Syed Ali Asghar

Karachi, Pakistan | syedaliazgher2001@gmail.com | +923312118576

www.linkedin.com/in/syedaliasghar2001 | github.com/SyedAliAsghar2001 | Personal Website

PROFILE

MSc Physics graduate specializing in quantum computing and computational physics, with research experience in developing and benchmarking variational quantum algorithms for quantum chemistry and fluid dynamics. Collaborated internationally under the Womanium WISER program and recognized in global quantum hackathons, including NED TechFest (Runner-up) and Classiq Open Challenge (2nd Place).

EDUCATION

University of Karachi Karachi, Pakistan
Masters of Science in Physics | **CGPA:** 3.26 / 4.00 *(First Division, Excellent)* JAN 2024 – DEC 2024

- **Coursework:** Gravitation and Cosmology, Quantum Mechanics II, Nuclear Physics, Computational Physics, Statistical Mechanics.
- **Thesis:**Relativistic and Nonextensive Generalizations of Planck's Blackbody Radiation Law

  * *Awarded after a 3-year BSc (Hons); together constituting a 4-year integrated program equivalent to an international Bachelor's degree in Physics.*

University of Karachi Karachi, Pakistan
Bachelor of Science (Honors) in Physics | **CGPA:** 3.19 / 4.00 *(First Division, Excellent)* JAN 2021 – DEC 2023

- **Coursework:** Classical Mechanics, Quantum Mechanics, Solid State Physics, Mathematical Physics, Electrodynamics

RESEARCH & ACADEMIC EXPERIENCE

External Research Assistant MAR 2025 – Present
School of Mathematics and Computer Science (SMCS), Institute of Business Administration (IBA)
Supervisor: Dr. Jibran Rashid, Assitant Professor, IBA

- Benchmarking the VQE (Variational Quantum Eigensolver) pipeline across molecular systems (H_2 to larger molecules), evaluating ansätze, qubit mappings, basis sets, classical optimizers, and quantum backends combinations.
- Identifying optimal configurations and trade-offs to enhance efficiency and accuracy of VQE for computational chemistry.
- Leading and mentoring two computer science students on related FYP projects focused on VQE benchmarking and quantum algorithm optimization.

Research Collaborator JUN 2025 – AUG 2025
Womanium WISER Quantum Project (Remote)
Collaborators: Team members from India and Egypt

- Conducted research on quantum algorithms for solving the 1D viscous Burgers' equation, comparing Quantum Tensor Networks (QTN) and Hydrodynamic Schrodinger Equation (HSE) approaches for computational fluid dynamics (CFD).
- Benchmarked quantum solvers against classical and physics-informed neural network (PINN) baselines, analyzing accuracy, scalability, and noise resilience using spectral and finite-difference discretizations.
- **Tools:** Python, Qiskit, PennyLane, NumPy, SciPy, Matplotlib, Jupyter Notebook. Presented at WISER Demo Day 2025 (Special Mention Award); shortlisted for the Quantum Solution Launchpad (QSL) Fellowship 2025.

MSc Research Thesis JAN 2024 – DEC 2024
Department of Physics, University of Karachi
Supervisor: Dr. Zeeshan Iqbal, Assitant Professor, UoK
Title: "Relativistic and Nonextensive Generalizations of Planck's Blackbody Radiation Law."

- Formulated relativistic and nonextensive extensions of Planck's law using temperature transformation theories and Tsallis entropy.
- Compared classical, relativistic, and nonextensive spectra, emphasizing the van Kampen–Israel framework for thermodynamic consistency.
- **Tools:** Python (NumPy, SciPy, SymPy, Matplotlib), Jupyter Notebook, LaTeX.

EDA Capstone Project AUG 2024

IBM Exploratory Data Analysis for Machine Learning Course *(Coursera)*

- Conducted EDA on 119,000 hotel bookings to identify drivers of cancellations.
- Applied statistical hypothesis testing and visualization to provide actionable insights for revenue management.
- **Tools:** Python (Pandas, Matplotlib, Seaborn), data preprocessing, feature engineering, statistical analysis.

*(*Source codes and extended project information are available on my GitHub and personal portfolio:* syedaliasghar2001.github.io/Portfolio.)

HACKATHONS & COMPETITIONS

Quantum Hackathon (Runner up) OCT 2025

NED University, Karachi

- Secured Runner-up position in the Quantum Hackathon at NED University's TechFest '25, solving advanced quantum computing challenges (superposition, entanglement, etc.) and winning a PKR 25,000 cash prize.

BlueQubit Hackathon APR 2025

- Participated in BlueQubit's global quantum hackathon, developing quantum circuit prototypes and exploring hybrid algorithms and error-mitigation techniques.

QSite Hackathon 2024 (Second Position) SEP 2024

Classiq Open Challenge

- Achieved 2nd position for implementing a quantum harmonic-oscillator simulation using the Tao Xin et al. (2020) approach on Classiq, modeling position, velocity, and energy evolution through custom quantum circuits.

