Joseph H. Thywissen

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Vital data

Citizen of Canada and of the United States. Born 26/Aug/1972. Graduate of the Kinkaid School (Houston, 1991). Married to Hulda María Einarsdóttir, 3/Sept/2011.

ACADEMIC HISTORY

Primary Appointments and Education

- University of Toronto, Department of Physics: Full Professor, 2015–
  (Assistant Prof. 2003; Associate Prof. with Tenure, 2008)
- Institut d'Optique (Orsay, France): Postdoctoral Fellow & CNRS "Poste Rouge", 2000–03
- Harvard University (Cambridge): M.A. 1997; Ph.D. 2000, Applied Physics
- Princeton University (Princeton): Research Assistant, 1994
- Harvey Mudd College (Claremont): B.S. Physics + B.S. Engineering, 1994

Honours and Secondary Appointments

- Canadian Institute for Advanced Research: Associate 2006; Scholar 2008; Fellow 2012–
- CNRS Visiting Researcher, Laboratoire Kastler Brossel (ENS-PSL University/UPMC/CdF) 2017
- Accelerator Grant recipient, NSERC, 2016
- Dean's Excellence Fund award, Faculty of Arts & Science, 2016
- Fellow, American Physical Society, 2014
- Yale University: Visiting Faculty, 2013
- MIT-Harvard Center for Ultracold Atoms: Visiting Scientist 2009
- Massey College: Assoc. Senior Fellow 2004–9; Senior Fellow on Corporation 2009–
- Dean's Excellence Fund award, Faculty of Arts & Science, 2005
- Centre for Quantum Information and Quantum Control (Toronto): Faculty, 2004–
- Canada Research Chair, 2003–13
- Premier's Research Excellence Award, 2004
- John Charles Polanyi Prize in Physics, 2003
- Ontario Distinguished Researcher Award, 2003
- Fannie and John Hertz Foundation Thesis Prize, 2000
- Chateaubriand Postdoctoral Fellowship, 2000, 2001
- Hertz Foundation Graduate Fellowship, 1994–2000
- Thomas E. Brown Undergraduate Research Award, 1994
- American Physical Society Sigma Pi Sigma Award, 1993
- American Mathematical Society Award, 1991

Honours awarded to group members

- Dimitris N. Chorafas Foundation Prize, G. Edge, 2017
- CAP Doctoral Thesis Prize in AMO physics, A. Bardon, 2015
- CAP Doctoral Thesis Prize in AMO physics, L. J. LeBlanc, 2011
- Centennial Thesis Prize, B. Shuve, 2007
- NSERC CGS/PGS awards to 11 group alum and 9 group members, 2004–
- OGS awards to 2 group members, 2004–12
- CQIQC Prize Postdoctoral Fellowships to 2 group members, 2007 & 2011
- NSERC Postdoctoral Fellowships to 1 group member, 2004

Grants Awarded

Research support has been awarded by the National Science and Engineering Research Council (NSERC), the Canadian Foundation for Innovation (CFI), the US Army Research Office (ARO), the Air Force Office of Sponsored Research (AFOSR), the Defense Advanced Research Projects Agency (DARPA), the Canadian Institute for Advanced Research (CIFAR), the Ontario Centres of Excellence (OCE), the Ontario Innovation Trust (OIT), and the Canada Research Chair program (CRC). Details are available upon request.

PROFESSIONAL ACTIVITIES

Affiliations

American Physical Society (Fellow, 2014)
Canadian Association of Physicists
American Association for the Advancement of Science

Professional society leadership

Executive committee member-at-large (2017–20), APS Division of AMO Physics
Past Chair (2012–13) and Vice-chair (2011–12), Division of AMO Physics, Canadian Association of Physics

Conference organization

Chair, International Conference on Atomic Physics (Toronto, July 2020)
Co-chair, Workshop on Cold-atom Experiments and Nuclear Physics (Trento, June 2018)
Chair, Canadian Institute for Advanced Research meeting on Cold Atoms (Banff, 19–21 February 2014)
Chair, Canadian Institute for Advanced Research meeting on Cold Atoms (Banff, 16–18 February 2012)
Chair, GriffinFest (University of Toronto, 13–14 May 2011)

Chair, Canadian Institute for Advanced Research meeting on Ultracold Magnetism (Halifax, 12–16 August 2009)

Chair, Canadian Institute for Advanced Research meeting on Ultracold Matter (Banff, 17–20 April 2008)

Member of the *American Physical Society DAMOP Program committee* for the 2011 APS March meeting (Dallas, 21–25 March), 2010 DAMOP meeting (Houston, 25–29 May), 2010 APS March meeting (Portland, 15–19 March), 2009 DAMOP meeting (Charlottesville, 19–23 May), 2009 APS March meeting (Pittsburgh, 16–20 March), 2008 DAMOP meeting (State College, PA, 27–31 May), 2008 APS March meeting (New Orleans, LA, 10–14 March), and 2007 DAMOP meeting (Calgary, AB, 5–9 June).

