

Lincoln D. Carr, PhD

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January 2024

1. Summary of Professional Activities

- 1.1. Collaborated with over 215 research scientists from 15 countries – U.S.A., Israel, New Zealand, France, Germany, Greece, Russia, Japan, The Netherlands, Canada, U.K. including both Northern Ireland and Scotland, Italy, Spain, UAE, and Austria
- 1.2. Taught for over 30 years in physics, math, engineering, scientific computation, and the humanities including languages, philosophy, poetry, literature, and science and engineering diplomacy.
- 1.3. Gave 243 invited seminars at conferences, workshops, and universities in the U.S.A., U.K., Austria, Germany, Switzerland, France, Spain, Italy, Portugal, The Netherlands, the Czech Republic, China, Saudi Arabia, UAE, Qatar, Brazil, South Africa, and Canada. Gave 62 additional presentations in seminars and posters.
- 1.4. Mentored 120 undergraduate and graduate students and postdoctoral scholars in research, who won 132 awards, fellowships, and honors.
- 1.5. Published 146 articles in refereed journals, 3 edited books, 4 book chapters, 10 invited articles, and 11 technical reports. Total of over 17000 citations, with an h-index of 61, according to Google Scholar, as of May 2023.
- 1.6. Awarded over \$10.5 million in external grants and fellowships as PI/co-PI, external grant collaborator on > \$10 million.

2. Education, including Post-Doctoral Work

- 2.1. Professional Research Associate, JILA, University of Colorado and National Institute of Standards and Technology (NIST), Boulder, Colorado, U.S.A. (2003-2005)
  - 2.1.1. Advisor: Prof. Murray J. Holland
- 2.2. Distinguished International Fellow of the National Science Foundation, Laboratoire Kastler Brossel, Ecole normale supérieure, Paris, France (2001-2003)
  - 2.2.1. Advisor: Dr. Yvan Castin, Claude Cohen-Tannoudji Group
- 2.3. Ph.D. in physics, University of Washington, Seattle, Washington, U.S.A. (1998-2001)
  - 2.3.1. Primary Advisor: Prof. William P. Reinhardt, Chemistry and Physics; Additional Advisors: Prof. Nathan Kutz, Applied Math; Prof. David Thouless, Physics.
- 2.4. M.S. in physics, University of Washington, Seattle, Washington, U.S.A. (1996-1998)
  - 2.4.1. Advisors: Prof. Eric G. Adelberger and Prof. Thomas A. Trainor
- 2.5. B.A. in physics, University of California, Berkeley, California, U.S.A. (1990-1994)
  - 2.5.1. Advisor: Prof. Stuart J. Freedman

3. Academic and Professional Research and Education Positions (Selected)

- 3.1. Foreign Affairs Officer (Expert), Sponsored by National Academy of Sciences, Engineering, and Medicines, Office of Science and Technology Cooperation, Bureau of Oceans and International Environmental and Scientific Affairs, U.S. Department of State (Fall 2021 – Fall 2022)

