

DALLIN DURFEE

PS 212C
Physics Department
Utah Valley University
Orem, UT 84058

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Professional Experience

UTAH VALLEY UNIVERSITY (August 2019 to present)
PHYSICS DEPARTMENT
Professor (August 2019 to present)

BRIGHAM YOUNG UNIVERSITY (August 2001 to July 2019)
DEPARTMENT OF PHYSICS AND ASTRONOMY
Associate Professor (September 2007 to July 2019)
Assistant Professor (August 2001 to September 2007)

AIR FORCE RESEARCH LAB, KIRTLAND AFB (June 2016 to August 2016)
Summer faculty fellow, Atomic clock development group, Space Vehicles Directorate

GUEST EDITOR, ATOMS (July 2015 to January 2017)
Served as one of two guest editors for a special edition on atom interferometry

YALE UNIVERSITY (September 1999 to July 2001)
Postdoctoral research in atom interferometry for precision measurement
Advisor: Mark Kasevich

Education

MASSACHUSETTS INSTITUTE OF TECHNOLOGY Ph.D., 1999
Thesis title: *Dynamic Properties of Dilute Bose-Einstein Condensates*
Thesis advisor: Wolfgang Ketterle

BRIGHAM YOUNG UNIVERSITY B.S., 1994
Major: *Physics*, Minor: *Mathematics*

Primary Research Interests

Structured illumination imaging, laser interferometry, atom and ion interferometry and metrology, ultracold atoms, laser manipulation of atoms, optics, imaging, and laser technology, advanced physics laboratory instruction

Professional Organizations

Member of the American Physical Society (APS)

Member of the American Association of Physics Teachers (AAPT)

Member of the Advanced Laboratory Physics Association (ALPhA)

Teaching Experience

Utah Valley University (August 2019 to present)

Taught and developed courses covering kinematics, fluid mechanics, oscillations and waves, sound, and thermodynamics. Taught and developed introduction to research course. Developed a unique course and developed a textbook to give new Physics students a thin but useful understanding of the math they will use in lower division physics courses – from pre-algebra through integral calculus in one semester. Taught course on advanced mathematical techniques.

Brigham Young University (September 2001 to July 2019)

Taught and developed courses covering the introduction to fluids, thermodynamics, waves, optics, and relativity, introduction to modern physics, and classical field theory (mathematical methods). Developed lab courses. Worked on committee to develop a new physics major's lab sequence, responsible for redesigning and improving the advanced physics lab course. Developed a series of computer simulations and a textbook for undergraduate physics courses. Created a sequence of video lectures and video example problems to implement a flipped classroom for a freshman calculus-based physics course. Created and ran an annual physics outreach program for high and junior-high aged girls.

Yale University (August 2000 to April 2001)

Conducted recitation sections for introductory courses on mechanics and electromagnetism.

Course Instructor: Michael E. Zeller

Awards

2024 UVU Academic Innovation Pedagogy Award

2018 BYU College of Physical and Mathematical Science “Outstanding Teacher” Faculty Excellence in Teaching Award for faculty with 10+ years of experience (given to one professor in the college each year)

Patents

WAVE INTERFERENCE SYSTEMS AND METHODS FOR MEASURING OBJECTS AND WAVES - U.S. App. No. 16/030,520 Submitted July 2018

Publications (* = student that I supervised)

1. Nathan Powers, David Allred, Richard Sandberg, and Dallin Durfee, "A laboratory for teaching coherent imaging principles and techniques," BFY4 Proceedings (Submitted).
2. *Benjamin G. Whetten, *Jarom S. Jackson, Richard L. Sandberg, and Dallin S. Durfee, "Understanding and correcting wavenumber error in interference pattern structured illumination imaging," *Optics Express* **30**, 70-80 (2022).
3. *J. Nicholas Porter, *Jarom S. Jackson, Dallin S. Durfee and Richard L. Sandberg, "Laser wavelength metrology with low finesse etalons and Bayer filters," *Optics Express* **28**, 37788-37797 (2020).
4. *J. Jackson, D. Durfee, "Mechanically Scanned Interference Pattern Structured Illumination Imaging," *Optics Express* **27**, 14969-14980 (2019).
5. *J. S. Jackson, D. S. Durfee, "Magneto-optical trap field characterization with the directional Hanle effect," *Scientific Reports* **9**, 8896 (2019).
6. *J. S. Jackson, D. S. Durfee, "Demonstration of Interference Pattern Structured Illumination Imaging," in *Frontiers in Optics / Laser Science*, OSA Technical Digest, FW7B.6 (2018).
7. N. Powers, D. Durfee, D. Allred, "Think first, act later - A course structure for improving student designed experiments," *2018 BFY Proceedings* (2018).
8. *J. S. Jackson, D. S. Durfee, "Lensless Single Pixel Imaging with Laser Interference Patterns," *Microscopy and Microanalysis*, **24**(S1), 1366-1367 (2018).
9. D. S. Durfee, *S. Kotter, *M. Carlson, N. Powers and D. D. Allred, "Coherent Imaging Student Lab," Submitted to the *American Journal of Physics* (2017).
10. *J. S. Jackson, *J. L. Archibald, D. S. Durfee, "Light splitting with imperfect wave plates," *Applied Optics* **56**, 1062-1068 (2017).
11. D. S. Durfee, *J. L. Archibald, "Applying classical geometry intuition to quantum spin," *European Journal of Physics* **37**, 055409 (2016).
12. *T. Jones, *N. Otterstrom, *J. Jackson, *J. Archibald, D. Durfee, "Laser Wavelength Metrology with Color Sensor Chips," *Optics Express* **23**, 32471-32480 (2015).
13. D.S. Durfee and J.S. Colton, "The physics of musical scales: theory and experiment," *American Journal of Physics* **83**, 835 (2015).
14. *D.L. Troxel, *C.J. Erickson, and D.S. Durfee, "Updates to an ultra-low noise laser current driver," *Review of Scientific Instruments* **82**, 096101 (2011).
15. *C. J. Erickson, *J. L. Archibald, and D. S. Durfee, "An Ultra-stable 657 nm Diode Laser," *The Journal of Utah Academy of Sciences, Arts, & Letters*, **86**, 257-272 (2009).
16. *Daniel Merrill, *Christopher Erickson, and Dallin Durfee, "Creating an ultra-stable, high power diode laser at 657 nm by injection locking," *Journal of Utah Academy of Sciences, Arts, & Letters*, **86**, 247-256 (2009).