Chair, Canadian Institute for Advanced Research meeting on Quantum Simulation (Vancouver, 22–24 February 2007)

Co-chair, Canadian Institute for Advanced Research meeting on Ultracold Matter (Toronto, 13–15 October 2005)

Editorial positions

Editorial Board Member, *New Journal of Physics* (2017–)

Guest editor, *Journal of Physics B*, for the *Special issue on Addressing Many-body Problems with Atoms, Ions, and Molecules* (2015–17)

Administrative service

Commission C15, AMO Physics, *International Union of Pure and Applied Physics (IUPAP)*, Canadian representative (2011–17)

DAMOP Thesis prize committee, *American Physical Society* (2013)

IUPAP Liaison Committee, *Canadian Association of Physics* (2011–17)

Management board, *CQIQC*, University of Toronto (2010–12)

Senior Fellow on Corporation, *Massey College,* University of Toronto (2009–)

Chair, Physics Technical Services committee, University of Toronto (2007–2015)

Chair, QO/AMO seminar series, University of Toronto (2003–08, 2010–2013)

Review and referee activities

Referee for *Physical Review Letters*, *Science*, *PNAS*, *Physical Review A*, *Nature Physics*, *New Journal of Physics*, ARO, AFOSR, BSF, CFI, ESF, FWF (Austria), NSERC, and NSF.

External examiner at Swinburne University; Université de Paris; York University

RESEARCH

Published and submitted work

"Observation of quantum-limited spin transport in strongly interacting 2D Fermi gases," C. Luciuk, S. Smale, F. Böttcher, H. Sharum, B. A. Olsen, S. Trotzky, T. Enss, J. H. Thywissen, *Physical Review Letters* **118**, 130405 (2017).

"Evidence for universal relations describing a gas with p-wave interactions," C. Luciuk, S. Trotzky, S. Smale, Zhenhua Yu, Shizhong Zhang, J. H. Thywissen, *Nature Physics* **92**, 019901 (2016) [doi:10.1038/nphys3670]. See also News & Views: "Fermi gases: Anisotropic universality," M. Ueda, *Nature Physics* **12**, 599 (2016).

"Spin correlations and entanglement in partially magnetised ensembles of fermions," G. S. Thekkadath, Liang Jiang, J. H. Thywissen, *Journal of Physics B: Atomic, Molecular, and Optical Physics* **49**, 214002 (2016).

"Universal Relations for a Fermi Gas Close to a p-Wave Interaction Resonance," Zhenhua Yu, J. H. Thywissen, Shizhong Zhang, *Physical Review Letters* **115**, 035304 (2015); **117**, 019901 (2016).

"Imaging and addressing of individual fermionic atoms in an optical lattice," G. J. A. Edge, R. Anderson, D. Jervis, D. C. McKay, R. Day, S. Trotzky, J. H. Thywissen, *Physical Review A* **92**, 063406 (2015), as "Editor's Suggestion". (Fermi gas microscopes also chosen by *Physics World* as one of the top ten breakthroughs of 2015.)

"Observation of the Leggett-Rice effect in a unitary Fermi gas," S. Trotzky, S. Beattie, C. Luciuk, S. Smale, A. B. Bardon, T. Enss, E. Taylor, Shizhong Zhang, and J. H. Thywissen, *Physical Review Letters* **114**, 015301 (2015), as "Editor's Suggestion".

"Transverse Demagnetization Dynamics of a Unitary Fermi Gas," A. B. Bardon, S. Beattie, C. Luciuk, W. Cairncross, N. S. Cheng, D. Fine, G. J. A. Edge, E. Taylor, Shizhong Zhang, S. Trotzky, and J. H. Thywissen, *Science* **344**, 722 (2014).

"Making an ultracold gas," D. Jervis and J. H. Thywissen, Chapter 2 of *Quantum Gas Experiments - Exploring Many-body States*, P. Torma, K. Sengstock, eds. *Cold Atoms* **3**, 5–32 (Imperial College Press, 2014).

"Experimental methods of ultracold atomic physics," D. M. Stamper-Kurn and J. H. Thywissen, Chapter 1 of *Ultracold Bose and Fermi Quantum Gases*, S. Fetter, K. Levin, D. M. Stamper-Kurn eds. *Contemporary Concepts of Condensed Matter Science* **5**, 1–26 (Elsevier, 2012).