- 3.2. Academic Visitor, Sponsored by Prof. James Freericks, Georgetown University, Washington, D.C. (Fall 2021 – Fall 2022)
- 3.3. Academic Visitor, Sponsored by Prof. Michael Tarbutt, Imperial college, London, U.K. (Fall 2020 – Present)
- 3.4. NIST Associate, Sponsored by Dr. Raymond Simmonds, Advanced Microwave Photonics Group, NIST, Boulder, CO, U.S.A. (Spring 2020 – Spring 2023)
- 3.5. Interdisciplinary Academic Program Director, Quantum Engineering Program, Colorado School of Mines (Interim, Fall 2019 – Fall 2020)
- 3.6. Visiting Member, Kavli Institute for Theoretical Physics, University of California, Santa Barbara, CA, U.S.A. (Spring 2019)
- 3.7. Visiting Researcher, Sponsored by Prof. Richard Scalettar, Department of Physics, University of California, Davis, CA, U.S.A., (December 2017 – Present)
- 3.8. Affiliate Faculty, Sponsored by Prof. Mingzhong Wu, Department of Physics, Colorado State University, Ft. Collins, CO, U.S.A. (August 2015 – Fall 2023)
- 3.9. Full Professor, Department of Physics, Colorado School of Mines, Golden, CO, U.S.A. (April 2013 – Present)
- 3.10. Humboldt Fellow, Center for Quantum Dynamics, Department of Physics, University of Heidelberg, Heidelberg, Germany, Sponsored by Prof. Dr. Matthias Weidemueller and Prof. Dr. Markus K. Oberthaler; co-sponsored by Prof. Dr. Ulrich Schollwoeck, University of Munich (July 2011 – August 2014)
- 3.11. Associate Professor, Department of Physics, Colorado School of Mines, Golden, CO, U.S.A. (April 2009 – April 2013)
- 3.12. Visiting Lecturer and Guest Researcher, Sponsored by Prof. Markus K. Oberthaler, Department of Physics, University of Heidelberg, Heidelberg, Germany (Late Spring – Summer 2009)
- 3.13. NIST Associate, Sponsored by Dr. Charles W. Clark, Joint Quantum Institute, NIST, Gaithersburg, Maryland, U.S.A. (Summer 2008, 2009)
- 3.14. Visiting Member, Sponsored by Dr. Yvan Castin and Prof. Gora Shlyapnikov, Institut Henri Poincaré, Université de Pierre et Marie Curie, Paris, France (Summer 2007)
- 3.15. NIST Associate, Sponsored by Prof. Charles W. Clark, Electron and Optical Physics Division, NIST, Gaithersburg, Maryland, U.S.A. (Summer 2006)
- 3.16. Assistant Professor, Department of Physics, Colorado School of Mines, Golden, CO, U.S.A. (Fall 2005 to April 2009)
- 3.17. Guest Researcher, Sponsored by Prof. Charles W. Clark, Electron and Optical Physics Division, NIST, Maryland, U.S.A. (Summer 2004)
- 3.18. Visiting Member, Kavli Institute for Theoretical Physics, University of California, Santa Barbara, CA, U.S.A. (Spring 2004)
- 3.19. Professional Research Associate, Advisor Prof. Murray J. Holland, JILA, NIST and University of Colorado, Boulder, CO, U.S.A. (2003-2005)
- 3.20. Visiting Researcher, Sponsored by Dr. Joachim Brand (now Prof.), Max Planck Institute for the Physics of Complex Systems, Dresden, Germany (Winter 2003)
- 3.21. Visiting Researcher, Sponsored by Prof. Charles W. Clark, Electron and Optical Physics Division, NIST, Gaithersburg, Maryland, U.S.A. (Summer 2002)
- 3.22. Distinguished International Fellow of the National Science Foundation, Advisor Dr. Yvan Castin, Département de Physique, Ecole Normale Supérieure, Paris, France (2001-2004)

- 3.23. Teaching Assistant, Department of Physics, University of Washington, Seattle, Washington, U.S.A. (2001)
  - 3.24. Research Assistant II, Advisor Prof. William P. Reinhardt, Department of Physics, University of Washington, Seattle, Washington, U.S.A. (1999-2001)
  - 3.25. Research Assistant I, Advisors Prof. Thomas A. Trainor and Prof. Eric G. Adelberger, Nuclear Physics Laboratory, University of Washington, Seattle, Washington, U.S.A. (1996-1998)
  - 3.26. Teacher, English as a Foreign Language, Bushiban school, Taipei, Taiwan (1995-1996)
  - 3.27. Associate Scientist, Advisor and Sponsor Prof. Stuart J. Freedman, Lawrence Berkeley National Laboratory, Berkeley, CA, U.S.A. (1994-1995)
  - 3.28. Head Teaching Assistant, University of California at Berkeley, Berkeley, CA, U.S.A. (1994-1995)
4. Selected Honors and Awards
- 4.1. Embassy Science Fellow, U.S. Department of State (2022)
  - 4.2. Jefferson Science Fellow, National Academies of Sciences, Engineering, and Medicine (2021-2022)
  - 4.3. IEEE Senior Member (2021-Present)
  - 4.4. Excellence in Research Award, CSM (2019 & 2011, 1 award/year at senior/junior level)
  - 4.5. Faculty Fellow, Payne Institute on Public Policy, CSM (2015-Present)
  - 4.6. Dean's Excellence Award, CSM (April 2015, top award on campus)
  - 4.7. Fellow of the American Physical Society (2014)
  - 4.8. Honors Faculty Fellow, CSM (2013-Present)
  - 4.9. Kavli Fellow, National Academy of Sciences (2011)
  - 4.10. Humboldt Fellowship, Alexander von Humboldt Foundation, Germany (2011-2014)
  - 4.11. National Science Foundation CAREER Grant (2006)
  - 4.12. Distinguished International Postdoctoral Research Fellowship, NSF (2001)
  - 4.13. Weis Prize for outstanding theoretical graduate research, U. Washington (2000)
5. University Service (past 10 years)
- Note: Significant university service before past 10 years, including Faculty Senate President*
- 5.1. Frank Oppenheimer Science and Society Award Review Committee (2023 – Present)
  - 5.2. Physics Promotion and Tenure Committee (2007 – Present)
  - 5.3. Physics Graduate Council (Chair, 2015-2016; Member, 2018 – Present)
  - 5.4. Physics Undergraduate Council (2016-2018)
    - 5.4.1. Integrating Computation across the Curriculum subcommittee
6. Professional Society Service (past 10 years)
- 6.1. American Physical Society
    - 6.1.1. March Meeting Task Force, American Physical Society (APS) (2020-2021)
    - 6.1.2. Secretary-Treasurer (Elected), Division of Atomic, Molecular, and Optical Physics (DAMOP), APS (2017-2020)
    - 6.1.3. Member-At-Large of the Executive Committee (Elected), Division of Computational Physics (DCOMP), APS (2017-2020)

