

JOHN P. DAVIS

CURRICULUM VITÆ

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CURRENT POSITIONS

University of Alberta, Edmonton, Alberta
Professor, 2021 to present

Resolved Instruments, Inc.
Co-Founder and Chief Innovation Officer

PREVIOUS EXPERIENCE & EDUCATION

University of Alberta, Edmonton, Alberta
Associate Professor: 2016 to 2021
Assistant Professor: 2010 to 2016

University of Alberta, Edmonton, Alberta
Post-Doctoral Fellow: June 2008 to September 2010
Adviser: Mark R. Freeman

Northwestern University, Evanston, Illinois
Ph.D. in Physics: Fall 2001 to April 17th, 2008
Adviser: William P. Halperin
Committee: William P. Halperin, James A. Sauls and John B. Ketterson
Thesis: "Transverse Sound Spectroscopy of Excited Cooper Pair States in Superfluid ³He"

Northwestern University, Evanston, Illinois
Master's in Physics: December 2003
Adviser: William P. Halperin

Washington University, St. Louis, Missouri
Bachelor's in Physics with Honors: Spring 2001
Honors Thesis Advisers: Kenneth F. Kelton and Patrick C. Gibbons

HONORS

- ◇ Alfred P. Sloan Fellow, 2013-2015
- ◇ Petro-Canada Young Innovator Award, 2016
- ◇ Discovery Accelerator Awardee, 2016
- ◇ Provost's Award for Early Achievement of Excellence in Undergraduate Teaching, 2014
- ◇ Alberta Innovates Strategic Chair, 2012-2016
- ◇ Teaching "Honour Roll", University of Alberta Faculty of Science, 2014
- ◇ Teaching Excellence Appreciation Award from the Delta Chi Fraternity, University of Alberta Chapter, 2012
- ◇ Inaugural Fellow of the National Institute for Nanotechnology, NRC
- ◇ Associate Member of the former Canadian Institute for Advanced Research (CIFAR) Nanoelectronics Program, 2010-2013
- ◇ *Summa Cum Laude*, Washington University, St. Louis, Missouri, 2001

PUBLICATIONS

60. Prototype Superfluid Gravitational Wave Detector, **V. Vadakkumbatt**, **M. Hirschel**, **J. Manley**, **T.J. Clark**, **S. Singh** and **J.P. Davis**, *under review* (2021). [[arXiv:2107.00120](https://arxiv.org/abs/2107.00120)]
59. Strong-coupling corrections to hard domain walls in superfluid $^3\text{He-B}$, **M.J. Rudd**, **P. Senarath Yapa**, **A.J. Shook**, **J. Maciejko**, and **J.P. Davis**, *under review* (2021). [[arXiv:2106.02065](https://arxiv.org/abs/2106.02065)]
58. Polymer-loaded three dimensional microwave cavities for hybrid quantum systems, **M. Ruether**, **C.A. Potts**, **J.P. Davis** and **L.J. LeBlanc**, *under review* (2021). [[arXiv:2104.10237](https://arxiv.org/abs/2104.10237)]
57. Dynamical Backaction Magnomechanics, **C.A. Potts**, **E. Varga**, **V.A.S.V. Bittencourt**, **S. Viola Kusminskiy** and **J.P. Davis**, *accept to Phys. Rev. X* (2021). [[arXiv:2104.11218](https://arxiv.org/abs/2104.11218)]
56. Observation of bistable turbulence in quasi-two-dimensional superflow, **E. Varga**, **V. Vadakkumbatt**, **A.J. Shook**, **P.H. Kim** and **J.P. Davis**, *Phys. Rev. Lett.* 125, 025301 (2020). - *Selected as an Editors' Suggestion* [[doi:10.1103/PhysRevLett.125.025301](https://doi.org/10.1103/PhysRevLett.125.025301)]
55. Strong magnon-photon coupling within a tunable cryogenic microwave cavity, **C.A. Potts** and **J.P. Davis**, *Appl. Phys. Lett.* 116, 263503 (2020). [[doi:10.1063/5.0015660](https://doi.org/10.1063/5.0015660)]
54. Magnon-Phonon Quantum Correlation Thermometry, **C.A. Potts**, **V.A.S.V. Bittencourt**, **S. Viola Kusminskiy** and **J.P. Davis**, *Phys. Rev. Applied* 13, 064001 (2020). [[doi:10.1103/PhysRevApplied.13.064001](https://doi.org/10.1103/PhysRevApplied.13.064001)]
53. Wavelength transduction from a 3D microwave cavity to telecom using piezoelectric optomechanical crystals, **H. Ramp**, **T.J. Clark**, **B.D. Hauer**, **C. Doolin**, **K.C. Balram**, **K. Srinivasan** and **J.P. Davis**, *Appl. Phys. Lett.* 116, 174005 (2020). - *Selected as Feature article and for cover* [[doi:10.1063/5.0002160](https://doi.org/10.1063/5.0002160)] - also selected as a Scilight: [[doi:10.1063/10.0001223](https://doi.org/10.1063/10.0001223)]
52. Atomic microwave-to-optical signal transduction via magnetic-field coupling in a resonant microwave cavity, **A. Tretiakov**, **C.A. Potts**, **T.S. Lee**, **M.J. Thiessen**, **J.P. Davis** and **L.J. LeBlanc**, *Appl. Phys. Lett.* 116, 164101 (2020). - *Selected as Feature article and for cover* [[doi:10.1063/1.5144616](https://doi.org/10.1063/1.5144616)]
51. Stabilized Pair Density Wave via Nanoscale Confinement of Superfluid ^3He , **A.J. Shook**, **V. Vadakkumbatt**, **P. Senarath Yapa**, **C. Doolin**, **R. Boyack**, **P.H. Kim**, **G.G. Popowich**, **F. Souris**, **H. Christani**, **J. Maciejko**, and **J.P. Davis**, *Phys. Rev. Lett.* 124, 015301 (2020). - *Selected as an Editors' Suggestion* [[doi:10.1103/PhysRevLett.124.015301](https://doi.org/10.1103/PhysRevLett.124.015301)]
50. Coherent Magneto-Optomechanical Signal Transduction and Long-Distance Phase-Shift Keying, **M.J. Rudd**, **P.H. Kim**, **C.A. Potts**, **C. Doolin**, **H. Ramp**, **B.D. Hauer**, and **J.P. Davis**, *Phys. Rev. Applied* 12, 034042 (2019). - *Selected as an Editors' Suggestion* [[doi:10.1103/PhysRevApplied.12.034042](https://doi.org/10.1103/PhysRevApplied.12.034042)]
49. Elimination of Thermomechanical Noise in Piezoelectric Optomechanical Crystals, **H. Ramp**, **B.D. Hauer**, **K.C. Balram**, **T.J. Clark**, **K. Srinivasan**, and **J.P. Davis**, *Phys. Rev. Lett.* 123, 093603 (2019). [[doi:10.1103/PhysRevLett.123.093603](https://doi.org/10.1103/PhysRevLett.123.093603)]
48. Dueling dynamical backaction in a cryogenic optomechanical cavity, **B.D. Hauer**, **T.J. Clark**, **P.H. Kim**, **C. Doolin**, and **J.P. Davis**, *Phys. Rev. A* 99, 053803 (2019). [[doi:10.1103/PhysRevA.99.053803](https://doi.org/10.1103/PhysRevA.99.053803)]
47. Two-Level System Damping in a Quasi-One-Dimensional Optomechanical Resonator, **B.D. Hauer**, **P.H. Kim**, **C. Doolin**, **F. Souris**, and **J.P. Davis**, *Phys. Rev. B* 98, 214303 (2018). [[doi:10.1103/PhysRevB.98.214303](https://doi.org/10.1103/PhysRevB.98.214303)]
46. Cryogenic Microwave Filter Cavity with a Tunability Greater than 5 GHz, **T.J. Clark**, **V. Vadakkumbatt**, **F. Souris**, **H. Ramp** and **J.P. Davis**, *Rev. Sci. Instr.* 89, 114704 (2018). [[doi:10.1063/1.5051042](https://doi.org/10.1063/1.5051042)]
45. Phonon Quantum Nondemolition Measurements in Nonlinearly Coupled Optomechanical Cavities, **B.D. Hauer**, **A. Metelmann** and **J.P. Davis**, *Phys. Rev. A* 98, 043804 (2018). [[doi:10.1103/PhysRevA.98.043804](https://doi.org/10.1103/PhysRevA.98.043804)]
44. Broadband optomechanical transduction of nanomagnetic spin modes, **P.H. Kim**, **F. Fani Sani**, **M.R. Freeman** and **J.P. Davis**, *Appl. Phys. Lett.* 113, 083104 (2018). [[doi:10.1063/1.5039640](https://doi.org/10.1063/1.5039640)]