"Low-temperature, high-density magneto-optical trapping of potassium using the open 4S $\rightarrow$ 5P transition at 405 nm," D. C. McKay, D. Jervis, D. J. Fine, J. W. Simpson-Porco, G. J. A. Edge, and J. H. Thywissen, *Physical Review A* **84**, 063420 (2011).

"Bragging Rights," J. H. Thywissen, *Physics* **4**, 41 (2011).

"Ultracold superfluids," J. H. Thywissen, *Physics in Canada* **67**, 129 (2011).

"Dynamics of a tunable superfluid junction," L. J. LeBlanc, A. B. Bardon, J. McKeever, M. H. T. Extavour, D. Jervis, J. H. Thywissen, F. Piazza, and A. Smerzi, *Physical Review Letters* **106**, 025302 (2011).

"Itinerant ferromagnetism in a strongly interacting Fermi gas of ultracold atoms," G.-B. Jo, Y.-R. Lee, J.-H. Choi, C. A. Christensen, T. H. Kim, J. H. Thywissen, D. E. Pritchard, and W. Ketterle, *Science* **325**, 1521 (2009). [Note: Subsequent work showed that molecular formation mimicked the signatures of ferromagnetism in this work. See Sanner, Ketterle, et al., *PRL* **108**, 240404 (2012), and Trotzky et al., *PRL* **113**, (2014) above.]

"Enhanced Pauli blocking of light scattering in a trapped Fermi gas," B. Shuve and J. H. Thywissen, *Journal of Physics B: Atomic, Molecular, and Optical Physics* **43**, 015301 (2010).

"Repulsive Fermi gas in a harmonic trap: Ferromagnetism and spin textures", L. J. LeBlanc, J. H. Thywissen, A. Burkov, and A. Paramekanti, *Physical Review A* **80** 013607 (2009).

"Fermions on atom chips", M. H. T. Extavour, L. J. LeBlanc, J. McKeever, A. B. Bardon, S. Aubin, S. Myrskog, T. Schumm, and J. H. Thywissen, Chapter 12 of *Atom Chips*, J. Reichel, V. Vuletić, eds. (Wiley-VCH, 2011).

"Species selective optical lattices," L. J. LeBlanc and J. H. Thywissen, *Physical Review A* **75** 053612 (2007).

"Dual-species quantum degeneracy of ^{40}K and ^{87}Rb on an atom chip," M. H. T. Extavour, L. J. LeBlanc, T. Schumm, B. Cieslak, S. Myrskog, A. Stummer, S. Aubin, and J. H. Thywissen, *Atomic Physics* **20**, 241-249 (2006).

"Rapid sympathetic cooling to Fermi degeneracy on a chip," S. Aubin, S. Myrskog, M. H. T. Extavour, L. J. LeBlanc, D. McKay, A. Stummer, and J. H. Thywissen, *Nature Physics* **2**, 384 (2006).

"Coherence length of an elongated condensate: a study by matter-wave interferometry" M. Hugbart, J. A. Retter, F. Gerbier, A. Varon, S. Richard, J. H. Thywissen, D. Clement, P. Bouyer, A. Aspect, *European Physical Journal D* **35**, 155 (2005).

"Trapping fermionic ^{40}K and bosonic ^{87}Rb on a chip," S. Aubin, M. H. T. Extavour, S. Myrskog, L. J. LeBlanc, J. Estève, S. Singh, P. Scrutton, D. McKay, R. McKenzie, I. D. Leroux, A. Stummer, and J. H. Thywissen, *Journal of Low Temperature Physics* **140**, 377 (2005).

"Demonstration of frequency encoding in neutral atom lithography," J. H. Thywissen and M. Prentiss, *New Journal of Physics* **7**, 47 (2005).

"One-dimensional behavior of elongated Bose-Einstein condensates" P. Bouyer, J. H. Thywissen, F. Gerbier, M. Hugbart, S. Richard, J. Retter, and A. Aspect *J. Phys. IV France* **116**, 219 (2004).

"Using magnetic chip traps to study Tonks-Girardeau quantum gases" J. Reichel and J. H. Thywissen, *J. Phys. IV France* **116**, 265 (2004).

"Experimental study of the thermodynamics of an interacting, trapped Bose-Einstein condensed gas" F. Gerbier, J. H. Thywissen, S. Richard, M. Hugbart, P. Bouyer, and A. Aspect *Physical Review A* **70**, 013607 (2004).

"Exponentially localized magnetic fields for quantum computation," D. A. Lidar and J. H. Thywissen, *Journal of Applied Physics* **96**, 754 (2004).

"Critical temperature of a trapped, weakly interacting Bose gas," F. Gerbier, J. H. Thywissen, S. Richard, M. Hugbart, P. Bouyer, and A. Aspect, *Physical Review Letters* **92**, 030405 (2004).