- 6.1.4. Organizer for DAMOP Annual Meeting, APS (2017-2020)
  - 6.1.5. DAMOP March Meeting Organizing Committee, APS (2015-2020; Chair, 2016)
  - 6.1.6. Special Liaison on National Quantum Initiative, DAMOP and DQI, American Physical Society (2018)
  - 6.1.7. Organizer for DCOMP, Computational Physics Conference, University of California, Davis, CA (July 2018)
  - 6.1.8. DCOMP Rahman Award Committee (2018-2019)
  - 6.1.9. APS DCOMP organizing committee for the APS March Meeting (2016-2017)
  - 6.2. National Academy of Sciences, Engineering, and Medicine
    - 6.2.1. Jefferson Science Fellow Distinguished Lecture, National Academies of Sciences, Engineering, and Medicine, Washington, D.C., U.S.A. (September 2022)
    - 6.2.2. Jefferson Science Fellow, Office of Science and Technology Cooperation, Bureau of Oceans and International Environmental and Scientific Affairs, U.S. Department of State (Fall 2021-Fall 2022)
    - 6.2.3. Physics organizer (together with South Korean counterpart Prof. Sug-Bong Choe) for first Korean-US Joint Kavli Frontiers of Science Symposium in Korea, Jeju Island (August 2015)
    - 6.2.4. Physics organizer (together with South Korean counterpart Prof. Sug-Bong Choe) for first Korean-US Joint Kavli Frontiers of Science Symposium at the National Academy of Sciences, CA, U.S.A. (August 2013)
    - 6.2.5. Reviewer for Proceedings of National Academy of Sciences
7. Other National and International Professional Experience (Selected)
- 7.1. Academic, National Lab, and Government Program Creation, Support, and Consulting
    - 7.1.1. Quad Investors Network (QUIN) Quantum Center of Excellence (CoE) Ecosystem Task Force (Fall 2023 – Present)
    - 7.1.2. External Advisor, Quantum Collaborative, Arizona State University (Spring 2023 – Present)
    - 7.1.3. Chair of Advisory Board, UC Davis Physics and Astronomy Department (Spring 2023 – Present)
    - 7.1.4. External Advisor, College of Engineering, University of Nevada, Reno (Fall 2022 – Spring 2023)
    - 7.1.5. Senior Advisor (Consultant), Office of Science and Technology Cooperation, Bureau of Oceans and International Environmental and Scientific Affairs, U.S. Department of State (Fall 2022 – Spring 2023)
    - 7.1.6. National Science Foundation Research Traineeship program, 2 universities and 4 national labs, led by CSM (2021-2026; Director, Fall 2022-2024)
    - 7.1.7. Quantum Engineering Program, CSM, offering MS degree (thesis and non-thesis) professional graduate certificate for retraining from industry, and undergraduate minor (2019-Present)
    - 7.1.8. Open Quantum Frontier Institute, 7 universities and 4 national labs in the Western U.S., led by CSM (2018-2021)
    - 7.1.9. Official Liaison at the CSM for the Summer Undergraduate Research Fellowship Program at the NIST (2005-2018)