43. Cooperativity enhancement in buckled-dome microcavities with omnidirectional claddings, S. Al-Sumaidae, M.H. Bitarafan, C.A. Potts, J.P. Davis, and R.G. DeCorby, *Optics Express* 26, 11201 (2018). [[doi:10.1364/OE.26.011201](https://doi.org/10.1364/OE.26.011201)] - Selected as "Editor's Pick".
42. Magnetic Actuation and Feedback Cooling of a Cavity Optomechanical Torque Sensor, P.H. Kim, B.D. Hauer, T.J. Clark, F. Fani Sani, M.R. Freeman and J.P. Davis, *Nat. Commun.* 8, 1355 (2017). [[doi:10.1038/s41467-017-01380-z](https://doi.org/10.1038/s41467-017-01380-z)]
41. Tuning a 3D Microwave Cavity via Superfluid Helium at MilliKelvin Temperatures, F. Souris, H. Christiani and J.P. Davis, *Appl. Phys. Lett.* 111, 172601 (2017). [[doi:10.1063/1.4997641](https://doi.org/10.1063/1.4997641)] - Feature article & selected as the cover for the October 23rd issue.
40. Ultra-Low Dissipation Superfluid Micromechanical Resonator, F. Souris, X. Rojas, P.H. Kim and J.P. Davis, *Phys. Rev. Applied* 7, 044008 (2017). [[doi:10.1103/PhysRevApplied.7.044008](https://doi.org/10.1103/PhysRevApplied.7.044008)]
39. Approaching the Standard Quantum Limit of Mechanical Torque Sensing, P.H. Kim, B.D. Hauer, C. Doolin, F. Souris and J.P. Davis, *Nat. Commun.* 7, 13165 (2016). [[doi:10.1038/ncomms13165](https://doi.org/10.1038/ncomms13165)]
38. Tunable open-access microcavities for on-chip cavity quantum electrodynamics, C.A. Potts, A. Melnyk, H. Ramp, M.H. Bitarafan, D. Vick, L.J. LeBlanc, J.P. Davis and R.G. DeCorby, *Appl. Phys. Lett.* 108, 041103 (2016). [[doi:10.1063/1.4940715](https://doi.org/10.1063/1.4940715)]
37. Optomechanics and thermometry of cryogenic silica microresonators, A.J.R. MacDonald, B.D. Hauer, X. Rojas, P.H. Kim, G.G. Popowich and J.P. Davis, *Phys. Rev. A* 93, 013836 (2016). [[doi:10.1103/PhysRevA.93.013836](https://doi.org/10.1103/PhysRevA.93.013836)]
36. Bistability in buckled dome microcavities, M.H. Bitarafan, H. Ramp, C. Potts, T.W. Allen, J.P. Davis and R.G. DeCorby, *Optics Letters* 40, 5375 (2015). [[doi:10.1364/OL.40.005375](https://doi.org/10.1364/OL.40.005375)]
35. Nonlinear Power Spectral Densities for the Harmonic Oscillator, B.D. Hauer, J. Maciejko and J.P. Davis, *Annals of Physics* 361, 148 (2015). [[doi:10.1016/j.aop.2015.05.031](https://doi.org/10.1016/j.aop.2015.05.031)]
34. Accurate sensing of the mass distribution of adsorbed molecules and their sublimation from nanomechanical strings, T.S. Biswas, Jin Xu, N. Miriyala, C. Doolin, T. Thundat, J.P. Davis and K.S.D. Beach, *Phys. Rev. Applied* 3, 064002 (2015). [[doi:10.1103/PhysRevApplied.3.064002](https://doi.org/10.1103/PhysRevApplied.3.064002)]
33. Thermo-mechanical characterization of on-chip buckled dome Fabry-Perot microcavities, M.H. Bitarafan, H. Ramp, T.W. Allen, C. Potts, X. Rojas, A.J.R. MacDonald, J.P. Davis and R.G. DeCorby, *J. Opt. Soc. Am. B* 32, 1214 (2015). [[doi:10.1364/JOSAB.32.001214](https://doi.org/10.1364/JOSAB.32.001214)]
32. Refractometric sensing of Li salt with visible-light Si₃N₄ microdisk resonators, C. Doolin, P. Doolin, B.C. Lewis and J.P. Davis, *Appl. Phys. Lett.* 106, 081104 (2015). [[doi:10.1063/1.4913618](https://doi.org/10.1063/1.4913618)]
31. Optical microscope and tapered fiber coupling apparatus for a dilution refrigerator, A.J.R. MacDonald, G.G. Popowich, B.D. Hauer, P.H. Kim, A. Fredrick, X. Rojas, P. Doolin, and J.P. Davis, *Rev. Sci. Inst.* 86, 013107 (2015). [[doi:10.1063/1.4905682](https://doi.org/10.1063/1.4905682)]
30. A Superfluid Nanomechanical Resonator for Quantum Nanofluidics, X. Rojas and J.P. Davis, *Phys. Rev. B* 91, 024503 (2015). [[doi:10.1103/PhysRevB.91.024503](https://doi.org/10.1103/PhysRevB.91.024503)]
29. Femtogram-scale Photothermal Spectroscopy of Explosive Molecules on Nanostrings, T.S. Biswas, N. Miriyala, C. Doolin, X. Liu, T. Thundat and J.P. Davis, *Analytical Chemistry* 86, 11368-11372 (2014). [[doi:10.1021/ac503318e](https://doi.org/10.1021/ac503318e)]
28. Dissipative and Dispersive Optomechanics in a Nanocavity Torque Sensor, M. Wu, A.C. Hryciw, C.J. Healey, D.P. Lake, H. Jayakumar, M.R. Freeman, J.P. Davis and P.E. Barclay, *Phys. Rev. X* 4, 021052 (2014). [[doi:10.1103/PhysRevX.4.021052](https://doi.org/10.1103/PhysRevX.4.021052)]
27. Nonlinear optomechanics in the stationary regime, C. Doolin, B.D. Hauer, P.H. Kim, A.J.R. MacDonald, H. Ramp and J.P. Davis, *Phys. Rev. A* 89, 053838 (2014). [[doi:10.1103/PhysRevA.89.053838](https://doi.org/10.1103/PhysRevA.89.053838)]