IBM Quantum Challenge JUN 2024

IBM Qiskit

- Participated in the IBM Quantum Challenge, solving advanced exercises on quantum algorithms, circuit optimization, and real-device execution using Qiskit.

TEACHING & PROFESSIONAL EXPERIENCE

Applied Physics Lab Instructor, Iqra University – Karachi, Pakistan AUG 2025 – OCT 2025

- Conducted electronics-focused physics labs for computer science undergraduates, covering component identification, circuit assembly.
- Guided students in measurement, debugging, and experimental documentation, emphasizing the link between physical principles and practical implementation.

Scientia Writing Internship, Scientia Magazine – Remote MAY – JUL 2025

- Authored and edited science communication articles, translating advanced physics and quantum computing concepts into accessible language for broad audiences.
- Collaborated with the editorial team to ensure scientific accuracy, clarity, and timely publication across multiple outreach platforms.

Online Mathematics Instructor, Ed Tech – Karachi, Pakistan JUL 2022 – NOV 2022

- Developed and delivered interactive online lessons on high-school mathematics, focusing on conceptual understanding and problem-solving.
- Designed digital learning modules integrating visual explanations and step-wise examples to enhance engagement and comprehension.

STANDARDIZED TESTS

IELTS | Overall band score: 7.5 NOV 2025
Listening 9.0/9.0, Reading 7.5/9.0, Speaking 7.0/9.0, Writing 6.5/7.0

CERTIFICATIONS & EXTRA CURRICULAR ACHIEVEMENTS

Courses and Online Learning

- **QBronze Diploma** - *QWorld*
- **Programming with JavaScript** - *Meta (Coursera)*
- **Practical Quantum Computing with IBM Qiskit for beginners** - *Packt (Coursera)*
- **Quantum Machine Learning Fundamentals Course** - *Ingenii*
- **Exploratory Data Analysis for Machine Learning** *(With Honors)* - *IBM (Coursera)*
- **Introduction to Python Programming** - *University of Pennsylvania (Coursera)*
- **Philosophy of Science** - *The University of Edinburgh (Coursera)*
- **Introduction to Philosophy** - *University of Pennsylvania (Coursera)*
- **ER22.1x: Justice** - *HarvardX (Edx)*

Extra Curricular Achievements

- First Prize — Particle Physics Video Competition JAN 2024
  Won first prize (PKR 20,000 cash award) in a video-making competition about particle physics and the ATLAS experiment, organized by the Department of Physics Alumni, University of Karachi.
- Second Prize — Particle Physics Outreach Event SEP 2021
  Secured second position (PKR 5,000 cash award) in an outreach event designed for bachelor's students to communicate particle physics concepts effectively.

WORKSHOPS & SUMMER SCHOOLS

- **Quantum Machine Learning Workshop** - *QPoland & Fundacja Quantum AI* OCT 2025
- **Celestial Holography Summer School** - *Perimeter Institute* JUL 2024
- **Qiskit Global Summer School** - *IBM Qiskit* AUG 2024
- **CMS Open Data Workshop** - *CMS CERN* JUL 2024

CONFERENCES & PRESENTATIONS

- **18th National Symposium on Frontiers in Physics** – *Quaid-i-Azam University, Islamabad* FEB 2025
  Participated as an attendee in the physics symposium focused on current research topics in quantum computing and condensed matter physics.
- **JuliaHEP 2024 – Workshop CERN, Geneva (Remote)** OCT 2024
  Delivered a lightning talk on inclusive computational practices using the Julia programming language. Talk title: "Empowering Underrepresented Communities Through Julia".

OUTREACH AND VOLUNTEERING

- **Founder and Coordinator** — Zeta Science Forum 🔗 2024 – Present
  Founded a student-led science forum promoting dialogue between physics, computer science, and philosophy students. Organized seminars on quantum computing, cosmology, and philosophy of science, with events featured on the forum's official website (Zeta Science Forum)
- **External Academic Mentor** — Institute of Business Administration (IBA), Karachi MAR 2025 – Present
  Mentored undergraduate teams working on Variational Quantum Eigensolver (VQE) benchmarking and algorithm optimization projects, bridging physics, quantum computing, and applied research in an

interdisciplinary academic setting.

- **Volunteer** — 2nd Physics Camp for Girls, University of Karachi DEC 2022
  Assisted in organizing physics experiments and mentoring high-school students to promote gender diversity in STEM fields.

TECHNICAL SKILLS

- **Programming:** Python (NumPy, SciPy, Matplotlib, Pandas), Julia
- **Quantum & Simulation Tools:** Qiskit, Tangelo, Classiq, PennyLane, Multisim
- **Documentation & Version Control:** LaTeX, Git, GitHub