- 7.1.10. Official Liaison for the National Center for Atmospheric Research Summer Internship Program in High Performance Computing, created jointly with Dr. Rich Loft, CTO of the Computational and Information Systems Laboratory (CISL) at NCAR (2006 -2015)
- 7.1.11. Created Mines Undergraduate Research Fellowship together with Vice President for Research and Technology Transfer Anthony Dean (2014-2015, continues till Present)
- 7.2. Invited international research and teaching visits of less than one month (past 10 years)
  - 7.2.1. Imperial College, U.K. (June 2016, March 2018, July 2018, October 2019, March 2020 & 2021 (canceled due to pandemic), December 2022)
  - 7.2.2. Queen Mary University of London, U.K. (September 2019)
  - 7.2.3. Turku University, Finland (September 2019)
  - 7.2.4. Zhejiang University, Hangzhou, China (July 2019)
  - 7.2.5. King Fahd University of Petroleum and Minerals, Saudi Arabia (November 2018)
  - 7.2.6. UAE University, Al Ain, UAE (November 2016, November 2018)
  - 7.2.7. University of Munich, Germany (May 2016, July 2018)
  - 7.2.8. Vienna Technical University, Austria (October 2017, July 2018)
  - 7.2.9. University of Pierre and Marie Curie, Paris, France (June 2018)
  - 7.2.10. University of Heidelberg, Germany (June 2016, March 2018)
  - 7.2.11. Ecole Normale Supérieure, Paris, France (June 2016)
  - 7.2.12. Queen’s University, Belfast, Northern Ireland, U.K. (May 2016)
- 7.3. Conference Organizing (besides professional society work in Sec. 5):
  - 7.3.1. Co-Organizer (1 of 4), Satellite conference “Complex Systems: Quantum information and computation” to Conference on Complex Systems CCS2022, Mallorca, Spain (October 2022)
  - 7.3.2. Conceptualized and Co-organized, Academic-Government Joint International Dialog of 10 countries on Research Integrity and Security, U.S. Department of State and White House Office of Science and Technology Policy, Washington, D.C., U.S.A. (September 2022)
  - 7.3.3. Quantum Simulator Lead, National Science Foundation Technology and Innovation Partnership workshop to develop vision and recommendation for Quantum Virtual Laboratory, The Ohio State University, Columbus, OH, U.S.A. (June 2022)
  - 7.3.4. Lead Organizer (1 of 2), Joint US-Korea quantum workshop leading directly to the formation of Korea-U.S. Science Cooperation Center (KUSCO, <https://kusco.org/>) (June 2022)
  - 7.3.5. Lead organizer for U.S. Department of State, “Pursuing Quantum Information Together:  $2^N$  vs.  $2N$ ,” 12 nation meeting on quantum cooperation, Office of Science and Technology Policy, The White House, Washington, D.C., U.S.A. (May 2022)
  - 7.3.6. Lead Organizer, 11 co-organizers from U.S. industry, academia, and national labs, NSF Workshop on Quantum Engineering Education, Virtual Meeting based in Golden, CO (February 2021)
  - 7.3.7. Co-Organizer, Quantum Network Science Satellite of Network Society Conference in Rome, Italy; Lead organizer Prof. Saikat Guha, U. Arizona; co-organizers Prof. Don Townsley, MIT and Dr. Roberta Zambrini, IFISC, Spain (September 2020)

- 7.3.8. Lead Organizer, Workshop on Quantum Simulators: Architectures and Opportunities, National Science Foundation, Washington, D.C. (September 2019)
- 7.3.9. Lead Organizer, Conference on Exploring Open Quantum Systems in Quantum Simulators, Kavli Institute for Theoretical Physics, Santa Barbara, CA, U.S.A.; co-organizers Prof. Dr. Susana Huelga (University of Ulm, Germany), Sabrina Maniscalco (University of Turku, Finland), and Vladan Vuletic (Massachusetts Institute of Technology, U.S.A.) (May 2019)
- 7.3.10. Organizer, Program on Open Quantum System Dynamics: Quantum Simulators and Simulations Far From Equilibrium, Kavli Institute for Theoretical Physics, Santa Barbara, CA, U.S.A.; co-organizers Prof. Andrew Daley (University Strathclyde, U.K.), Sabrina Maniscalco (University of Turku, Finland), and Prof. Dr. Ulrich Schollwoeck (University of Munich, Germany) (April-June 2019)
- 7.3.11. Session organizer, Nuclear Physics and Quantum Simulator Workshop, Prague, Czech Republic (June 2016)
- 7.3.12. Lead Organizer, Conference on New Science with ultracold molecules; Organizer, Program on Fundamental Science and Applications of Ultra-cold Polar Molecules (co-organizers Prof. Roman Krems, U. British Columbia; Dr. Paul Julienne, the Joint Quantum Institute of the NIST and the University of Maryland; Prof. Susanne Yelin, U. Connecticut and Harvard University), Kavli Institute for Theoretical Physics, Santa Barbara, CA, U.S.A. (February-April 2013)
- 7.3.13. Organizer, Mini-symposium on nonlinear waves in quantum systems (with Prof. Joachim Brand of Massey University, NZ), Second International Conference on Nonlinear Waves: Theory and Applications in Beijing, China (July 2010)
- 7.3.14. Member of scientific committee, Conference on Nonlinear Phenomena in Quantum Degenerate Gases at Universidad de Vigo, Ourense, Spain (April 2010)
- 7.3.15. Organizer of two sessions and plenary talk on cold and ultracold molecules at the Fortieth International Conference on the Physics of Quantum Electronics in Snowbird, Utah, U.S.A. (January 2010)
- 7.3.16. Lead Organizer of Aspen Workshop on Quantum Computation/Simulation with Ultracold Atoms and Molecules; co-organizers Dr. Ignacio Cirac of the Max Planck Institute for Quantum Optics, Prof. Erich Mueller of Cornell Univ., and Prof. David Weiss of Penn. State Univ. (May-June 2009)

