014, Winter 2015
- **Physics 291, Introduction to Physics Careers and Research 2:** Fall 2015, Fall 2016, Fall 2017
- **Physics 430, Computational Physics Lab 3:** Winter 2010
- **Physics 441, Electricity and Magnetism:** Spring 2016, Fall 2016, Fall 2017, Fall 2018, Fall 2019, Spring 2021, Fall 2021, Spring 2022, Fall 2022, Spring 2024
- **Physics 442, Electrodynamics:** Summer 2016, Winter 2017, Winter 2018, Winter 2019, Winter 2020, Summer 2021, Winter 2022, Summer 2023, Summer 2024
- **Physics 471, Principles of Optics:** Winter 2008, Winter 2012, Winter 2019, Winter 2024
- **Physics 497R, Mentored undergraduate research:** nearly every semester
- **Physics 581, Solid-State Physics:** Winter 2011, Winter 2012, Winter 2013, Fall 2020, Fall 2021
- **Honors 225, Unexpected Connections, “Uncertainty: Quantum Mechanics and Early 20th Century Europe”:** Fall 2018, Fall 2019, Winter 2020 (with Evan Ward, BYU History Dept)

### Classes taught at UW-La Crosse (2003-2007)

- **Physics 103, Fundamental Physics I – Laboratory:** Fall 2003, Fall 2004, Fall 2006
- **Physics 104, Fundamental Physics II – Laboratory:** Spring 2004, Spring 2005, Spring 2007
- **Physics 311, Computational Physics Laboratory:** Fall 2004, Fall 2005
- **Physics 332, Electrodynamics:** Spring 2005, Spring 2006, Spring 2007
- **Physics 334, Circuits - Lecture and Laboratory:** Spring 2006, Spring 2007
- **Physics 335, Electronics - Lecture and Laboratory:** Fall 2003, Fall 2004, Fall 2005, Fall 2006
- **Physics 343, Thermodynamics:** Spring 2004, Spring 2005, Spring 2006
- **Physics 432, Advanced Electrodynamics:** Fall 2005, Fall 2006
- **Physics 476, Advanced Optics - Lecture and Laboratory:** Spring 2004
- **Physics 453, Capstone Course:** Spring 2007
- **Physics 498, Mentored Undergraduate Research:** nearly every semester
- **MCAT review course:** Spring 2005, Spring 2006

### Significant Teaching Accomplishments

- **BYU Physics 230:** wrote new lab manual to teach computational physics using Mathematica which is still used today, Spring/Summer 2015
- **BYU Physics 441:** initiator of a significant physics education research project on improving instruction upper-level electricity & magnetism which has resulted in 3 peer-reviewed publications and 9 conference presentations, Fall 2019-current
- **BYU Honors 225:** new class, titled “Uncertainty: Quantum Mechanics and Early 20th Century Europe.” Taught as an “unexpected connections” class in conjunction with Evan Ward, BYU Dept of History, as a combination science and culture class, taught Fall 2018, Fall 2019, Winter 2020
- **UWL Physics 334:** new class, developed all new curriculum for Circuits, Spring 2006
- **UWL Physics 335:** redesigned class, developed all new curriculum for Electronics, Fall 2003
- **UWL Physics 453:** new class, developed all new curriculum for Capstone class, Spring 2007

### Teaching Awards/Recognition

1. **The 2024 College Outstanding Teaching Award** from the BYU College of Physical and Mathematical Sciences, Apr 2024
2. **Outstanding Performance Award** from BYU Department of Physics and Astronomy, for creating active learning environments in advanced electricity and magnetism courses, Feb 2023
3. **Alcuin Fellow** by the BYU Honors program (see the Honors 225 class info above), 2017-2020
4. **Wisconsin Teaching Fellow** from UW-La Crosse, 2006-2007 academic year.
5. Co-winner of the **McGlynn Fund Award** at UW-La Crosse, 2006.

6. **Most Accessible Award Nominee** at UW-La Crosse for the 2005-2006 year and for the 2006-2007 year, from the Students Advocating Potential Ability group.
7. **Regents Teaching Award** given to the entire Department of Physics at UW-La Crosse by the University of Wisconsin system; this is given to a single department from among all of the 26 University of Wisconsin campuses and the state-wide extension program, 2004.
8. **Outstanding Graduate Student Instructor** award from the Department of Physics at UC-Berkeley for work in the Solid State Physics course, 1998.

## Mentoring

### Undergraduate students at BYU, faculty advisor

(with Honors theses/senior theses/capstone projects/REU projects and notable student awards indicated)