17. *C. J. Erickson and D.S. Durfee, "Reflow soldering of surface mount electronic components in a laboratory," arXiv:0901.0136 [physics.ins-det] (2009).
18. W. Weyerman, *B. Neyenhuis, *J. Archibald, *M. Washburn, D. Durfee, and S. Warnick, "Identification and Control of a Grating-Stabilized External-Cavity Diode Laser," *IEEE Transactions on Control System Technology* **17**, 161-166 (2009).
19. *C. J. Erickson, *M. Van Zijll, *G. Doermann, and Dallin S. Durfee, "An ultrahigh stability, low-noise laser current driver with digital control," *Rev. Sci. Instrum.* **79**, 073107 (2008).
20. *B. Neyenhuis, *D. Christensen, and D. S. Durfee, "Testing Nonclassical Theories of Electromagnetism with Ion Interferometry," *Phys. Rev. Lett.* **99**, 200401 (2007).
21. W. Weyerman, *B. Neyenhuis, *J. Archibald, *M. Washburn, D. Durfee, D. S. Warnick, "Black-Box Identification of a Grating-Stabilized External-Cavity Diode Laser," *IEEE International Conference on Control Applications, 2007*, 515-520 (2007).
22. *D. Christensen, *B. Neyenhuis, and D. S. Durfee, "Numerical calculation of classical and non-classical electrostatic potentials" arXiv:physics/0609128 (2006).
23. D. S. Durfee, Y. Shaham, and M. Kasevich, "Long-term stability of an area-reversible atom-interferometer Sagnac gyroscope," *Phys. Rev. Lett.* **97**, 240801 (2006).
24. *C. J. Erickson, *B. Neyenhuis, and D. S. Durfee, "A high temperature calcium vapor cell for spectroscopy on the $4s^2\ ^1S_0$ to $4s4p\ ^3P_1$ intercombination line," *Rev. Sci. Instrum.*, **76**, 123110 (2005).
25. E. A. Cummings, J. E. Daily, D. S. Durfee, and S. D. Bergeson, "Ultracold neutral plasma expansion in two dimensions," *Phys. Plasmas*, **12**, 123501 (2005).
26. E. A. Cummings, J. E. Daily, D. S. Durfee, and S. D. Bergeson, "Fluorescence measurements of expanding strongly-coupled neutral plasmas," *Phys. Rev. Lett.*, **95**, 235001 (2005).
27. J. E. Daily, R. Gommers, E. A. Cummings, D. S. Durfee and S. D. Bergeson, "Two-photon photoionization of the Ca $4s3d\ ^1D_2$ level in an optical dipole trap," *Phys. Rev. A*, **71**, 043406 (2005).
28. *R. Olson, *J. Paul, S. D. Bergeson, and D. S. Durfee, "Self-referenced prism deflection measurement schemes with microradian precision," *Appl. Opt.*, **44**, 4639-4647 (2005).
29. *R. Merrill, *R. Olson, S. Bergeson, and D. S. Durfee, "Increasing the Output of a Littman-Type Laser by Use of an Intracavity Faraday Rotator," *Appl. Opt.*, **43**, 3910-3914 (2004).
30. D. Durfee, J. Fixler, G. Foster, T. Gustavson, A. Landragin, J. McGuirk, M. Kasevich, "Atom Interferometer Inertial Force Sensors," *Position Location and Navigation Symposium, IEEE*, (2000).
31. R. Onofrio, D. S. Durfee, C. Raman, M. Köhl, C.E. Kuklewicz, and W. Ketterle, "Surface excitations in a Bose-Einstein condensate," *Phys. Rev. Lett.*, **84**, 810 (2000).
32. C. Raman, M. Köhl, R. Onofrio, D. S. Durfee, C.E. Kuklewicz, Z. Hadzibabic, and W. Ketterle, "Evidence for a critical velocity in a Bose-Einstein condensed gas," *Phys. Rev. Lett.* **83**, 2502-2505 (1999).

