JAM K. A. KHAN

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EDUCATION

University of Hong Kong   Hong Kong SAR
BEng, Major: Computer Science, Minor: Mathematics   *Sept 2021 - June 2025*
Coursework: Functional Programming, Optimization Theory, Numerical Methods, Quantum Computation, etc.

Northeastern University   Boston, USA
Semester Exchange   *Jan 2024 - May 2024*
Coursework: Programming Languages, Number Theory, Networks and Distributed Systems, and Algorithms.

RESEARCH PAPERS & EXTENDED ABSTRACTS

Submitted   Traq: Estimating the Quantum Cost of Classical Programs
Anurudh Pedhuri, **Jam Kabeer Ali Khan**, Gilles Barthe, Michael Walter

Preprint   A Duality Theorem for Classical-Quantum States with Applications to Complete Relational Program Logics
Gilles Barthe, Minbo Gao, **Jam Kabeer Ali Khan**, Matthijs Muis, Ivan Renison, Keiya Sakabe, Michael Walter, Yingte Xu, and Li Zhou

PLDI'25 SRC   Capabilities as First-Class Modules with Separate Compilation
🥇 Gold award (Undergraduate)
Jam Kabeer Ali Khan

RESEARCH EXPERIENCE

Max Planck Institute for Security & Privacy, Research Intern, Germany   April - Sept 2025
Supervised by Gilles Barthe, collaboration with Michael Walter

- Extended the `Traq` **Haskell** package to support amplitude amplification and Simon's algorithm, and contributed to the probabilistic language design and semantics.
- Formalized quantum lemmas, e.g., Dirac notation rewrites, in **Lean4**, and contributed to a prover based on relational Hoare logic for classical-quantum programs, using **OCaml**.

HKU Programming Languages Group, Undergraduate Research   Aug 2024 - April 2025
Supervised by Bruno C. d. S. Oliveira

- Designed a language with capabilities as *first-class* modules, first-class environments, and dynamic linking. Formalized the semantics of language via type-directed elaboration to a core calculus.
- Implemented the language in **Haskell** and mechanized the formal proofs of elaboration in **Rocq**. Submitted to PLDI'25 SRC.

HKU Quantum Information and Computation Lab, Research Intern, HKU   June - Aug 2024
Supervised by Ravishankar Ramanathan

- Utilized semi-definite programming (NPA Hierarchy) to calculate the guessing probability curve for a Bell inequality.
- Performed sum-of-squares decomposition to show protocol is self-testing.

INDUSTRIAL EXPERIENCE

Standard Chartered, Haskell Quantitative Developer   Oct 2025 - Present

- Conformance testing, including property-based testing, for the internal gRPC protoc compiler for Haskell/Mu.
- Implementing a version distribution system for the financial library using Haskell/Mu.

ActusRayPartners Limited Hedge Fund, Technology Intern, Hong Kong   June - Aug 2023
Developed a Python utility library to abstract over common database operations for traders.

All Round Education Academy, Software Developer, Freelance   March - Nov 2023
Designed and built an interactive education web app for students to prepare for IB examinations.

HKU Sleep Lab, Student Research Assistant, Hong Kong   April - Oct 2022
Assisted the lab with Android (Java) and IOS (Objective-C) app development to deploy sleep therapy studies.

Programming Languages:	**Haskell, OCaml**, Racket, Gallina, C++, Java, Python
Theorem Provers:	**Rocq, Lean4**
Software:	Git, Latex

TEACHING EXPERIENCE

CS Department, HKU   Hong Kong SAR
Student Teaching Assistant: COMP2396 OOP in Java   Fall 24
Student Teaching Assistant: COMP2396 OOP in Java   Fall 23
Student Teaching Assistant: ENGG1340 C++   Spring 23

All Round Education Academy   Hong Kong SAR
Math and CS Tutor - *part-time*   March 22 - June 23, June - Oct 24

AWARDS AND HONORS

- PLDI'25 SRC Gold Award
- HKU Undergraduate Entrance Scholarship for Outstanding Academic Talents — 2022, 23, 24
- HKSAR Government Scholarship Fund — 2021, 22, 23, 24
- Rosita King Ho Scholarship — 2024
- Cathay Hackathon: 2nd runner-up - Won Free Ticket to Boston, USA — 2023
- HKU Foundation Entrance Scholarship — 2021-2022
- Top in Sindh and Balochistan, GCE A-levels Computer Science & Physics — 2020
- Best Across Three GCE A-levels, 2nd place in Pakistan — 2020
- 100% Merit Scholarship GCE A-levels, Nixor College Karachi — 2018-2020

CONFERENCES

- CAV'25 Student Volunteer
- PLDI'25 Attendee & SRC Participant
- POPL'25 Virtual Attendee