Amina Sokoli

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Research Interests

- My research interests include computer architecture and microarchitecture with a focus on:
- Memory systems. Processing-in-memory and near-data processing. Data movement bottlenecks.
- Cloud architectures. Energy-efficient and heterogeneous infrastructure.
- Security and privacy (hardware security, RowHammer).
- Agent-based modeling (large-scale simulation).
- High performance computing (multi-core, GPUs). Parallel programming and performance optimisation.

Education

ACACES
July 2026

Advanced Computer Architecture and Compilation for High-Performance Embedded Systems (ACACES), Fiuggi, Italy, July 2026
Completed coursework:
Compiler Design for AI Chips and Programming Frameworks
Feeding the Beast: Three Decades of Wasted (CPU) Cycles
Memory Consistency and Cache Coherence
Composable Heterogeneous Computing: A New Design Paradigm
Presented poster: *Understanding Performance Bottlenecks of Large-Scale Agent-based Simulations*

Polytechnic University of Tirana
October 2022 – July 2025

B.Sc, Computer Engineering, July 2025
Thesis Title: *Implementing Encryption as an Architectural Approach to Securing Memory Systems*

Experience

CISPA Helmholtz Center for Information Security, Secure and Sustainable System Scaling Lab (S4L), Affiliated Researcher, ***February 2026 – Present***

- Characterised memory and performance bottlenecks of large-scale agent-based simulations presented at ACACES and REACH 2026
- Develop BeSA, a representative agent-based modeling benchmark suite for architecture simulators; presented at Arch4Health workshop in conjunction with MICRO 2026
- Studied fault tolerance in shared-memory and MPI-based execution covering communication and failure handling

3i Solutions, Full-stack Software Engineer, ***July 2025 – Present***

- Develop and maintain microservices in cloud-based distributed systems
- Teach and mentor interns in the company's software engineering internship program each cycle since late 2025

Research Work

- Understanding Performance Bottlenecks of Large-Scale Agent-based Simulations, REACH Conference: Emerging Architectures in Computing Horizons, 2026
  Amina Sokoli, A. Giray Yaglikci, Poster
- BeSA: Benchmarks for Simulating Agent-based Models in Architecture Research, 4th Arch4Health workshop, MICRO, 2026
  Amina Sokoli, A. Giray Yaglikci, Talk
- Practical Implications of BMSSP: Shortest Path Computation on Urban Road Networks, ICITEE, 2025
  Amina Sokoli, Ina Papadhopulli, Paper
- Implementing Encryption as an Architectural Approach to Securing Memory Systems, 2025
  Amina Sokoli, Ina Papadhopulli, Paper

Skills

- **Systems & Architecture:** distributed systems, microservices, MPI, OpenMP, gem5, ZSim, ChampSim, Ramulator v2.0 and v2.1, SimPoint, Intel Pin, Valgrind

- **Hardware Description Languages:** Verilog, VHDL
- **Software Engineering:** C, C++, Java, PL/SQL, JavaScript, TypeScript, C#, Python, TDD, agile
- **Communication:** Presented a poster on agent-based simulations at ACACES and REACH 2026 and gave a talk at the 4th Arch4Health workshop in conjunction with MICRO 2026; Regularly present and discuss recent computer architecture papers in the S4L group reading sessions; Teaching the software engineering internship program at 3i Solutions to interns of different levels;
- **Collaboration:** Co-authored research on memory systems and work closely with my supervisor on planning and discussing research experiments; Collaborate with other S4L group members on other projects and teaching assistant tasks, and with the 3i Solutions team on developing enterprise software;
- **Independence:** Conduct research at CISPA on memory bottlenecks in large-scale agent-based models. Alongside this main project, I independently study processor design, microarchitecture and data movement bottlenecks.

Services

Universität des Saarlandes, Teaching Assistant in Computer Architecture, **October 2026 – Present**

- Grade student assignments
- Mentor students in seminar classes
- Supervise and advise students on their literature reviews

Languages

Albanian, Native language
English, Advanced
German, Intermediate
Italian, Intermediate