33. W. Ketterle, D. S. Durfee, and D. M. Stamper-Kurn, "Making, probing and understanding Bose-Einstein condensates," in *Bose-Einstein condensation in atomic gases, Proceedings of the International School of Physics "Enrico Fermi", Course CXL*, edited by M. Inguscio, S. Stringari and C.E. Wieman, IOS Press, Amsterdam (1999).
34. H.-J. Miesner, D. M. Stamper-Kurn, M. R. Andrews, D. S. Durfee, S. Inouye, and W. Ketterle, "Bosonic stimulation in the formation of a Bose-Einstein condensate," *Science* **279**, 1005-1007 (1998).
35. D. S. Durfee and W. Ketterle, "Experimental studies of Bose-Einstein condensation," *Optics Express* **2**, 299-313 (1998).
36. M. R. Andrews, D. S. Durfee, S. Inouye, D. M. Kurn, H.-J. Miesner, and W. Ketterle, "Studies of Bose-Einstein condensates," *Proceedings of the Symposium on "Quantum Fluids and Solids" (QFS 97)*, Paris, July 20-26, 1997. and *J. Low Temp. Phys.* **110**, 153-166 (1998).
37. M. R. Andrews, D. M. Kurn, H.-J. Miesner, D. S. Durfee, C. G. Townsend, S. Inouye, and W. Ketterle, "Propagation of sound in a Bose-Einstein condensate," *Phys. Rev. Lett.* **79**, 553-556 (1997); Erratum: *Phys. Rev. Lett.* **80**, 2967 (1998).
38. M. R. Andrews, D. S. Durfee, S. Inouye, D. M. Kurn, H.-J. Miesner, and W. Ketterle, "Studies of Bose-Einstein condensates," in: "Macroscopic Quantum Coherence", eds. E. Sassaroli, Y. Srivastava, J. Swain, and A. Widom (World Scientific, Singapore, 1998), pp. 38-52.
39. M. R. Andrews, C. G. Townsend, H.-J. Miesner, D. S. Durfee, D. M. Kurn, and W. Ketterle, "Observation of interference between two Bose condensates," *Science* **275**, 637-641 (1997).
40. M.-O. Mewes, M. R. Andrews, D. M. Kurn, D. S. Durfee, C. G. Townsend, and W. Ketterle, "Output coupler for Bose-Einstein condensed atoms," *Phys. Rev. Lett.* **78**, 582-585 (1997).
41. C. G. Townsend, N. J. van Druten, M. R. Andrews, D. S. Durfee, D. M. Kurn, M.-O. Mewes, and W. Ketterle, "Bose-Einstein condensation of a weakly interacting gas," in: Atomic Physics 15, Fifteenth International Conference on Atomic Physics, Amsterdam, August 1996 (World Scientific, Singapore, 1997), pp. 192-211.
42. N. J. van Druten, C. G. Townsend, M. R. Andrews, D. S. Durfee, D. M. Kurn, M.-O. Mewes, and W. Ketterle, "Bose-Einstein condensates – a new form of quantum matter," *Proceedings of the 21st International Conference on Low Temperature Physics (LT 21)*. *Czech. J. Phys.* **46**, Suppl. S6, 3077-3088 (1996).
43. M.-O. Mewes, M. R. Andrews, N. J. van Druten, D. M. Kurn, D. S. Durfee, C. G. Townsend, and W. Ketterle, "Collective excitations of a Bose-Einstein condensate in a magnetic trap," *Phys. Rev. Lett.* **77**, 988-991 (1996).
44. W. Ketterle, M. R. Andrews, K. B. Davis, D. S. Durfee, D. M. Kurn, M.-O. Mewes, and N.J. van Druten, "Bose-Einstein condensation of ultracold atomic gases," *Proceedings of the 15th General Conference of the Condensed Matter Division of the European Physical Society*, Baveno-Stresa, April 1996 and *Physica Scripta* **T66**, 31-37 (1996).
45. M. R. Andrews, M.-O. Mewes, N. J. van Druten, D. S. Durfee, D. M. Kurn, and W. Ketterle, "Direct, non-destructive imaging of a Bose condensate," *Science* **273**, 84-87 (1996).

46. M.-O. Mewes, M. R. Andrews, N. J. van Druten, D.M. Kurn, D. S. Durfee, and W. Ketterle, "Bose-Einstein condensation in a tightly confining dc magnetic trap," *Phys. Rev. Lett.* **77**, 416-419 (1996).
47. C. G. Townsend, N. J. van Druten, M. R. Andrews, D. S. Durfee, D. M. Kurn, M.-O. Mewes, and W. Ketterle, "Bose-Einstein condensation of a weakly interacting gas," OSA Trends in Optics and Photonics (TOPS) Vol. 7, Ultracold Atoms and Bose-Einstein-Condensation, Keith Burnett ed. (Optical Society of America, Washington, DC 1996), pp. 2-13.
48. K. B. Davis, M.-O. Mewes, M. R. Andrews, N. J. van Druten, D. S. Durfee, D. M. Kurn, and W. Ketterle, "Bose-Einstein condensation in a gas of sodium atoms," *Phys. Rev. Lett.* **75**, 3969-3973 (1995).
49. D. S. Durfee, J. W. Moody, K. D. Brady, C. Brown, B. Campbell, M. K. Durfee, D. Early, E. Hansen, D. W. Madsen, D. B. Morey, P. W. A. Roming, M. B. Savage, P. F. Eastman, and V. Jensen, "Goldhelix: a soft x-ray solar telescope," *Journal of X-ray Science and Technology* **5**, 20-28 (1995).

Textbooks

D. S. Durfee, *Slendermath* (textbook for a course I developed which rapidly covers the basics of math from pre-algebra through integral calculus in one semester, allowing science and engineering students to get into major courses more quickly rather than being held up by math pre-requisites) (2023-2024).