1. Jaydon Southwell – Fall 2024 (current)
2. Hadley Hillyer – Fall 2024 (current)
3. Shane LeBaron – Fall 2024 (current)
4. Matthew Bradshaw – Spring/Summer 2024 - Fall 2024 (current) (visiting REU student, from University of Connecticut; continued research after returning to U. Connecticut)
  - a. REU project (2024): “Measurement and calculation of the optoelectronic properties of 2D hybrid organic-inorganic perovskites”
5. Amelia Poulin – Winter 2024 - Fall 2024 (current)
6. Jenna Davenport – Fall 2023 - Fall 2024 (current)
7. Garrett Davis – Fall 2023 - Fall 2024 (current)
8. James Hecht – Fall 2023 - Fall 2024 (current)
9. Levi Homer – Fall 2022 - Fall 2024 (current)
10. Trigg Randall – Fall 2022 - Fall 2024 (current)
11. Dorian Baldwin-Bott – Fall 2022 - Spring/Summer 2024
  - a. Capstone project (2024): “Evaluating a Physics Problem Tutorial Format in Upper-Level Undergraduate Electromagnetism Courses”
12. Sierra Whipple – Fall 2023, Winter 2024, Spring 2024
  - a. Senior thesis (2024): “Terahertz circular dichroism of R/S-MBA2PbI4”
13. Benjamin Bassett – Fall 2022 - Spring/Summer 2023
14. Michael Murdock – Fall 2021 - Winter 2022
15. Ally Stonas – Spring/Summer 2023 (visiting REU student, from Walla Walla University)
  - a. REU project (2023): “Optical Research on Semiconductors: Electroabsorption, Circular Dichroism, and Photoluminescence Spectroscopies”
16. Daniel King – Winter 2021 - Spring/Summer 2023
  - a. REU project (2021): “Testing the Optical Properties of Perovskite Quantum Dots for Use in Optical and Microfluidic Environments”
  - b. Senior thesis (2023): “Simulating the TE<sub>016</sub> Mode of a Dielectric Resonator in Free Space”
17. Chapman Lindsay – Fall 2018 - Spring/Summer 2023
  - a. Senior thesis (2023): “Impedance Spectroscopy on Metal Halide Perovskites to Produce a Temperature Dependent Series”
18. Grant Miller – Fall 2022 - Winter 2023
  - a. Capstone project (2022): “Designing Upper-Division Undergraduate Physics Course Problem Tutorials”
19. Michele Eggleston – Spring/Summer 2022 - Winter 2023 (visiting REU student, from Oberlin College; continued research after returning to Oberlin)
  - a. REU project (2022): “Using Electro-Absorption to Determine the Exciton Properties of Hybrid Organic-Inorganic Perovskites”
  - b. Oberlin senior thesis (2023): “Using Electro-Absorption to Determine the Exciton Binding Energies of Hybrid Organic-Inorganic Perovskites”
20. Blake Romrell – Winter 2021 - Winter 2023
  - a. REU project (2022): “Investigation of Exciton properties of Hybrid Organic Inorganic Perovskites”
  - b. Senior thesis (2023): “Metal Halide Perovskite Exciton Tuning Through Composition Variations and Alloying”

21. Samuel Jeppson – Fall 2021 - Winter 2023
  - a. Senior thesis (2023): “Electroabsorption as a method to accurately measure the band gap and exciton binding energy in 2D metal halide perovskites”
22. Emma McClure – Fall 2018 - Spring/Summer 2022; additional post-bac research Winter 2024 - Spring/Summer 2024
  - a. Won 3<sup>rd</sup> place at CUWIP poster session, Jan 2019
  - b. Won a “Student Presentation Award” at 2020 APS Four Corners Conference
  - c. Won a “Best in session” award at 2021 BYU Student Research Conference
  - d. Won the BYU Department of Physics and Astronomy “3 minute thesis” competition, Feb 2022
  - e. Won a “Best in session” award at 2022 BYU Student Research Conference
  - f. REU project (2020): “Neural Network Temperature Predictions based on the Optical Properties of Quantum Dots”
  - g. Senior thesis (2022): “Dielectric spectroscopy on 2D and 3D metal halide perovskites using an interdigitated electrode geometry”
23. Jonathan Hale – Winter 2021 - Winter 2022 [became a graduate student in Mathematics Apr 2021]
24. Alex Mumford – Winter 2022
  - a. Capstone project (2022): “Developing a system for automated crop steering in cannabis”
25. Jordan Bryan – Spring/Summer 2020 - Fall 2021 (visiting REU student, from Illinois State University; continued research after returning to Illinois State)
  - a. REU project (2020): “Use of Machine Learning and Photoluminescent Quantum Dots to Measure Temperature of Microfluidic Devices AND Use of Machine Learning to Predict Waves Formed at Resonance Frequencies in a Microwave Cavity”
26. Bryce Eggers – Fall 2021
27. Sophia Chiang – Spring/Summer 2021 (visiting REU student, from University of Chicago)
  - a. REU project (2021): “Synthesis and Optical Properties of Ferritin Encapsulated Zinc Oxide Nanoparticles”
28. Kane Fanning – Winter 2020 - Winter 2021
29. Spencer King – Fall 2018 - Winter 2021
  - a. Senior thesis (2021): “Zinc Oxide Nanoparticle Synthesis in Apoferritin”
30. Nathan Schwartz – Fall 2018 - Winter 2021
  - a. Senior thesis (2021): “Neural Network Solutions to Cylindrical Microwave Cavities”
31. Marissa Iraca – Spring/Summer 2020 (visiting REU student, from Lock Haven University)
  - a. REU project (2020): “Machine Learning with Temperature Sensing Quantum Dots Data”
  - b. Won a “Student Presentation Award” at 2020 APS Four Corners Conference
32. Charles Lewis – Fall 2017 - Spring/Summer 2020; additional post-bac research Fall 2020 - Fall 2021
  - a. Senior thesis (2020): “Neural Network Approximations of the Temperature of CdTe Quantum Dots”
33. James Erikson – Fall 2017 - Winter 2020
  - a. Won a “Best in session” award for presentation at 2018 APS Four Corners Conference
  - b. Senior thesis (2020): “Photoluminescence Lifetime as an Indicator of Temperature in Materials”
34. Alex Gruszkiewicz Christensen – Fall 2017 - Winter 2020
  - a. Senior thesis: “Brachytherapy Implant Evaluation Using New Isodose Surface Metrics”, Apr 2020
35. Lydia Harris – Spring/Summer 2019 (visiting REU student, from BYU Idaho)
  - a. REU project (2019): “Characterization of Zn<sub>3</sub>As<sub>2</sub> using X-ray Diffraction”
36. Matt Richards – Fall 2017 - Winter 2019
  - a. Senior thesis (2019): “Ferritin-bound Platinum Nanoparticles in Hydrogen Production”
37. Daniel Boyce – Fall 2017 - Winter 2019
  - a. REU project (2018): “Hydrogen Evolution Assisted by Platinum Nanoparticles Bound to Ferritin”
  - b. Senior thesis (2019): “Using platinum nanoparticles on ferritin to form hydrogen gas from methyl viologen and organic acids”
38. Colter Stewart – Fall 2017 - Winter 2019
  - a. Won a BYU ORCA grant for 2018
  - b. Senior thesis (2019): “Optical Constants of Amorphous Zinc Arsenide (Zn<sub>3</sub>As<sub>2</sub>) via Spectroscopic Ellipsometry”
39. Micah Shelley – Fall 2016 - Winter 2019
  - a. Senior thesis (2019): “RF magnetron sputtering of arsenic-doped p-type zinc oxide”
40. Katelyn Watson Hottman – Spring/Summer 2018 (visiting REU student, from Arkansas State University)