26. Ultrasonic Interferometer for First-Sound Measurements of Confined Liquid ^4He , **X. Rojas, B.D. Hauer, A.J.R. MacDonald, P. Saberi, Y. Yang** and J.P. Davis, *Phys. Rev. B* 89, 174508 (2014). [[doi:10.1103/PhysRevB.89.174508](https://doi.org/10.1103/PhysRevB.89.174508)]
25. Remote sensing in hybridized arrays of nanostrings, **T.S. Biswas**, Jin Xu, **X. Rojas, C. Doolin, A. Suhel**, K.S.D. Beach and J.P. Davis, *Nano. Lett.* 14, 2541-2545 (2014). [[doi:10.1021/nl500337q](https://doi.org/10.1021/nl500337q)]
24. On-chip cavity optomechanical coupling, **B.D. Hauer, P.H. Kim, C. Doolin, A.J.R. MacDonald, H. Ramp** and J.P. Davis, *EPJ Techniques and Instrumentation* 1, 4 (2014). [[doi:10.1140/epjti4](https://doi.org/10.1140/epjti4)]
23. Multidimensional Optomechanical Cantilevers for High Frequency Force Sensing, **C. Doolin, P.H. Kim, B.D. Hauer, A.J.R. MacDonald** and J.P. Davis, *New Journal of Physics* 16, 035001 (2014). [[doi:10.1088/1367-2630/16/3/035001](https://doi.org/10.1088/1367-2630/16/3/035001)]
22. A general procedure for thermomechanical calibration of nano/micro-mechanical resonators, **B.D. Hauer, C. Doolin**, K.S.D. Beach and J.P. Davis, *Annals of Physics* 339, 181 (2013). [[doi:10.1016/j.aop.2013.08.003](https://doi.org/10.1016/j.aop.2013.08.003)]
21. Quantitative Magneto-mechanical Detection and Control of the Barkhausen Effect, J.A.J. Burgess, A.E. Fraser, F. Fani Sani, D. Vick, **B.D. Hauer**, J.P. Davis and M.R. Freeman, *Science* 339, 1051 (2013). - *Selected for Science Express*. [[doi:10.1126/science.1231390](https://doi.org/10.1126/science.1231390)]
20. Nanoscale Torsional Optomechanics, **P.H. Kim, C. Doolin, B.D. Hauer**, M.R. Freeman, P.E. Barclay and J.P. Davis, *Appl. Phys. Lett.* 102, 053102 (2013). - *Selected as the cover for the February 4th issue*. - *One of most downloaded papers of APL in February 2013*. [[doi:10.1063/1.4789442](https://doi.org/10.1063/1.4789442)] Also selected for a Nature Research Highlight [[doi/10.1038/494151b](https://doi.org/10.1038/494151b)]
19. High-Q Gold and Silicon Nitride Bilayer Nanostrings, **T.S. Biswas, A. Suhel, B.D. Hauer, A. Palomino**, K.S.D. Beach and J.P. Davis, *Appl. Phys. Lett.* 101, 093105 (2012). [[doi:10.1063/1.4748977](https://doi.org/10.1063/1.4748977)]
18. Microfluidic and Nanofluidic Cavities for Quantum Fluids Experiments, **A. Duh, A. Suhel, B.D. Hauer, R. Saeedi, P.H. Kim, T.S. Biswas** and J.P. Davis, *J. Low Temp. Phys.* 168, 31 (2012). [[doi:10.1007/s10909-012-0617-4](https://doi.org/10.1007/s10909-012-0617-4)]
17. Dissipation Mechanisms in Thermomechanically Driven Silicon Nitride Nanostrings, **A. Suhel, B.D. Hauer, T.S. Biswas**, K.S.D. Beach and J.P. Davis, *Appl. Phys. Lett.* 100, 173111 (2012). [[doi:10.1063/1.4704914](https://doi.org/10.1063/1.4704914)]
16. Thermally Activated Decay of Magnetic Vortices, J.A.J. Burgess, D.C. Fortin, J.E. Losby, D. Grombacher, J.P. Davis and M.R. Freeman, *Phys. Rev. B* 82, 144403 (2010). [[doi:10.1103/PhysRevB.82.144403](https://doi.org/10.1103/PhysRevB.82.144403)]
15. Observation of Magnetic Supercooling of the Transition to the Vortex State, J.P. Davis, D. Vick, J.A.J. Burgess, D.C. Fortin, P. Li, V. Sauer, W.K. Hiebert and M.R. Freeman, *New J. of Physics* 12, 093033 (2010). [[doi:10.1088/1367-2630/12/9/093033](https://doi.org/10.1088/1367-2630/12/9/093033)]
14. Observation of the Transition between Real and Complex Superconducting Order Parameters Phases in UPt_3 , J.D. Strand, D.J. Bahr, D.J. Van Harlingen, J.P. Davis, W.J. Gannon, W.P. Halperin, *Science* 328, 1368 (2010). [[doi:10.1126/science.1187943](https://doi.org/10.1126/science.1187943)]
13. Nano-Torsional Resonator Torque Magnetometry, J.P. Davis, D. Vick, D.C. Fortin, J.A.J. Burgess, W.K. Hiebert and M.R. Freeman, *Appl. Phys. Lett.* 96, 072513 (2010). - *Selected as the Research Highlight for March 2010*. [[doi:10.1063/1.3319502](https://doi.org/10.1063/1.3319502)]
12. Impurity Scattering of ^3He in Aerogel, W.P. Halperin, H. Choi, J.P. Davis and J. Pollanen, *J. Phys. Soc. Jpn.* 77, 111002 (2008). [[doi:10.1143/JPSJ.77.111002](https://doi.org/10.1143/JPSJ.77.111002)]
11. High Frequency Sound in Superfluid ^3He -B, J.P. Davis, H. Choi, J. Pollanen and W.P. Halperin, *J. Low Temp. Phys.* 153, 1 (2008). [[doi:10.1007/s10909-008-9819-1](https://doi.org/10.1007/s10909-008-9819-1)]
10. Anomalous Attenuation of Transverse Sound in ^3He , J.P. Davis, J. Pollanen, H. Choi, J.A. Sauls, W.P. Halperin and A.B. Vorontsov, *Phys. Rev. Lett.* 101, 085301 (2008). [[doi:10.1103/PhysRevLett.101.085301](https://doi.org/10.1103/PhysRevLett.101.085301)]

