Farshad Rahimi Ghashghaei

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Profile

As a researcher, I focus on post-quantum cryptography at the intersection of quantum information science and cryptography. My work explores the design and analysis of cryptographic protocols that remain secure against quantum adversaries.

Education

M.Sc. in Cyber Security *Jan 2023 – Jan 2024*
Birmingham City University, United Kingdom
• **Thesis:** Post-Quantum Authenticated-Encryption Schemes for QKD
• **Supervisor:** Dr. Mehdi Yousefi • **Grade:** Distinction (GPA: 4.0/4.0)

B.Eng. in Computer Engineering *Sep 2018 – Sep 2022*
Institute for Higher Education ACECR Khuzestan, Iran
• **Supervisor:** Dr. Jamshid Afshani • **Grade:** 13.82/20 (Final project: 19/20)

Research Experience

Research Assistant *Sep 2023 – Feb 2024*
Birmingham City University, United Kingdom

- Developed post-quantum cryptographic protocols to secure classical and quantum communications.
- Researched quantum control, error correction, and multi-particle modeling.
- Applied machine learning and ensemble methods for quantum simulations and network security.

Publications

Journal papers

- **F. Rahimi Ghashghaei**, N. Elmrabit, A.-U.-H. Qureshi, A. Akhunzada, and M. Yousefi, "Advanced Quantum Control With Ensemble Reinforcement Learning: A Case Study on the XY Spin Chain," IEEE Access, vol. 13, pp. 49514–49526, Jan. 2025. doi:10.1109/ACCESS.2025.3551232
- **F. Rahimi Ghashghaei**, Y. Ahmed, N. Elmrabit, and M. Yousefi, "Enhancing the Security of Classical Communication with Post-Quantum Authenticated-Encryption Schemes for the Quantum Key Distribution," Computers, vol. 13, no. 7, pp. 163, Jul. 2024. doi:10.3390/computers13070163
- H. J. Jin, **F. Rahimi Ghashghaei**, N. Elmrabit, Y. Ahmed, and M. Yousefi, "Enhancing Sniffing Detection in IoT Home Wi-Fi Networks: An Ensemble Learning Approach with Network Monitoring System (NMS)," IEEE Access, vol. 12, pp. 86840–86853, Jun. 2024. doi:10.1109/ACCESS.2024.3416095

Conference papers

- **F. Rahimi Ghashghaei**, "Recent Advances in Quantum Error Correction and Their Impact on the Stability of Quantum Computing," presented as a poster at the 9th International Conference on Interdisciplinary Studies in Nanotechnology, Iran, 2026
- **F. Rahimi Ghashghaei**, "Prediction of the Behavior of Many-Particle Systems in Quantum Mechanics Using Quantum Neural Networks," presented as a poster at the 13th International Conference on Applied Research in Basic Sciences, Engineering and Technology, Georgia, 2026. Certificate

Awards & Honors

- Editor's Choice Article, Computers, 2024 (selected by editorial board).
- MSc with Distinction; ranked among the top students of the cohort.

Work Experience

Head of IT *Dec 2024 – Apr 2026*
Takta Ofogh Bargozideh Pars Company, Iran

- Resolved LMS outages during peak enrollment by fixing database issues with the hosting provider.
- Managed user access, roles, and exam systems for government-accredited training programs.
- Delivered stable, secure IT infrastructure for digital training platforms, ensuring system availability.

System Administrator *Nov 2020 – Dec 2022*
Arya Ravesh Mahshahr Company, Iran

- Maintained and monitored servers, including configurations and user access.
- Trained staff on best practices for cyber security and efficient use of resources.

Academic Service

Peer Reviewer for Journals *Dec 2024 – Present*

- **Quantum Reports:** 1 review (Certificate)
- **Energies:** 1 review (Certificate)
- **Journal of Computer Sciences and Informatics:** 1 review (certificate available upon request)
- **Symmetry:** 2 reviews (Certificate 1, Certificate 2)

Technical Skills

Quantum Computing & Simulation: Designed and simulated quantum circuits, implemented Grover, Shor, VQE, QAOA algorithms, modeled noise and decoherence

Quantum Information Theory: Entanglement measures (entropy, concurrence, negativity), quantum error correction (Shor, Steane, surface codes), quantum communication protocols (BB84, teleportation)

Machine Learning and Optimization: Classical ML (regression, classification, clustering), reinforcement learning (Q-learning, DQN, PPO), quantum ML (variational circuits, quantum kernels, hybrid models), with gradient-based optimization and probabilistic modeling experience.

Programming and Tooling: Python (NumPy, SciPy, Pandas, Matplotlib, Qiskit, PennyLane, TensorFlow, PyTorch), C++, Linux, Git, LaTeX.

Languages

• **English** – C2 (Advanced) • **German** – B1 (Intermediate) • **Spanish** – A1 (Beginner) • **Persian** – Native

Referees

Available upon request.