- a. REU project (2018): “Temperature Dependence of Photoluminescence Lifetime of Rhodamine B and CdTe Quantum Dots”
- 41. Heather Longstaff Hogg – Fall 2016 - Winter 2018
  - a. Senior thesis (2018): “Temperature Dependence of Photoluminescence Lifetime of Rhodamine B”
- 42. Ryan Peterson – Fall 2015 - Winter 2018
  - a. REU project (2016): “Quantum Dot Band Gap Investigations”
  - b. Senior thesis (2018): “Sputtering p-Type Arsenic-doped Zinc Oxide Thin Films”
- 43. Scott Crossen – Fall 2015 - Winter 2018
  - a. Won a BYU ORCA grant for 2017
  - b. Senior thesis (2018): “Optically Detected magnetic Resonance: Computational Predictions and Experimental Results”
- 44. Alessandro Perego - Winter 2015 - Winter 2018
  - a. Won 2<sup>nd</sup> place in the paper competition for presentation at AIChE Rocky Mountain Regional Conference, Apr 2016
  - b. Won a BYU ORCA grant for 2016
  - c. Won a “Best talk by undergraduate” award for presentation at 2015 Four Corners Sections of American Physical Society Meeting, Tempe AZ
- 45. Andrew Henrichsen – Fall 2015 - Winter 2017
  - a. Won a BYU ORCA grant for 2016
- 46. Kameron Hansen – Fall 2015 - Winter 2017
  - a. Won a BYU Physics Department Mentoring Award, Spring/Summer 2016
  - b. Won a BYU ORCA grant for 2017
  - c. Senior thesis (2017): “Ferritin encapsulated PbS, PbSe, and MoS<sub>2</sub> Nanocrystals for Photovoltaic Applications”
- 47. Luis Perez - Spring/Summer 2016 (visiting REU student, from University of Redlands)
  - a. REU project (2016): “Efficiencies of Dye-Sensitized Solar Cells using Ferritin-Encapsulated Quantum Dots with Various Staining Methods”
- 48. Shane Oh – Fall 2016
- 49. Cameron Olsen – Winter 2014 - Winter 2016
  - a. Won a “Best in session” award for presentation at 2016 BYU Spring Research Conference
  - b. Won a Utah Governor’s Energy Leadership Scholars Program award, Aug 2015
  - c. Senior thesis (2016): “Permanganate-Based Synthesis of Semiconducting Metal Oxide Nanoparticles in the Protein Ferritin”
- 50. Jacob Embley – Winter 2014 - Winter 2016
  - a. Won a “Best in session” award for presentation at 2016 BYU Spring Research Conference
  - b. Won a “Best in session” award for presentation at 2015 BYU Spring Research Conference
  - c. REU project (2015): “SiC Spin Coherence Lifetime Results”
  - d. Senior thesis (2016): “Electron Spin Coherence in Silicon Vacancy Defects of Proton-irradiated Silicon Carbide”
- 51. Michael Meehan – Fall 2013 - Winter 2016
  - a. Senior thesis (2016): “Continuous Wave Operation and Mode-Locking of Ti:Sapph Lasers”
- 52. Jake Maxfield – Winter 2015 - Fall 2015
- 53. Kyle Miller – Fall 2012 - Spring/Summer 2015
  - a. Won a BYU ORCA grant, Fall 2015
  - b. REU project (2014): “Optically Detected Magnetic Resonance of silicon vacancies in SiC”
  - c. Senior thesis (2015): “Electron spin echo and coherence times in silicon carbide defects”
- 54. Margaret Morris – Spring/Summer 2015 (visiting REU student, from Brandeis University)
  - a. REU project (2015): “Measuring Spin Lifetimes in 4H-SiC”
- 55. Stephen Erickson – Fall 2012 - Winter 2015
  - a. Won a Utah Governor’s Energy Leadership Scholars Program award, Feb 2014
  - b. Won a Goldwater Scholarship, Mar 2014
  - c. Won a “Best in session” award for presentation at 2015 BYU Spring Research Conference
  - d. Featured in these two news articles
    - i. BYU news: <http://news.byu.edu/archive15-mar-solar.aspx>
    - ii. KSL.com: <http://www.ksl.com/?nid=1012&sid=34181706>
  - e. Featured in these two TV news segments:

- i. Fox13: <http://fox13now.com/2015/03/28/byu-students-research-into-nanocrystals-could-lead-to-better-solar-panels/>
  - ii. KUTV 2: <http://kutv.com/news/local/byu-researchers-discover-process-for-improving-solar-panel-technology>
- f. REU project (2013): “Band Gap Measurements of Ferrihydrite Core Ferritin through Absorption Spectroscopy”
- g. Senior thesis (2015): “Tunable band gaps of nanocrystals encapsulated by the protein ferritin”
- 56. Kevin Zenner – Spring/Summer 2014 (visiting REU student, from Arizona State University)
  - a. REU project (2014): “Analyzing the Reduction/Oxidation Potential of Native Ferrihydrite by Substituting Different Anions in Solution”
- 57. Skyler Hair – Fall 2013 - Winter 2014
- 58. Ken Clark – Fall 2009 - Winter 2014
- 59. Phil White – Fall 2011 - Spring/Summer 2013
- 60. Matt Cullins – Spring/Summer 2013 (visiting REU student, from College of Coastal Georgia/Georgia Southern University)
  - a. REU project (2013): “Electron Spin Lifetimes in Quantum Dots”
- 61. Daniel Craft – Winter 2011 - Winter 2013
  - a. Won a “Best in session” award for presentation at 2012 BYU Spring Research Conference.
  - b. Won a “Best in session” award for presentation at 2013 BYU Spring Research Conference.
  - c. Won an “Outstanding presentation” award at undergraduate session of 2013 APS March Meeting.
  - d. REU project (2012): “Measuring T1 Electron Spin Lifetimes in GaAs Quantum Dots”
  - e. Senior thesis (2013): “Non-exponential electron spin decay in indium arsenide quantum dots”
- 62. Jane Cutler Tanner – Winter 2011 - Winter 2013
  - a. Honors thesis (2013): “Offline prototype of an online sheet shape measurement system”
- 63. David Meyer – Winter 2011 - Spring/Summer 2012
  - a. REU project (2011): “Analysis of Quantum Wells in a Gallium Arsenide Sample”
  - b. Senior thesis (2012): “Spin Lifetime Measurements in a 14nm GaAs Quantum Well”
- 64. Danielle Law – Spring/Summer 2012 (visiting REU student, from Central College, Iowa)
  - a. REU project (2012): “Electron Spin Lifetimes in InGaAs Quantum Dots”
- 65. Christel Herlin Djaha Fodja – Spring/Summer 2012 (visiting REU student, from U. North Texas)
  - a. REU project (2012): “Quantum Dots Imaging and Spin Lifetime”
- 66. Scott Thalman – Winter 2009 - Spring/Summer 2011
  - a. REU project (2010): “Time-Correlated Single Photon Counting (TCSPC)”
  - b. Senior thesis (2011): “Photoluminescence Lifetimes of Quantum Dots”
- 67. Andrew Perry – Spring/Summer 2011 (visiting REU student, from U. Utah)
  - a. REU project (2011): “Analysis of Quantum Wells in a Gallium Arsenide Sample”
- 68. Dallas Smith – Winter 2009 - Winter 2011
  - a. Senior thesis (2011): “Optical Measurement of Electron Spin Lifetimes in Gallium Arsenide”
- 69. Courtney Klosterman – Spring/Summer 2010 (visiting REU student, from U. Oregon)
  - a. REU project (2010): “Computer control of a water-cooled electromagnet”
- 70. Matt Guerron – Spring/Summer 2010 (visiting REU student, from West Chester University)
  - a. REU project (2010): “Optical Properties of InGaAs Quantum Dots (QDs) and QD Chains”
- 71. Steve Brown – Fall 2008 - Spring/Summer 2010
  - a. Honors thesis (2010): “An Object-Oriented Framework For Experimental Control in the Colton Spin Dynamics Laboratory”
- 72. Steven Allen – Winter 2010
  - a. Honors thesis (2010): “Phase-Sensitive And Dual-Angle Radiofrequency Mapping In <sup>23</sup>Na Magnetic Resonance Imaging”
- 73. Mitch Jones – Fall 2008 - Winter 2010
  - a. Won a 2009 Armed Forces Communications and Electronics Association - Intelligence Scholarship, one of just two awarded in the nation.
  - b. Won a 2010 National Science Foundation graduate fellowship
  - c. Senior thesis (2010): “Photoluminescence of Indium Gallium Arsenide Quantum Dots and Dot Chains”
- 74. Michael Johnson – Fall 2007 - Winter 2010
  - a. REU project (2008): “Electron spin resonance”

75. Benjamin Heaton – Fall 2007 - Winter 2009
  - a. Won a “Best talk by undergraduate” award for presentation at 2008 Texas and Four Corners Sections of American Physical Society Joint Meeting, El Paso TX
  - b. REU project (2008): “Nuclear spin polarization effects on electron spin resonances”
  - c. Senior thesis (2009): “Nuclear-Electron Coupling in GaAs Spin States and Control of the Effects”
76. Daniel Jenson – Fall 2007 - Fall 2008
  - a. Senior thesis (2008): “A System for Simultaneously Driving Three Discrete Nuclear Resonances in GaAs: Theory and Experiment”
77. Scott Eldredge – Fall 2007