9. Globally Anisotropic High Porosity Silica Aerogels, J. Pollanen, K. Shirer, S. Blinstein, J.P. Davis, H. Choi, T.M. Lippman, L.B. Lurio and W.P. Halperin, *J. Non-Crystalline Solids* 354, 4668-4674 (2008). [[doi:10.1016/j.jnoncrysol.2008.05.047](https://doi.org/10.1016/j.jnoncrysol.2008.05.047)]
8. Discovery of a New Excited Pair State in Superfluid ^3He , J.P. Davis, J. Pollanen, H. Choi, J.A. Sauls and W.P. Halperin, *Nature Physics* 4, 571-575 (2008). [[doi:10.1038/nphys969](https://doi.org/10.1038/nphys969)]
7. Magnetoresistance of UPt_3 , T.M. Lippman, H. Choi, J.P. Davis, J. Pollanen, W.J. Gannon and W.P. Halperin, *New J. of Physics* 10, 043006 (2008). [[doi:10.1088/1367-2630/10/4/043006](https://doi.org/10.1088/1367-2630/10/4/043006)]
6. Stability of the Axial Phase of Superfluid ^3He in Aerogel with Globally Anisotropic Scattering, J.P. Davis, J. Pollanen, B. Reddy, K.R. Shirer, H. Choi and W.P. Halperin, *Phys. Rev. B* 77, 140502(R) (2008). [[doi:10.1103/PhysRevB.77.140502](https://doi.org/10.1103/PhysRevB.77.140502)]
5. Magneto-Acoustic Spectroscopy in Superfluid $^3\text{He-B}$, J.P. Davis, H. Choi, J. Pollanen and W.P. Halperin, *Phys. Rev. Lett.* 100, 015301 (2008). [[doi:10.1103/PhysRevLett.100.015301](https://doi.org/10.1103/PhysRevLett.100.015301)]
4. Strong coupling corrections to the Ginzburg-Landau theory of superfluid ^3He , H. Choi, J.P. Davis, J. Pollanen, T. M. Haard and W. P. Halperin, *Phys. Rev. B* 75, 174503 (2007). [[doi:10.1103/PhysRevB.75.174503](https://doi.org/10.1103/PhysRevB.75.174503)]
3. Collective Modes and f -Wave Pairing Interactions in Superfluid ^3He , J.P. Davis, H. Choi, J. Pollanen and W.P. Halperin, *Phys. Rev. Lett.* 97, 115301 (2006). [[doi:10.1103/PhysRevLett.97.115301](https://doi.org/10.1103/PhysRevLett.97.115301)]
2. Surface Specific Heat and Andreev Bound States, H. Choi, J.P. Davis, J. Pollanen and W.P. Halperin, *Phys. Rev. Lett.* 96, 125301 (2006). [[doi:10.1103/PhysRevLett.96.125301](https://doi.org/10.1103/PhysRevLett.96.125301)]
1. Specific Heat of Disordered Superfluid ^3He , H. Choi, K. Yawata, T.M. Haard, J.P. Davis, G. Gervais, N. Mulders, P. Sharma, J.A. Sauls and W.P. Halperin, *Phys. Rev. Lett.* 93, 145301 (2004). [[doi:10.1103/PhysRevLett.93.145301](https://doi.org/10.1103/PhysRevLett.93.145301)]

