Charles Block

Education

2022-Present **Ph.D. Computer Science**, *University of Illinois*, Urbana-Champaign
NSF Graduate Research Fellow, advised by Dr. Josep Torrellas. Research topics include computer architecture and distributed systems for HPC applications.

2018-2022 **B.S. Electrical & Computer Engineering with Honors**, *University of Texas*, Austin

Industry Experience

Summer 2022 **Intel Corporation**, *Design Validation Intern*
- Supported CPU validation in the Advanced Architecture Development Group.
- Debugged core RTL & software infrastructure to address performance and power issues.
- Improved run-time performance of long- and often-running validation jobs by 20x.

Summer 2021 **Microsoft Corporation**, *Software Development Intern (Azure)*
- Initiated development of a distributed service to supplement PostgreSQL databases.
- Developed major modifications to the PostgreSQL storage system.
- Developed software using the C and Rust programming languages.

Summer of 2019 & 2020 **Amazon Robotics**, *Firmware Development Intern*
- Supported firmware development for the Amazon Scout robotics project.
- Integrated various sensors, MCUs, and SoCs using both embedded Linux and bare-metal C.
- Developed/evaluated a real-time object detection and tracking system on an embedded SoC.

Summer 2018 **TyRex Group, LTD**, *Engineering Intern*

Academic & Leadership Experience

2023-Present **i-acoma Group at UIUC**, *Graduate Researcher*
- Working with Professor Josep Torrellas on HPC architectures and distributed systems.
- Current work involves supercomputer-scale distributed algorithms for sparse matrix kernels.

2021-2022 **Lu Research Group at UT Austin**, *Research Assistant*
- Worked with Professor Nanshu Lu to develop wearable low-power biomedical sensors.
- Developed measurement circuitry for experiments with novel pressure sensor technology.

2018-2022 **Longhorn Racing - Solar Vehicle Team**
- Served as Chief Engineer and Electronics Lead at various points.
- Oversaw manufacturing of composite materials, electronic systems, and structural components.
- Developed embedded hardware and software components for control and power systems.
- Developed lessons & mentored other members in designing hardware and software systems.

Spring of 2020 & 2021 **Intro to Embedded Systems at UT Austin (EE319K)**, *Teaching Assistant*
- Assisted in teaching and lab supervision for a freshman embedded systems course.

Awards

2022 **NSF Graduate Research Fellowship**, *National Science Foundation*

2022 **Wing Kai Cheng Fellowship**, *University of Illinois Urbana-Champaign*

2020 & 2021 **Dr. Ariane L. Beck and Mr. Eric Sebesta Endowed Scholarship**, *UT Austin ECE*

Relevant Coursework

- Machine Learning for Compilers & Architecture (Charith Mendis, *UIUC*)
- Parallel Computer Architecture (Josep Torrellas, *UIUC*)
- Microarchitecture (Yale Patt, *UT Austin*)
- System-on-Chip Design (Andreas Gerstlauer, *UT Asutin*)
- ML Algorithm & Hardware Co-Design (Mattan Erez & Michael Orshansky, *UT Austin*)

Publications

[1] **C. Block**, G. Gerogiannis, C. Mendis, A. Azad, and J. Torrellas, "Two-face: Combining collective and one-sided accesses for efficient distributed spmm," *ASPLOS 2024*.

[2] V. Suresh, B. Mishra, Z. Zhu, Y. Jing, N. Jin, **C. Block**, P. Mantovani, D. Giri, J. Zuckerman, L. P. Carloni, and S. Adve, "Composable fine-grained acceleration in shared-memory socs," *Under Submission*.

[3] K.-H. Ha, Z. Li, S. Kim, H. Huh, Z. Wang, **C. Block**, S. Bhattacharya, H. Shi, and N. Lu, "Stretchable hybrid response pressure sensors," *Under Submission*.