D. S. Durfee, *Physics phor Phynatics* (supplementary material for a physics majors section of introductory physics II), Lulu.com (2006).

Graduate thesis

"Dynamic properties of dilute Bose-Einstein condensates," Massachusetts Institute of Technology, 1999.

Graduate theses of students I advised

1. Jarom Silver Jackson, PhD Dissertation, June 2019, "Mechanically Scanned Interference Pattern Structured Illumination Imaging."
2. Jarom Silver Jackson, Masters Thesis, June 2016, "In Situ Magnetic Field Characterization with the Directional Hanle Effect."
3. Lawrence Archibald, Masters Thesis, December 2015, "Construction of a 408 nm Laser System for Use in Ion Interferometry."
4. Christopher Joseph Erickson, PhD Dissertation, December 2011, "Development of a Strontium-87 Ion Interferometer."
5. Christopher Joseph Erickson, Masters Thesis, November 2007, "Construction of a Calcium Matter-Wave Interferometer."

Undergraduate theses of students I advised

1. Daniel Gray, UVU Senior Thesis, April 2020, "Improving MAS-IPSII Image Acquisition Time by Using Spatial and Acousto-Optic Modulators."
2. Benjamin Whetten, BYU Senior Thesis, April 2020, "Wavenumber Error in Interference Pattern Lensless Imaging," (co-advised with Dr. Richard Sandberg).
3. Dallen Petersen, BYU Senior Thesis, April 2020, "Motorized Mirror Controller with 3D Printed Parts," (co-advised with Dr. Richard Sandberg).
4. Carter Day, BYU Senior Thesis, June 2020, "Effects of Illumination Shadows in Interference Pattern Structured Illumination Imaging," (co-advised with Dr. Richard Sandberg).
5. Paige Price, BYU Capstone, April 2019, "Locking a Cavity to a Laser for Laser Phase Noise Measurements."
6. Ethan Welch, BYU Senior Thesis, April 2018, "Stabilizing Injection-Locked Lasers through Active Feedback."
7. John Chorak, BYU Senior Thesis, August 2017, "Characterizing a Digital Camera for Use in a Wavelength Meter."
8. McKinley Pugh, BYU Senior Thesis, April 2016, "Increasing Stability in Extended Cavity Diode Lasers using Frequency Noise Feedback."
9. Cassi Burton, BYU Capstone, September 2015, "An Ideal Guitar Tuner: Optimizing Consonance by Minimizing Beating."
10. Tyler Jones, BYU Senior Thesis, April 2015, "Measuring Laser Wavelength with Filtered-Photodiode Color Sensors."
11. Adam Kingsley, BYU Senior Thesis, December 2015, "Instructional Lab for Undergraduates Utilizing the Hanbury Brown and Twiss Effect."
12. Nils Otterstrom, BYU Senior Thesis, April 2015, "Filtered Photodiodes for Laser Wavelength Metrology."
13. Enoch Lambert, BYU Senior Thesis, April 2014, "Mode Stabilization of a Diode Laser Using Radio-frequency Lock Noise."
14. Jarom Jackson, BYU Senior Thesis, April 2013, "Frequency Stabilization of Diode Lasers for Ion Interferometry."
15. Michael Hermansen, BYU Capstone, April 2012, "Low-Noise Piezoelectric Driver for External Cavity Diode Lasers."
16. Aaron Bennett, BYU Senior Thesis, August 2010, "Homodyne Detection in a Laser Locking System."
17. Daylin Troxel, BYU Senior Thesis, August 2010, "A Characterization Of The Noise Spectral Density Of A Low Noise Current Driver And Pid Controller."
18. James Archibald, BYU Senior Thesis, August 2009, "Construction of a 423 nm Fluorescence Probe Using Second Harmonic Generation."
19. Daniel Merrill, BYU Senior Thesis, August 2009, "Amplifying An Ultra-Stable Diode Laser Via Injection Locking."
20. Jeremiah Birrell, BYU Senior Thesis, December 2007, "Design of a Frequency-Doubled 423 nm Laser For Use in a Calcium Interferometer."
21. Daniel Christensen, BYU Senior Thesis, August 2007, "Instrumentation And Calculations For Matter-Wave Interferometry Experiments."

22. Marshall van Zijl, BYU Senior Thesis, April 2007, "A Digital Potentiometer For An Ultra Stable Laser Current Driver."
23. Greg Doermann, BYU Senior Thesis, August 2006, "An Ultra-Stable Laser Current Controller."
24. Brian Neyenhuis, BYU Senior Thesis, April 2006, "Developing A Narrow Linewidth 657 Nm Diode Laser For Use In A Calcium Atom Interferometer."
25. Justin Paul, BYU Senior Thesis, August 2006, "Contributions to an Atomic Frequency Standard."
26. Christopher Erickson, BYU Senior Thesis, June 2005, "A High Temperature Vapor Cell for Absorption Spectroscopy on the Calcium Intercombination Line."
27. Rebecca Olson, BYU Senior Thesis, January 2004, "Self-Referencing Interferometer Measurement of Prism Angles with Microradian Precision."
28. Rebecca Merrill, BYU Honors Thesis, March 2003, "A New Scheme for External-Cavity Diode Laser Stabilization."

