

Siddharth Dangwal

siddharthdangwal@uchicago.edu | dangwal.sid6@gmail.com | [LinkedIn](#) | [Google Scholar](#)

EDUCATION

The University of Chicago

2021-2026 (expected)

Ph.D. in Computer Science

Indian Institute of Technology Delhi

2017-2021

Bachelor Of Technology in Electrical Engineering, Specialization in Cognitive Science

9.554/10.000

INDUSTRY EXPERIENCE

PhD Research Intern

June 2023 - September 2023

IBM

Working on designing a low-overhead variant of digital ZNE for VQE. Currently ZNE requires a high circuit overhead, which leads to a long time overhead for each VQE iteration. We are working to reuse ZNE computations across iterations and across multiple circuit terms in the same iteration, to reduce the overhead substantially.

ACADEMIC RESEARCH EXPERIENCE

Graduate Research Assistant

September 2021 -

EPiQC, The University of Chicago

Broadly working on designing error mitigation techniques (either as a compiler pass or as a post processing protocol) for execution of circuits in the NISQ regime. Special focus on Variational Algorithms. Also work on error correction problems including mapping existing codes to new hardware technology, and designing efficient decoders.

Undergraduate Research Assistant

May 2019 - May 2021

NAITS Group, IIT Delhi

Designed and implemented quantum algorithms for performing machine learning tasks. Algorithms primarily focus on training a quantum ansatz faster by processing multiple samples parallelly.

Summer Intern

April 2020 - August 2020

Memory Systems Lab, Georgia Institute Of Technology

Demonstrated the efficacy of Dynamical Decoupling (DD) at an application level and proposed an adaptive scheme to apply DD judiciously to qubits which would really benefit from them. Reported a 2.8x average increase in fidelity over the default compiler used by IBM quantum computers.

PUBLICATIONS

- **Siddharth Dangwal**, Gokul Subramanian Ravi, Poulami Das, Kaitlin N. Smith, Jonathan M. Baker, and Frederic T. Chong - VarSaw: Application-tailored Measurement Error Mitigation for Variational Quantum Algorithms - (To Appear - ASPLOS 2024) [link](#)
- Ji Liu, Max Bowman, Pranav Gokhale, **Siddharth Dangwal**, Jeffrey Larson, Frederic T Chong, and Paul D Hovland - QContext: Context-Aware Decomposition for Quantum Gates - (ISCAS 2023) [link](#)
- Poulami Das, Swamit Tannu, **Siddharth Dangwal**, and Moinuddin Qureshi - ADAPT: Mitigating Idling Errors in Qubits via Adaptive Dynamical Decoupling-(MICRO 2021) [link](#)
- Soumik Adhikary, **Siddharth Dangwal**, and Debanjan Bhowmik-Supervised learning with a quantum classifier using a multi-level system-(Quantum Information Processing 19 (3), 89) [link](#)
- Saurabh Kumar, **Siddharth Dangwal**, Soumik Adhikary, and Debanjan Bhowmik-A Quantum Activation Function for Neural Networks: Proposal and Implementation-(IJCNN 2021) [link](#)

- **Siddharth Dangwal**, Ritvik Sharma and Debanjan Bhowmik-An Algorithm for Fast Supervised Learning in Variational Circuits through Simultaneous Processing of Multiple Samples-(Quantum Information Processing 21 (5), 189)[link](#)
- **Siddharth Dangwal**, Gokul Subramanian Ravi, Lennart Maximilian Seifert, and Frederic T. Chong - Clifford Assisted Optimal Pass Selection for Quantum Transpilation - (Currently under submission) [link](#)
- **Siddharth Dangwal**, Gokul Subramanian Ravi and Frederic T. Chong - Cryogenic Heirarchical Decoder for Quantum Error Correction - (Poster, MICRO SRC 2022)

AWARDS AND ACHIEVEMENTS

- Awarded the Crerar Fellowship by The University of Chicago
- Ranked fourth out of 110+ students in the Electrical Engineering class of 2021 at IIT Delhi with a CGPA of 9.554/10
- Awarded Summer Undergraduate Research Award for outstanding research at undergraduate level at IIT Delhi.
- Awarded semester merit award for being in the top 7% of the class in semesters 1,2 3, 4, and 8 at IIT Delhi.
- Secured All India Rank 379 in Joint Entrance Exam Advanced out of 1,120,000 candidates for admission to the IITs.
- Awarded National Talent Search scholarship by National Council of Education, Research and Training, India.
- Awarded KVPY fellowship by the Indian Institute Of Science, Bangalore.

SKILLS

Languages: Java, Python, C/C++, MATLAB, ARM assembly

Libraries and packages: Qiskit, PennyLane, Keras, PyTorch

Frameworks: Arduino, Autodesk Inventor