EESH GUPTA

Undergraduate Student in Physics
Rutgers University, New Brunswick NJ

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RESEARCH INTERESTS

Quantum Computing: Superconducting Qubits, Quantum Optimal Control

EDUCATION

Rutgers University 2019 - 2023
B.S. in Physics
Minors in Mathematics and Computer Science
Societies: Society of Physics Students, Rutgers Concert Band

RESEARCH EXPERIENCE

Undergraduate Research Assistant,
Superconducting Quantum Systems Lab,
Rutgers University-New Brunswick Dec. 2021- Present
Supervisor: Srivatsan Chakram, Ph.D.
Topic: Optimal Control of Multimode Cavities coupled to Superconducting Circuits; Designed Conditional Displacement Gates for preparing Fock states in two cavities coupled to a transmon; Developed code for qubit characterization experiments on XILINX RFSoC board

Research Assistant,
Computational Science Division,
Argonne National Laboratory Summer-Fall 2021
Supervisor: Yuri Alexeev, Ph.D.
Topic: Making Quantum Approximate Optimization Algorithm (QAOA) for MaxCut non-variational by reusing optimal parameters of known instances to solve unknown instances; Predicting similarity or transferability of optimal parameters of graphs using transferability of their underlying subgraphs.

Undergraduate Research Assistant,
Rutgers University-New Brunswick Fall 2019 – Spring 2021
Supervisor: Stephen Schnetzer, Ph.D.
Topic: Quantum computations of molecular ground states; investigating Variational Quantum Eigensolver (VQE) in computing ground state energy of the Hydrogen molecule; comparing noise amplification techniques in Zero Noise Extrapolation (ZNE),

error mitigation technique; performed statistical analysis of Polynomial and Richardson Extrapolation.

Research Programming Intern,
University of Nebraska-Lincoln Summer 2018
Supervisor: Ashu Guru, Ph.D.
Topic: Agricultural Education; front-end programming on "Agpocalypse 2050" project; investigated criteria for effective, educational video games.

PRESENTATIONS

E. Gupta, A. Galda, X. Liu, D. Lykov, I. Safro, Y. Alexeev. Predicting Transferability of Optimal Parameters of Quantum Approximate Optimization Algorithm.

- Talk by E. Gupta at: American Physical Society March Meeting 2022, Chicago IL, March 2022.
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E. Gupta, Y. Alexeev. Predicting Optimal QAOA Parameters for Random Graphs.

- Talk by E. Gupta to Learning off the Lawn (Student Symposium), Argonne National Laboratory, July 2021.

E. Gupta, S. Schnetzer, R. Gambhir. Error Mitigating Quantum Computation of Molecular Ground States.

- Poster Presentation by E.Gupta at 2020 Virtual Summer Science Poster Session, Aresty Research Center for Undergraduates, July 2020.

E. Gupta. Quantum Computing Electronic Structure.

- Talk by E. Gupta to Professor Richard Remsing's chemical physics group, Rutgers University, May 2020.
- Talk by E. Gupta to Stephen Schnetzer's Vector Like Quarks (VLQ) group, Rutgers University, May 2020.
- Talk by E.Gupta at Quantum Computing Workshop, New Jersey section of the American Association of Physics Teachers (NJAAPT), June 2020.

HONORS AND AWARDS

Barry Goldwater Scholarship Spring 2022
National undergraduate scholarship in the natural sciences, engineering and mathematics awarded for academic and research accomplishments.

The Timothy Hubbard Scholarship Spring 2021
Rutgers School of Arts and Sciences (SAS) Excellence Award for academic merit and strong record of service to university and/or community.

Robert L. Sells Scholarship Spring 2021

Awarded annually to two Rutgers physics majors who, in the judgment of the physics faculty, have demonstrated outstanding academic excellence.

Aresty Summer Science Research Fellowship Summer 2020
Aresty Research Center for Undergraduates, Rutgers University

IBMQ Qiskit Advocate Summer 2020
Recognized for code contributions and community outreach by IBM's quantum computing community.

Dean's List 2019- Present
Rutgers University

OUTREACH

Staff Instructor July, 2022
Rutgers Quarknet
Assisted in teaching quantum computing to a cohort of 24 high school students; Led interactive discussions, designed problem sets, organized lab tours, delivered three 75 minute talks on superconducting qubits

Hacking Workshop March, 2021
Society of Physics Students
Delivered an oral presentation and led interactive coding session on quantum computing and Quantum Teleportation algorithm for undergraduates.

Virtual Workshop July, 2020
Governor's School of New Jersey
Delivered an oral presentation and led interactive coding session on quantum computing and Variational Quantum Eigensolver algorithm for high school students.

OTHER

- Programming Experience and related coursework in **Python**, **Java**, **C** and **C#**.