Colloquia and presentations at professional meetings since October, 2012 (First author is presenter, * = student that I supervised)

1. *John Walton, Dallin Durfee, "Inexpensive Optical Power Meter," UCUR (February 2024).
2. *Ulises Thornock, *Jackson Phippen, Dallin Durfee, "Mechanically Scanned Interference Pattern Structured Illumination," APS Four Corners Section Meeting (October 2023).
3. *William Ireland, Dallin Durfee, "Implementing Parallel Imaging with Interference Pattern Structured Illumination Imaging," APS Four Corners Section Meeting (October 2023).
4. *Pedro Del Valle, Dallin Durfee, "Programing Robotic Arms for Use in IPSII Imaging," APS Four Corners Section Meeting (October 2023).
5. *Ulises Thornock, *Jackson Phippen, Dallin Durfee, "Mechanically Scanned Interference Pattern Structured Illumination," Frontiers in Optics + Laser Science (October 2023).
6. *Ulises Thornock, *Jackson Phippen, Dallin Durfee, "Characterizing Lasers for Use in IPSII Imaging," UVU Showcase (April 2023).
7. Dallin Durfee, "Reciprocal Space: Images from the Upside Down," UVU Physics Colloquium (April 2023).
8. *Jackson A. Phippen, *Ulises G. Thornock, Dallin S. Durfee, "Characterizing Lasers for IPSII Interferometry," APS Four-Corners meeting (October 2022).
9. *Ulises Thornock, *Tensor Elmikaway, Dallin Durfee, "Characterizing Lasers for Use in IPSII Imaging," UVU Showcase (April 2022).
10. Dallin Durfee, "Replacing lenses with lasers: lensless imaging with laser interferometry," Colloquium, Utah Valley University (September 2021).
11. *Daniel Gray, Dallin Durfee, "Interference Pattern Structured Imaging Utilizing Micromirror Display," APS Four Corners Sectional Meeting (2020).

12. Dallin Durfee, "Twenty-Five Years of Bose-Einstein Condensation," Colloquium, Utah Valley University (September 2020).
13. *Benjamin Whetten, *Carter Day, Dallin Durfee, Richard Sandberg, "Addressing Wavenumber Error in Interference Pattern Structured Illumination Imaging," OSA Frontiers in Optics (2020).
14. D. Durfee, "BYU/UVU-GAL: A Focused Outreach Activity for Young Women," American Association of Physics Teachers Summer Meeting (2020).
15. *T. McDowell, D. Durfee, "Solutions to address Angular Stability Variances of Long Distance Linear Translation stages and Automation of Kinematic Mirror Mounts," Utah Conference on Undergraduate Research (2020).
16. *D. Gray, D. Durfee, "Interference Patter Structured Imaging Utilizing Micromirror Display," Utah Conference on Undergraduate Research (2020).
17. *T. J. McDowell, D. Durfee, "A Reduction in Vibratory Noise for Motorized Optics Mounting," UVU Showcase of Undergraduate Scholarly and Creative Works (2019).
18. *B. Whetten, *J. Jackson, D. S. Durfee, "Modeling the effect of wavenumber error on IPSII images," Frontiers in Optics (2019).
19. *J. N. Porter, *J. S. Jackson, D. S. Durfee, "Etaloning laser interference analysis spectrometry," Frontiers in Optics (2019).
20. *C. Rogers, D. S. Durfee, "Interference pattern structured illumination imaging using acoustical waves," Frontiers in Optics (2019).
21. D. Durfee, D. Allred, N. Powers, "Coherent imaging in an advanced lab techniques course," American Association of Physics Teachers Summer Meeting (2019).
22. N. Powers, D. Durfee, D. Allred, "Establishing experimental goals through a competitive proposal development process," American Association of Physics Teachers Summer Meeting (2019).
23. D. Allred, D. S. Durfee, N. D. Powers, "How a clueless lab can help students learn," American Association of Physics Teachers Summer Meeting (2019).
24. *M. Nuttall, D. Durfee, N. Powers, D. Allred, "Two demos on waves and uncertainty," American Association of Physics Teachers Summer Meeting (2019).
25. D. Durfee, N. Powers, D. Allred, "An In-Depth Term Project Proposal and Review Process," Idaho/Utah AAPT Conference, American Association of Physics Teachers, (2019).
26. D. Allred, D. Durfee, N. Powers, "How a 'clueless' lab can help students learn," Idaho/Utah AAPT Conference, American Association of Physics Teachers, (2019).
27. *Dallen Petersen, Dallin Durfee, "High Precision Mirror Control With a 3D Printed Apparatus," BYU CPMS Student Research Conference, (2019).
28. *Paige Price, Dallin Durfee, "Stabilizing Lasers by Analyzing Phase Noise," BYU CPMS Student Research Conference, (2019).
29. *Benjamin Whetten, Dallin Durfee, "Modeling the Effects of Wavenumber Error in IPSII Images," BYU CPMS Student Research Conference, (2019).
30. *Nick Porter, Dallin Durfee, "Wavelength Metrology with Webcams," BYU CPMS Student Research Conference, (2019).