"Momentum spectroscopy of 1D phase fluctuations in Bose-Einstein condensates" S. Richard, F. Gerbier, J. H. Thywissen, M. Hugbart, P. Bouyer, and A. Aspect, *Physical Review Letters* **91**, 010405 (2003).

"Momentum distribution and correlation function of quasicondenstaes in elongated traps," F. Gerbier, J. H. Thywissen, S. Richard, M. Hugbart, P. Bouyer, and A. Aspect, *Physical Review A* **67**, 051902(R) (2003).

"Self-Assembled Monolayers Exposed to Metastable Argon Beams Undergo Thiol Exchange Reactions," M. Chabinyc, C. Love, J. H. Thywissen, F. Cervelli, M. Prentiss, and G. M. Whitesides, *Langmuir* **19**, 2201 (2003).

"Production of CW and mode-locked atom lasers," P. Bouyer, S. A. Rangwala, J. H. Thywissen, Y. Le Coq, F. Gerbier, S. Richard, G. Delannoy, and A. Aspect, *J. Phys. IV* **12**, 115 (2002).
"Atom Laser Divergence", Y. Le Coq, J. H. Thywissen, S. A. Rangwala, F. Gerbier, S. Richard, G. Delannoy, P. Bouyer, and A. Aspect, *Physical Review Letters* **87**, 170403 (2001).
"Microfabrication of Two Layer Structures of Electrically Isolated Wires Using Self-Assembly to Guide the Deposition of Insulating Organic Polymer", A. J. Black, P. F. Nealy, J. H. Thywissen, M. Deshpande, N. El-Zein, G. N. Marcus, M. Prentiss, and G. M. Whitesides, *Sensors and Actuators A* **86**, 96 (2000).
"Guiding neutral atoms on a chip", N. H. Dekker, C. S. Lee, V. Lorent, J. H. Thywissen, S. P. Smith, M. Drndić, R. M. Westervelt, and M. Prentiss *Physical Review Letters* **84**, 1124 (2000).
"Quantum Point Contacts for Neutral Atoms", J. H. Thywissen, R. M. Westervelt, and M. Prentiss, *Physical Review Letters* **83**, 3762 (1999).
"Properties of Microelectromagnet Mirrors as Reflectors of Cold Rb Atoms", M. Drndić, G. Zabow, C. S. Lee, J. H. Thywissen, K. S. Johnson, M. Prentiss, R. M. Westervelt, P. D. Featonby, V. Savalli, L. Cognet, K. Helmerson, N. Westbrook, C. I. Westbrook, W. D. Phillips, and A. Aspect, *Physical Review A* **60**, 4012 (1999).
"Microfabricated magnetic waveguides for neutral atoms", J. H. Thywissen, M. Olshanii, G. Zabow, M. Drndić, R. M. Westervelt, and M. Prentiss, *European Physical Journal D* **7**, 361 (1999).
"Improving the Specularity of Magnetic Mirrors for Atoms", G. Zabow, M. Drndić, J. H. Thywissen, K. S. Johnson, R. M. Westervelt, and M. Prentiss, *European Physical Journal D* **7**, 351 (1999).
"Using neutral atoms and standing light waves to form a calibration artifact for length metrology", J. H. Thywissen, K. S. Johnson, N. H. Dekker, A. P. Chu, M. Prentiss, *Journal of Vacuum Science and Technology B* **16**, 3841 (1998).
"Atomic deflection using an adaptive microelectromagnetic mirror", K. S. Johnson, M. Drndić, J. H. Thywissen, G. Zabow, M. Prentiss, and R. M. Westervelt, *Physical Review Letters* **81**, 1137 (1998).
"Micro-electromagnets for Atom Manipulation", M. Drndić, K. S. Johnson, J. H. Thywissen, M. Prentiss, and R. M. Westervelt, *Applied Physics Letters* **72**, 2906 (1998).
"Metastable-atom-activated growth of of an ultra-thin carbonaceous resist for reactive ion etching of SiO_2 and Si_3N_4", J. H. Thywissen, K. S. Johnson, N. H. Dekker, M. Prentiss, S. S. Wong, M. Weiss, and M. Grunze, *Journal of Vacuum Science and Technology B* **16**, 1155 (1998).
"Localization of Metastable Atom Beams with Optical Standing Waves: Nanolithography at the Heisenberg Limit", K. S. Johnson, J. H. Thywissen, N. H. Dekker, K. K. Berggren, A. P. Chu, R. Younkin, and M. Prentiss, *Science* **280**, 1583 (1998).
"Nanofabrication using neutral atomic beams", J. H. Thywissen, K. S. Johnson, R. Younkin, N. H. Dekker, K. K. Berggren, A. P. Chu, M. Prentiss, and S. A. Lee, *Journal of Vacuum Science and Technology B* **15**, 2093 (1997).
"A combined polarized target/ionization chamber for measuring the spin dependence of nuclear capture in laser polarized muonic 3He", P. Bogarad et al., *Nucl. Instrum. Meth. A* **398**, 211 (1997).
"Spin-rotation interaction of alkali-metal-He atom pairs", T. G. Walker, J. H. Thywissen, and W. Happer, *Physical Review A* **56**, 2090 (1997).
"Using neutral metastable argon atoms and contamination lithography to form nanostructures in silicon, silicon dioxide, and gold", K. S. Johnson, K. K. Berggren, A. Black, C. T. Black, A. P. Chu, N. H. Dekker, D. C. Ralph, J. H. Thywissen, R. Younkin, M. Tinkham, M. Prentiss, and G. M. Whitesides, *Applied Physics Letters* **69**, 2773 (1996).