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PROCEEDINGS

16. Measuring Twists with Cavity Optomechanics, **P.H. Kim, B.D. Hauer, C. Doolin, A.J.R. MacDonald, H. Ramp** and J.P. Davis, *Physics in Canada* 71, No. 3, 150 (2015). [[link to CAP website](#)]
15. Optomechanical torsional sensing in photonic crystal split-beam nanocavities, M. Wu, A.C. Hryciw, M.R. Freeman, J.P. Davis, P.E. Barclay, *CLEO: Science and Innovations*, (2013).
14. Dissipation Mechanisms In Thermomechanically Driven Silicon Nitride Nanostrings, **B.D. Hauer, A. Suhel, T.S. Biswas**, K.S.D. Beach, and J.P. Davis, *Physics in Canada* 68, No. 3, 134 (2012). [[link to pdf at CAP website](#)]
13. Photonic crystal paddle nanocavities for optomechanical torsion sensing, M. Wu, A.C. Hryciw, B. Khanaliloo, M.R. Freeman, J.P. Davis, P.E. Barclay, *CLEO: Science and Innovations*, May 6 (2012).
12. Nonlinear field-dependence of the Imaginary Squashing Mode of superfluid ^3He at moderate magnetic fields, C.A. Collett, J. Pollanen, J.I.A. Li, W.J. Gannon, J.P. Davis, W.P. Halperin, *Journal of Physics: Conference Series* 400, 012006 (2012). [[doi:10.1088/1742-6596/400/1/012006](#)]
11. Nanomechanical Torsional Resonator Torque Magnetometry, J.P. Davis, D. Vick, P. Li, S.K.N. Portillo, A.E. Fraser, J.A.J. Burgess, D.C. Fortin, W.K. Hiebert and M.R. Freeman, *J. of Appl. Phys.* 109, 07D309 (2011). [[doi:10.1063/1.3540643](#)]
10. Superfluid phase stability of ^3He in axially anisotropic aerogel, J. Pollanen, J.P. Davis, B. Reddy, K.R. Shirer, H. Choi and W.P. Halperin, *Journal of Physics: Conference Series* 150, 032084 (2009). [[doi:10.1088/1742-6596/150/3/032084](#)]
9. Low temperature thermal resistance for a new design of silver sinter heat exchanger, J. Pollanen, H. Choi, J.P. Davis, B.T. Rolfs, and W.P. Halperin, *Journal of Physics: Conference Series* 150, 012037 (2009). [[doi:10.1088/1742-6596/150/1/012037](#)]
8. Magnetoresistance of UPt_3 , T.M. Lippman, J.P. Davis, H. Choi, J. Pollanen and W.P. Halperin, *J. Low Temp. Phys.* 148, 863 (2007). [[doi:10.1007/s10909-007-9469-8](#)]
7. Anisotropic Aerogels for Studying Superfluid ^3He , J. Pollanen, S. Blinstein, H. Choi, J.P. Davis, T.M. Lippman, L.B. Lurio and W.P. Halperin, *J. Low Temp. Phys.* 148, 579 (2007). [[doi:10.1007/s10909-007-9449-z](#)]
6. Analysis of Strong-Coupling Parameters for Superfluid ^3He , H. Choi, J.P. Davis, J. Pollanen, T.M. Haard and W.P. Halperin, *J. Low Temp. Phys.* 148, 507 (2007). [[doi:10.1007/s10909-007-9420-z](#)]
5. Imaginary Squashing Mode Spectroscopy of Helium Three B, J.P. Davis H. Choi, J. Pollanen and W.P. Halperin, *J. Low Temp. Phys.* 148, 501 (2007). [[doi:10.1007/s10909-007-9417-7](#)]
4. Specific Heat of Disordered ^3He , AIP Proceedings, H. Choi, J.P. Davis, J. Pollanen, N. Mulders and W.P. Halperin, *AIP Conf. Proc.* 850, 241 (2006). [[doi:10.1063/1.2354683](#)]
3. Acoustic Spectroscopy of Superfluid ^3He in Aerogel, J.P. Davis, H. Choi, J. Pollanen and W.P. Halperin, *AIP Conf. Proc.* 850, 239 (2006). [[doi:10.1063/1.2354682](#)]
2. Compressed Silica Aerogels for the Study of Superfluid ^3He in Aerogel, J. Pollanen, H. Choi, J.P. Davis, S. Blinstein, T.M. Lippman, L.B. Lurio, N. Mulders and W.P. Halperin, *AIP Conf. Proc.* 850, 237 (2006). [[doi:10.1063/1.2354681](#)]
1. Ternary phase diagram studies in Ti-Zr-Ni alloys, J.P. Davis, E.H. Majzoub, J.M. Simmons and K.F. Kelton, *Materials Science and Engineering A* 294, 104 (2000). [[doi:10.1016/S0921-5093\(00\)01093-5](#)]

