Anurag K S V

Quantum Analyst

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Degree / Course	University / Institute	Year	CGPA / %
M.Tech - Quantum Computing	School of Quantum Technology, DIAT Pune	2022-2024	9.05
B. Tech - Computer Science & Engineering	School of Technology, GITAM Visakhapatnam	2018-2022	9.06
Intermediate (XII) - [Math-Phys-Chem]	Sri Chaitanya Junior Kalasala, TSBIE	2016-2018	93%
Matriculation (X)	Johnson Grammar School, ICSE	2016	93%

Publications & Conferences

- **Anurag K. S. V.**, Ashish Kumar Patra, Chinmay Anand, et al. (2025) Potential Energy Surface Scan of n-butane Using Various Quantum Chemistry Software. *Authorea (preprint)*. DOI: 10.22541/au.174624847.78353339/v1
- S. Chouhan[*], **K. S. V. Anurag**[*], G. Raghavan and P. Kanaka Raju, FPGA-based Toeplitz Strong Extractor for Quantum Random Number Generators, *2024 IEEE 5th India Council International Subsections Conference (INDISCON)*, Chandigarh, India, 2024, pp. 1-5, doi: 10.1109/INDISCON62179.2024.10744392 ([*]Contributed equally to the work)
- **Anurag K. S. V.**, G. Raghavan, & Kanaka Raju P. (2024). High-efficiency implementation of Toeplitz Strong Extractor for PRNG and QRNG output on CPU/GPU hardware systems. *Physica Scripta* (Vol. 99, Number 7), 075115. DOI: 10.1088/1402-4896/ad587f
- **Anurag K. S. V.,** & Bhaskara Rao B. (2022). Temporal and Correlational Analysis of Air Pollution and Covid-19 Across Major Metropolis in India. *International Journal of Innovative Technology and Exploring Engineering* (Vol. 11, Issue 11), 1–6. DOI: 10.35940/ijitee.K9277.10111122
- **ICQTA24 | MAHE - Poster Presentation** *Manipal, KA*
  - **Anurag K. S. V.**, Kanaka Raju P., & G. Raghavan (2024). Development of High-Speed Quantum Random Number Generator harvesting Quantum Phase Fluctuations. *International Conference on Quantum Technologies and Applications 2024.* DOI: 10.13140/RG.2.2.22320.98569
  - **Anurag K. S. V.**, G. Raghavan, & Kanaka Raju P. (2024). Implementation and Evaluation of Toeplitz Strong Extractor for Post Processing of QRNGs on various Hardware Systems. *ICQTA24*. DOI: 10.13140/RG.2.2.33226.17606
- **Quantum 2.0 | Optica (Formerly OSA)** *Denver, CO*
  Virtual Attendee *Jun'23*
- **4th International Conference - QIQT23 | IISER Kolkata** *Online*
  Attendee *May'23*

Professional Experience

- **Quantum Analyst** | **QClairvoyance Quantum Labs** *Jul '24 – Present*
  - Spearheading the design and development of a proprietary quantum software stack for quantum computing applications, enabling modular workflows across NISQ and FTQC paradigms.
  - Integrating quantum-classical hybrid solvers with classical fragmentation methods to enable scalable molecular simulations on quantum hardware.
  - Implementing error handling strategies, including suppression and mitigation for noise-resilient simulations on quantum computing hardware.
  - Prototyping FTQC subroutines and evaluating early-stage performance using ideal state-vector simulation backends.
  - Architecting and developing full-stack infrastructure for quantum educational and research platforms, with seamless frontend, backend, and cloud-based compute pipeline integration.
  - Built an in-house quantum circuit resource estimation tool and conducted extensive evaluations of various ansatz, optimizer strategies, and Hamiltonian reduction techniques for simulations of molecular systems.
  - Surveying the current quantum computing hardware landscape, error correction strategies and benchmarking metrics at qubit, system and application level.

- **Business Data Analyst** | **Hexawel Healthcare** *Jun '21 – Jul '22*
  - Designed and managed an operations management system, enabling seamless end-to-end product tracking and significantly reducing paper-based and labor-intensive processes.
  - Developed an interactive Google Looker Studio dashboard for visualizing purchases, inventory, and sales forecasts, empowering stakeholders with real-time insights for informed decision-making.
- **Summer Intern** | **Trinity Consultants - Aztec Process Automation** *May '19 – Jun '19*
  - Reviewed and formatted Software and Functional Design Specification documents for diverse projects at the firm.
  - Gained real-time experience using software design tools such as PLC and SCADA, essential for automation.

