

# Joseph T. Iosue

Doctoral Candidate

University of Maryland  
College Park, Maryland  
Mathematical Physics  
✉ [jtiosue@umd.edu](mailto:jtiosue@umd.edu)  
🌐 [jtiosue.github.io](https://jtiosue.github.io)  
👤 [jtiosue](#)



## Education

- 2020 – **University of Maryland**, *Doctor of Philosophy (Physics)*, JQI Graduate Fellow  
Advisors: Prof. Alexey Gorshkov and Prof. Victor Albert
- 2015 – 2019 **Massachusetts Institute of Technology**, *Bachelor of Science*  
B.S. (Physics), Minor (Computer Science) – GPA 4.9/5.0

## Research Experience

- 2020 – **University of Maryland, Department of Physics**, *Research Assistant*  
Affiliations:  
○ Joint Quantum Institute (JQI)  
○ Joint Center for Quantum Information and Computer Science (QIICS)
- 2019 – 2020 **QC Ware, Corp**, *Quantum Algorithms Researcher*  
Developed software and algorithms for customer use cases, including [1].
- 2017 – 2018 **MIT Laboratory for Nuclear Science**, *Undergraduate Researcher*  
Supervisor: Prof. Or Hen. Studied proton/neutron dynamics in asymmetric nuclei with C++ and ROOT.
- 2018 **Los Alamos National Laboratory**, *Quantum Computing Summer Fellowship*  
Supervisor: Dr. Patrick Coles. Developed and published a novel quantum algorithm [3].
- 2017 **Joint Quantum Institute, University of Maryland**, *Summer Researcher*  
Supervisor: Prof. Alexey Gorshkov. Studied quantum phase transitions via quench dynamics [2].
- 2016 **MIT Plasma Science and Fusion Center**, *Undergraduate Researcher*  
Supervisor: Prof. Nuno Loureiro. Modeled particle transport in turbulent media using C.
- 2015 **MIT Department of Nuclear Science and Engineering**, *Undergraduate Researcher*  
Supervisor: Prof. Emilio Baglietto. Modeled responses of nuclear waste storage canisters to fission waste using finite element software ADINA.

## Awards and Achievements

- 2020 – 2025 **JQI Graduate Fellowship**, Joint Quantum Institute, University of Maryland
- 2019, 2020 **NSF GRFP Honorable Mention**, National Science Foundation

## Press

- 2020 **PHYS.ORG**, *Popular science article*  
New quantum computing algorithm skips past time limits imposed by decoherence, [Online](#)

## Service and Teaching

### Journal and Conference Reviews/Subreviews

- Quantum Information Processing (QIP) 2023

- 2020 – 2022 **Volunteer Tutor**, *UMD Department of Physics*
- 2016 **Teaching assistant and grader**, *MIT Department of Physics*

## Publications

See also: [Google Scholar](#), [arXiv](#)

- [5] **J. T. Iosue**, K. Sharma, M. J. Gullans, and V. V. Albert, “Continuous-variable quantum state designs: theory and applications”, [10.48550/arXiv.2211.05127 \(2022\)](#).
- [4] **J. T. Iosue**, A. Ehrenberg, D. Hangleiter, A. Deshpande, and A. V. Gorshkov, “Page curves and typical entanglement in linear optics”, [10.48550/arXiv.2209.06838 \(2022\)](#), *Submitted to Quantum*.
- [3] C. Cirstoiu, Z. Holmes, **J. T. Iosue**, L. Cincio, P. J. Coles, and A. Sornborger, “Variational Fast Forwarding for Quantum Simulation Beyond the Coherence Time”, [npj Quantum Information 6, 82 \(2020\)](#).
- [2] P. Titum, **J. T. Iosue**, J. R. Garrison, A. V. Gorshkov, and Z.-X. Gong, “Probing ground-state phase transitions through quench dynamics”, [Physical Review Letters 123, 115701 \(2019\)](#).
- [1] R. M. Parrish, **J. T. Iosue**, A. Ozaeta, and P. L. McMahon, “A Jacobi Diagonalization and Anderson Acceleration Algorithm For Variational Quantum Algorithm Parameter Optimization”, [10.48550/arXiv.1904.03206 \(2019\)](#).

## Talks

**Continuous-variable quantum state designs: theory and applications**, based on [5]

- 2023 – Quantum Information Processing (QIP)
- 2022 – Prof. David Gross’s group seminar (invited, virtual)
- 2022 – CU Boulder journal club (invited, virtual)
- 2022 – University of Maryland JQI-QulCS quantum seminar
- 2022 – APS March Meeting (virtual)

## Posters

**Page curves and typical entanglement in linear optics**, based on [4]

- 2023 – Quantum Information Processing (QIP)

**An initial condition robust outer-loop optimization strategy for QAOA**

- 2019 – TQC Conference, College Park, Maryland

## Selected Projects

2019 – **qubovert**, *Python package (with C extension) for binary optimization*

- Created **qubovert**, which is particularly designed to aid in converting optimization problems to a form that can be solved with quantum annealers and quantum optimization algorithms.
- qubovert can be installed with `pip install qubovert`, the source code is hosted at [github.com/jtiosue/qubovert](#), and the documentation is hosted at [qubovert.readthedocs.io](#).
- qubovert currently has **over 204k downloads** from [PyPI](#) and 20 stars and 5 forks on GitHub.

2019 **Powell bounded multivariate optimization**, *SciPy contribution*

- Authored [pull request number 10648](#) on Python’s SciPy package. My contribution is included in the [1.5.0](#) release and later releases
- The pull request implements an additional feature for SciPy’s minimization method. I devised a bounded version of the standard unbounded Powell minimization method and found it to often perform much better than the other gradient-free minimizers. I then implemented this variant in SciPy’s software stack and created the pull request.

2018 **Quantum Computer Simulator**, *C++ project*

- Implemented a [quantum computer simulator](#) in C++.

2023 **rcal**, *Python package (with C extension) for review calibration*

- Devised a novel review calibration algorithm ([written report](#))
- Implemented the algorithm in a Python [package](#) with a C extension to optimize for speed.



## Skills

### **Programming**

Python, C, C++, Mathematica, Javascript, Julia,  $\LaTeX$ , Git