ANKITH MOHAN

CURRICULUM VITAE

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EDUCATION

PhD in Computer Science *2021-2026* (expected)
Virginia Tech, Blacksburg, VA, USA
Advisor: Jamie Sikora

MS in Computer Science *2018-2020*
University of Southern California, Los Angeles, CA, USA
Advisors: Aiichiro Nakano and Emilio Ferrara

RESEARCH EXPERIENCE

Virginia Tech *2021 - Present*
PhD Candidate *Blacksburg, VA*

Advisor: Jamie Sikora

- Developed quantum heuristics for linear optimization over large separable operators.
- Developed pretty bad measurements for the state exclusion problem as a counterpart of the pretty good measurements for the state discrimination problem.
- Using multi-agent reinforcement learning for obtaining policies that minimize classical communication costs in quantum repeaters for entanglement distribution.

Agency for Science, Technology and Research (A*STAR) *May - August, 2024*
Research Intern *Singapore*

Advisor: Kishor Bharti

- Constructed several approximate dynamical codes using the strategic code framework using a variant of a coordinate descent algorithm.
- Developed a hierarchy of decoders for quantum error correction.

Fujitsu Research of America *May - August, 2023*
Research Intern *Sunnyvale, CA*

Advisor: Sarvagya Upadhyay

- Proposed a generalization of the state discrimination problem by introducing a reward function as a user-defined data.
- Developed a hybrid quantum-classical algorithm for exact exponential reduction of the primal-dual pair of problems.
- Developed heuristics for detecting and identifying multiple quantum change points.

Fujitsu Research of America *May - August, 2022*
Research Intern *Sunnyvale, CA*

Advisor: Sarvagya Upadhyay

- Researched on convex relaxation techniques to identify influential nodes in social networks.
- Developed approximation algorithms by reducing the influentials identification problem as a variant of the maximum directed cut problem.
- Formulated problem as a QUBO problem which can be approximated using digital annealer or an QAOA algorithm.

University of Southern California *2018 - 2020*
Research Assistant *Los Angeles, CA*

Advisor: Sze-Chuan Suen

- Researched on techniques to model the effectiveness of *Pre-exposure prophylaxis* (PrEP) on HIV/AIDS outcomes in Los Angeles county.
- Developed interactive web application that allows online modeling of HIV/AIDS outcomes.
- Designed end-to-end deep learning pipeline to predict mortality of patients at Sutter Health based on patient characteristics, vitals, labs and interventions.

Information Sciences Institute *January - May, 2019*
Directed Research Assistant *Marina Del Rey, CA*

Advisors: Robert F Lucas and Jeremy Liu

- Modeled large-scale reactive molecular dynamics (RMD) simulations data set of MoS_2 monolayer to be able to denoise grain boundaries and defects.
- Used restricted Boltzmann machines (RBM) and limited Boltzmann machines (LBM) which was sampled using D-Wave adiabatic quantum annealer (AQA).
- Improved the performance of the LBM by finding techniques to efficiently reassign its hidden units to the qubits of AQA.

PUBLICATIONS

Ankith Mohan, Chen Bai, Stav Halder, Sumeet Khatri. "*Trading beliefs for classical communication in entanglement distribution with quantum repeaters: a multi-agent reinforcement learning approach*". In preparation.

Ankith Mohan, Tobias Haug, Kishor Bharti, and Jamie Sikora. "*Quantum heuristics for large separable operators*". arXiv: 2509.25585.

Nirupam Basak, Andrew Tanggara, **Ankith Mohan**, Goutam Paul, Kishor Bharti. "*Approximate Dynamical Quantum Error-Correcting Codes*". arXiv: 2502.09177.

Caleb McIrvin, **Ankith Mohan**, and Jamie Sikora. "*Quantum state exclusion through offset measurement*". Physical Review A 110, 042211.

Mohammad Beigi, Ying Shen, Runing Yang, Zihao Lin, Qifan Wang, **Ankith Mohan**, Jianfeng He, Ming Jin, Chang-Tien Lu, Lifu Huang. "*InternalInspector I^2: Robust Confidence Estimation in LLMs through Internal States*". Findings of the Association for Computational Linguistics: EMNLP 2024 (pp. 12847-12865).

Ankith Mohan, Jamie Sikora, and Sarvagya Upadhyay. "*A generalized framework for quantum state discrimination, hybrid algorithms, and the quantum change point problem*". arXiv: 2312.04023.

Ankith Mohan, Aiichiro Nakano, and Emilio Ferrara. "*Graph signal recovery using restricted Boltzmann machines*". Expert Systems with Applications 185 (2021): 115635.