PROJECTS

- **Development of a High-Speed Quantum Random Number Generator with Post Processing Techniques used for Randomness Extraction**
  Guide: Dr. K Raju Pandiri (Asst. Prof.), Dr. G Raghavan (Prof.) *Aug '23 – May '24*
  - **Physical System:** Development of modular QRNG system by harvesting phase fluctuations using delayed self-heterodyne measurement technique with raw data generation rates in order of Gbps.
  - **Post Processing:** Completed implementation of randomness extraction algorithm using GPU Acceleration on High-Performance Computers using Nvidia CUDA (CDAC – Param Shavak Systems).
  - **Randomness Tests:** Extracted data passes all NIST SP 800-22, Diehard randomness test suites for randomness.
  - **Speed:** The extraction rate is 19.5 Gbps well suited for Quantum Key Distribution Applications.
- **A Study on Quantum Computing Operators, Protocols, Algorithms and Applications**
  Guide: Dr. Bhaskar Rao B (Assoc. Prof.) *Jan '22 – Apr '22*
  - **Literature Review:** An extensive study was done on Quantum Computing paradigms such as Quantum Gate Logic, Quantum Teleportation, Superdense Coding, and Grover's Search Algorithm.
  - **Simulation and Testing:** The above paradigms were tested and simulated on IBM Quantum Aer Simulator using the Qiskit framework.
  - **Python Package Development:** Developed qulib, a quantum computing package, which provides users with a quick simulation of the above paradigms.
- **NBA Match Analysis** *(ECS392)* | *Python* *May '21 – Jun '21*
  - Calculated and plotted each player's contribution in an NBA match for a quick comparative snap-shot of their performance in the game.
  - The custom Player Contribution Metric considers a player's statistics during the match. It compiles them into one metric for comparative analysis similar to NBA's advanced statistics such as PER and Box +/-.
- **WhatsApp Web Automate** | *Python* *Oct '20 – Nov '20*
  - Directly message multiple WhatsApp users using WhatsApp Web without storing their contact information on your mobile phone using Python Automation.
  - Used to communicate with registered users for events, reminders, workshops, etc., without any external 3rd party software integration. Thereby increasing privacy and substantially reducing the time to personalize and communicate information.
- **Dynamic Fine Calculation** *(EID201)* | *C++* *Aug '19 – Sep '19*
  - Case Study where we calculate traffic fines by considering the offender's previous violation history.
  - Developed a prototype code for the system in C++.

TECHNICAL SKILLS

- **Core Programming** : C, C++, Python, Java, SQL.
- **Web Technologies** : HTML5, CSS3, JavaScript, React, Flask, FastAPI, Celery, RabbitMQ, PostgreSQL, MongoDB, Selenium, PyTest, OAuth.
- **AI Automation** : API, Local, ChatGPT, Grok, Ollama.
- **Quantum Computing** : Qiskit, Cirq, PennyLane, CUDA-Q.
- **Accelerated Computing** : NumPy, Pandas, Numba, CuPy, OpenMP, Nvidia CUDA.
- **Computational Chemistry** : PySCF, Psi4, Gaussian, Amber Tools, GROMACS.
- **Business Intelligence** : Google Looker Studio, Power BI, Matplotlib, Seaborn, Plotly.
- **Hardware Description & Simulation** : VHDL, System Verilog, AMD Xilinx Vivado, MATLAB.
- **Cloud & DevOps** : Docker, Docker Compose, GCP, AWS.

- **Operating Systems** : Linux (Ubuntu, CentOS), Windows Subsystem for Linux 2 (WSL2), Microsoft Windows.
- **IDEs & Development Tools** : Git, GitHub, LaTeX, Visual Studio Code, Cursor, Windsurf.
- **Creative & Design** : Canva, GIMP, DaVinci Resolve.

