Andrei Ilinescu

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RESEARCH EXPERIENCE

HONOURS RESEARCHER - QUANTUM DATA MANAGEMENT   2024 - PRESENT
InfiniData Lab, TUDelft

- **Developed** a **quantum circuit simulator that outperforms leading frameworks** (e.g., **QimB**) by **50% in execution time** and reduces memory usage on sparse circuits with high qubit counts.
- Leveraged a sparse MPS (Matrix Product State) representation and optimized memory storage using coordinate-format databases storage, improving data locality and contraction efficiency.
- Currently researching parallel execution of independent state contractions to further enhance simulation performance. Focused on tensor networks, circuit compression, and numerical optimizations for quantum computation on classical hardware.

WORK EXPERIENCE

RESEARCH AND DEVELOPMENT ENGINEER INTERN   OCT 2023 - PRESENT
Ampelmann Operations, Delft

- Designed and implemented a high-performance UDP logging system, leveraging **parallel processing** and **asynchronous data handling** to efficiently process and store real-time analytics data.
- Contributed to the design and development of the primary Human-Machine Interface (HMI) software, enabling operators to interact with the PLCs controlling the gangway system and improving real-time monitoring and usability.
- Developed a GUI-based simulation tool and a real-time plotting system, enhancing **data visualization**, **diagnostics**, and **operator feedback**. Optimized internal software efficiency by designing **data processing pipelines** for real-time analytics and monitoring.

EDUCATION

BACHELOR'S DEGREE IN COMPUTER SCIENCE AND ENGINEERING   SEP 2023 - EXPECTED 2026
Delft University of Technology, Netherlands

- Preparing for an Applied Mathematics (Quantitive Finance Track) minor at Politecnico di Milano (Sep 2025)
- Relevant Coursework: Algorithm Design, Probability & Statistics, Linear Algebra, Multivariate Calculus, Computational Intelligence (ANNs, Reinforcement Learning, Evolutionary Algorithms), Machine Learning (SVMs, Bayesian models, Regressions), Data Mining (Embeddings, Dimensionality Reduction), Computer Graphics (C++, OpenGL)

SKILLS

Programming & Development:
C++ (Performance Optimization, Competitive Programming), Python, Java, JavaScript, Scala, Bash

Networking & Systems:
TCP/UDP, Network Design & Troubleshooting *(CCNA Certified)*, Linux, System Profiling & Optimization

High-Performance Computing & Parallelism:
Multithreading, Asynchronous Processing, Parallel Computing, Memory Optimization, Low-Level Systems Programming

Quantum Computing & Simulation:
Qiskit, Tensor Networks, Quantum Circuit Simulation, Quantum Information Theory

Data Science & Big Data:
NumPy, Pandas, Spark, Flink, MongoDB, SQL, Machine Learning, Reinforcement Learning, Neural Networks

Graphics & Visualization:
OpenGL (C++), GUI Development, Real-Time Data Visualization

Software Engineering & Testing:
Agile Development, Design Patterns, Software Testing *(JUnit, Mockito, JaCoCo)*, Domain & Mutation Testing, CI/CD

Languages:
English (Fluent), Romanian (Native), German (Limited)

AWARDS & CERTIFICATIONS

1st Place – AcadNet Applied Informatics Olympiad (Computer Networking, National & International Phase) *(2023)*

Top 10 – Romanian National Olympiad in Informatics *(2016-2020)*

2nd Place – Harman Hackathon *(2021)*

Special Prize – Hermes Hackathon *(2021, Babes-Bolyai University)*

CCNA *(Cisco), MongoDB Performance & Cluster Administration, Google Digital Marketing*

PROJECTS

MNIST Classifier – Implemented a neural network from scratch in **C++** to classify handwritten digits from the MNIST dataset, optimizing matrix operations and activation functions for performance.

Foreign – InnovationLabs Pre-Accelerator (Semifinalist, 2022) - Developed a cross-platform mobile app in **React Native** to connect tourists with locals for authentic travel experiences. Built core features including **real-time messaging** and location-based recommendations. Led MVP development, UX/UI design, and product iteration based on user feedback.

Splitty – Built a client-server expense management app with Spring & JavaFX, featuring real-time updates via REST & WebSockets.