

CURRICULUM VITAE

Jahan Claes

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EDUCATION

- 2010 - 2014 University of Chicago
B.A. Physics with Honors
B.S. Mathematics with Honors
GPA: 3.86
Dean's List 2010-2014
- 2014 - 2021 University of Illinois at Urbana-Champaign
Ph.D. Physics
Advisor: Taylor L. Hughes
GPA: 3.95

ACADEMIC EMPLOYMENT

- Summer 2011 **REU Participant**, University of Chicago Mathematics
- Summer 2012 **Undergraduate Researcher**, University of Nebraska Electrical Eng.
- Summer 2013 **Undergraduate Researcher**, University of Nebraska Physics
- Aug 2014 - Apr 2021 **Graduate Researcher**, University of Illinois Physics
- June 2020 - Oct 2020 **USRA Intern**, Quantum Artificial Intelligence Laboratory, NASA Ames
- Oct 2020 - Jan 2021 **Quantum Algorithms Intern**, QC Ware
- May 2021 - present **YQI Postdoctoral Fellow**, Yale Department of Applied Physics

HONORS AND AWARDS

- 2014 **Phi Beta Kappa**
Awarded by the Phi Beta Kappa society
- 2016 **Honorable Mention, Graduate Research Fellowship Program**
Awarded by the NSF Graduate Research Fellowship Program
- 2018 **Mavis Future Faculty Fellowship**
Awarded by the University of Illinois School of Engineering
- 2021 **Yale Quantum Institute Postdoctoral Fellowship**
Awarded by the Yale Quantum Institute, Department of Applied Physics

PUBLICATIONS

J. Claes and B. K. Clark, *Finite temperature properties of strongly correlated systems via variational Monte Carlo*, Phys. Rev. B 95, 205109 (2017)

J. Claes, and T. L. Hughes, *Disorder driven phase transitions in weak AIII topological insulators*, Phys. Rev. B 101, 224201 (2020)

J. Claes and T. L. Hughes, *Wannier band transitions in disordered π -flux ladders*, Phys. Rev. B 102, 100203(R) (2020)

J. Claes, E. Rieffel, and Z. Wang, *Character randomized benchmarking for non-multiplicity-free groups with applications to subspace, leakage, and matchgate randomized benchmarking*, PRX Quantum 2, 010351 (2021)

J. Claes and T. L. Hughes, *Skin effect and winding number in disordered non-Hermitian systems*, Phys. Rev. B 103, L140201 (2021)

J. Claes and W. van Dam, *Instance Independence of Single Layer Quantum Approximate Optimization Algorithm on Mixed-Spin Models at Infinite Size*, Quantum 5, 542 (2021)

J. Claes, J. E. Bourassa, and S. Puri, *Tailored cluster states with high threshold under biased noise*, arXiv:2201.10566 (2022)

J. Claes and S. Puri, *Estimating the bias of CX gates via character randomized benchmarking*, arxiv:2206.00009 (2022)

PRESENTATIONS

INVITED TALKS

J. Claes (2020). *Character randomized benchmarking with multiplicity: applications to subspace and matchgate randomized benchmarking*. YQI Talk, Yale Quantum Institute

J. Claes (2021). *Tailoring bespoke benchmarking protocols via character randomized benchmarking*. HRL Seminar, HRL Laboratories

J. Claes (2022). *Tailored cluster states with high threshold under biased noise*. QuAIL seminar, NASA Ames research center

J. Claes (2022). *Tailored cluster states with high threshold under biased noise*. Research seminar, ORCA Computing

J. Claes (2022). *Noise-tailored quantum error correction for next-generation qubit technologies*. Monte Verità conference on Quantum Systems and Technology

RESEARCH TALKS

J. Claes and B.K. Clark (2017). *Finite temperature properties of strongly correlated systems via variational Monte Carlo*. APS March meeting, Explicitly correlated methods and quantum few-body systems

J. Claes (2017). *Locality in quantum systems: Lieb-Robinson bounds, adiabatic evolution, and the stability of eigenstates*. Theoretical physics seminar, University of Nebraska-Lincoln

J. Claes and T. L. Hughes (2019). *Disorder-driven phase transitions in chiral-symmetric topological insulators*. APS March meeting, Quantum Effects in Topological Systems

J. Claes (2021). *Skin effect and winding number in disordered non-Hermitian systems*. APS March meeting, Topological Insulators Without Translation Symmetry

J. Claes (2021). *Instance independence of the QAOA on mixed-spin optimization problems*. CQE Member and Partner Workshop, Chicago Quantum Exchange

J. Claes (2021). *Benchmarking bias in CNOT gates for error correcting codes*. Early career session, NASA Quantum Conference

J. Claes, J. E. Bourassa, and S. Puri (2022). *High threshold fault-tolerant measurement-based quantum computing with biased noise qubits*, APS March meeting, Towards Fault Tolerance and Realization of Quantum Error Correction

OUTREACH TALKS

J. Claes (2017). *The Kosterlitz-Thouless transition*. Undergraduate journal club, University of Illinois at Urbana-Champaign

J. Claes (2021) *Quantum error correction with the surface code*. Berkeley undergraduate fall school on quantum error correction

J. Claes (2022) *An introduction to quantum error correction I-III*. Seminar series, Q-munity

SERVICE AND OUTREACH

2014 **Science at the Market**

Public outreach at the local farmers market

2016-2019 **Illinois GPS (Guidance for Physics Students) Mentor**

Mentorship program that matches grad students with interested undergrads

2017-2019 **Illinois GPM (Graduate Peer Mentoring) Mentor**

Mentorship program that matches senior grad students with new grad students

2021 **OQI (Open Quantum Initiative), Chicago Quantum Exchange**

Served on a committee establishing the OQI undergraduate fellowship for underrepresented students

Served as an organizer and panel moderator for the 2021 OQI Workshop

2021-2022 **Q-munity Mentor**

Mentorship program for high school students interested in quantum computing

TEACHING EXPERIENCE

TEACHING ASSISTANTSHIPS

Fall 2014*	PHYS 212: University Physics: Electricity and Magnetism
Spring 2015*	PHYS 213: University Physics: Thermal Physics
	PHYS 214: University Physics: Quantum Physics
Summer 2015†	PHYS 213: University Physics: Thermal Physics
Fall 2015†	PHYS 211: University Physics: Mechanics
Spring 2016†	PHYS 101: College Physics: Mechanics and Heat
Fall 2016†	PHYS 212: University Physics: Electricity and Magnetism
Spring 2017†	PHYS 325: Classical Mechanics I
Fall 2017†	PHYS 326: Classical Mechanics II
Spring 2018†	PHYS 486: Quantum Mechanics I
Fall 2018†	PHYS 487: Quantum Mechanics II
Spring 2019†	PHYS 427: Thermal and Statistical Physics
Spring 2020†	PHYS 435: Electromagnetic Fields I
Spring 2021†	PHYS 225: Relativity and Math Applications

‡ Rated an “Outstanding” teaching assistant by CITL (top 10% of TAs)

* Rated an “Excellent” teaching assistant by CITL (Teaching rating above 4.3/5.0)

† Rated both “Excellent” and “Outstanding”