John Bernard DeBrota

Curriculum Vitae
April 2026

Ludwig Maximilian University of Munich
Munich Center for Mathematical Philosophy
Ludwigstraße 31, 80539 München, Room 032
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Research interests

QBism, quantum information theory, foundations of physics

Employment

Postdoctoral Researcher, Munich Center for Mathematical Philosophy
Chair of Philosophy and Decision Theory, Ludwig Maximilian University of Munich
April 2026 – *present*

NSF Focused Research Hub in Theoretical Physics Postdoctoral Fellow
Center for Quantum Information and Control, University of New Mexico, Albuquerque, NM
July 2022 – July 2025

Postdoctoral Researcher, Department of Physics and Astronomy, Tufts University, Medford, MA
Sponsor: Peter J. Love
September 2020 – June 2022

Education

Ph.D. in Applied Physics, August 2020, University of Massachusetts Boston, Boston, MA
Thesis: Informationally Complete Measurements and Optimal Representations of Quantum Theory
Advisor: Christopher A. Fuchs

M.Sc. in Physics, June 2015, University of Waterloo, Waterloo, Canada
Perimeter Scholars International
Thesis: A Quantum Information Geometric Approach to Renormalization
Advisor: Ryszard P. Kostecki

B.S. in Physics with Highest Distinction, May 2014
B.S. in Mathematics with Highest Distinction and Honors, May 2014
Indiana University Bloomington, Bloomington, IN
Advisor: Srinivasan S. Iyengar

Publications

1. DeBrota, J. B. and C. List (2026). "Consciousness, quantum mechanics, and the limits of scientific objectivism." arXiv:2604.14234
2. Raza, M., J. B. DeBrota, A. Shlosberg, N. Lordi, and I. H. Deutsch (2026). "Robust negativity in the quantum-to-classical transition of Kerr dynamics." arXiv:2602.05223.

3. DeBrota, J. B. and P. J. Love (2026). "Bayesian rational agents in iterated quantum games." *Physical Review A* **113**, 042456. arXiv:2408.02058

4. DeBrota, J. B. and C. List (2026). "A heptalemma for quantum mechanics." *Foundations of Physics* **56**, 24. arXiv:2512.01982.

5. Piera, R. S., J. B. DeBrota, M. B. Weiss, G. B. Lemos, J. S. Araújo, G. H. Aguilar, and J. L. Pienaar (2024). "Synthesizing the Born rule with reinforcement learning." *Physical Review Research* **7**, 033042. arXiv:2404.19011.

6. DeBrota, J. B., C. A. Fuchs, and R. Schack (2024). "QBism's account of quantum dynamics and decoherence." *Physical Review A* **110** (5), 052205. arXiv:2312.14112.

7. Propp, T. B., S. Ray, J. B. DeBrota, T. Albash, and I. H. Deutsch (2023). "Decoherence limiting the cost to simulate an anharmonic oscillator." *Physical Review A* **108**, 062219. arXiv:2307.00748.

8. DeBrota, J. B. and P. J. Love (2022). "Quantum and classical Bayesian agents." *Quantum* **6**, 713.

9. Liu, Y. and J. B. DeBrota (2021). "Relating measurement disturbance, information and orthogonality." *Physical Review A* **104**, 052216. arXiv:2105.02074.

10. DeBrota, J. B., C. A. Fuchs, J. L. Pienaar, and B. C. Stacey (2021). "Born's rule as a quantum extension of Bayesian coherence." *Physical Review A* **104**, 022207. arXiv:2012.14397.

11. DeBrota, J. B., C. A. Fuchs, and B. C. Stacey (2021). "The varieties of minimal tomographically complete measurements." *International Journal of Quantum Information* **19**, 7, 2040005. arXiv:1812.08762.

12. DeBrota, J. B. and B. C. Stacey (2020). "Discrete Wigner functions from informationally complete quantum measurements." *Physical Review A* **102**, 032221. arXiv:1912.07554.

13. DeBrota, J. B., C. A. Fuchs, and R. Schack (2020). "Respecting one's fellow: QBism's analysis of Wigner's friend." *Foundations of Physics* **50**, 1859–1874. arXiv:2008.03572.

