

Blake C. Stacey
Curriculum Vitae
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Personal:

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Education:

B. S. in Physics, Massachusetts Institute of Technology, June 2005.
M. S. in Physics, Brandeis University, February 2014.
PhD in Physics, Brandeis University, August 2015.

Research Interests:

Statistical physics of nonequilibrium systems, universality and renormalization, information theory, quantum probability, evolutionary ecology.

Funding History:

- Co-Principal Investigator (with PI C. A. Fuchs), “Symmetric Informationally Complete Measurements and Quantum Computation,” NSF grant 2210495, 1 September 2022 – 31 August 2025. Total funding: 400,000 USD.
- Project Leader (with co-leader C. A. Fuchs), “Geometric Phases and Symmetric Quantum Measurements,” contract for John Templeton Foundation, 1 July 2018 – 30 June 2020. Total funding: 211,370 USD.
- Principal Investigator (with co-PI C. A. Fuchs), “Why the Quantum? A Video Series,” contract for Foundational Questions Institute (FQXi), 1 December 2016 – 31 December 2017. Total funding: 4,500 USD.

Publications:

- P. Antonioli, R. T. Fienberg, F. Fleurot, Y. Fukuda, W. Fulgione, A. Habig, J. Heise, A. B. McDonald, C. Mills, T. Namba, L. J. Robinson, K. Scholberg, M. Schwendener, R. W. Sinnott, B. C. Stacey, Y. Suzuki, R. Tafirout, C. Vigorito, B. Viren, C. Virtue and A. Zichichi, “[SNEWS: the Supernova Early Warning System](#),” *New Journal of Physics* **6** (2004): 114. [arXiv:astro-ph/0406214](#).
- B. C. Stacey, “[Relation of Electron Scattering Cross Sections to Drift Measurements in Noble Gases](#).” Senior thesis under the supervision of Prof. U. Becker, MIT (2005).
- B. C. Stacey and Y. Bar-Yam, “Principles of Security: Human, Cyber, and Biological.” Report for the Chief of Naval Operations Strategic Studies Group (SSG). [arXiv:1303.2682 \[cs.CR\]](#) (2008).

- M. J. Wade, D. S. Wilson, C. Goodnight, D. Taylor, Y. Bar-Yam, M. A. M. de Aguiar, B. C. Stacey, J. Werfel, G. A. Hoelzer, E. D. Brodie III, P. Fields, F. Breden, T. A. Linksvayer, J. A. Fletcher, P. J. Richerson, J. D. Bever, J. D. Van Dyken and P. Zee, “Multilevel and kin selection in a connected world,” *Nature* **463** (2010): E8–E9.
- D. Harmon, B. C. Stacey, Y. Bar-Yam and Y. Bar-Yam, “Networks of Economic Market Interdependence and Systemic Risk,” [arXiv:1011.3707 \[q-fin.ST\]](#) (2010).
- D. Braha, B. C. Stacey and Y. Bar-Yam, “Corporate Competition: A Self-Organizing Network,” *Social Networks* **33**, 3 (2011): 219–30.
[arXiv:1107.0539 \[physics.soc-ph\]](#).
- M. A. M. de Aguiar, E. M. Rauch, B. C. Stacey and Y. Bar-Yam, “Erratum: Mean Field Approximation to a Spatial Host-Pathogen Model,” *Physical Review E* **88**, 3 (2013): 039901(E). [arXiv:1307.5335 \[q-bio.PE\]](#).
- B. C. Stacey, A. Gros and Y. Bar-Yam, “Eco-Evolutionary Feedback in Host–Pathogen Spatial Dynamics,” [arXiv:1110.3845 \[q-bio.PE\]](#) (2014).
- B. C. Stacey, “‘Is Algebra Necessary?’ Are You High?” In *The Open Laboratory 2013: The Best of Science Writing on the Web*, edited by S. Huler. Series produced by ScienceOnline. <https://scienceonline.creatavist.com/openlab2013> (2013).
- C. A. Fuchs, M. Schlosshauer (foreword) and B. C. Stacey (editor). *My Struggles with the Block Universe*, [arXiv:1405.2390 \[quant-ph\]](#) (2014).
- B. Allen, B. C. Stacey and Y. Bar-Yam, “An Information-Theoretic Formalism for Multiscale Structure in Complex Systems,” [arXiv:1409.4708 \[cond-mat.stat-mech\]](#) (2014).
- B. C. Stacey, *Multiscale Structure in Eco-Evolutionary Dynamics*. PhD thesis, Brandeis University. [arXiv:1509.02958 \[q-bio.PE\]](#) (2015).
- C. A. Fuchs and B. C. Stacey, “Some Negative Remarks on Operational Approaches to Quantum Theory.” In *Quantum Theory: Informational Foundations and Foils*, edited by G. Chiribella and R. W. Spekkens. (Springer, 2016.) [arXiv:1401.7254 \[quant-ph\]](#).
- B. C. Stacey, “Von Neumann Was Not a Quantum Bayesian.” *Philosophical Transactions of the Royal Society A* **374**, 2068 (2016): 20150235.
[arXiv:1412.2409 \[physics.hist-ph\]](#).
- B. C. Stacey, “SIC-POVMs and Compatibility among Quantum States,” [arXiv:1404.3774 \[quant-ph\]](#) (2016).
- B. C. Stacey, “Geometric and Information-Theoretic Properties of the Hoggar Lines,” [arXiv:1609.03075 \[quant-ph\]](#) (2016).
- C. A. Fuchs and B. C. Stacey, “QBism: Quantum Theory as a Hero’s Handbook.” In *Proceedings of the International School of Physics “Enrico Fermi,” Course 197 – Foundations of Quantum Physics*, edited by E. M. Rasel and W. P. Schleich (2017).
[arXiv:1612.07308 \[quant-ph\]](#).

