

Curriculum Vitae – Avner Bensoussan

King's Quantum | VSL-Q | RoaRQ

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Research Objective

I am a motivated researcher with expertise in Quantum Software Testing and Formal Verification. My goal is to advance the understanding and development of testability in Quantum Software and Hybrid Quantum-Classical architectures. My research spans Quantum Software Testability, Quantum Information Theory, and the design of rigorous testing and verification frameworks for emerging quantum-classical architectures, with applications to large-scale and reliable quantum computing.

Education

Sept 2020 – June 2023 **B.Sc. in Computer Science**, Artificial Intelligence Pathway,
King's College London, UK
Specialization: Artificial Intelligence and Ethical Decision Making
Final Project: *Testing the Ethical Decision-Making of Autonomous Vehicles*

Research Experience

Oct 2023 – Present **PhD Candidate**, Department of Informatics, King's College London
Jointly supervised by Prof. Mohammad Reza Mousavi (Department of Informatics) and
Prof. George Booth (Department of Physics).
Member of King's Quantum and the Software Systems (SSY) research group.
- Investigating testing and verification methods for hybrid quantum-classical architectures.
- Defining a novel information-theoretic metric for quantum software testability:
Quantum Squeeziness.
- Developed a taxonomy of real faults in hybrid quantum-classical systems.
- Research contributions within the RoaRQ (Robust and Reliable Quantum Computing) collaboration and the VSL-Q (Verified Simulation for Large Quantum Systems) project.
- Prospective Graduation: March 2027

- May 2023 – Sept 2023 **Fellow Researcher**, Department of Informatics,
King's College London
- Investigated testing approaches for autonomous vehicles using CARLA
and ROS.
- Designed and executed experiments to evaluate realism in simulation
environments.
- Collaboration with Dr. Qunying Song (UCL), resulting in a publica-
tion in
Automated Software Engineering.

Publications

- **A. Bensoussan**, et al. (2025). *A Taxonomy of Real Faults in Hybrid Quantum-Classical Architectures.*
ACM Transactions on Software Engineering and Methodology (TOSEM).
- **A. Bensoussan**, et al. *Quantum Squeeziness: An Information Theoretical Metric for Quantum Software Testability.*
Submitted to *ICST*.
- **A. Bensoussan**, et al. (2024). *Accelerating Quantum Eigensolver Algorithms With Machine Learning.*
In: *OOPSLA 2025*. [OOPSLA]
- V. Klimis, **A. Bensoussan**, et al. *Shaking Up Quantum Simulators with Fuzzing and Rigour.*
In: *OOPSLA 2025*. [OOPSLA]
- D. Blackwell, **A. Bensoussan**, et al. (2024). *Fuzzing-Based Differential Testing for Quantum Simulators.*
In: *Proceedings of SSBSE 2024*, pp. 63–69. [Springer]
- G. d'Aloisio, **A. Bensoussan**, et al. (2024). *Exploring LLM-Driven Explanations for Quantum Algorithms.*
ESEM 2024, pp. 475–481. [ACM]
- Q. Song, **A. Bensoussan**, et al. (2025). *Synthetic versus real: an analysis of critical scenarios for autonomous vehicle testing.*
Automated Software Engineering, Volume 32. [Springer]

Conferences & Presentations

- Dec 2025 Lecture: **Testing Hybrid Quantum-Classical Systems**, Prof. Mousavi's Testing module, King's College London
- Nov 2025 Poster: **Quantum Squeeziness: An Information Theoretical Metric for Quantum Software Testability**, Advanced Quantum Algorithms for Many-Body Systems Workshop, Montpellier

Oct 2025	Talk: AccelerQ: Accelerating Quantum Eigensolvers with Machine Learning , Talk: Shaking Up Quantum Simulators with Fuzzing and Rigour , OOPSLA 2025, Singapore
Oct 2024	Poster: A Taxonomy of Real Faults in Hybrid Quantum-Classical Architectures , PICS Summer School, ITU Copenhagen
Sept 2024	Poster: A Taxonomy of Real Faults in Hybrid Quantum-Classical Architectures , SeeQa, Oxford University
Dec 2023	Talk: Synthetic versus real: an analysis of critical scenarios for autonomous vehicle testing , MDENET

Awards & Honors

2022	B'NAI B'RITH UK – Rothschild Institute Award
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Technical Skills

Programming Languages: Python, C, C++, R, Scala, MATLAB

Frameworks & Tools: Qiskit, Cirq, Pennylane, Tensorflow Quantum, ROS, CARLA, Git, LATEX

Languages: French (Native), Hebrew (Fluent), English (Fluent), Portuguese (Beginner), Arabic (Beginner)

References

Prof. Mohammad Reza Mousavi

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Prof. George Booth

Professor of Theoretical Physics, King's College London

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Dr. Karine Even-Mendoza

Lecturer in Systems & Programming Languages, King's College London

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