14. DeBrota, J. B. (2020). Informationally Complete Measurements and Optimal Representations of Quantum Theory, PhD thesis, University of Massachusetts Boston, https://scholarworks.umb.edu/doctoral_dissertations/617/.

15. DeBrota, J. B., C. A. Fuchs, and B. C. Stacey (2020). "Symmetric informationally complete measurements identify the irreducible difference between classical and quantum systems." *Physical Review Research* **2**, 013074. arXiv:1805.08721.

16. DeBrota, J. B. and B. C. Stacey (2019). "Lüders channels and the existence of symmetric-informationally-complete measurements." *Physical Review A* **100**, 062327 (2019). arXiv:1907.10999.

17. DeBrota, J. B. and B. C. Stacey (2018). "FAQBism." arXiv:1810.13401.

18. DeBrota, J. B. and C. A. Fuchs (2017). "Negativity bounds for Weyl–Heisenberg quasiprobability representations." *Foundations of Physics* **47**, 1009–1030 (2017). arXiv:1703.08272.

19. DeBrota, J. B. (2016). A Quantum Information Geometric Approach to Renormalization. Master's Thesis, University of Waterloo, arXiv:1609.09440.

20. Phatak, P., J. Venderley, J. B. DeBrota, J. Li, and S. S. Iyengar (2015). "Active site dynamical effects that affect the hydrogen transfer rate-limiting step in the catalysis of linoleic acid by soybean lipoxygenase-1 (SLO-1): primary and secondary isotope effects." *Journal of Physical Chemistry B* **119**, 9532.

In preparation

1. "A guided tour outside of Cantor's paradise" with M. Barakat.
2. A paper on ontology and QBism with C. List.
3. A paper on decoherence and classicality in QBism with C. A. Fuchs and R. Schack.
4. A paper on discrete spin Wigner functions with M. Raza and I. H. Deutsch.

Presentations

1. **Research seminar in decision and action theory*, Munich Center for Mathematical Philosophy, Ludwig Maximilian University of Munich, 12 November 2025, Munich, Germany.
2. **Philosophy of Science Association 2024*, QBism and the Evolution of Quantum Ontology, 14 Nov 2024, New Orleans, Louisiana, USA.
3. **Participatory Reality and Quantum Measurement*, 24-26 June 2024, Hanover, NH, USA.
4. **Quantum Information and Probability: from Foundations to Engineering (QIP24)*, 11-14 June 2024, Växjö, Sweden.
5. *The Quantum Reconstruction Program and Beyond*, 1-3 August 2023, Graz, Austria.
6. **Center for Quantum Information and Control*, University of New Mexico, 19 January 2022, Albuquerque, New Mexico
7. **CS 5120 Graduate Seminar and Computer Science Colloquium*, 31 August 2021, Texas Tech University, Lubbock, Texas, USA.
8. **DISC: Agent-based Modeling Seminar*, 10 & 24 March 2021, Tufts University, Medford, Massachusetts, USA.
9. **Algebraic structures in quantum computation IV (ASQC)*, 22-24 June 2020, University of British Columbia, Vancouver, Canada (remote).
10. *APS March Meeting, Quantum Foundations I Session*, 4-8 March 2019, Boston, USA.
11. *University of Massachusetts Lowell Theoretical Physics Seminar, 14 September 2018, Lowell, Massachusetts, USA.
12. **Towards Ultimate Quantum Theory (UQT)*, 11-14 June 2018, Växjö, Sweden.
13. *University of KwaZulu-Natal (UKZN) Physics Seminar, National Institute for Theoretical Physics (NITheP), 25 May 2018, Durban, South Africa
14. *National Institute for Theoretical Physics (NITheP) Seminar, 23 May 2018, Stellenbosch, South Africa.
15. *American Mathematical Society Special Session: Mathematical Perspectives in Quantum Information Theory*, 21 April 2018, Northeastern University, Boston, USA.
16. **Algorithmic Information, Induction and Observers in Physics*, 9-13 April 2018, Perimeter Institute for Theoretical Physics, Waterloo, Canada.
17. *ETH Zürich, Renner research group, 6 June 2017, Zürich, Switzerland.
18. *Discrete Structures in Quantum Mechanics*, 20-22 June 2016, Linköping, Sweden.

