Joseph Carolan

Graduate Student

Joint Center For Quantum Information and Computer Science
University of Maryland, College Park
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Education

2022-Present **PhD Student**, *University of Maryland, College Park*

Advisor- Andrew Childs

2018-2022 **BS in Computer Science, Physics**, *University of Illinois, Urbana Champaign*

Received dual degrees in computer science (with a focus in theory) and physics (with a focus in computational physics). GPA- 4.0/4.0

Honors
- Recipient of the Lanczos Graduate Research Fellowship, providing two years of research assistantship funding and tuition coverage. *UMD, 2022*
- Recipient of the Deans Fellowship, providing a two year stipend. *UMD, 2022*
- Recipient of Bronze Tablet Award, equivalent to highest honors. *UIUC, 2022*
- Recipient of James Scholar Award. *UIUC, 2018*

Papers & Preprints

(1) "Succinct Fermion Data Structures" Joseph Carolan and Luke Schaeffer. **Under Review**

(2) "Exponental Quantum Advantage with Parallel Queries" Joseph Carolan, Amin Shiraz Gilani, Mahathi Vempathi. **Under Review**

(3) "Quantum One-Wayness of the Single Round Sponge with Invertible Permutations" Joseph Carolan, Alexander Poremba. **Under Review**

(4) "Quantum Computation of Dynamical Quantum Phase Transitions and Entanglement Tomography in a Lattice Gauge Theory." Niklas Mueller, Joseph Carolan, Andrew Connelly, Zohreh Davoudi, Eugene F. Dumitrescu, and Kübra Yeter-Aydeniz. **PRX Quantum 4**, 030323 – Published 18 August 2023

(5) "Hardness of Approximation of Quantum Max-Cut" Joseph Carolan, Suchetan Dontha **Preprint**, October 2022

Posters and Presentations

(1) "Quantum Money with Minimal Quantum", Joseph Carolan. **Presented at Quantum Cryptography with Classical Communication Seminar**

(2) "Machine Learning Approximated Nucleon Matrix Elements with Domain Wall Fermions", Akio Tomiya, Joseph Carolan, Andrew Connelly, Taku Izubuchi, Luchang Jin, Chulwoo Jung, Christopher Kelly, Meifeng Lin, Sergey Syritsyn. **Co-Presented at Lattice 2021**

(3) "Applying Image Registration to Model Order Reduction", Joseph Carolan and Rambod Mojgani. **Presented at P.U.R.E. Undergraduate Research Symposium, 2019**

Work Experience

Summer 2021 **Research Intern**, The Aerospace Corporation

Summer 2020 **Research Intern**, Brookhaven National Lab
Summer 2019 **Software Engineering Intern**, John Deere
Summer 2018 **Software Engineering Intern**, Concorde Software Solutions
Summer 2017 **Research Intern**, Fermi National Accelerator Laboratory

Teaching

Fall 2020,   Advanced Algorithms (Undergrad Assistant)
Spring 2021

Spring 2019,   Introduction to Algorithms and Models of Computation (Undergrad Assistant)
Fall 2021

Spring 2019,   Software Design Studio (Undergrad Assistant)
Fall 2019

Service

Fall 2023   **Conference Reviewer,** Quantum Information Processing

Fall 2022   **Textbook Contributor,** Computational Intractability: A Guide to Algorithmic Lower Bounds

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