INVITED TALKS

Invited conference presentations

Pittsburgh Quantum Institute Symposium (April 26-28, 2017, Pittsburgh): "P-wave correlations in an ultracold Fermi gas"

From few to many: Exploring quantum systems one atom at a time (11-13 April 2017, Obergurgl, Austria): "Observation of quantum-limited spin transport in a strongly interacting 2D Fermi gas"

Quantum Gases 2016 (22-24 August 2016, IAS Tsinghua, China): "Spin transport in strongly interacting 3D & 2D Fermi gases"

EQM16 / Workshop on Engineering Quantum Matter: From Understanding to Control (8-10 June 2016, St Andrews, Scotland, UK): "Quantum many-body dynamics with ultracold atoms"

Topological Phases in Condensed Matter and Cold Atomic Systems (HKUST, Hong Kong, 11-19 December 2015): "Imaging and addressing individual fermions in an optical lattice"

Bose-Einstein Condensation 2015 – Frontiers in Quantum Gases (Sant Feliu de Guixols, 6-10 Sept 2015): "The p-wave contacts"

Gordon Research Conference on Atomic Physics (Newport, 14-19 June 2015): "Correlation dynamics in a Fermi gas"

DAMOP'15 – 46th Meeting of the APS Division of Atomic, Molecular, and Optical Physics (Columbus, 8-12 June 2015): "Observation of the Leggett-Rice Effect in an Ultracold Fermi gas"

APS March Meeting (San Antonio, 2-6 March 2015): "Transverse Demagnetization Dynamics of a Unitary Fermi Gas"

Symposium on Ultracold Atomic Physics (University of Hong Kong, 18 January 2015)

CAP Congress (Sudbury, 16-20 June 2014): "Spin transport in a unitary Fermi gas"

CIFAR quantum materials meeting (Montreal, 7-10 May 2014): "Spin transport in a unitary Fermi gas"

CIFAR Meeting on Cold Atoms (The Banff Centre, 18-21 Feb 2014): S. Beattie, "The Leggett-Rice effect in a unitary Fermi gas"

DARPA Optical Lattice Emulator (OLE) program meeting meeting (Arlington, 10 Feb 2014): "Spin dynamics of fermions"

Hong Kong Forum of Physics (12-14 December 2013): "Spin transport in a unitary Fermi gas."

Frontiers in Optics: The 97th OSA Annual Meeting / Laser Science XXIX (Orlando 6-10 October 2013): "Diffusive Spin Transport in a Unitary Fermi Gas."

Bose-Einstein Condensation 2013 - Frontiers in Quantum Gases (Sant Feliu de Guixols, Spain, 7-13 September 2013): invited presentation by S. Trotzky: "Spin Transport in a Unitary Fermi Gas."

OLE collaboration meeting (San Francisco, 30 May 2013): "Diffusive Spin Transport in a Unitary Fermi Gas."

CIFAR quantum materials meeting (Vancouver, 9-11 May 2013): "Diffusive Spin Transport in a Unitary Fermi Gas."

OLE collaboration meeting (Miami, 28 November 2012): "Quantum Microscopes."

NewSpin2: Spin physics and topological effects in cold atoms and condensed matter (Texas A&M, 11-17 December 2011): "Ultracold ferromagnetism: The good, the bad, and the ugly."

OLE/MURI Collaboration meeting (Ft. Lauderdale, 6-8 December 2011): "Enhanced laser cooing of fermionic potassium."

OLE Collaboration meeting (Vail, 22-23 June 2011): "Observation of a 'blue' potassium MOT at 405 nm."

CAP Congress (St. John's Newfoundland, 13-17 June 2011): invited presentation by L. J. LeBlanc

Cross-border workshop on laser science (Rochester, 9-10 June 2011): "Transport dynamics of an ultracold superfluid junction."

