

Jacob Bringewatt

Homepage: jacobbringewatt.com

Email: jbringew@umd.edu

SUMMARY STATEMENT	I'm a PhD candidate in theoretical physics and a Department of Energy Computational Science Graduate fellow. My research interests span many aspects of quantum information and quantum computing. Current areas of focus include adiabatic quantum computation and quantum annealing, quantum metrology, and quantum algorithms for nuclear theory.		
EDUCATION	Doctoral Candidate in Physics		2018–
	University of Maryland, College Park <i>Advisor: Alexey Gorshkov</i>		
	Bachelor of Science in Physics		2014–2018
	University of Maryland, College Park <i>Cum laude with high honors in physics.</i>		
FELLOWSHIPS	KITP Graduate Fellow (Accepted)		
	Kavli Institute for Theoretical Physics, University of California, Santa Barbara		2022
	Computational Science Graduate Fellow		
	United States Department of Energy		2018-2022
	Lanczos Graduate Fellow		
	Joint Center for Quantum Information and Computer Science		2018-2020
PUBLICATIONS	Banneker/Key Scholar		
	University of Maryland, College Park		2014-2018
	10. <i>J Bringewatt</i> , L T Brady. “Simultaneous stoquasticity.” Phys. Rev. A. Accepted. (2022) [arXiv:2202.08863]		
	9. T C Mooney, <i>J Bringewatt</i> , L T Brady. “Lefschetz thimble quantum Monte Carlo for spin systems.” Preprint. (2021) [arXiv:2110.10699]		
	8. A Ehrenberg*, <i>J Bringewatt</i> *, A V Gorshkov. “Minimum entanglement protocols for function estimation.” Preprint. (2021) [arXiv:2110.07613]		
	7. <i>J Bringewatt</i> , I Boettcher, P Niroula, P Bienias, A V Gorshkov. “Protocols for estimating multiple functions with quantum sensor networks: geometry and performance.” Phys. Rev. Research 3, 033011. (2021), [arXiv:2104.09540]		
	6. T Qian, <i>J Bringewatt</i> , I Boettcher, P Bienias, A V Gorshkov. “Optimal measurement of field properties with quantum sensor networks.” Phys. Rev. A (Letter) 103, L030601. (2021), [arXiv:2011.01259]		
	5. <i>J Bringewatt</i> , N Sato, W Melnitchouk, J Qiu, F Steffens, M Constantinou. “Confronting lattice par- ton distributions with global QCD analysis.” Phys. Rev. D. 103, 016003 (2021) [arXiv:2010.00548]		
	4. <i>J Bringewatt</i> *, M Jarret* [†] . “Effective gaps are not effective: quasipolynomial classical simulation of obstructed stoquastic Hamiltonians.” Phys. Rev. Lett. 125, 170504 (2020), [arXiv:2004.08681]		
	3. <i>J Bringewatt</i> , W Dorland, SP Jordan. “Polynomial time algorithms for estimating spectra of adia- batic Hamiltonians.” Phys. Rev. A 100 (3), 032336 (2019), [arXiv:1905.07461]. Editors’ Sugges- tion.		

* EQUAL CONTRIBUTION
† ALPHABETICAL ORDER

2. *J Bringewatt*, W Dorland, SP Jordan, A Mink. "Diffusion Monte Carlo approach versus adiabatic computation for local Hamiltonians." Phys. Rev. A 97 (2), 022323 (2018), [arXiv:1709.03971]
1. K Pushkin, C Akerlof, D Anbajagane, J Armstrong, M Arthurs, *J Bringewatt*, T Edberg, C Hall, M Lei, R Raymond, M Reh, D Saini, A Sander, J Schaefer, D Seymour, N Swanson, Y Wang, W Lorenzon. "Study of radon reduction in gases for rare event search experiments." Nucl. Instrum. Methods Phys. Res., Sect. A 903, 267-276 (2018), [arXiv:1805.11306]

GRANTS	Institute for Robust Quantum Simulation (RQS) Seed Grant National Science Foundation Amount awarded: \$33k	2022
AWARDS	3 Minute Thesis College Level Winner College of Computer, Mathematical, and Natural Sciences (CMNS), University of Maryland Communicate Your Science Essay Contest Winner Krell Institute (Department of Energy Computational Science Graduate Fellowship)	2022 2019
TEACHING EXPERIENCE	Designed and wrote a self-study packet on quantum computing for high schoolers Girls Talk Math Program, University of Maryland, College Park Math Tutor University of Maryland, College Park Teaching Assistant for Philosophy of Quantum Mechanics University of Maryland, College Park	2021 2016-2018 Fall 2016
MENTORSHIP	Othello D. Gomes (Montgomery College) For GRAD-MAP Winter Workshop project on geometry of quantum states. Connor Mooney (George Mason University) For research project on Lefshetz thimble methods for sign problems. Akshita Gorti (Cornell University) For a research project on quantum sensor networks. Victoria Adebayo (Howard University) For GRAD-MAP Winter Workshop on adiabatic quantum computation. Timothy Qian (Montgomery Blair High School) For a research project on quantum sensor networks. Outcome: Letter in Physical Review A and 5 th place Regeneron Science Talent Search.	2022 2021 2021 2021 2020
EDUCATION- RELATED TRAINING AND WORKSHOPS	Seminar Course on Physics Education Research on Teaching Quantum Mechanics University of Maryland, College Park Workshop on Relationships Among Intuition, Reasoning, and Conceptual Understanding in Physics American Association of Physics Teachers Seminar Course on Introduction to Physics Education Research University of Maryland, College Park Workshop on Science Communication Skype a Scientist organization	Fall 2021 2021 Fall 2020 2020