### Undergraduate students at UW-La Crosse, faculty advisor

78. Lee Wienkes – Spring 2005 - Summer 2007
  - a. Won a “Dean’s Distinguished Fellowship” for Summer 2005
  - b. Won a Goldwater fellowship in 2006
  - c. Won the UW-L “Murphy Award” for the top graduating senior in 2007
79. Susan Allemann – Summer 2007
80. Andrew Gierke – Summer 2007
81. Joseph Lanska – Fall 2006 - Spring 2007
82. Lindsay Oestreich – Fall 2006 - Spring 2007
83. Paul Schroeder – Jan 2006 - Jan 2007
  - a. Won a WSGC Scholarship in 2006
84. Andy Stokes – Jan 2006 - Fall 2006
85. Mike Heeb – Summer 2005 - Spring 2006
86. Ashley Wulff – Fall 2004

### Graduate students at BYU (Advisor/Committee chair)

1. Carter Shirley – Ph.D. advisor, Spring/Summer 2022 – Fall 2024 (current)
2. Tyler Park – M.S. advisor, Fall 2010 – Spring/Summer 2013
  - a. M.S. Thesis (2013): “Characterization of InGaAs quantum dot chains”

### Graduate students at BYU (Committee member)

1. Isaac Burkholder – Ph.D. committee member, 2024-current
2. Edison Carlisle – Ph.D. committee member, 2023-current
3. Sabrina Hatt – Ph.D. committee member, 2023-current
4. Alexis Gibson (BYU Dept of Chemistry and Biochemistry) – Ph.D. committee member, 2023-current
5. Kelsey Garden (University of Utah Dept of Chemistry) – Ph.D. committee member, 2022-current
6. James Harkness – M.S. committee member, 2021-2023
7. Raju Baral – Ph.D. committee member, 2020-2022
8. Colby Walker – M.S. committee member, 2018-2022
9. Kameron Hansen (University of Utah Dept of Chemistry) – Ph.D. committee member, 2021-2022
10. Kevin Laughlin – Ph.D. committee member, 2022
11. Ty Beus – Ph.D. committee member, 2015-2022
12. Yonatan Kurniawan – Ph.D. candidacy exam committee member, Nov 2021
13. Sam Bellows – Ph.D. candidacy exam committee member, Apr 2021
14. Wiley Morgan – M.S. and Ph.D. committee member, 2015-2019
15. Miles Clemens – M.S. committee member, 2017-2018
16. Hyun Lim - Ph.D. candidacy exam committee member, May 2018
17. Pegah Aslani – Ph.D. committee member, 2013-2017
18. Trevor Smith (BYU Dept of Chemistry and Biochemistry) – Ph.D. committee member, 2013-2015
19. Conrad Rosenbrock – Ph.D. committee member, 2014
20. Lance Nelson – Ph.D. committee member, 2009-2013
21. Michael Besselmann – Ph.D. candidacy exam committee member, 2009-10
22. Richard Taylor – M.S. advisor (until he switched to a different group), 2008

23. Ivan Okhrimenko – Ph.D. committee member, 2008

### Visiting high school teachers at BYU (Advisor)

1. Delwar Hossain – Summer 2024 (visiting RET high school teacher, from Oklahoma School of Science and Mathematics in Oklahoma City, OK)
  - RET project (2024): “Optical Properties of ZnO Ferritin Nanoparticles by Photoluminescence (PL) Spectroscopy”
2. Barbara Austin – Summer 2017 (visiting RET high school teacher, from Northmont High School in Clayton, OH)
  - RET project: “The Book of Making Hydrogen Gas with Platinum Nanoparticles Attached to Ferritin”
3. Clair Wilson – Summer 2013 (visiting RET high school teacher, from Mountain View High School in Orem, UT)
  - RET project: “Characterization of Bulk Cadmium Zinc Telluride”

## Citizenship

### Departmental Service at BYU

- REU/RET Program Co-PI (Nov 2017-present). Help run the NSF-funded REU/RET program in our department (grant listed above), which allows 12 visiting students and 2 visiting teachers to participate in faculty-mentored research over the summer. Responsible for maintaining website (<https://reu.byu.edu/>), setting up application forms, coordinating which faculty are willing to participate, evaluating and selecting candidates, determining housing for the visiting students, planning trips and other social activities, helping lead weekly meetings and “mini-classes” and the other academic outcomes such as prospectus documents, midterm presentations, final reports, and final presentations, and helping make all other decisions for the program as they arise.
- Department Fletcher Research Internship (FRI) Program Co-Chair (Nov 2023-present). Help run the college-funded FRI program for our department, which runs in conjunction with the REU program and allows for an additional ~5 visiting students to participate in faculty-mentored research over the summer.
- Department Teaching Improvement Committee (Jul 2019-present). Assist in establishing, assessing, and reporting program learning outcomes and in improving departmental teaching.
  - **Chair** from Jul 2020-present
- Department Ad Hoc Committee on Data Science Major (Mar 2022-Oct 2022). Assisted in implementing a new data science major for our department.
- Department Undergraduate Research Committee (Jul 2019-Aug 2020). Responsible for reading, assessing, and approving all senior theses; and awarding departmental research assistantship funding.
- Departmental Undergraduate Committee (2014-2019). Assisted in establishing and assessing the undergraduate degree requirements, assessing the undergraduate classes, and serving as academic advisor for approx. one quarter of the undergraduate majors who do not yet have a research advisor.
  - **Undergraduate Chair** from Aug 2015 – Aug 2019. Additional responsibilities included supervising the committee, managing undergraduate portion of department website including careers documents and major flowcharts, managing the undergraduate email list, managing the senior survey, and representing the department on the college curriculum committee. Took a large role in the unit review in summer 2019.
- Departmental Computational Lab Committee (2018-2019). Assisted in evaluating and improving the computational physics classes, namely Physics 230, 330, and 430. Assisted in evaluating and improving the computational skills of our majors in general.
- Physics GRE Boot Camp (Mar 2015, Mar 2016, Mar 2017). Ran an approx. 90 minute session of the Saturday “Physics GRE boot camp” sponsored by the BYU Physics Department to help prepare students taking the Physics GRE in the Fall.
- Department Ad Hoc Committee on Faculty Annual Reviews (Mar-Apr 2017). Assisted in evaluating faculty members on their performance based on the 2016 faculty profiles.
- Departmental Scholarship Committee (2008-2016). Assist in selecting undergraduate physics students for receiving departmental scholarships.