31. D. Durfee, "High resolution imaging with a lensless, single pixel camera," Colloquium, Utah Valley University (2019).
32. D. Durfee, "High resolution imaging with a lensless, single pixel camera," Colloquium, BYU-Idaho (2018).
33. D. Durfee, N. Powers, D. Allred, "An advanced term project proposal and review process," Idaho/Utah AAPT Conference, American Association of Physics Teachers, (2018).
34. D. Allred, D. Durfee, N. Powers, "How a 'Clueless' Lab Can Help Students Learn," Idaho/Utah AAPT Conference, American Association of Physics Teachers, (2018).
35. *Paige Price, Dallin S. Durfee, and *Jarom S. Jackson, "Stabilizing Lasers by Analyzing Phase Noise," APS Four Corners Sectional Meeting, (2018).
36. *Carter F. Day, *Jarom S. Jackson, and Dallin S. Durfee, "IPSII Shadow Simulations," APS Four Corners Sectional Meeting, (2018).
37. *Dallen Petersen, *Jarom S. Jackson, *Nick Porter, and Dallin S. Durfee, "3D Printing Motorized Mirror Mounts," APS Four Corners Sectional Meeting, (2018).
38. *Jason N Porter, *Jonathan Treter, *Jarom S. Jackson, and Dallin S. Durfee, "Wavelength Metrology with Webcams," APS Four Corners Sectional Meeting, (2018).
39. *Benjamin G. Whetten, *Jarom S. Jackson, and Dallin S. Durfee, "Construction and Characterization of an Avalanche Photodiode Detector," APS Four Corners Sectional Meeting, (2018).
40. Dallin S. Durfee and *Jarom S. Jackson, "Taking High Resolution Images with a Lensless, Single Pixel Camera," APS Four Corners Sectional Meeting, (2018).
41. *Jarom S. Jackson and *Dallin S. Durfee, "Demonstration of Interference Pattern Structured Illumination Imaging," Frontiers in Optics, Optical Society of America / APS Division of Laser Science, (2018).
42. *Carter F. Day, *Jarom S. Jackson, and Dallin S. Durfee, "IPSII Shadow Simulations," Frontiers in Optics, Optical Society of America / APS Division of Laser Science, (2018).
43. *J. Nicholas Porter, *Jonathan *Treter, Jarom S. Jackson, and Dallin S. Durfee, "Wavelength Metrology with Webcams," Frontiers in Optics, Optical Society of America / APS Division of Laser Science, (2018).
44. *Jarom S. Jackson, Dallin S. Durfee, "Lensless Single Pixel Imaging with Laser Interference Patterns," Microscopy and Microanalysis, Microanalysis Society, (2018).
45. Nathen D. Powers, Dallin S. Durfee, David D. Allred, "Think first, act later - A course structure for improving student designed experiments," Conference on Laboratory Instruction Beyond the First Year, Advanced Laboratories Physics Association, (2018).
46. Dallin S. Durfee, David D. Allred, Nathen D. Powers, *S. Hill, *M. Parkes, *Ethan Welch, *Stefan Lehnardt, *Jacob Fields, *A. J. Rasmusson, "Physics 245 Term Projects," BYU Physics Colloquium, (2018). (*I and six different undergraduates took part in the actual presentation.*)

47. *Benjamin Whetten, *Jarom Jackson, Dallin Durfee, "Construction and characterization of an avalanche photodiode detector." BYU CPMS Student Research Conference, (2018).
48. *Dallen Petersen, *Jarom Jackson, Dallin Durfee, "3D Printed Motorized Mirror Mounts," BYU CPMS Student Research Conference, (2018).
49. *Carter Day, *Jarom Jackson, Dallin Durfee, "Simulating aberrations in IPSII imaging," BYU CPMS Student Research Conference, (2018).
50. *Ethan Welch, *Jarom Jackson, Dallin Durfee, "Using spectra and Amplitude to stabilize an injection locked laser," BYU CPMS Student Research Conference, (2018).
51. *Paige Price, *Jarom Jackson, Dallin Durfee, "Stabilizing Lasers by Analyzing Phase Noise," BYU CPMS Student Research Conference, (2018).
52. *Jarom Jackson, Dallin Durfee, "Interference Pattern Structured Illumination Imaging," BYU CPMS Student Research Conference, (2018).
53. *Nick Porter, *Jonathan Treter, *Jarom Jackson, Dallin Durfee, "Wavelength metrology through etaloning effects and color filtering," BYU CPMS Student Research Conference, (2018).
54. *Jonathan Treter, *Nick Porter, *Jarom Jackson, Dallin Durfee, BYU CPMS Student Research Conference, (2018).
55. *Dionicio Sauer, *Jarom S. Jackson, Dallin S. Durfee, "Progress on developing an MRI analog lensless imaging technique using laser interference patterns," APS Four Corners Sectional Meeting, (2017).
56. *Ethan Welch, *Jarom S. Jackson, Dallin S. Durfee, "Using Spectra and Amplitude to Stabilize an Injection Locked Laser," APS Four Corners Sectional Meeting, (2017).
57. *Dionicio Sauer, *Jarom S. Jackson, Dallin S. Durfee, "Progress on Developing an MRI Analog Lensless Imaging Technique Using Laser Interference Patterns," Frontiers in Optics, Optical Society of America / APS Division of Laser Science, (2017).
58. *Ethan Welch, *Jarom S. Jackson, Dallin S. Durfee, "Using Spectra and Amplitude to Stabilize an Injection Lock," Frontiers in Optics, Optical Society of America / APS Division of Laser Science, (2017).
59. Dallin S. Durfee, David D. Allred, Nathen D. Powers, "The Paschen Curve - A Culminating Project for a Vacuum Lab," AAPT Summer Meeting, American Association of Physics Teachers, (2017).
60. *Jarom S. Jackson, Dallin S. Durfee, "Using a directional analog to the Hanle effect to Characterize fields in a magneto-optical trap," Annual Meeting of the Division of Atomic, Molecular, and Optical Physics, Americal Physical Society, (2017).
61. David D. Allred, Dallin S. Durfee, Nathen D. Powers, "Paschen Curves in the Advanced lab," Idaho/Utah AAPT Conference, American Association of Physics Teachers, (2017).
62. *Four of my undergraduates (Jonathan Treter, Paige Saunders, John Chorak, Ethan Welch), and my graduate student (Jarom Jackson) gave presentations at the BYU CPMS Student Research Conference, one of them (Jarom Jackson) won the top presentation in their session, (2017).

