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AAMOD ATRE

M. Sc. Quantum Science and Technology

About Me

1. **INTERESTED** in understanding the interplay of quantum dynamical processes across various timescales
2. **ENJOY** delving into the theoretical underpinnings of a problem and exploring systems computationally
3. **INTEND** to pursue the development of hardware-oriented protocols in quantum information and many-body physics

Education History

Post-Graduate	**Technical University of Munich**	**Oct 2022 - Jun 2025**
GPA 1.4/5.0 | Max. 1.0	M. Sc. Quantum Science and Technology	
Undergraduate	**Birla Institute of Technology and Science, Pilani**	**Aug 2017 - Jul 2021**
GPA 8.65/10.0	B.E. Chemical Engg. | Minor : Physics	
Higher Secondary	**FIITJEE Junior College, Kukatpally, Hyderabad**	**Apr 2015 - Aug 2017**
Percentage : 96.5 %	Grades XI & XII	
Senior Secondary	**Delhi Public School, Nacharam, Hyderabad**	**Mar 2013 - Mar 2015**
GPA : 10.0/10.0	Grades IX & X	

Academic Research

Master's Thesis **Apr. 2024 - May 2025**

Prof. Frank Pollmann | *Technical University of Munich* | *(PDF)*

Using the stabilizer formalism to numerically study measurement-induced entanglement transitions, in random quantum circuits of varying local Hilbert-space dimensions, to understand the transition universality and distill a dynamical classical analogue of the transition. Presented at DPG Spring Meetings 2025.

Undergraduate Thesis **Jan. 2021 - June 2021**

Prof. Jeremy Richardson | *ETH Zürich*

Gauged the efficacy of a spin-mapping-based semiclassical dynamics technique by a Python-based numerical study of the population and coherence dynamics of exciton relaxation in a 1D polymer chain. Formulated a spin-mapping dynamics algorithm for tight-binding polymer chains which conform to SU(2) symmetry.

Work Experience

Student Assistant | ***HiWi*** **May 2024 - Sept. 2025**

Quantum Computing and Technologies Dept. | *Leibniz Supercomputing Centre (LRZ), Munich*

Benchmarked HPC-enabled quantum simulators on optimization and Hamiltonian evolution tasks, for integration into LRZ's HPC infrastructure. Examined automated calibration protocols for the Munich Quantum Software Stack (MQSS).

Student Assistant | ***HiWi*** **Apr. 2023 - Sept. 2023**

Prof. Peter Rabl | *Walther Meißner Institute, Munich*

Compared various numerical integration approaches in stochastic Master equation simulations of a dissipative cascading quantum network, to facilitate simulations of larger system sizes.

Remote Research Assistant **Oct. 2021 - Oct. 2022**

Dr. Aaron Kelly | *Max Planck Institute for the Structure and Dynamics of Matter, Hamburg*

Benchmarked a semiclassical mapping-based dynamics method (spin-PLDM) by modelling the interactions between a two-level atomic subsystem and a cavity-modified field.

Remote Research Internship **July 2021 - Sept. 2021**

Prof. Pengfei Huo | *University of Rochester, New York*

Numerically compared the performance of standard and spin-based partially linearized density matrix (PLDM) algorithms in calculating linear absorption spectra of a bi-exciton coupled dimer model.

Research Internship **May 2019 - July 2019**

Prof. Bibek Dash | *CSIR Institute of Minerals and Materials Technolgy, India*

DFT-based computational designing of triazole-based molecular precursors for selective CO_2 capture. Statistically determined the optimum functional-basis combination to model the CO_2-triazole interactions with DFT. Studied CO_2 interactions with the aromatic building blocks to propose a new triazole moiety design.

Technical Skills

Programming	Software Packages		Languages
Python	MATLAB	LAMMPS	English (Native/Bilingual)
C++	COMSOL	Quantum Espresso	German (B1)
Julia/C (Elementary)	Mathematica	Gaussian	French (Elementary)
			Marathi | Hindi (Native)

Standardized Tests

GRE General Test : 335/340 | Quant : 168/170 | Verbal : 167/170 | Analytical Writing : 5/6 — **Aug. 2021**

TOEFL : 115/120 | Reading : 30/30 | Listening : 30/30 | Speaking : 25/30 | Writing : 29/30 — **Sept. 2021**

Undergraduate Teaching Experience

Teaching Assistant — **Aug. 2020 - Dec. 2020**
Dr. S. D. Manjare | *Process Design Principles - I*

Teaching Assistant — **Aug. 2020 - Dec. 2020**
Dr. Radhika Vathsan | *Quantum Mechanics - II*

Featured Undergraduate Projects

Designing Lithium-based metal organic frameworks for hydrogen production — **Jan. 2020 - June 2021**
Design Project | *Dr. Paramita Haldar*

Ab initio computational study of graphene-based Li-MOFs, employing density functional theory implementation in Quantum Espresso for electronic structure calculations & reactive molecular dynamics within LAMMPS framework to study hydrogen evolution amongst proposed models.

Study of cavity QED formalism and modern quantum control techniques — **Aug. 2020 - Dec. 2020**
Study Project | *Dr. Raghunath Ratabole*

Literature survey of modern qubit implementations, entangled state preparation and quantum gate implementations in molecule-coupled cavity systems. Study of field quantization, cavity QED formalism and the applications of Jaynes-Cummings model.

Modelling kinetics of photo-catalytic reactions involved in waste-water treatment — **Aug. 2019 - Dec. 2019**
Study Project | *Dr. Sharad Sontakke*

Modelled TiO_2-based photocatalytic degradation of phenol and extraction of Cr and Cu ions with MATLAB. Optimizated TiO_2 catalyst concentration and reaction rates for varying contamination levels.

Study of metal-organic frameworks as tools for adsorptive CO_2 capture — **Jan. 2019 - May. 2019**
Study Project | *Dr. Richa Singhal*

Literature review of thermodynamic and electronic properties of MOFs. Studied the methodologies and developments in the field of CO_2 capture, focusing on MOFs.

Extracurricular Activities

Quantum Computing	· Selected participant - Berlin Quantum Hackathon Crew scheduling optimization problem	**Dec. 2025 - Present**
	· Cleared Quantum Open Source Foundation (QOSF) Cohort 4 assessment task	**Sept. 2021**
	· Completed IBM Quantum's Global Summer School	**June 2020, July 2022**
Social Groups	· Member - Offerings Dept. : *PushQuantum*	**Nov. 2023 - Nov 2025**
	· Core Member : *Kala - Fine Arts Club*	**Mar. 2018 - May 2020**
Hobbies	· Long distance running, and hiking in the Bavarian Alps.	
	· Avid reader of fiction and non fiction literature	