- Department Ad Hoc Committee on Homework/Course Management Systems (Jan-Feb 2016). Assisted in evaluating numerous homework and course management systems for potential adoption by the department.
- Departmental Graduate Committee (2007-2013). Assisted in selecting students for admission into BYU's physics graduate program, helped mentor incoming students, etc. In particular, two of my major areas of responsibility were
  - *Graduate qualifying exam* – From 2008-13 I was the primary individual responsible for all things related to the qualifying exam. This exam is given twice annually to new graduate students and older graduate students needing to pass it for advancement to PhD candidacy.
  - *Graduate website* – From 2008-13 I was the primary individual responsible for creating and maintaining the website for our graduate program.
- Physics Career Night (Nov 2007). Gave lecture for Career Night, for the BYU chapter of the Society of Physics Students.

## Departmental Service at UW-La Crosse

- Departmental Assessment Committee (2004-7). In 2005/6, the UW-L Physics Department Assessment Committee did a major overhaul of our assessment activities. In particular, some of the items that I was heavily involved with include:
  - *Development of a capstone course* – I was the primary individual responsible for developing a capstone course in Physics. We offered this course for the first time in Spring 2007, taught by myself.
  - *Major Field Test* – I was the one primarily responsible for administering and analyzing the MFT assessment exam to our seniors in Spring 2006 and Spring 2007.
  - *Retreat* – I assisted in planning and leading a Departmental Assessment Retreat, in Jan 2006. At the retreat, we codified our Departmental Program Goals, and discussed plans for assessing those goals.
  - *Annual Meetings* – I assisted in planning and leading our first two annual Departmental Assessment Meetings in May 2006 and May 2007. We discussed what we had learned from the assessment activities of the past year, and what aspect(s) of the program we should consider changing.
- Department Meeting Secretary (2005-2007)
- Departmental Library Representative (2004-2006)
- Faculty Search & Screen Committee (2004-2006)
- Distinguished Lecture Series Committee (2003-2005). As part of the DLS committee, I assisted in bringing Nobel Laureates Dr. Robert C. Richardson and Dr. Joseph H. Taylor to UW-L for a series of lectures. My responsibilities included publicizing the lectures and helping host the speakers.
- Strategic Planning Committee (2004-2005). In 2004/5, the Department Chair convened a Strategic Planning Committee, of which I was part. The committee was given a number of charges involving items of departmental concern. We met extensively, and at the end of the year prepared an 87 page report with recommendations and responses to the charges.
- Physics 103/104 Lab Coordinator (2004-2005)
- Freshman Scholarship Committee (2003-2004)
- Freshman Registration (summer 2004)

## University Service at BYU

- BYU A Cappella Club, faculty advisor (Aug 2012 - present). Hold weekly meetings with the club officers to plan club activities such as shows, socials, advertising, service, etc. Help plan and execute the semesterly "A Cappella Jam" and "Y-Cappella Showcase" concerts. Help produce the annual "Best of BYU A Cappella" CDs.
- BYU IACHord A Cappella Club, faculty advisor (Sep 2018 – present). Give advice as needed and help oversee their finances.
- BYU Dynamite A Cappella Club, faculty advisor (Jan 2020 – present). Give advice as needed and help oversee their finances.
- Phi Kappa Phi board (Feb 2016 – Sep 2021). Representative from College of Physical and Mathematical Sciences. Among other things, in charge of the annual college PKP scholarship competition.
- College Curriculum Committee (Aug 2015 – Jul 2019). Met with others from the College of Physical and Mathematical Sciences to review and vote on proposed curriculum changes to programs and courses.

- Math Department review (Dec 2017). Participated in interview for unit review of BYU Mathematics Department.
- New faculty seminar (Oct 2017). Assisted with the new faculty seminar by speaking at the “Lunch & Learn on Time Management”.
- Dean Search Committee (Dec 2016 – Mar 2017). Served on the search committee to find a new dean for BYU’s College of Physical and Mathematical Sciences.
- Usher at college commencement ceremonies (2009, 2010, 2011, 2012, 2013, 2014, 2015)
- BYU Math Circle (Sep 2008 – Apr 2013). Assisted with the weekly “Math Circle” program at BYU for junior high/high school math students, run by David Wright.
- Technology Focus Group (Feb 2010). Participated in focus group about BYU’s Academic Technology usage and plans.