63. Dallin S. Durfee, "The physics of musical scales," Idaho State University Physics Colloquium, (2016).
64. *Jarom S. Jackson, Dallin S. Durfee, "In situ magnetic field characterization with the Hanle effect," AFRL atomic physics colloquium, Air Force Research Lab, Albuquerque, NM, (2016).
65. Nathen D. Powers, David D. Allred, Dallin S. Durfee, "Enhancing Student-designed Experiments Using a Real-world Funding Scenario," AAPT Summer Meeting, American Association of Physics Teachers, (2016).
66. David D. Allred, Nathen D. Powers, Dallin S. Durfee, "Teaching Techniques for Experimental Success," AAPT Summer Meeting, American Association of Physics Teachers, (2016).
67. Dallin S. Durfee, *Jarom S. Jackson, *N. Otterstrom, *T. Jones, *J. L. Archibald, "A color sensor wavelength meter," Annual Meeting of the APS Division of Optical, Molecular, and Atomic Physics, American Physical Society, (2016).
68. *Jarom S. Jackson, Dallin S. Durfee, "In Situ Magnetic Field Measurement using the Hanle Effect," Annual Meeting of the APS Division of Optical, Molecular, and Atomic Physics, American Physical Society, (2016).
69. David D. Allred, Nathen D. Powers, Dallin S. Durfee, "Building and Using Vacuum Pumping Stations in Advanced Physics Lab," Idaho/Utah AAPT Conference, American Association of Physics Teachers, (2016).
70. Dallin S. Durfee, David D. Allred, Nathen D. Powers, "Coherent Imaging Lab," Idaho/Utah AAPT Conference, American Association of Physics Teachers, (2016).
71. David D. Allred, Dallin S. Durfee, Nathen D. Powers, "Simulated real-world funding scenario to enhance experimental skills," Idaho/Utah AAPT 2017 Conference, American Association of Physics Teachers, (2016).
72. *McKinley Pugh, Dallin Durfee, "Using Frequency Noise Feedback to Improve Stability in Extended Cavity Diode Lasers," BYU CPMS Student Research Conference, (2016).
73. *Ethan Welch, Dallin Durfee, "Using a feedback controller to stabilize laser injection locking," BYU CPMS Student Research Conference, (2016).
74. *Jarom Jackson, Dallin Durfee, "In Situ Magnetic Field Characterization with the Hanle Effect," BYU CPMS Student Research Conference, (2016).
75. Dallin S. Durfee, J. S. Colton, "The physics of musical scales: theory and experiment," BYU Physics Colloquium, (2016).
76. *Savannah Vasquez, *Jarom S. Jackson, "Eliminating Mode Hopping in Injection-locked Lasers," Frontiers in Optics, Optical Society of America / APS Division of Laser Science, (2015).
77. *Adam Kingsley, Dallin S. Durfee, "Instructional Lab for Undergraduates Utilizing the Hanbury Brown and Twiss Effect," Frontiers in Optics, Optical Society of America / APS Division of Laser Science, (2015).
78. *McKinley Pugh, *Jarom S. Jackson, *Enoch Lambert, Dallin S. Durfee, "Using Frequency Noise Feedback to Stabilize Extended Cavity Diode Lasers," Frontiers in Optics, Optical Society of America / APS Division of Laser Science, (2015).
79. *Tyler Jones, *Nils Otterstrom, *Jarom S. Jackson, *James L. Archibald, Dallin S. Durfee, "A robust, inexpensive wavelength meter using a commercial color