APS March meeting (Dallas, 21-25 March 2011): "Quantum Simulation with Ultracold Atoms."

Workshop on control of quantum correlations in tailored matter (Günzburg, Germany, 29 Nov - 1 Dec, 2010): "Dynamics of a tunable superfluid junction."

Michigan Quantum Summer School (Ann Arbor, 2-13 August 2010)

OLE Collaboration meeting (Houston, 24-25 May 2010): "Quantum transport in a double-well system."

CIFAR Quantum Materials meeting (Montreal, 5-9 May 2010): "Ultra-cold ferromagnetism."

NewSpin: Spin Manipulation in cold atoms and condensed matter (Utrecht, 6-9 January 2010): "Ultracold ferromagnetism."

Kavli Institute for Theoretical Physics China (Beijing, 5-9 October 2009): "Ultracold ferromagnetism."

Wolfgang Pauli Institute (Vienna, 7-8 July 2009): "Josephson Oscillations in an RF-dressed double well."

Integrated Atomic Systems (IAS2, Seattle WA, 18 February 2009): "Chips beyond chips."

OLE/MURI Collaboration meeting (Las Vegas, 16-18 December 2008): "High resolution imaging at 405nm."

CIFAR Ultracold Matter workshop series (Banff, AB, 17-20 April 2008): "Towards strongly interacting fermions at Toronto."

ONR atoms-on-chips workshop (US Naval Observatory, Washington D.C., 8 March 2008): "Atoms-on-chips at Toronto."

Quantum Atom Optics Downunder (Wollongong, Australia, 3-6 December 2007): "Number counting in a Bose Josephson Junction."

CIFAR Quantum materials meeting (Lac Carling, QC, 18-20 October 2007): "Current topics in cold atoms."

MURI Optical lattice program kick-off meeting (Newport, RI, 10-11 October 2007): "Requirements for Quantum simulation of the Hubbard Model."

Gordon Research Conference on Atomic Physics (Tilton School, NH, 26 June 2007): "Atom chips for Fermi-Degenerate Gases."

Cross Border Workshop on Laser Science (Toronto, 18 May 2007): "Atom chips, neutral fermions, and light scattering."

Kavli Institute for Theoretical Physics (KITP) Program on Strongly Correlated Phases in Condensed Matter and Degenerate Atomic Systems (Santa Barbara, 1 May 2007): "Double-well geometries and species-selective environments."

Emerging Themes in Physics Workshop, University of Texas at Austin (5-6 October 2006): "Bose and Fermi gases in single- and double-well chip traps."

Engineering Science Undergraduate Research Day 2006, Keynote speaker (Toronto, ON, 21 August 2006): "Ultracold Atoms ... and some comments on a career in research."

Frontiers of Quantum Decoherence (Fields Institute, Toronto, 12-14 August 2006): "Phase (de)coherence in ultracold quantum gases."

ICAP'06 – 20th International Conference on Atomic Physics (Innsbruck, 16-21 July 2006): "Atom

chips for neutral fermions."

Canadian Association of Physicists (CAP) congress (Brock, June 11-14, 2006): "Ultra-cold Bose-Fermi mixture on a chip."

CIAR Quantum Materials meeting (Montreal, QC, May 11-13, 2006): "Ultracold atoms 2013."

CIAR Ultra Cold Matter meeting (Banff, February 25, 2006): panel member in discussion of future directions

Strong Correlations in Ultra-Cold Fermi Systems (Aspen, 15-21 Jan 2006): "Bose-Fermi mixtures on a chip."

CIAR Ultra-cold Matter meeting (Toronto, ON, 13-15 Oct 2005): "Bose-Fermi mixtures @ Toronto."

Amazing Light symposium, in honor of Charles Townes (Berkeley, CA, 7 Oct 2005): "Micro-ElectroMagnets: an enabling technology for ultracold atom research and practical applications."

QUEST'05 (Santa Fe, NM, 8 August 2005): "Sympathetic cooling of ultracold fermions in a chip trap."

Advances in Computational Many-body Physics (ACMP'05, Banff, January 13-16, 2005): "New directions in dilute quantum gas experiments."

New Laser Scientist Conference (Rochester, October 2004): "Bose and Fermi Gases in Microfabricated Magnetic Traps."

ITAMP Workshop on Quantum Degenerate Gases in Low Dimensionality, Harvard University (Cambridge, October 2004): "Toward Ultracold Fermions on a Chip."

Banff Cold Atoms Meeting (February 2004): "Towards Cold Fermions on a Chip."

Canadian Association of Physicists (CAP) Congress (Charlottetown, PEI, June 2003): "Bose-Einstein condensates at finite temperature."