SERVICE TO SCIENTIFIC COMMUNITY	Reviewer Journals: Quantum Conferences: TQC	
	Member of UMD Physics Department Graduate Student Colloquium Committee	2021–
	Panelist at GRAD-MAP Winter Workshop	2022
	Organizer of QuICS-JQI-CMTC Friday Seminar	2020–2021
	Panelist at Conference for Undergraduate Underrepresented Minorities in Physics (cu2mip)	2021
	Volunteer at University of Maryland Prospective Graduate Student Open Houses	2019–2021
OUTREACH	Skype a Scientist Conversations with students (elementary, middle, and high school) on physics.	2020–
	Proctor for U.S. Physics Olympiad F=ma Exam	2022
	Writing for Non-scientific Audience “Spherical cows: Using barnyard animals to understand quantum computing.” (2019) – won Communicate Your Science Essay Contest, published in Deixis Magazine (magazine on computational science at DoE national labs)	
PROFESSIONAL MEMBERSHIPS	American Physical Society (APS) American Association of Physics Teachers (AAPT)	
INVITED TALKS	<ol style="list-style-type: none"> 4. “The role of entanglement for function estimation with quantum sensor networks.” George Mason University Quantum Computing Seminar. (Feb. 2022) Invited Talk. 3. “Lefschetz thimble quantum Monte Carlo for spin systems.” MIT Computational Research in Boston and Beyond (CRIBB) seminar. (Nov. 2021) Invited Talk. 2. “Lattice data in the JAM framework.” Amherst Center for Fundamental Interactions (ACFI) Workshop on QCD Real-Time Dynamics and Inverse Problems. (Oct. 2020) Invited Talk. 1. “Confronting lattice parton densities with global QCD analysis.” AI for Nuclear Physics Workshop. (Mar. 2020) Invited Talk. 	
CONTRIBUTED TALKS	<ol style="list-style-type: none"> 4. “Measuring functions with quantum sensor networks.” 23rd Annual SQuInT Workshop. (Oct. 2021) Talk. 3. “Effective gaps are not effective: quasipolynomial simulation of obstructed stoquastic Hamiltonians.” DOE Computational Science Graduate Fellowship Annual Program Review. (July 2021) Talk. 2. “Optimal measurement of field properties with quantum sensor networks.” March Meeting 2021. (Mar. 2021) Talk. 1. “Confronting lattice parton densities with global QCD analysis.” DNP2019. (Oct. 2019) Talk. 	
SEMINAR TALKS	<ol style="list-style-type: none"> 11. “Ultimate limits for function estimation in quantum metrology.” Gorshkov Group Meeting. (Jan. 2022) Talk. 10. “Lefschetz thimble quantum Monte Carlo for spin systems.” USC Condensed Matter Seminar. (Nov. 2021) Talk. 	

9. "Minimum entanglement protocols for function estimation." QuICS/JQI Friday Quantum Seminar. (Oct. 2021) Talk.
8. "Fermionic mappings, qubit architectures, and graph coloring." Davoudi Group Meeting. (Aug. 2021) Talk.
7. "Estimating multiple functions with quantum sensor networks." Gorshkov Group Meeting. (Jan. 2021) Talk.
6. "Effective gaps are not effective." Gorshkov Group Meeting. (April 2020) Talk.
5. "Quantum sensor networks and Fisher information." Gorshkov Group Meeting. (Aug. 2019) Talk.
4. "Confronting lattice parton densities with global QCD analysis." Jefferson Lab Theory Seminar. (July 2019) Talk.
3. "Diffusion Monte Carlo approach versus adiabatic computation for local Hamiltonians." Gorshkov Group Meeting. (Aug. 2018) Talk.
2. "Diffusion Monte Carlo approach versus adiabatic computation for local Hamiltonians." University of Maryland Undergraduate Research Showcase. (May 2018) Talk.
1. "Diffusion Monte Carlo approach versus adiabatic computation for local Hamiltonians." Undergraduate Thesis Defense. (May 2018) Talk.

POSTERS

10. "Simultaneous Stoquasticity." QuICS Stakeholder Day. (Apr. 2022) Poster.
9. "Lefschetz thimble quantum Monte Carlo for spin systems." QIP2022. (Mar. 2022) Poster.
8. "Optimal measurement of field properties with quantum sensor networks." QuICS Admitted Students Days. (Apr. and May 2021) Poster.
7. "Optimal measurement of field properties with quantum sensor networks." QuICS Stakeholder Day. (Mar. 2021) Poster.
6. "Estimating multiple functions with quantum sensor networks." QuICS 5 Year Anniversary Symposium. (Jan. 2020) Poster.
5. "Effective gaps are not effective." FARQC Kickoff Meeting. (Nov. 2019) Poster.
4. "Polynomial time algorithms for estimating spectra of adiabatic Hamiltonians." DOE Computational Science Graduate Fellowship Annual Program Review. (July 2019) Poster.
3. "Polynomial time algorithms for estimating spectra of adiabatic Hamiltonians." QIP2019. (Jan. 2019) Poster.
2. "Polynomial time algorithms for estimating spectra of adiabatic Hamiltonians." STAQ Kickoff Meeting. (Nov. 2018) Poster.
1. "Diffusion Monte Carlo approach versus adiabatic computation for local Hamiltonians." QIP2018. (Jan. 2018) Poster.