- B. C. Stacey, B. Allen and Y. Bar-Yam, “Multiscale information theory for complex systems: Theory and applications.” In *Information and Complexity*, edited by M. Burgin and C. S. Calude. (World Scientific, 2017.)
- B. C. Stacey, “Sporadic SICs and the Normed Division Algebras,” *Foundations of Physics* (2017). [arXiv:1605.01426 \[quant-ph\]](#).
- B. C. Stacey, “Multiscale Structure of More-than-Binary Variables,” [arXiv:1705.03927 \[cond-mat.stat-mech\]](#) (2017).
- B. Allen, B. C. Stacey and Y. Bar-Yam, “Multiscale Information Theory and the Marginal Utility of Information,” <https://necsi.edu/s/entropy-19-00273.pdf> (2017).
- A. Khrennikov and B. C. Stacey, “Aims and Scope of the Special Issue *Quantum Foundations: Informational Perspective*,” *Foundations of Physics* (2017).
- C. A. Fuchs, M. C. Hoang and B. C. Stacey, “The SIC Question: History and State of Play,” [arXiv:1703.07901 \[quant-ph\]](#).
- M. Appleby, C. A. Fuchs, B. C. Stacey and H. Zhu, “Introducing the Qplex: A Novel Arena for Quantum Theory,” *The European Physical Journal D* **71** (2017): 197. [arXiv:1612.03234 \[quant-ph\]](#).
- B. C. Stacey and Y. Bar-Yam, “The Stock Market Has Grown Unstable Since February 2018,” [arXiv:1806.00529 \[q-fin.ST\]](#) (2018).
- B. C. Stacey, “Is the SIC Outcome There When Nobody Looks?” [arXiv:1807.07194 \[quant-ph\]](#) (2018).
- B. C. Stacey, “Misreading EPR: Variations on an Incorrect Theme,” [arXiv:1809.01751 \[quant-ph\]](#) (2018).
- J. B. DeBrotta and B. C. Stacey, “FAQBism,” [arXiv:1810.13401 \[quant-ph\]](#) (2018).
- B. C. Stacey, “QBism and the Ithaca Desiderata,” [arXiv:1812.05549 \[quant-ph\]](#) (2018).
- B. C. Stacey, “Book Review: *What Is Quantum Information?*,” *Theoria* **34**, 1 (2019): 153–55.
- B. C. Stacey, “Invariant Off-Diagonality: SICs as Equicoherent Quantum States,” [arXiv:1906.05637 \[quant-ph\]](#) (2019).
- B. C. Stacey, “Quantum Theory as Symmetry Broken by Vitality,” [arXiv:1907.02432 \[quant-ph\]](#) (2019).
- B. C. Stacey, “On QBism and Assumption (Q),” [arXiv:1907.03805 \[quant-ph\]](#) (2019).
- J. B. DeBrotta and B. C. Stacey, “Lüders Channels and the Existence of Symmetric-Informationally-Complete Measurements,” *Physical Review A* **100**, 6 (2019): 062327, [arXiv:1907.10999 \[quant-ph\]](#).