Beyond BEC, CUA-ITAMP Joint Workshop (Cambridge, MA, November 2001): "Towards Bragg Spectroscopy of Quasi-Condensates."

EIPBN'98, The International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication (Chicago, IL, May 1998): "Novel etch and patterning techniques for neutral metastable atom lithography."

Seminars and Colloquia

Laboratoire Kastler Brossel (ENS Paris / UPMC / College de France, 15 March 2017)

Hong Kong University of Science and Technology (20 February 2017)

Institut d'Optique, Groupe Optique Atomique (École Polytechnique, France, 10 October 2016)

University of Guelph, Physics Colloquium (27 September 2016)

University of Amsterdam (6 June 2016)

Cornell University, LASSP and A&EP Seminar (Ithaca, 12 April 2016)

University of Alberta, Physics Colloquium (Edmonton, 26 February 2016)

University of Alberta, Condensed Matter Seminar (Edmonton, 25 February 2016)

University of Calgary, Physics Colloquium (22 January 2016)

University of Waterloo, Physics Colloquium (19 March 2015)

Rice University, AMO Seminar (Houston, 26 February 2015)

University of Toronto, Chemical Physics Theory Group Seminar (3 February 2015)

Chinese University of Hong Kong, Physics Colloquium (19 January 2015)

Universität Hamburg, AMO group seminar (16 October 2014)

Universität Stuttgart, seminar of the 5.Physikalisches Institut (14 October 2014)
Queen's University Condensed Matter Seminar (Kingston, 3 April 2014)
Laboratoire Kastler Brossel, ENS (Paris, 3 July 2013)
Institut d'Optique (Ecole Polytechnique, France, 2 July 2013)
Trent University, Physics & Chemistry Colloquium (Peterborough, 6 Feb 2013)
Simon Fraser University, Physics Colloquium (Burnaby, 27 January 2012)
University of British Columbia, Physics Colloquium (Vancouver, 26 January 2012)
University of Victoria, Physics Colloquium (Victoria BC, 25 January 2012)
LSU Department of Physics (Baton Rouge, 23 May 2011)
Yale University Department of Physics (New Haven, 15 February 2011)
University of Toronto, Physics Colloquium (Toronto, 11 March 2010)
Boston University, Condensed Matter Theory seminar (Boston 26 February 2009)
University of British Columbia, Physics Colloquium (Vancouver, 20 November 2008)
Rice University, Keck Seminar (Houston, 7 October 2008)
University of Illinois at Urbana-Champagne, Condensed Matter Physics seminar (25 April 2008)
McGill University, Condensed Matter Physics seminar (Montreal, 15 March 2007)
Queen's University, Physics Department Colloquium (Kingston, 14 March 2007)
Sherbrooke University, Physics Department seminar (Sherbrooke, 14 February 2007)
IFRAF – Institut francilien de recherche sur les atomes froids (Orsay, France, 9 June 2006)
ENS Paris (Paris, France, 8 June 2006)
CIAR summer school (Montreal, 8-10 May 2006)
Harvard-MIT Center for Ultracold Atoms (Cambridge, MA, 2 May 2006)
McMaster University, Physics and Astronomy Colloquium, (Hamilton, ON, 1 March 2006)
University of Waterloo, Physics Department Colloquium (Waterloo, ON, 2 February 2006)
Institut d'Optique, Université de Paris XI-Sud (Orsay, France, 13 June 2005)
Queen's University, Condensed Matter Physics Seminar (Kingston, March 2004)
University of Calgary, AMO group seminar (February 2004)
York University Physics Colloquium (Toronto, Ontario, January 2003)
University of Pisa, Arimondo group seminar (Pisa, Italy, November 2002)
New York University (June 2002)
Rice Quantum Institute (Houston, June 2002)
Department of Physics, University of Toronto (March 2002)
Cold atom group meeting, JILA (Boulder, November 2001)
Massachusetts Institute of Technology, AMO seminar (Cambridge, 14 April 2000)
Dartmouth Physics colloquium (Hanover, October 1998)
Roland Institute for Science (Cambridge, 29 September 1997)

TEACHING AND MENTORSHIP

Undergraduate Courses

Classical Mechanics (PHY180: Fall of 2013–17), **Thermal Physics** (PHY252: Fall of 2010, 2011, 2012), **Vibrations and Waves** (PHY280: Fall of 2004 & 2005; as PHY290F: Fall of 2006 & 2007) **Advanced Undergraduate Laboratory** (PHY325/425)

Graduate Courses

Advanced Classical Optics (PHY1485: Fall of 2012, 2013, 2014), **Quantum Optics I** (PHY2203: Spring 2008, Fall 2008, Spring 2010–12, Fall 2017), **Ultracold Atoms** (PHY2205: Spring of 2007, 2011, 2016)

Research Supervision

Undergraduate theses supervised: Swati Singh (B.Sc. 2004), Ian Leroux (B.A.Sc. 2005), Barbara Cieslak (B.A.Sc. 2005), David McKay (B.A.Sc. 2006), Brian Shuve (B.A.Sc. 2007), Julie Sutton (B.A.Sc. 2009), Michael Yee (B.A.Sc. 2009), Boris Bravermann (B.A.Sc. 2011), Guillaume Thekkadath (B.A. 2015).

