Bence Sooki-Toth

Aarhus, Denmark | +45 81 95 36 99 | bence.sooki.toth@gmail.com | linkedin.com/in/stbence | github.com/0xSooki

Personal Statement

Computer engineering student specializing in cryptography. Experienced in Rust, C++, and Python, with a background in research, algorithm optimization, and cryptographic engineering. Interested in cryptography broadly, particularly proof systems and zero-knowledge.

Research Experience

Research Assistant Oct 2024 – Dec 2025
Eötvös Loránd University *Remote*
- Designed and implemented a secure encryption module in C++ for the EuroQCI quantum communication project.

Student Research Engineer Jun 2024 – Jun 2025
Wigner Research Centre for Physics *Hybrid*
- Collaborated with PhD researchers to accelerate permanent function computation for photonic quantum computing workloads.
- Derived and implemented a novel gradient formula for the permanent.

Education

Aarhus University Aarhus, Denmark
Master of Computer Engineering, focus on Cryptography *Aug 2025 – Present*

Eötvös Loránd University Budapest, Hungary
Bachelor of Computer Science, Mathematical Modelling Specialization *Sep 2022 – June 2025*

Aalto University Espoo, Finland
Exchange Semester *Aug 2024 – Dec 2024*

Manuscripts

Trustless Consensus Manipulation Through Bribing Contracts Sep 2025
Bence Soóki-Tóth, *István András Seres, Kamilla Kara, Ábel Nagy, Balázs Pejó, Gergely Biczók*
https://eprint.iacr.org/2025/1719.pdf

Experience

Co-founder & CEO Sep 2023 – Jul 2024
Hiraeth Labs *Budapest, Hungary*
- Developed a mobile application that analyzes medical reports and "translates" them to human-readable language.

Test Automation Trainee July 2023 – May 2024
SAP *Budapest, Hungary*
- Increased SAP Service and Asset Manager automated test coverage from 5% to 88% by converting manual workflows into Java/Appium test suites.

Full-stack Developer June 2022 – Oct 2022
Coding Sans *Budapest, Hungary*
- Implemented scalable backend services in TypeScript, improving performance and reliability.
- Built Angular frontend components from Figma designs, ensuring responsiveness.

Projects

stark-rs (source) | Rust — Sep 2025 – Present
- Work-in progress implementation of a minimal, dependency-free STARK prover and verifier from scratch.

Applied cryptography (source) | Rust — Sep 2025 – Present
- Implemented minimal, dependency-free cryptographic primitives in Rust to demonstrate low-level understanding of protocol design and security assumptions

Permanent boost (source) | C++, CUDA, OpenMP, CMake, Python — June 2024 – May 2025
- Achieved up to 2× speedup over state-of-the-art permanent computation libraries through algorithmic optimization.
- Proposed and validated a new differentiable gradient formula for the permanent function.

Quantum Circuit Simulator (source) | C++, SFML, Eigen — Sep 2024 – Dec 2024
- Led the development of a full-stack quantum circuit simulation desktop application using C++, Eigen, and SFML as part of a four-member team.

Contributions

reth (source) | Rust — Nov 2025 - Present
- Implemented batching for multiproof messages to reduce per-message processing overhead and significantly lower lock contention.

piquasso (source) | C++, OpenMP — Jun 2025
- Integrated an improved permanent computation backend, boosting performance for Gaussian boson sampling workloads.

unitaryHACK 2025 (source) | Rust, C++ — May 2025
- Contributed to multiple open-source quantum-computing projects, including ldpc, rustworkx, and quizx.

Achievements

Top 10 Most Innovative Startups | National Research, Development, and Innovation agency — July 2024
- My startup, Hiraeth Labs, was recognized as the top 10 most innovative startups by the HSUP (Hungarian Startup University Program), organized by the National Research, Development, and Innovation agency in Hungary.

Talks

Developer tools & Ecosystem on Polygon (slides) | DevX Global Tour — July 2023
- Delivered a presentation on the developer tooling, network solutions (PoS, zkEVM, Supernets, ID), and ecosystem of Polygon

Travel Grants

TCC 2025 - granted by Aarhus University — Dec 2025

Skills

Expertise: Applied Cryptography, High-Performance Computing, Distributed Systems
Programming Languages: Rust, C++, Python, Java, TypeScript
Technologies: Docker, Jira, Git, Node.js
Languages: English, Hungarian, Danish (currently learning)