Axel S. **Feldmann**

PhD Student in Computer Architecture

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Academic/Research

Massachusetts Institute of Technology – CSAIL *Cambridge, MA*

PhD in Computer Science – Computer Architecture *2019-*

- **Advisor:** Prof. Daniel Sanchez
- Working on *F1* [2], a flexible hardware accelerator for Fully Homomorphic Encryption (FHE)
  - Designed and configured the system architecture based on careful architecutral analysis of FHE applications
  - Developed scheduling algorithms for mapping FHE computations onto *F1*'s hardware
  - Evaluated *F1* on a variety of benchmarks showing gmean 5,400x speedups over CPU-based FHE implementations
- Coursework: Computer Architecture, Networks, Computer Vision, Distributed Algorithms
- GPA 5.0/5.0

Carnegie Mellon University - School of Computer Science *Pittsburgh, PA*

B.Sc. in Computer Science *2015-2019*

- Worked on *Livia* [1], a system architecture for data centric computing throughout the memory hierarchy
  - Worked in Prof. Nathan Beckmann's group
  - Created `zsim` based simulation infrastructure to evaluate our proposed architecture
  - Designed *Livia*'s hardware-software interface
  - Evaluated our system on data intensive irregular applications obtaining 1.3-2.4x speedups over CPU baselines
- Served as a teaching assistant for Operating Systems (15-410) and Introduction to Computer Systems (15-213)
- Selected coursework: Operating Systems, Compilers, Parallel Computer Architecture, Programming Languages, Distributed Systems, Algorithms
- GPA 3.9/4.00

Industry Experience

NVIDIA *Santa Clara, CA*

Software Engineering Intern *Summer 2018*

- Improved display driver performance for existing and upcoming Tegra SoCs
- Reduced kernel test time by 30% via improved thread synchronization

Yahoo – Flurry Analytics *Sunnyvale, CA*

Software Engineering Intern *Summer 2017*

- Created webapp to help users design metrics API queries
- Re-engineered User Acquisition Analysis (UAA) features on the Flurry data platform

Publications

[1] Elliot Lockerman, **Axel Feldmann**, Mohammad Bakhshalipour, Alexandru Stanescu, Shashwat Gupta, Daniel Sanchez, and Nathan Beckmann. Livia: Data-centric computing throughout the memory hierarchy. In *Proceedings of the Twenty-Fifth International Conference on Architectural Support for Programming Languages and Operating Systems*, 2020.

[2] **Axel Feldmann***, Nikola Samardzic*, Aleksandar Krastev, Srini Devadas, Ron Dreslinski, Chris Peikert, and Daniel Sanchez. F1: A fast and programmable accelerator for fully homomorphic encryption. In *2021 54th Annual IEEE/ACM International Symposium on Microarchitecture (MICRO)*, 2021.

∗ authors contributed equally

Relevant Skills

Programming C++, C, Python, Rust, Java, x86/64 assembly
Tools Unix, Intel Pin, PyTorch, LLVM