* indicates an invited presentation

19. *Quantum and Beyond*, 13-16 June 2016, Växjö, Sweden.

Supervision

Genevieve DiBari (Physics Undergraduate at Pomona College), Summer 2021
VERSE summer research student. Co-advised with Professor Peter Love.

Yizhou Liu (Engineering Mathematics Undergraduate at Tsinghua University), 2021
Remote. Now a student in Biophysics at MIT.

Abhi Khanal (Physics Undergraduate at UMass Boston), Spring 2019 – Spring 2020
Co-advised with Professor Christopher Fuchs.

Joseph Farah (Physics Undergraduate at UMass Boston), Spring 2018 – Spring 2019
Co-advised with Professor Christopher Fuchs. Now a PhD student in Astrophysics at UCSB.

Teaching and leadership

Organizing committee for 26th annual Southwest Quantum Information and Technology (SQuInT) workshop (October 30-November 1, 2024)

Lead instructor for the CQuIC Summer Course on Quantum Foundations (July 10-August 14, 2024)

Organizing committee member for 25th annual Southwest Quantum Information and Technology (SQuInT) workshop (October 26-28, 2023)

Co-organizer of Quantum Phase Estimation and Metrology Reading Group/Seminar (Spring 2023)

Master of Ceremonies for the weekly CQuIC Group Meeting (Spring and Summer 2023)

Teaching assistant for Introductory Physics 1&2, Modern Physics, and Statistical Mechanics (2016-2018)

Journal refereeing

Advanced Quantum Technologies; *Entropy*; *Foundations of Physics*; *International Journal of Theoretical Physics*; *Journal of Physics A: Mathematical and Theoretical*; *Physical Review A*; *Quantum*; *Quantum Studies: Mathematics and Foundations*; *Science Advances*

Other academic activities

Wolfram Summer School, 2025
Project: Towards agency in computational systems

Research Experience for Undergraduates, University of Illinois at Urbana-Champaign, 2013
Advisor: Taylor L. Hughes
Project: Entanglement in Topological States of Matter Protected by Point Group Symmetries.

Wolfram Science Summer School, 2012
Project: Universal Assemblers in Multiway Systems

Awards, marks of distinction, and sources of funding

NSF Focused Research Hub in Theoretical Physics Prize Postdoctoral Fellowship, July 2022 – July 2025
Center for Quantum Information and Control, University of New Mexico.

Personnel in Foundational Questions Institute (FQXi) Grant, 1 August 2016 – 31 July 2018

Title: "Does Participatory Realism Make Sense? The Role of Observership in Quantum Theory." Provides supplemental salary and one-month research time at Oxford University per year.

UMass Boston Distinguished Doctoral Fellowship, September 2015 – May 2019
Four-year full tuition and stipend. Awarded by committee selection among outstanding nominated graduate student applicants.

Indiana University Cox Research Scholarship, September 2010 – May 2014
Merit-based scholarship covering all academic and living expenses and facilitating undergraduate research.

IU National Merit Scholarship, September 2010 – May 2014
Awarded to National Merit Finalists who have chosen to attend Indiana University.

Malcolm A. Kochert Scholarship, College of Arts and Sciences, 2014
Merit-based scholarship available to students entering their senior year.

Marie S. Wilcox Scholarship, Department of Mathematics, 2012, 2013
Awarded by faculty nomination to students who "demonstrate a deep understanding and appreciation of mathematics and who maintain a record of high academic achievement".

Hutton Honors College Summer Research Scholarship, 2012
Funding for summer research.

Harry G. Day Chemistry Summer Scholarship, Department of Chemistry, 2011
Funding for summer research.

Memberships and certifications

American Physical Society, Member
Topical group on Quantum Information

Phi Beta Kappa, elected November 2013

Technical proficiencies

Mathematica (high); LaTeX (high); Microsoft Office (high); GNU Linux (good); Python (basic)