FUNDING

- ◇ CFI Innovation 2020 - UofA lead, awarded 4.9M for quantum-system nanofabrication infrastructure (total project led by UofC, awarded 13M)
- ◇ Alberta Innovates Major Initiative Fund: Quantum Technologies - 660k of 5.8M
- ◇ NSERC CREATE 2017 (lead applicant for team of six PIs) - 2.83M over 8 years including university matching
- ◇ CFI Innovation 2017 - UofA lead, awarded 2.78M for hybrid quantum system infrastructure (total project led by UofC, awarded 6.8M)
- ◇ Alberta Innovates Strategic Research Project - 231k per year for three years
- ◇ NSERC Discovery 2016 & Accelerator Supplement - 62k per year for 5 years (Discovery), plus 40k per year for 3 years (Accelerator)
- ◇ NSERC CRD - 75k over 2 years
- ◇ McDonald Institute HQP Pooled Resources Competition - 42k over 2 years
- ◇ NSERC Engage + AITF CASBE 2017 - 50k for 1 year
- ◇ Quantum Alberta Quantum Network Funding - 88.5k for one year
- ◇ NSERC Strategic Project Grant 2016 on quantum optomechanical devices (co-applicant) - 1/3 share of 192k per year for 3 years
- ◇ NSERC Strategic Project Grant 2016 on integrated platforms for quantum networks (co-applicant) - 1/3 share of 178k per year for 3 years
- ◇ Petro-Canada Young Innovator Award 2016 - 10k for one year
- ◇ NSERC Engage 2015 - 25k for 6 months
- ◇ Department of National Defence: Targeted Engagement Grant Program - 7.5k once
- ◇ Alfred P. Sloan Foundation 2013 - 50k over two years
- ◇ Alberta Innovates Technology Futures iCore Strategic Chair 2012 - 175k per year for 3 years
- ◇ Canada Foundation for Innovation 2010: Equipment & operating funds - 376k and 94k respectively
- ◇ Grand Challenges Canada: Stars in Global Health - 100k for 18 months
- ◇ NSERC Research Tools and Instruments (×2) - 150k and 53k
- ◇ nanoBridge - 75k for one year
- ◇ University of Alberta: Faculty of Science & Office of the VP of Research - 745k (startup) and 43k (equipment)
- ◇ Canada School of Energy and the Environment (×2) - 25k each
- ◇ Member of Alberta Innovates Health Solutions team funding - 30k per year for 3 years
- ◇ National Institute for Nanotechnology: 200k (startup) and team funding of ~15k per year for 5 years
- ◇ Alberta Innovates Technology Futures team funding - 30k per year for 3 years

