

# KUSHAGRA GARG

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LinkedIn/arXiv/Google Scholar  
Webpage/GitHub/X

## EDUCATION

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<b>International Institute of Information Technology</b> <i>M.S. in Computational Natural Science</i> <ul style="list-style-type: none"><li>• Advisors: Shantanav Chakraborty, Subhadip Mitra</li><li>• Research area: Quantum Algorithms (<a href="#">Thesis</a>)</li><li>• GPA: 9.5/10</li></ul>	Hyderabad, India 2023 - 2025
<i>B.Tech in Computer Science</i> <ul style="list-style-type: none"><li>• GPA: 8.55/10</li></ul>	2019 - 2023

## EXPERIENCE

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<b>Fujitsu Research</b> <i>Research Scientist</i> <ul style="list-style-type: none"><li>• Designed a Lindbladian simulation algorithm for early fault-tolerant quantum computers, requiring only a single ancilla qubit.</li><li>• Achieved exponential circuit-depth reduction through polynomial interpolation techniques and collision models.</li><li>• Validated the end-to-end method, demonstrating up to 10,000× precision improvement over existing approaches at comparable circuit depths.</li><li>• Co-developing a quantum resource estimation package to enable comparisons across algorithms, error-correction schemes, and device architectures.</li></ul>	Bangalore, India July 2024 - Present
<b>Microsoft Research</b> <i>Research Intern</i> <ul style="list-style-type: none"><li>• Explored the application of multi-party computation for secure inference of large language models, focusing on OT-based protocols.</li><li>• Leveraged symmetry properties of the fundamental neural network operations (ReLU, GeLU, LayerNorm) to optimize secure inference protocols, reducing computational and communication costs by more than 50%.</li></ul>	Bangalore, India Feb 2024 - July 2024
<b>QunaSys Inc.</b> <i>Research Intern</i> <ul style="list-style-type: none"><li>• Developed qubit-efficient entanglement estimation methods, enabling simulations of larger quantum states on limited hardware.</li><li>• Used ZX-calculus to show that MERA tensor-network ansätze avoid barren plateaus, making them more reliable for variational algorithms.</li><li>• Contributed hardware-tailored diagonalization algorithms to the Quri-SDK package, enabling reduction of circuit depth for variational quantum eigensolvers.</li></ul>	Tokyo, Japan June 2022 - Jan 2024

## PUBLICATIONS

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- K. Garg, Z. Ahmed, S. Mitra, S. Chakraborty. [Simulating quantum collision models with Hamiltonian simulations using early fault-tolerant quantum computers.](#) *Physical Review A*, vol. 112, no. 2, Aug. 2025.
  - K. Garg, Z. Ahmed, A. Thomasen. [Entanglement determination with a deep multiscale entanglement renormalization ansatz.](#) *Physical Review A*, vol. 111, no. 4, Apr. 2025.
  - Z. Ahmed, A. Chaudhuri, K. S. S. Grover, A. Rao, K. Garg, P. Malhotra. [Classifying CELESTE as NP-complete.](#) *arXiv:2012.07678*, 2020.

## AWARDS

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- Dean's List Academic Award 2023
  - Dean's List Academic Award 2022
  - Winner of Quantum Chemistry Challenge Qhack 2022
  - KVPY Scholarship 2019
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## ACADEMIC SERVICES

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**Reviewer for:** *Quantum Journal*, AQIS 2025.  
**Teaching Assistant:** *Automata Theory*, *Statistical Mechanics*.  
**Student Moderator:** *ACM CompEd* 2023, *NQSTS* 2021.  
**Club Coordinator:** The Art Society, Astronomy Club.

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## SKILLS

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**Languages:** English, Hindi.  
**Programming:** Python, C/C++, MATLAB, Go.  
**Miscellaneous:** LaTeX, Git, Qiskit.