## University Service at UW-La Crosse

- University Scholarship Committee (2004-2007)
  - Secretary of the Scholarship Committee (2004-2006)
  - Chair of the Scholarship Committee (2006-2007)
- School of Education Content Liaison for Physics (2004-2007). I attended School of Education meetings and specific Content Liaison meetings, representing the Physics Department’s point of view in the teacher education process.

## Professional Activities

### Professional Associations

- American Physical Society (APS) member (1998-current)
- American Association of Physics Teachers member (2007-current)
- Materials Research Society member (2024-current)

### Professional Citizenship

- APS Committee on the Status of Women in Physics (CSWP) (Aug 2024-current). Committee member for the CSWP, which provides guidance for APS activities related to the goals of the production, retention, and career development of women physicists. Committee members participate in and lead activities related to these topics. This is a very new assignment; exact responsibilities remain to be seen.
- Team lead for APS March Meeting (2019-current). Team lead for sorting category 13, “Superlattices, nanostructures, and other artificially structured materials.” Responsibilities include attending the annual sorters meetings, reviewing all abstracts submitted to this category, deciding on how many sessions to hold, what their titles are, sorting the abstracts into the sessions (leading a team of other scientists), finding and inviting people to chair the sessions.
- Reviewed paper for American Journal of Physics (Aug 2024)
- Reviewed paper for PERC Proceedings (Jun 2024)
- Reviewed paper for Applied Physics Reviews (Jan 2024)
- Reviewed paper for Applied Physics Reviews (Dec 2023)
- Reviewed paper for Advanced Energy Materials (Oct 2023)
- Reviewed paper for American Journal of Physics (Jul-Aug 2023)
- Reviewed paper for Advanced Materials (Jul 2023)
- Arranged and coordinated departmental visit of class from Discovery Academy, about 20 students and 5 teachers (Jan 2022).
- Reviewer for National Science Foundation (Dec 2021-Jan 2022).
- Reviewed paper for RSC Advances (Nov 2021).
- Reviewed paper for IEEE Transactions on Magnetics (Jul 2021).
- Reviewed paper for Applied Physics Letters (Jul 2021).

- Reviewed paper for Physical Review B (Jun 2021).
- Served as textbook website reviewer: *Physical Science Digital*, McGraw Hill (Apr 2021). (Received remuneration.)
- Served as textbook reviewer: Krauskopf and Beiser, *The Physical Universe*, McGraw Hill (Mar 2021). (Received remuneration.)
- Reviewed paper for ACS Applied Nano Materials (Dec 2020).
- Reviewed paper for Psychomusicology: Music, Mind, and Brain (May 2020).
- Reviewed paper for RSC Advances (Mar 2020).
- Served as textbook reviewer: Abell and Braselton, *Mathematica by Example*, 5th edition, Elsevier (Mar 2020). (Received remuneration.)
- Reviewed paper for Physical Review Applied (Feb 2020).
- Developed and taught three lectures on the quantum mechanics of solids for Me En 556, Materials Modeling, a BYU class taught by Eric Homer (Jan/Feb 2020).
- Reviewed paper for Physical Review Applied (Sep 2019).
- Reviewed paper for ACS Omega (Jul 2019).
- Reviewed paper for IEEE Transactions on Magnetics (Mar 2019).
- Session chair for “S11. Group IV- and III-V-Based Low-Dimensional Semiconductor Heterostructures” session, APS March Meeting, Boston, MA, Mar 7, 2019.
- Reviewer for National Science Foundation (Dec 2018 – Feb 2019)
- Reviewed paper for Journal of Materials Chemistry C (Feb 2019).
- Reviewed paper for Physical Review Letters (Aug 2018).
- Arranged and coordinated departmental and BYU visit by Orem High School radio/media productions class, ~10 students (Apr 2018).
- Session co-chair for “Nanoparticles, Nanocrystals, Colloids, Sols, and Quantum Dot” session, BIT's 4th Annual World Congress of Smart Materials, Osaka, Japan, Mar 8, 2018.
- Reviewed paper for Physical Review B (Feb 2018).
- Reviewed paper for Journal of Nanostructure in Chemistry (Nov 2017).
- Wrote recommendation letter for a scientist's U.S. permanent residency application (a physicist with EPR specialty) (Sept 2017).
- Organized two lengthy bicycle excursions for visiting students that were part of BYU's REU program (Research Experience for Undergraduates) (Jul 2017).
- Served as textbook reviewer: Wolfson, *Essential University Physics*, 3<sup>rd</sup> edition (May 2017). (Received remuneration.)
- Reviewed tenure portfolio for professor at South Dakota School of Mines and Technology, Nov 2016.
- Session chair for “Quantum Dots/Low Dimensional Structures in Quantum Information Science” session, EMN (Energy, Material, & Nanotechnology) Meeting on Quantum Communication & Quantum Imaging, Berlin, Germany, Aug 25, 2016.
- Edited physics-related sections of MCAT review materials and wrote/edited sample MCAT problems for Altius Test Prep (Jul-Aug 2012, Jul 2014 - Aug 2015, Aug 2016). (Received remuneration.)
- Gave tour of department lab areas to 8<sup>th</sup> and 9<sup>th</sup> graders visiting from the Waterford School (Apr 2016).
- Reviewed four proposals for the National Science Foundation (Apr 2016).
- Assisted with “BYU GAL” (Girls and Light) program run by Dr. Dallin Durfee (Aug 2015).
- Participated in interview for “Scientists in International Context” study of social influences on science, including ethics, religion, gender, and family. PI: Professor Elaine Howard Ecklund; interviewer: David R. Johnson (May 2015)
- Arranged and coordinated Physics Dept visit by church youth group, Apr 2015.
- Consulted on new Springer nanomaterials database (Nov 2014, July 2015). (Received remuneration.)
- Reviewed post-doctoral proposal for the Naval Research Lab (Feb 2015).
- Served as “job shadowee” for seventh grader Luke Richards, for a day (Dec 2014).
- Participated in email interview with Danny Glover, 8th grade student at North Star Academy (Oct 2014)
- Served as Research Corporation proposal reviewer (Nov 2013, Dec 2010).
- Edited textbook chapter, correcting several errors: *Solid State Physics for Advanced Undergraduate Students*, by Harold Stokes, Chapter 10 (Feb 2013).