**INVITED
PRESENTATIONS**

- ◇ Invited Talk at the International Conference on Quantum Fluids and Solids, Bangalore, India, August 2021.
- ◇ Invited Talk at the Kitchener-Waterloo Quantum Enthusiasts meet-up, February 2021.
- ◇ Invited Talk at the Ginzton Laboratory, Stanford University, Stanford, October 2020.
- ◇ Invited Talk at the 29th International Conference on Low Temperature Physics (LT29), Sapporo, Japan, August 2020. — Cancelled.
- ◇ Plenary Talk at 21st Annual Meeting of the APS Northwest Section, Kamloops, May 2020. — Cancelled.
- ◇ Invited Talk at APS March Meeting 2020, Denver, March 2020. — Cancelled.
- ◇ Invited Talk at the Physics of Quantum Electronics (PQE) 2020, Snowbird, January 2020.
- ◇ Talk at “Forty years of super-solid physics: a tribute to the career of John Beamish”, Edmonton, December 2019.
- ◇ Invited Talk at Quantum Alberta Workshop 2019, Edmonton, July 2019.
- ◇ Invited Talk at Photonics North, Québec City, May 2019.
- ◇ Invited Colloquium at Simon Fraser University, Burnaby, March 2019.
- ◇ Invited Seminar at D-Wave Systems, Burnaby, March 2019.
- ◇ Talk 2019 Frontiers of Nanomechanical Systems, Palm Springs, CA, February 2019.
- ◇ Invited Talk at AVS International Symposium 65, Long Beach, CA, October 2018.
- ◇ Invited Talk at the International Conference on Quantum Fluids and Solids, Tokyo, Japan, July 2018.
- ◇ Invited Talk at Canadian Association of Physicists Congress, Halifax, NS, June 2018.
- ◇ Invited Seminar at Michigan State University, East Lansing, MI, April 2018.
- ◇ Invited Seminar at Princeton University, Princeton, NJ, November 2017.
- ◇ Invited Talk at Photonics North, Ottawa, June 2017.
- ◇ Invited Talk at Spin Mechanics 4, Banff, February 2017.
- ◇ Invited Seminar at Brown University, Providence, RI, September 2016.
- ◇ Invited Colloquium at the Univ. of Lethbridge, Lethbridge, March 2016.
- ◇ Invited Talk at the Gordon Research Conference: Mechanical Systems in the Quantum Regime, Ventura, CA, 2016.
- ◇ Invited Seminar at the Univ. of British Columbia, Vancouver, February 2016.
- ◇ Invited docent for “Grand Challenges in Quantum Fluids and Solids” Workshop for “Micromechanical Oscillators” session, University of Buffalo, August 2015.
- ◇ Invited Talk at the International Conference on Quantum Fluids and Solids, QFS2015, August 2015.
- ◇ Invited Talk at the Canadian Association of Physicists Congress, June 2015.
- ◇ “How and why we quest for absolute zero” at University of Alberta Faculty of Science alumni events, Vancouver and Victoria, April 2015.
- ◇ Invited Talk on Helium Availability at the APS March Meeting, March 2015.
- ◇ Invited Seminar, University of Florida, February 23rd 2015.
- ◇ Invited Seminar, Washington University, February 16th 2015.
- ◇ Invited Colloquium, University of Calgary, January 23th 2015.
- ◇ Invited Seminar, University of Toronto, December 15th 2014.
- ◇ Invited Seminar, Northwestern University, February 27th 2014.
- ◇ Invited Colloquium in the Dept. of Physics, University of Waterloo, February 27th 2014.
- ◇ Invited Seminar in the Department of Applied Physics, Caltech, February 18th 2014.
- ◇ Invited Talk at the Opto- and Electro-Mechanics Workshop, Italy, January 2014.
- ◇ Invited Talk at the Livestock Gentec Symposium, Alberta, November 2013.
- ◇ Invited Seminar at the University of Virginia, Virginia, March 2013.
- ◇ Presentation at the Canadian Institute for Advanced Research Nanoelectronics Conference, Vancouver, British Columbia, November 2012.
- ◇ Presentation at Metabolomic Technologies Inc. Edmonton, Alberta, August 2012.
- ◇ Invited talk at the 3rd Korea-Japan Workshop on Quantum Phenomena in Helium, Daejeon, Korea, December 2010.
- ◇ Invited talk at the Canadian Institute for Advanced Research Nanoelectronics Conference, Banff, Alberta, November 2010.
- ◇ Physics Dept. Colloquium at the University of Alberta, Edmonton, Alberta, April 2010.
- ◇ Seminar at the University of Pittsburgh, Pennsylvania, January 2010.
- ◇ Invited talk at the QFS2009 Conference, Evanston, Illinois, August 2009.

MEDIA

Story about our spin-off, Resolved Instruments, in CMC Microsystems newsletter.

Story about our spin-off, Resolved Instruments, in UofA Science Contours alumni magazine.

Write up in Avenue Magazine about our low-temperature lab.

Story about our nanomechanics research in Edmonton Journal, May 5th, 2013.

Front page cover story in the Edmonton Journal, February 16th, 2013 about receiving the Sloan Fellowship.

Front page cover story in the Edmonton Journal, May 14th, 2012 about low-temperature lab.

Featured in the April 17th, 2012 (Vol. 26, No. 5) issue of superconducting industry trade magazine: Superconductor Week

Article in Chronicle of Higher Education

Story about our lab in Canadian Geographic Magazine, October 2012 issue.

Live on CTV "Afternoon Express" on August 7th, 2012 discussing helium conservation.

Article on cold, and our lab, in the St. Albert Gazette.

Nerd Nite Edmonton presenter and frequent contributor

CJSR Campus Radio: Sound of Science Podcast

OTHER

- ◇ Director and lead PI of the Quanta NSERC CREATE program
- ◇ Co-Founder, VP, and Chief Innovation Officer at Resolved Instruments (www.resolvedinstruments.com)
- ◇ Recently achieved cooling into superfluid phase of ³He, unique in Canada
- ◇ Co-chair of organizing committee for the International Conference for Quantum Fluids and Solids 2019
- ◇ Patent US62588527 "Optically Heated and Optically Measured Fouling Sensor"
- ◇ Member of International Program Advisory Committee for QFS2021, Bangalore India.
- ◇ Member of International Advisory Committee for 29th International Conference on Low Temperature Physics in Sapporo, Japan, 2020
- ◇ Faculty mentor for organizing team of CUPC (Canadian Undergraduate Physics Conference) 2018
- ◇ Graduate student Paul Kim won 1st place in Raith Micrograph image contest 2017
- ◇ Graduate student Brad Hauer awarded the Zurich Instruments Travel Grant 2015
- ◇ Postdoctoral Fellow Xavier Rojas awarded prestigious AITF Postdoctoral Fellowship
- ◇ Postdoctoral Fellow Xavier Rojas invited to speak at Quantum Fluids and Solids Conferences in both 2013 and 2015.
- ◇ Graduate student Allison MacDonald DCMMP division finalist in student oral competition at the 2015 Canadian Association of Physicists Conference
- ◇ Graduate student Paul Kim won best overall student poster at the 2015 Canadian Association of Physicists Conference
- ◇ Graduate student Brad Hauer won best overall student talk at the 2012 Canadian Association of Physicists Conference
- ◇ Graduate admissions and recruiting committee 2010-2013, 2018
- ◇ Co-organizer of the [Alberta Quantum-Nano Workshop, Red Deer AB](#) 2011 and 2014, in [Banff in 2016](#), and in Calgary in 2018.
- ◇ Executive committee of the Alberta Innovates funded Quantum Alberta
- ◇ Science representative on Engineering Faculty Council
- ◇ Lifetime member of the American Physical Society
- ◇ Lifetime member of the Division of Condensed Matter Physics of the APS
- ◇ Board of Directors and Treasurer of Garneau/University Early Learning Centre
- ◇ Vice-Chair of Parent Council of Garneau School