Lab Experience

- **Lasers & Optics:**
  Hands-On exposure to using optical components such as lasers, mirrors, lenses, waveplates, beam splitters, and AOMs to perform fundamental optics-based experiments including free-space, fibre-based interferometry, stokes parameter measurement for polarization of light.
- **Quantum Communication:**
  Performed experiments on Quantum Entanglement Generation employing the Spontaneous Parametric Down Conversion phenomenon realized using a BBO Crystal and its characterization via Quantum State Tomography, CHSH Parameter and the Second-Order Correlation Function. Worked on the prototypical demonstration of the B92 Quantum Key Distribution Protocol.
- **Light Matter Interaction:**
  Worked on experiments including observation of Saturation Absorption Spectroscopy while passing laser light through an Rb Vapour Cell.
- **Laboratory Electronics Equipment:**
  Worked with various photodetectors including High Bandwidth InGaAs, Avalanche, Single Photon Avalanche Diodes, High Speed Oscilloscopes, RF Spectrum Analysers, and Optical Spectrum Analyzer Systems.

Certifications

- **IBM Quantum** ***Online***
  Badge of Excellence & Certificate of Participation – Qiskit Global Summer School 2024 *Aug '24*
- **Indian Institute of Technology – Bombay (IITB)** ***Mumbai, MH***
  Certificate of Participation – ICONS2023 (Two-Day Workshop on Quantum Technologies) *Nov '23*
- **Centre for Development of Advanced Computing (CDAC), India** ***Online***
  Certification of Completion with Merit – Quantum Computing using QSim. *Jul '23*
- **Society for Electronic Transaction and Security (SETS)** **Chennai, TN**
  Certificate of Training – FPGA based post-processing for Quantum Key Distribution Systems. *Jun '23*
- **IBM Quantum** ***Online***
  Quantum Spring 2023 Challenge *Apr '23*
- **SOLID Software Design Principles in Java | Pluralsight** ***Online***
  Certificate of Completion *Apr '20*
- **Google Cloud | Coursera** ***Online***
  Google Cloud Platform Fundamentals: Core Infrastructure *Apr '20*

Positions of Responsibility

- **Student Sports Associate (SSA) at Directorate of Sports GITAM (DU)** *Jul '20 – Jun '22*
  - Successfully conducted 100+ campus events, creating cumulative participation of 13500+ students while establishing multiple sustainable student organizations to develop sports at GITAM.
  - Drafted event policies, guidelines and recruitment procedures for representatives of Sports Clubs & Interest Groups.

Achievements

- Secured **3rd position** in the IBM Qiskit Fall Fest 2023 QUantest: the coding challenge organized by IBM Quantum and DIAT.
- Secured **85th percentile** in Graduate Aptitude Test in Engineering (Physics) 2022 with All India Rank - 2879.
- Graduated in the **95th percentile** in a cohort of 1080 students, receiving a Merit Scholarship for semester 4 (2019 top 5% of CSE Dept.) during my undergraduate studies.
- Received **Certificate of Excellence** for being a Student Sports Associate with the Directorate of Sports in 2020-2021.
- Received the **Bronze Medal** (School) in the National Cyber Olympiad and 11th Rank Zonal in 2015.

EXTRACURRICULARS & DETAILS

- **Languages:** English, Telugu, Hindi, Japanese.
- **Hobbies:** Playing and Coaching Basketball, Sketching, Playing Electronic Piano.
- **Runner-Up** at Inter-University Basketball Tournament organized by Vijaybhoomi University representing DIAT in 2023.
- Participated in **Jr.NBA Coaches Camp** conducted by NBA in GITAM (DU), 2020.
- Placed **2nd** in a debate competition conducted by The Amikus Qriae (legal services) on Information Technology Laws 2020.
- **Core member** of IEEE Computer Society, worked in Content, and Administration domains from 2019 to 2021.
- Member followed by **Vice President** of Creative Arts in Kalakrithi Cultural Club of GITAM (DU) from 2018 to 2020.
- Worked as **Content Writer and Event Manager** in Science and Activity Center (GUSAC) of GITAM (DU) in 2019-20.
- Volunteered as a **Public Relations Executive** for events conducted by Google Developer Student Club in 2019-20.
- Represented GITAM at **IIT Kharagpur Spring Fest, 2018**, as Creative Arts – Kalakrithi Cultural Club member.
- Taekwondo practitioner (Blue Belt) from 2014 to 2015.
- Scout in the Scouts/Guides Organization (S.G.O) with an experience of 3 years from 2011 to 2014.