#### 7.4. Scientific Journal Service

- 7.4.1. Board Member, IOP Publishing Quantum Series (2022-2023)
- 7.4.2. Senior Advisor to the Editorial Board, Journal of Physics: Complexity, Institute of Physics (IOP), U.K. (2019 – 2022)
- 7.4.3. Board Member, IOP Publishing (2017-2022)
- 7.4.4. Guest Editor, Focus Issue on Quantum Software for Quantum Computing, Quantum Science and Technology, IOP, U.K. (2018-2020)
- 7.4.5. Editorial College Member, SciPost Journal, Belgium (2017-2019)
- 7.4.6. Guest Editor, Focus Issue on New Frontiers of Cold Molecules, New Journal of Physics, co-editors Prof. David Demille of Yale, Prof. Roman Krems of U. British Columbia, and Prof. Jun Ye of JILA, NIST and the University of Colorado, Boulder (2015)
- 7.4.7. Associate Editor, New Journal of Physics, IOP, U.K. (2013-2016)

- 7.4.8. Member, Editorial Board, New Journal of Physics, IOP, U.K. (2011-2013)
- 7.4.9. Guest Editor, Special Issue on Strongly Correlated Quantum Fluids: From Ultracold Quantum Gases to QCD Plasmas, New Journal of Physics, IOP, U.K. – co-editors Prof. Allan Adams of MIT, Prof. Thomas Schaefer of North Carolina State Univ., Dr. Peter Steinberg of Brookhaven National Laboratory, and Prof. John Thomas of Duke Univ.) (2011-2012)
- 7.4.10. Guest Editor, Special Issue of New Journal of Physics on Cold and Ultracold Molecules (41 papers published in April 2009 – co-editor Prof. Jun Ye of JILA, NIST and the University of Colorado, Boulder)
- 7.4.11. Frequent reviewer for Science, Nature, Nature Nanotechnology, Nature Physics, APS journals including Physical Review Letters, Review of Modern Physics, Physical Review A, B, E; IOP journals including Quantum Science and Technology, New Journal of Physics, Journal of Physics A, B, and C, European Physics Letters; and many others.
- 7.4.11.1. *Note 2023 reviewer for Science, PRA, PRE, and Optica*
- 7.5. U.S. Grant Agencies Service
- 7.5.1. Grant Program Panelist, National Science Foundation (2007, 2009, 2010, 2014, 2016, 2019 (x2), 2020, 2021 (x3), 2023 (x2))
- 7.5.2. Frequent reviewer for NSF, DOE, ARO, AFOSR
- 7.5.2.1. *Note 2023 reviewer for NSF*
- 7.5.3. Panel Member, Biocomplexity and Biocontrol Program, Biology in Technology Meeting, DARPA, Washington, D.C. (June 2015)
8. Peer-Reviewed Publications (146 total; listed here from 2015-2023 only)
- 8.1. Mattia Walschaers, Nicholas Treps, Bhuvanesh Sundar, Lincoln D Carr, and Valentina Parigi, “Emergent complex quantum networks in continuous-variables non-Gaussian states,” Quantum Science and Technology, v. 8, p. 035009 (2023)
- 8.2. Nathan Crosette, Lincoln D. Carr, and Bethany R. Wilcox “Correlations between student connectivity and academic performance: a pandemic follow-up,” American Journal of Physics, Phys. Rev. Phys. Educ. Res. v. 19, p. 010106 (2023)
- 8.3. Ginestra Bianconi, Alex Arenas, Jacob Biamonte, Lincoln D Carr, Byungnam Kahng, Janos Kertesz, Jürgen Kurths, Linyuan Lü, Cristina Masoller, Adilson E Motter, Matjaž Perc, Filippo Radicchi, Ramakrishna Ramaswamy, Francisco A Rodrigues, Marta Sales-Pardo, Maxi San Miguel, Stefan Thurner, and Taha Yasseri, “Complex systems in the spotlight: next steps after the 2021 Nobel Prize in Physics,” Journal of Physics: Complexity, v. 4, p. 010201 (2023)
- 8.4. Mark J. Ablowitz, Joel B. Been, and Lincoln D. Carr, “Integrable Discrete Equations and the Fractional Nonlinear Discrete Schroedinger Equation,” Physics Letters A, v. 452, p. 128459 (2022)
- 8.5. Mark J. Ablowitz, Joel B. Been, and Lincoln D. Carr, “Integrable Fractional Modified Korteweg-de Vries, Sine-Gordon, and sinh-Gordon Equations,” Journal of Physics A: Mathematical and Theoretical, v. 55, p. 384010 (2022)
- 8.6. Eric B. Jones, Logan E. Hillberry, Matthew T. Jones, Mina Fasihi, Pedram Roushan, Zhang Jiang, Alan Ho, Charles Neill, Eric Ostby, Peter Graf, Eliot Kapit, and Lincoln D. Carr,