TEACHING

- ◇ 3 terms of PHYS310 - Thermodynamics (~ 60 students)
- ◇ 1 term of PHYS294 - General Physics Laboratory (24 students)
- ◇ 2 terms of PHYS311 - Statistical Physics (~ 50 students)
- ◇ 2 terms of PHYS495/595 - Physics Innovation and Entrepreneurship (15 students)
- ◇ 5 terms of PHYS130 - Wave Motion, Optics and Sound - lecturer (~ 250 students) and course coordinator (3 terms, 4 sections each term, ~ 1000 students)
- ◇ 4 terms of PHYS208 - Aspects of Modern Physics (~ 60 students)
- ◇ 2 terms of Science Internship Program coordinator for Physics

CURRENT PERSONNELPostdoctoral Fellows:

Dr. Vaisakh Vadakkumbatt

Dr. Emil Varga

PhD Students:

Clinton Potts - NSERC PGS-M & PGS-D, Quanta CREATE top-up

Alex Shook - Quanta CREATE awardee

Elham Zohari - co-supervised with Paul Barclay

Ali Rashedi

Master's Students:

Sean McClure

Scott Agnew

Matthew Rudd - NSERC CGS & AI AGES

Marvin Hirschel

Undergraduate Students:

Robyn Learn

Camryn Undershute

FORMER PERSONNELPostdoctoral Fellow:

Dr. Fabien Souris

- now at Institut NÈEL CNRS

Dr. Fatemeh Fani Sani

- now at TU Delft

Dr. Xavier Rojas - AITF Postdoctoral Fellowship

- now at Royal Holloway with prestigious Royal Society Fellowship

Research Assistant:

Abdul H. Suhel - (now Non-Destructive Testing Technician at Acuren)

Visiting Scholars:

Junko Kiriya-Taniguchi - University of Electro-Communications, Tokyo, Japan

PhD Students:

Hugh Ramp

- Thesis: "Microwave to Telecom Wavelength Transduction" - September 2020

- now Research Scientist at D-Wave Systems

Bradley D. Hauer

- Thesis: "On-Chip Silicon Optomechanical Cavities
at Low Temperatures" - December 2019

- now post-doctoral fellow at NIST, Boulder

Callum Doolin

- Thesis: "Integrated optical and mechanical resonators
for evanescent field sensing" - August 2019

- now Director: Scientific Research Operations at GFI Systems Inc

Paul H. Kim

- Thesis: "Passive and Active Cooling of Cavity Optomechanical Torque Sensors
for Magnetometry Applications" - April 2019

- now Research Scientist at Norcada

Tushar S. Biswas

- Thesis: "Fabrication, Characterization, and Applications of Nanomechanical
Resonators" - June 2017

- now Research Scientist at Avalon Holographics

**FORMER PERSONNEL
CONTINUED**

Master's Students:

Tommy Clark

- Thesis: "Applications of superconducting re-entrant microwave cavities" - August 2019
- now PhD student at McGill University

Muhammad Ruhul Amin

- Thesis: "Sensing applications of nanomechanical resonators" - January 2017
- now PhD student at Univ. of Saskatchewan

Clinton Potts - NSERC PGS-M (co-supervised with Ray DeCorby of ECE)

- now PhD student in my group
- Thesis: "Integrated Devices for On-Chip Quantum Optics" - December 2016

Allison MacDonald - NSERC PGS-M, AITF Graduate Scholarship, QEII

- Thesis: "Cryogenic Optomechanics with Silica Microresonators" - March 2015
- now Research Scientist at D-Wave Systems

Kyle Reid

- Thesis: "Measuring Optomechanics with a Photon STM" - Jan. 2015
- now Research Scientist at Heraeus

Paul H. Kim - Queen Elizabeth Scholarship, NINT RA

- Thesis: "Nanoscale Torsional Optomechanics" - May 2014
- now Research Scientist at Norcada

Yikai Yang

- Thesis: "Electrical Properties of Al-Ge Granular Superconducting Films" - Dec. 2013
- now PhD student at EPFL

Undergraduate Students:

Myles Ruether - (now Research Technician at SFU)

Nick Sorensen Sean McClure - Departmental SUPRE awardee

Ted Robinson - Departmental SUPRE awardee

Holly Christiani - URI Research Stipend - (now Research Technician at D-Wave Systems)

Matthew Thiessen - NSERC USRA

Tyler Zimmerling - NSERC USRA

Pearse Doolin - (CEO and co-Founder of Resolved Instruments)

Tommy Clark- NSERC USRA - (now graduate student in our group)

John Grey

Alberto Palomino - URI - (now Master's Program in Space Science at the University of Pisa)

Davis Iwaniuk

Aron Fredrick - NSERC USRA (now grad student at UBC)

Parnian Saberi - Ryerson Co-op, nanoUSRA (now pursuing PhD at University of Toronto)

Benjamin Rehl - nanoUSRA (now grad student in Dept. of Chemistry, U of A)

Alex Hoy

Andrej Duh - International Student Work Study Program

Soonho Kwon - STEP (now Co-Founder and CEO of EarlierCare)

Stephen Portillo - NSERC USRA (now pursuing PhD at Harvard University)

Rahmat Saeedi