Undergraduate summer and term research students: Hyun Youk (2003), Swati Singh (2003), Phil Scrutton (2003), Micha Strauß(2004), Michael Häffner (2004–5), Ryan Mckenzie (2004), David McKay (2004–6), David Shirokoff (2005), David Burns (2006), Brian Shuve (2006), Iliya Sigal (2007), Michael Yee (2007), Julie Sutton (2008), Tout Wang (2008), Michael Yee (2008), Gabriello Presenza-Pitman (2009), John Simpson (2009), Alex Piggot (2010), Amber Houle (2011), Kirby Schiemann (2011), Will Cairncross (2011 & 2013), Ian Kivlichan (2012), Chen Ge (Amy) Qu (2012), Ryan Day (2013), Rohan Pavone (2014), Mary Miedema (2015), Geyue (Frank) Cai (2016), Tristan Gautie (2017).

Masters students supervised: Marcius H. T. Extavour (M.Sc. 2004), Lindsay LeBlanc (M.Sc. 2005), Amir Mazouchi (M.Sc. 2007), Dylan Jervis (M.Sc. 2007), Hai-Jun Cho (M.Sc. 2010), Michael Sprague (M.Sc. 2010), Carolyn Kierans (M.Sc. 2012), Nathan Cheng (M.Sc. 2012), Daniel Fine (M.Sc. 2013), Chris Luciuk (M.Sc. 2013), Ryan Day (M.Sc. 2014), Scott Smale (M.Sc. 2014), Daniel Nino (M.Sc. 2015), Vijin Venu (M. Sc. 2016).

Doctoral students supervised: Marcius H. T. Extavour (Ph.D. 2009), Lindsay LeBlanc (Ph.D. 2011), David McKay (Ph.D. 2012), Alma Bardon (Ph.D. 2014), Dylan Jervis (Ph.D. 2014), Graham Edge (Ph.D. 2016), Chris Luciuk (Ph.D. 2017), Rhys Anderson (current), Scott Smale (current), Haille Sharum (current), Peihang Xu (current), Vijin Venu (current), Kenneth Jackson (current), Matthew Taylor (current).

Postdoctoral fellows supervised: Seth Aubin (2003 – 06), Stefan Myrskog (2004 – 06), Thorsten Schumm (2006), Jason McKeever (2007 – 09), Karl Pilch (2009), David McKay (2012), Scott Beattie (2012 – 14), Stefan Trotzky (2011 – 17), Ben Olsen (current), Fudong Wang (current).

International graduate student training: Gael Veroquaux (Ecole Polytechnique / Institut d'Optique, France, Fall 2006), Josefine Metzkes (U. Halle-Wittenberg, October 2007 to April 2008), Matthias Schöll (U. Kaiserslautern, October 2009 to March 2010), Felix Stubenrauch (U. Kaiserslautern, April to October 2010), Thomas Maier (U. Stuttgart, August to October 2012), Simon Heun (U. Kaiserslautern, August to December 2012), Christian Veit (U. Stuttgart, October 2013 to February 2014), Matthias Wenzel (U. Stuttgart, October 2013 to February 2014), Nicolas Zuber (U. Stuttgart, October 2014 to February 2015), Fabian Böttcher (U. Stuttgart, February 2016 to May 2016).

Group alumni leading research groups:

- Dr. Seth Aubin: Associate Professor, College of William & Mary
- Dr. Scott Beattie: Technical lead, Atomic clocks, NRC Ottawa
- Dr. Lindsay LeBlanc: Assistant Professor, University of Alberta
- Dr. Stefan Myrskog: Chief Scientist, Morgan Solar Inc.
- Dr. John Simpson: Assistant Professor, University of Waterloo
- Dr. Thorsten Schumm: Professor, TU Vienna
- Dr. David Shirokoff: Assistant Professor, New Jersey Institute of Technology
- Dr. Brian Shuve: Assistant Professor, Harvey Mudd College
- Dr. John Simpson: Assistant Professor, University of Waterloo
- Dr. Swati Singh: Assistant Professor, Williams College
- Dr. Hyun Youk: Assistant Professor, TU Delft