- “Small-world complex network generation on a digital quantum processor,” *Nature Communications* v. 13, p. 4483 (2022)
- 8.7. Mark J. Ablowitz, Joel B. Been, and Lincoln D. Carr, “Fractional Integrable Nonlinear Soliton Equations,” *Phys. Rev. Lett.*, v. 128, p.184101 (2022)
  - 8.8. Zachary C. Coleman and Lincoln D. Carr, “Exact Analytical Solution of the Driven Qutrit in an Open Quantum System: V and Lambda Configurations,” *Journal of Physics B: Atomic, Molecular, and Optical Physics*, v. 55, p. 065501 (2022)
  - 8.9. Arya Dhar, Daniel Jaschke, and Lincoln D. Carr, “Dynamics for the Haldane phase in the Bilinear-Biquadratic Model,” *Phys. Rev. B*, v. 105, p. 094309 (2022)
  - 8.10. Justin Q. Anderson, P. A. Praveen Janantha, Diego A. Alcalá, Mingzhong Wu, and Lincoln D. Carr, “Physical realization of complex dynamical pattern formation in magnetic active feedback rings,” *New J. Phys.*, v. 24, p. 033018 (2022)
  - 8.11. Abraham Asfaw, Alexandre Blais, Kenneth R. Brown, Jonathan Candelaria, Christopher Cantwell, Lincoln D. Carr, Joshua Combes, Dripto M. Debroy, John M. Donohue, Sophia E. Economou, Emily Edwards, Michael F. J. Fox, Steven M. Girvin, Alan Ho, Hilary M. Hurst, Zubin Jacob, Blake R. Johnson, Ezekiel Johnston-Halperin, Robert Joynt, Eliot Kapit, Judith Klein-Seetharaman, Martin Laforest, H. J. Lewandowski, Theresa W. Lynn, Corey Rae H. McRae, Celia Merzbacher, Spyridon Michalakis, Prineha Narang, William D. Oliver, Jens Palsberg, David P. Pappas, Michael G. Raymer, David J. Reilly, Mark Saffman, Thomas A. Searles, Jeffrey H. Shapiro, and Chandralekha Singh, “Building a Quantum Engineering Undergraduate Program,” *IEEE Transactions on Education*, v. 65, p. 220 (2022)
  - 8.12. Logan E. Hillberry, Matthew T. Jones, David L. Vargas, Patrick Rall, Nicole Yunger Halpern, Ning Bao, Simone Notarnicola, Simone Montangero, Lincoln D. Carr, “Entangled quantum cellular automata, physical complexity, and Goldilocks rules,” *Quantum Science and Technology*, v. 6, p. 045017 (2021)
  - 8.13. Bhuvanesh Sundar, Mattia Walschaers, Valentina Parigi, and Lincoln D Carr, “Response of quantum spin networks to attacks,” *J. Phys. Complexity*, v.2, p. 035008 (2021)
  - 8.14. David Awschalom, Karl K. Berggren, Hannes Bernien, Sunil Bhave, Lincoln D. Carr, Paul Davids, Sophia E. Economou, Dirk Englund, Andrei Faraon, Marty Fejer, Saikat Guha, Martin V. Gustafsson, Evelyn Hu, Liang Jiang, Jungsang Kim, Boris Korzh, Prem Kumar, Paul G. Kwiat, Marko Lončar, Mikhail D. Lukin, David A. B. Miller, Christopher Monroe, Sae Woo Nam, Prineha Narang, Jason S. Orcutt, Michael G. Raymer, Amir H. Safavi-Naeini, Maria Spiropulu, Kartik Srinivasan, Shuo Sun, Jelena Vučković, Edo Waks, Ronald Walsworth, Andrew M. Weiner, and Zheshen Zhang, “Development of Quantum InterConnects (QuICs) for Next-Generation Information Technologies,” *Physical Review X Quantum*, v. 2, p. 017002 (2021)
  - 8.15. Yuri Alexeev, Dave Bacon, Kenneth R. Brown, Robert Calderbank, Lincoln D. Carr, Frederic T. Chong, Brian DeMarco, Dirk Englund, Edward Farhi, Bill Fefferman, Alexey V. Gorshkov, Andrew Houck, Jungsang Kim, Shelby Kimmel, Michael Lange, Seth Lloyd, Mikhail D. Lukin, Dmitri Maslov, Peter Maunz, Christopher Monroe, John Preskill, Martin Roetteler, Martin Savage, Jeff Thompson, Umesh Vazirani, “Quantum Computer Systems for Scientific Discovery,” *Physical Review X Quantum*, v. 2, p. 017001 (2021)