- sensors,” Annual Meeting of the APS Division of Optical, Molecular, and Atomic Physics, American Physical Society, (2015).
80. *Jarom S. Jackson, Dallin S. Durfee, “Cold Strontium Ion Source for Ion Interferometry,” Annual Meeting of the APS Division of Optical, Molecular, and Atomic Physics, American Physical Society, (2015).
 81. Dallin S. Durfee, “Interfering Quantum Matterwaves,” Weber State University Physics Colloquium, (2015).
 82. Dallin S. Durfee, John S. Colton, *Cassi Lee, “Experiencing the Physics of Intonation with Temperament Studio,” Idaho/Utah AAPT Conference, American Association of Physics Teachers, (2015).
 83. *Nils Otterstrom, Dallin Durfee, “Filtered Photodiodes for Laser Spectroscopy,” BYU CPMS Student Research Conference, (2015).
 84. *Adam Kingsley, Dallin Durfee, “Using Intensity Interferometry to Measure a Light Source,” BYU CPMS Student Research Conference, (2015).
 85. *McKinley Pugh, Dallin Durfee, “Using Frequency Noise Feedback to Stabilize Extended Cavity Diode Lasers for Use in Atomic Physics,” BYU CPMS Student Research Conference, (2015).
 86. *Tyler Jones, Dallin Durfee, “Measuring Laser Wavelength with Photodiode Color Sensors Used in Consumer Electronics,” BYU CPMS Student Research Conference, (2015).
 87. *Jarom Jackson, Dallin Durfee, “Generating a Slow Ion Beam for Ion Interferometry,” BYU CPMS Student Research Conference, (2015).
 88. *Cassi Lee, Dallin Durfee, “An Ideal Guitar Tuner,” BYU CPMS Student Research Conference, (2015).
 89. J. Ward Moody, Jonathan Barnes, Peter Roming, Dallin S. Durfee, Branton Campbell, R. Steven Turley, Paul Eastman, “Mentoring Undergraduate Students through the Space Shuttle Hitchhiker GoldHELOX Project,” American Astronomical Society 225th Meeting, American Astronomical Society, (2015).
 90. *Dallin Smith, *McKinley Pugh, Dallin S. Durfee, “Enhancing PiezoElectric Amplifiers,” APS Four Corners Sectional Meeting, (2014).
 91. Dallin S. Durfee, “Ion Interferometry,” APS Four Corners Sectional Meeting, (2014).
 92. *Adam Kingsley, Dallin S. Durfee, “Precision External Timer,” APS Four Corners Sectional Meeting, (2014).
 93. *Tyler Jones, *Nils Otterstrom, *Jarom S. Jackson, *James L. Archibald, Dallin S. Durfee, “Precision Measurement of Laser Wavelength Using an RGB Sensor Common in Consumer Electronics,” APS Four Corners Sectional Meeting, (2014).
 94. *Nils Otterstrom, *Tyler Jones, *Jarom S. Jackson, *James L. Archibald, Dallin S. Durfee, “Wavelength Detection from Filtered Photodiodes,” APS Four Corners Sectional Meeting, (2014).
 95. Dallin S. Durfee, “Hearing the Physics of Musical Scales,” Utah Valley University Physics Colloquium, (2014).
 96. *Jarom S. Jackson, *Enoch Lambert, *Nils Otterstrom, *Tyler Jones, Dallin S. Durfee, “Interferometry with Strontium Ions,” Annual Meeting of the APS

- Division of Optical, Molecular, and Atomic Physics, American Physical Society, (2014).
97. *Five of my undergraduates and my graduate student gave presentations at the BYU CPMS Student Research Conference, (2014).
 98. *Enoch Lambert, *James L. Archibald, Dallin S. Durfee, “Observations of Radio-Frequency Noise on an Extended-cavity Diode Laser (ECDL),” *Frontiers in Optics, Optical Society of America / APS Division of Laser Science*, (2014).
 99. *Tyler Jones, *Nils Otterstrom, *Kevin Blisset, *Jarom S. Jackson, Dallin S. Durfee, “Photodiode Wavelength Meter,” *Frontiers in Optics, Optical Society of America / APS Division of Laser Science*, (2014).
 100. *Nils Otterstrom, *Tyler Jones, *Jarom Jackson, *Kevin Blisset, “Wavelength Detection from Filtered Photodiodes,” *APS Four Corners Sectional Meeting*, (2013).
 101. *Jarom S. Jackson, *James L. Archibald, *Christopher Erickson, Dallin S. Durfee, “Progress on and Instrumentation for an Ion Interferometer,” *Annual Meeting of the APS Division of Optical, Molecular, and Atomic Physics, American Physical Society*, (2013).
 102. Dallin S. Durfee, “Exploring the Physics of Musical Scales with MIDI,” *Idaho/Utah AAPT Conference, American Association of Physics Teachers*, (2013).
 103. *Jarom S. Jackson, *Christopher Erickson, *James L. Archibald, Dallin S. Durfee, “Laser Locking to the Sr Resonant Transition,” *Frontiers in Optics, Optical Society of America / APS Division of Laser Science*, (2012).

Funded grant proposals

SAC summer stipend

UVU Scholarly Activities committee

\$2,000.00

Grant dates: July – Aug 2021

SAC summer stipend

UVU Scholarly Activities committee

\$3,380.00

Grant dates: July – Aug 2020

Sponsored Programs grant-networking trip

UVU Sponsored Programs

Applied and received funding for a trip to D.C. to meet with program officers.

Trip was cancelled due to COVID

Planned date: May 2020

Interference Pattern Structured Illumination Imaging - CHIRP

BYU College of Physical and Mathematical Science

\$26,000.00

Grant dates: December 2017 - December 2018

Improved Methods of Ion Interferometry

WAESO Student Grant

\$378.00

Grant dates: May 2015 – August 2015

Atomic State Detection in Rarified Calcium Vapors

Air Force Research Lab Summer Faculty Fellowship Program

\$25,800 – this provided the salary for myself and my graduate student plus a \$2,800 moving allowance.

Jun 2016 – Aug 2016

Matterware Interferometry with Ions

National Science Foundation (NSF)

\$232,345.00

Grant dates: August 2012 - July 2016

Matterware Interferometry with Ions

National Science Foundation (NSF)

\$169,517.00

Grant dates: June 2009 – May 2012

Testing Coulomb's Law with Cold- Ion Matterwave Interferometry

NIST Precision Measurement Grant

\$150,000.00

Grant dates: October 2007 – October 2010

An “optical clock” measurement of the drift of the fine structure constant

Research Corporation Research and Innovation Award

\$35,000.00

Grant dates: May 2002 – May 2006