JUE XU

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EDUCATION

University of Maryland (College Park), MD *Aug 2018 -Jun 2020*
Master in Computer Science
University of Chicago, IL *Aug 2017 - Jun 2018*
Master in Physical Sciences, Major in Physics
National University of Singapore, Singapore *Jan 2016 - Jun 2016*
Exchange student, University Scholarship Program
Fudan University, Shanghai, China *Aug 2013 - Jun 2017*
Bachelor of Applied Science, Department of Nuclear Science and Technology

COURSES

Physics: Quantum Field Theory, The Physics of Quantum Information, General Relativity, Advanced Statistical Mechanics, Implementation of Quantum Information Processors, etc.
Computer Science: Quantum Information Processing, Machine learning, Cryptography, etc.
Mathematics: Discrete Mathematics, Quantum Computing, Stochastic Methods with Applications, etc.

TA EXPERIENCE

Introduction to Quantum Computing (*2019 Spring, Prof. Andrew Childs*)
Design and Analysis of Computer Algorithms (*2019 Fall, Prof. Andrew Childs*)
Discrete Structures (*2018 Fall & 2019 Spring*), Introduction to Data Science (*2019 Summer & 2020 Fall*)

RESEARCH

On Lagrangian Formalism of Quantum Computation [arXiv] *2021*
We reformulate quantum computation in terms of Lagrangian (path integral) formalism, in contrast to the common Hamiltonian (unitary gate) formulation. We exemplify this formalism with some widely-studied models, including standard quantum circuit model, quantum optimization heuristics, and quantum random walk. The meanings of Lagrangian (action) are interpreted in various contexts of quantum computation, such as complexity. Furthermore, an analog quantum simulation scheme is suggested where the Lagrangian serves as the starting point and the sum-over-path method is applied.

Separations between Different Complexity Measures: a Survey [PDF] *2018*
Master Thesis at University of Chicago (supervised by Prof. Alexander Razborov): A survey on the separations between quantum and classical complexity measures, Discussed the power and limit of quantum computation

New theory of statistical mechanics for finite-size systems *2015-2017*
Research Project at Fudan University (supervised by Prof. Yongli Ma): Proposed a new statistical theory for finite-size systems by offering a new form of density matrix, Calculated the specific heat capacity of finite-size Bose-Einstein condensation

Transverse vibrations of a thin loaded rod: theory and experiment [DOI] [PDF] *2014*
Undergraduate Research Project (supervised by Prof. Yongli Ma): Solved vibration frequencies of a thin homogeneous rod carrying a concentrated mass as a function of the load's position and mass

HONORS & AWARDS

Scholarship to cover one-half tuition granted by University of Chicago *2017*
Scholarship granted by Shanghai Institute of Applied Physics *2015*