- Reviewed paper for *Journal of Electromagnetic Waves and Applications* (Feb 2013).
- Arranged and coordinated departmental outreach visit by Waterford High School A.P. Physics class, ~20 students each year (May 2012, Apr 2011, Mar 2010).
- Served as textbook reviewer: Knight, Jones, and Field, *College Physics*, 2<sup>nd</sup> edition (Feb 2012). (Received remuneration.)
- Participated in nation-wide review of MCAT exam (Dec 2009).
- Reviewed paper for *Journal of Infrared, Millimeter, and Terahertz Waves* (Jun 2009).
- Gave outreach lecture on the Physics of Music and Sound, for ~30 music teachers and students from the Provo/Orem area (May 2009).
- Participated in the American Institute of Physics “Adopt a Physicist” program, answering career questions for high school students (Nov 2005, Oct 2007, and Apr 2009).
- Participated in Mentornet.net program, serving as professional mentors for the following:
  - Michael Young, graduate student at the University of Pennsylvania (Oct 2007-May 2008)
  - Lori Bruce, lab manager/research assistant at the Social Neurosciences/Psychopathology Lab, Psychology Department, Harvard (Aug 2008 – Apr 2009).
- Served on an NSF two-day panel as a reviewer for CAREER program grant applications (Oct 2007).
- Served as an NSF proposal reviewer (Jan 2007).
- Arranged and coordinated visit and talk of retired NASA scientist Dr. Fritz Hasler to the UW-L Physics Dept and to North Woods Elementary School (Sep 2006).
- Gave a community lecture at “Soapbox in the Park” entitled, “Nuclear energy, weapons, and fuel” (Jun 2006).
- Ran a session of Kid’s College entitled “Exciting Optics”: demonstrations of optics principles/applications for elementary school children (Mar 2006).
- Coordinated visit and talk of Mr. Phil Colton, retired nuclear engineer and administrator with the International Atomic Energy Agency and U.S. State Department (Mar 2006).
- Taught the Physics portion of UW-L’s MCAT review class (Spring 2005, Spring 2006).
- Reviewed Wisconsin Space Grant Consortium (WSGC) proposals (Spring 2005, Spring 2006).
- Served as a World Year of Physics Talent Evaluator, evaluating projects of a high school student (Jul 2005)
- Taught Girls in Science “Physics In Action” lecture/demo on physics (Jun 2005).
- Assisted in the Elementary School Mathletics competition (May 2005).
- Served as a textbook reviewer for Cengel & Boles, *Thermodynamics: An Engineering Approach*, 5<sup>th</sup> edition. (Feb 2005).
- Served as “job shadowee” for high school student Martin O’Brien, for a day (Nov 2004).
- Served as a High School Science Fair Judge, for La Crescent High School (Jan 2004).
- Taught lecture/demo on physics to a local Webelos Scout unit (Nov 2004).

## Early Career Professional Development

- Participated in the BYU New Faculty workshop, May 2007.
- Participated in the BYU New Faculty seminar series, Fall 2007.
- Participated in the Wisconsin Teaching Fellows program, from the Office of Professional and Instructional Development (OPID), University of Wisconsin System, in the 2006-7 year.
- Conference: Attended OPID Spring 2007 Conference, Madison WI, Mar 2007.
- Conference: Attended “Faculty College”, from OPID, University of Wisconsin System, Richland Center, Jun 2006.
- Workshop: Attended Assessment workshop from the University of Wisconsin System, Baraboo WI, May 2006.
- Workshop: Attended American Physical Society/American Institute of Physics/American Association of Physics Teachers New Faculty Workshop, College Park, MD, Nov 2004.
- Conference: Attended Council on Undergraduate Research (CUR) conference, La Crosse WI, June 2004.
- Workshop: Attended “Demonstrating Impact Workshop,” sponsored by the UWS Women and Science Program, Wisconsin Dells, WI, May 2004.
- Workshop: Attended “Opening Workshop for New UW System STEM Educators”, sponsored by the UWS Women in Science Committee, Wisconsin Dells, WI, Oct 2003.
- Received UW-L Graduate Faculty membership, 2003.
- Received UW-L certification as “Writing Emphasis” instructor, 2003.



## **Other**

### **Full-time Volunteer Experience**

- **Full-time Missionary, Church of Jesus Christ of Latter-day Saints, Germany Munich Mission, 1989-1991.**  
Duties: teach lessons to people interested in the church, perform volunteer service in the community, supervise training in teaching and language of other missionaries, assist local church leaders in administration of the congregations, conduct interviews with prospective members.