- B. C. Stacey, “Sporadic SICs and Exceptional Lie Algebras,” [arXiv:1911.05808 \[quant-ph\]](#) (2019).
- B. C. Stacey, “Ideas Abandoned en Route to QBism,” [arXiv:1911.07396 \[quant-ph\]](#) (2019).
- J. B. DeBroda, C. A. Fuchs and B. C. Stacey, “[The Varieties of Minimal Tomographically Complete Measurements](#),” *International Journal of Quantum Information* (2020). [arXiv:1812.08762 \[quant-ph\]](#).
- J. B. DeBroda, C. A. Fuchs and B. C. Stacey, “[Symmetric Informationally Complete Measurements Identify the Irreducible Difference between Classical and Quantum Systems](#),” *Physical Review Research* **2** (2020): 013074. [arXiv:1805.08721 \[quant-ph\]](#).
- C. A. Fuchs and B. C. Stacey, “Are Non-Boolean Event Structures the Precedence or Consequence of Quantum Probability?” In *Probing the Meaning and Structure of Quantum Mechanics*, edited by D. Aerts, J. B. Arenhart, C. de Ronde and G. Sergioli (World Scientific, 2020.) [arXiv:1912.10880 \[quant-ph\]](#).
- B. C. Stacey, “An Underappreciated Exchange in the Bohr–Einstein Debate,” [arXiv:2003.14385 \[quant-ph\]](#) (2020).
- B. C. Stacey, “Maximal Sets of Equiangular Lines,” [arXiv:2008.13288 \[quant-ph\]](#) (2020).
- J. B. DeBroda and B. C. Stacey, “[Discrete Wigner Functions from Informationally Complete Quantum Measurements](#),” *Physical Review A* **102** (2020): 032221. [arXiv:1912.07554 \[quant-ph\]](#).
- C. A. Fuchs and B. C. Stacey, “QBians Do Not Exist,” [arXiv:2012.14375 \[quant-ph\]](#) (2020).
- B. C. Stacey, “On Two Recent Approaches to the Born Rule,” *International Journal of Quantum Foundations* **7** (2021): 28–33. [arXiv:2103.09910 \[quant-ph\]](#).
- B. C. Stacey, *A First Course in the Sporadic SICs* (Springer, 2021).
- J. B. DeBroda, C. A. Fuchs, J. L. Pienaar and B. C. Stacey, “[Born’s rule as a quantum extension of Bayesian coherence](#),” *Physical Review A* **104** (2021): 022207. Editors’ Selection. [arXiv:2012.14397 \[quant-ph\]](#).
- B. C. Stacey, “On Relationalist Reconstructions of Quantum Theory,” [arXiv:2109.03186 \[quant-ph\]](#) (2021).
- B. C. Stacey, “Is Relational Quantum Mechanics about Facts? If So, Whose? A Reply to Di Biagio and Rovelli’s Comment on Brukner and Pienaar,” [arXiv:2112.07830 \[quant-ph\]](#) (2021).
- B. C. Stacey, “On Feynman’s Discussion of Classical Physics Failing at Specific Heat,” [arXiv:2112.11678 \[physics.hist-ph\]](#) (2021).
- B. C. Stacey, “The Status of the Bayes Rule in QBism,” [arXiv:2210.10757](#) (2022).

- B. C. Stacey, “The De-Relationalizing of Relational Quantum Mechanics,” [arXiv:2211.03230 \[quant-ph\]](#) (2022).
- B. C. Stacey, “Masanes–Galley–Müller and the State-Update Postulate,” [arXiv:2211.03299 \[quant-ph\]](#) (2022).
- B. C. Stacey, “Whose Probabilities? About What? A Reply to Khrennikov,” [arXiv:2302.09475 \[quant-ph\]](#) (2023).
- B. C. Stacey, “A Critical, But Hopefully Cordial, QBist Reply to Ballentine,” [arXiv:2311.06904 \[quant-ph\]](#) (2023).
- B. C. Stacey, “Further Exercises about Sporadic SICs,” supplement to the *First Course* textbook listed above, [arXiv:2312.11946 \[quant-ph\]](#) (2023).
- B. C. Stacey, “Towards a World Game-Flavored as a Hawk’s Wing.” In *Phenomenology and QBism: New Approaches to Quantum Mechanics* (Routledge, 2023).

Teaching:

In the spring 2020 term, I taught the graduate statistical physics course (PHYS 614) for the University of Massachusetts Boston. I have also taught thermodynamics for undergraduates and quantum mechanics at both undergraduate and graduate levels. In addition, I have run discussion sections for introductory classical mechanics.

From 2007 through 2017, I taught at the New England Complex Systems Institute’s [winter and summer schools](#) on complex-systems science, hosted at MIT. My responsibilities included lecturing, supervising students’ group work projects and facilitating the programming lab that introduced scientific computing with Python. My standard course of lectures included the following:

- “Introduction to Complex Networks”
- “Genetic Algorithms: Solving Problems with Applied Evolution”
- “Nonlinear Dynamics and Chaos”
- “Random Processes, Probability and Information”

At Brandeis University, I graded and wrote solution sets for quantum physics, advanced classical mechanics, thermodynamics and electromagnetism, as well as regularly staffing the homework-help office that provided assistance to undergraduates.