- 8.16. Ehud Altman, Kenneth R. Brown, Giuseppe Carleo, Lincoln D. Carr, Eugene Demler, Cheng Chin, Brian DeMarco, Sophia E. Economou, Mark Eriksson, Kai-Mei C. Fu, Markus Greiner, Kaden R. A. Hazzard, Randall G. Hulet, Alicia J. Kollar, Benjamin L. Lev, Mikhail D. Lukin, Ruichao Ma, Xiao Mi, Shashank Misra, Christopher Monroe, Kater Murch, Zaira Nazario, Kang-Kuen Ni, Andrew C. Potter, Pedram Roushan, Mark Saffman, Monika Schleier-Smith, Irfan Siddiqi, Raymond Simmonds, Meenakshi Singh, I. B. Spielman, Kristan Temme, David S. Weiss, Jelena Vuckovic, Vladan Vuletic, Jun Ye, Martin Zwierlein, “Quantum Simulators: Architectures and Opportunities,” *Physical Review X Quantum*, v. 2, p. 017003 (2021)
- 8.17. Majed O. D. Alotaibi and Lincoln D. Carr, “Scattering of a dark-bright soliton by an impurity,” *Physical Review A*, v. 52, p. 165301 (2019)
- 8.18. Marc Andrew Valdez, Gavriil Shchedrin, Fernando Sols, and Lincoln D. Carr, “Layered Chaos in Mean-field and Quantum Many-body Dynamics,” *Phys. Rev. A*, v. 99, p. 063609 (2019)
- 8.19. Daniel Jaschke, Lincoln D. Carr, and Ines de Vega, “Thermalization in the Quantum Ising Model — Approximations, Limits, and Beyond,” *Quantum Science and Technology*, v. 4, p. 034002 (2019)
- 8.20. Xinxin Zhao, Marie A. McLain, J. Vijande, A. Ferrando, Lincoln D. Carr, and M. A. Garcia-March, “Nonequilibrium quantum dynamics of partial symmetry breaking for ultracold bosons in an optical lattice ring trap,” *New J. Phys.*, v. 21, p. 043042 (2019)
- 8.21. Daniel Jaschke, Simone Montangero, and Lincoln D. Carr, “One-dimensional many-body entangled open quantum systems with tensor network methods,” *Quantum Science and Technology*, v. 4, p. 013001 (2018)
- 8.22. David L. Vargas, Ariel Bridgeman, David Schmidt, Patrick B. Kohl, Bethany R. Wilcox, and Lincoln D. Carr, “Correlation Between Student Collaboration Network Centrality and Academic Performance,” *Physical Review Physics Education Research*, v. 14, p. 020112 (2018)
- 8.23. Daniel Jaschke and Lincoln D. Carr, “Open source Matrix Product States: Exact diagonalization and other entanglement-accurate methods revisited in quantum systems,” *J. Phys. A*, v. 51, p. 465302 (2018)
- 8.24. Majed O. D. Alotaibi and Lincoln D. Carr, “Internal Oscillations of a Dark-Bright Soliton in a Harmonic Potential,” *J. Phys. B*, v. 51, p. 205004 (2018)
- 8.25. Daniel Richardson, Boris A. Kalinikos, Lincoln D. Carr, and Mingzhong Wu, “Spontaneous exact spin-wave fractals in magnonic crystals,” *Phys. Rev. Lett.*, v. 121, p. 107204 (2018)
- 8.26. Marie A. McLain, Diego A. Alcalá, and Lincoln D. Carr, “For high-precision bosonic Josephson junctions, many-body effects matter,” *Quantum Science and Technology*, v. 3, p. 044005 (2018)
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## 9. Other Publications or Patents