Jeremy Liu, **Ankith Mohan**, Rajiv K. Kalia, Aiichiro Nakano, Ken-ichi Nomura, Priya Vashishta, and Ke-Thia Yao. "*Boltzmann machine modeling of layered MoS2 synthesis on a quantum annealer*". Computational Materials Science 173 (2020): 109429.

Krishnaraj P.M., **Ankith Mohan**, and Srinivasa K.G. *Practical Social Network Analysis with Python*. Springer International Publishing, 2018.

Krishnaraj P. M., **Ankith Mohan**, and Srinivasa K.G. "*Performance of procedures for identifying influentials in a social network: prediction of time and memory usage as a function of network properties*". Social Network Analysis and Mining 7, no. 1 (2017): 34.

PATENTS

Ankith Mohan, and Sarvagya Upadhyay. "*Hybrid Classical-Quantum Unsupervised Multiclass Classification*". US20250094447A1, filed September 15, 2023. Patent pending.

Ankith Mohan, Xiaoyuan Liu, and Sarvagya Upadhyay. "Identification of Influential Nodes in Graph Datasets Using Combinatorial Optimization Formulations". US12437003B2, filed January 18, 2023, granted 7 October 2025.

PRESENTATIONS

Talks

- **Ankith Mohan**, Tobias Haug, Kishor Bharti, and Jamie Sikora. "*Quantum heuristics for large separable operators*". Contributed talk, The Second IEEE Workshop on Quantum Intelligence, Learning and Security (QuILLS 2025).
- **Ankith Mohan**, and Sarvagya Upadhyay. "*Hybrid Classical-Quantum Unsupervised Multiclass Classification*". FRA Lunch and Learn series, July 2023.
- **Ankith Mohan**. "*NISQ Algorithms for Separable Ground States*". VT Quantum Information Science Symposium, April 2022.
- **Ankith Mohan**, Xiaoyuan Liu, and Sarvagya Upadhyay. "*Approximating the Influence Maximization Problem in social networks using DA and QAOA*". FRA Lunch and Learn series, July 2022.

Posters

- Nirupam Basak, Andrew Tanggara, **Ankith Mohan**, Goutam Paul, Kishor Bharti. "*Approximate Dynamical Quantum Error-Correcting Codes*". CCI Student Researcher Showcase, March 2024.
- Caleb McIrvin, **Ankith Mohan**, and Jamie Sikora. "*Pretty bad measurement*". CCI Student Researcher Showcase, March 2024. **Awarded the People's Choice Award.**
- **Ankith Mohan**, Jamie Sikora, and Sarvagya Upadhyay. "*A generalized framework for quantum state discrimination, hybrid algorithms, and the quantum change point problem*". VT Quantum Information Science Symposium, November 2023.
- **Ankith Mohan**, Tobias Haug, Kishor Bharti, and Jamie Sikora. "*Inner Approximations and a NISQ Algorithm for the Quantum Separability Problem*". 25th Annual Conference on Quantum Information Processing, March 2022.

TEACHING EXPERIENCE

Graduate Teaching Assistant

- Ethics and Professionalism in Computer Science, *Fall 2025.*
- Data and Algorithms Analysis, *Spring 2025.*
- Introduction to Problem Solving in Computer Science, *Fall 2021, Spring 2024.*

VOLUNTEER SERVICE

Quantum Information Science and Technology (QIST) Summer Camp *Jun - Jul, 2025*
Volunteer *Blacksburg, VA*

- Volunteer for 6 summer camps for middle school and high school students.
- Lead instructor for one camp of 64 students.

ACADEMIC SERVICE

- (Sub-)reviewer: TQC 2025.
- Reviewer: Journal of Physics A: Mathematical and Theoretical.

HONORS AND AWARDS

Best Research Award, Department of Computer Science, University of Southern California *2021*

REFERENCES

Jamie Sikora.
Assistant Professor of Computer Science. Virginia Tech. Blacksburg, VA 24060.
sikora@vt.edu
Relationship: Doctoral Advisor.

Sumeet Khatri.
Assistant Professor of Computer Science. Virginia Tech. Blacksburg, VA 24060.
skhatri@vt.edu
Relationship: Doctoral committee member.

Sarvagya Upadhyay.
Head of Quantum Lab. Fujitsu Research of America. Sunnyvale, CA 94085.
supadhyay@fujitsu.com
Relationship: Internship Advisor.

Kishor Bharti.
Senior Scientist. Institute of High Performance Computing (IHPC), Agency for Science,Technology and Research (A*STAR). Singapore 138632.
bharti_kishor@ihpc.a-star.edu.sg
Relationship: Internship Advisor.