Talks:

- “An Actually Pretty Good Mental Picture of a Qubit,” [Scholar.Social Summer School](#), 29 July 2023.
- “Introduction to Nonclassical Correlations and Their Use in Quantum Computation,” Linköping University, 28 September 2022.
- “Why in Blazes are Physics Textbooks So Expensive?!” [Scholar.Social Summer School](#), 25 July 2022.

- “Integers Across The Eighth Dimension!” [Scholar.Social Summer School](#), 31 July 2021.
- “On Reconstructing Quantum Theory,” [Scholar.Social Summer School](#), 29 July 2020.
- “From Quantum to Qplex and Back,” Quantum Chaos and Quantum Information seminar, Jagiellonian University, 15 June 2020.
- “Symmetric Informationally Complete Measurements Pinpoint the Essential Difference between Classical and Quantum Probability Theories,” APS March Meeting, 7 March 2019.
- “Two Departures from Classical Information Theory,” Brandeis IGERT Summer Institute, 27 June 2018.
- “Symmetric Informationally Complete quantum measurements,” CMS seminar, Tufts University, 4 April 2018.
- “Symmetric Informationally Complete measurements: Where quantum information meets sphere packing,” [American Mathematical Society sectional meeting](#), Ohio State University, 17 March 2018.
- “A Quantum-Informational Introduction to SICs,” opening talk of the “Seeking SICs” workshop, MIT Center for Theoretical Physics, November 2016.
- “Probability, Information Theory and Multiscale Structure in Complex Systems,” three lectures at the Brandeis IGERT Summer Institute, July 2015.
- “Mesoscopic Structure in Complex Networks,” Brandeis IGERT Summer Institute, August 2013.
- “Community Formation in Nonequilibrium Spatial Ecosystems,” IGERT seminar at Brandeis University, 19 September 2012.
- “Beyond the Mean Field in Spatial Evolutionary Ecology,” in the Adaptive Networks session of ICCS 2011.
- “Motif Statistics in Protein Geometric Networks,” ICCS 2006.
- “Relation of Electron Scattering Cross Sections to Drift Measurements in Noble Gases,” APS/AAPT joint session, May 2005.

Professional Community Engagement:

Academic journals for which I have written peer reviews include *Annalen der Physik*, *Complexity*, *EPL (Europhysics Letters)*, the *Journal of Genetics*, *NPJ Quantum Information*, *Physical Review A* and *Physical Review E*. I have refereed textbook proposals for the university presses of both Oxford and Cambridge.

I organized the “Seeking SICs” workshop at the MIT Center for Theoretical Physics, held on 15 November 2016.

With A. Khrennikov, I co-edited the [Quantum Foundations: Informational Perspective](#) special issue of *Foundations of Physics* (2017).

I have been thanked in the acknowledgements sections of the following publications, among others.

- B. Zwiebach, *A First Course in String Theory*. (Cambridge University Press, first edition 2004, second edition 2009.)
- T. Tao, *Structure and Randomness* (American Mathematical Society, 2008); also *An Epsilon of Room, I: Real Analysis* (AMS, 2010); and *An Introduction to Measure Theory* (AMS, 2011).
- J. C. Baez, “Rényi Entropy and Free Energy,” [arXiv:1102.2098 \[quant-ph\]](#) (2011).
- J. C. Baez and J. Biamonte, “A Course on Quantum Techniques for Stochastic Processes,” [arXiv:1209.3632 \[quant-ph\]](#) (2012).
- J. Cham, “Les (Really) Misérables,” <http://www.phdcomics.com/comics/archive.php?comicaid=1544> (2012).
- R. P. Feynman, R. Leighton and M. Sands, *The Feynman Lectures on Physics: New Millennium Edition*. (Basic Books, 2013.)
- C. A. Fuchs and R. Schack, “Quantum-Bayesian Coherence.” *Reviews of Modern Physics* **85**, 4 (2013): 1693–1715. [arXiv:1301.3274 \[quant-ph\]](#).
- D. M. Appleby, C. A. Fuchs and H. Zhu, “Group theoretic, Lie algebraic and Jordan algebraic formulations of the SIC existence problem,” *Quantum Information & Computation* **15**, 1–2 (2013): 61–94. [arXiv:1312.0555 \[quant-ph\]](#).
- H. Sayama, *Introduction to the Modeling and Analysis of Complex Systems*. (Open SUNY, 2015.)
- N. D. Mermin, “Erratum: Hidden variables and the two theorems of John Bell,” *Reviews of Modern Physics* **88**, 3 (2016): 039902.
- M. A. M. de Aguiar, “Speciation in the Derrida–Higgs model with finite genomes and spatial populations,” *Journal of Physics A* **50** (2017): 085602.
- J. C. Baez, *This Week’s Finds in Mathematical Physics: Weeks 1 to 50* (2021).