### 9.1. Papers under review or in press

- 9.1.1. Eliot Kapit, Brandon A. Barton, Sean Feeney, George Grattan, Gianni Mossi, Pratik Patnaik, Jacob C. Sagal, Lincoln D. Carr, and Vadim Oganesyan, “On the approximability of random-hypergraph MAX-3-XORSAT problems with quantum algorithms,” submitted to *Phys. Rev. X Quantum* (2023)
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- 9.1.4. Benjamin Krawciw, Lincoln D. Carr, and Cecilia Diniz Behn “The Small-World Effect for Interferometer Networks,” *Journal of Physics: Complexity*, under review (2023)
- 9.1.5. Paul Alsing, Phil Battle, Joshua C. Bienfang, Tammie Borders, Tina Brower-Thomas, Lincoln Carr, Fred Chong, Siamak Dadras, Brian DeMarco, Ivan Deutsch, Eden Figueroa, Danna Freedman, Henry Everitt, Daniel Gauthier, Ezekiel Johnston-Halperin, Jungsang Kim, Mackillo Kira, Prem Kumar, Paul Kwiat, John Lekki, Anjul Loiacono, Marko Loncar, John R. Lowell, Mikhail Lukin, Celia Merzbacher, Aaron Miller, Christopher Monroe, Johannes Pollanen, David Pappas, Michael Raymer, Ronald Reano, Brandon Rodenburg, Martin Savage, Thomas Searles, and Jun Ye, “Accelerating Progress Towards Practical Quantum Advantage: The Quantum Technology Demonstration Roadmap,” (invited roadmap to *Physical Review X: Quantum*, under review (2023))

- 9.1.6. Diego A. Alcala, Marie A. McLain, and Lincoln D. Carr, “Quantum Phases Drive the Dynamics of Macroscopic Quantum Tunneling Escape in Quantum Simulators,” *Quantum Science and Technology*, under review (2022)

## 9.2. Selected Books and Chapters in Books

- 9.2.1. Annual Review of Cold Atoms and Molecules, Volume II, ed. Kirk Madison, Kai Bongs, Lincoln D. Carr, Hui Zhai, and Ana Maria Rey (World Scientific, 2014)
- 9.2.2. M. L. Wall and L. D. Carr, “Matrix Product State Algorithms and Applications,” in *Quantum Gases: Finite Temperature and Non-equilibrium Dynamics (Cold Atoms)*, ed. Nick Proukakis, Simon Gardiner, Matthew Davis and Marzena Szymanska (Imperial College Press, London, 2013)
- 9.2.3. *Understanding Quantum Phase Transitions*, ed. L. D. Carr (Taylor and Francis, Boca Raton, FL, 2010)
- 9.2.4. L. D. Carr, R. Kanamoto, and M. Ueda, “Metastable Quantum Phase Transitions in a One-Dimensional Bose Gas,” in *Understanding Quantum Phase Transitions*, ed. L. D. Carr (Taylor and Francis, Boca Raton, FL, 2010)
- 9.2.5. L. D. Carr and J. B Brand, “Theory of Multidimensional Solitons,” in *Emergent Nonlinear Phenomena in Bose-Einstein Condensates: Theory and Experiment*, ed. P. G. Kevrekidis, D. J. Frantzeskakis, and R. Carretero-Gonzalez (Springer, 2007)

## 9.3. Editorials and Invited Articles (Selected)

- 9.3.1. Lincoln D. Carr and Valentina Parigi, “Thermal Exploration in Engine Design,” *Science* v. 379, p. 984 (2023)
- 9.3.2. Lincoln D. Carr, “Learning to Be Astonished,” *Physics World* v. 32 (5), p. 33, May (2019)
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