Tyler Estro

testro@cs.stonybrook.edu | fsl.cs.stonybrook.edu/~tyler | tyler-estro
Stony Brook, New York, USA

Objective

Ph.D. candidate in Computer Science at Stony Brook University advised by Erez Zadok. My research spans tiered memory, storage systems, virtualization, performance modeling, and visualization, with recent work focused on CXL-based live VM migration in QEMU/KVM. I have extensive experience in low-level systems and kernel programming, cloud and HPC environments, and rigorous performance analysis. Seeking research or engineering roles where foundational systems work enables the transformative technologies that will shape tomorrow.

Education

- **Stony Brook University** *2018 – Current*
  Ph.D. in Computer Science Stony Brook, NY
  - Advisor: Erez Zadok
  - Thesis: Understanding and Optimizing Tiered Memory and Storage Systems
  - Lab: File Systems and Storage Lab (FSL)
  - Coursework: Analysis of Algorithms, Computer Architecture, Compiler Design, Discrete Mathematics, Fundamentals of Data Science, Operating Systems, Logic in Computer Science, Systems Security, Theory of Computation.
- **Stony Brook University** *January 2022*
  M.S. in Computer Science Stony Brook, NY
- **Farmingdale State College**
  B.S. in Software Technology Farmingdale, NY
- **Suffolk County Community College**
  A.S. in Business Administration Selden, NY

Skills

- **Languages & Tools:** C, Python, Bash, Git *[8+ years]*; C++, Jupyter *[2+ years]*; Claude Code, Codex *[<1 year]*
- **Operating Systems:** Linux kernel and systems programming, systems administration *[8+ years]*; block layer, memory management, page cache *[4+ years]*; QEMU/KVM, live VM migration, device drivers *[2+ years]*
- **Memory, Storage & I/O:** tiered memory and storage *[8+ years]*; file systems *[4+ years]*; CXL, Open CAS, persistent memory *[2+ years]*
- **Networking:** TCP/IP, sockets, network performance analysis *[4+ years]*; RDMA *[2+ years]*
- **Performance Engineering:** benchmarking, profiling/tracing, simulation, workload characterization *[8+ years]*; performance modeling, performance optimization, perf, ftrace, eBPF/bpftrace, gdb *[4+ years]*
- **Research:** experimental design, scientific writing, LaTeX, mentoring *[8+ years]*; grant writing *[4+ years]*

EXPERIENCE

- **File Systems and Storage Lab** *2018 – Current*
  Research Assistant Stony Brook, NY
  - Conducted diverse systems research resulting in 12 peer-reviewed publications
  - Led research teams and mentored 50+ Ph.D., M.S., and undergraduate students
  - Established collaborations with external institutions and industry, facilitating numerous joint research initiatives
- **Department of Computer Science, Stony Brook University** *2017 – 2025*
  Graduate Teaching Assistant Stony Brook, NY
  - CSE 219: Computer Science III, CSE 506: Operating Systems, CSE 564: Visualization, CSE 590: Special Topics – Storage Systems
- **Institute for Advanced Computational Science** *2017 – 2018*
  High Performance Computing Assistant Stony Brook, NY
  - Provided support to users in areas such as parallelizing serial applications, modularizing environment configurations, software package installation and maintenance, debugging code, and education on HPC topics
  - Hosted XSEDE HPC Workshop: Big Data
- **Lake Grove Diner** *2012 – 2017*
  Waiter Lake Grove, NY
- **Various Service Industry Jobs** *2006 – 2012*

PUBLICATIONS

C=CONFERENCE, J=JOURNAL, M=MANUSCRIPT, S=SOFTWARE, T=TECHNICAL REPORT

[M.1] **Tyler Estro** et al. (2026). CXL-based live virtual machine migration. *Submitted for double-blind peer review*.

[M.2] Co-authored manuscript. (2026). Using cloud infrastructure to enhance systems and data education. *Submitted for double-blind peer review*.

[M.3] Co-authored manuscript. (2026). Distribution fitting for multi-tier storage caching systems. *In preparation*.

[T.1] **Tyler Estro**. (2026). **Understanding and Optimizing Tiered Memory and Storage Systems**. *Technical Report FSL-26-01*. Department of Computer Science, Stony Brook University, January 2026. Ph.D. Dissertation Proposal.

[S.1] **Tyler Estro**, Deniz Bajin, Md. Kamal Parvez, Kamalnath Polakam, Anthony Tran, Erez Zadok. (2025). **Topics in Storage Systems**. *Software/Educational Artifact, Trovi*, November 2025.

[C.1] Xinyu Zhang, Mario Antunes, **Tyler Estro**, Erez Zadok, Klaus Mueller. (2025). **Smart Starts: Accelerating Convergence Through Uncommon Region Exploration**. In *Proceedings of the Genetic and Evolutionary Computation Conference Companion (GECCO '25)*. ACM, August 2025, Málaga, Spain. DOI: 10.1145/3712255.3726720

[J.1] Xinyu Zhang, **Tyler Estro**, Geoff Kuenning, Erez Zadok, Klaus Mueller. (2025). **Into the Void: Mapping the Unseen Gaps in High-Dimensional Data**. *IEEE Transactions on Visualization and Computer Graphics (TVCG)*. DOI: 10.1109/TVCG.2025.3572850

[J.2] Mário Antunes, **Tyler Estro**, Pranav Bhandari, Anshul Gandhi, Geoff Kuenning, Yifei Liu, Carl Waldspurger, Avani Wildani, Erez Zadok. (2025). **Kneeliverse: A Universal Knee-Detection Library for Performance Curves**. *SoftwareX*, Vol. 30, Article 102161 (8 pp.). DOI: 10.1016/j.softx.2025.102161

[J.3] **Tyler Estro**, Mário Antunes, Pranav Bhandari, Anshul Gandhi, Geoff Kuenning, Yifei Liu, Carl Waldspurger, Avani Wildani, Erez Zadok. (2024). **Accelerating Multi-Tier Storage Cache Simulations Using Knee Detection**. *Performance Evaluation (PEVA)*, Vol. 164, Article 102410 (12 pp.). DOI: 10.1016/j.peva.2024.102410

[S.2] Mário Antunes, **Tyler Estro**, Pranav Bhandari, Anshul Gandhi, Geoff Kuenning, Yifei Liu, Carl Waldspurger, Avani Wildani, Erez Zadok. (2024). **Kneeliverse: A Universal Knee/Elbow Detection Library for Performance Curves**. *Software release, Zenodo*, Version 1.0, April 2024. DOI: 10.5281/zenodo.11089667

[C.2] Peter Desnoyers, Ian Adams, **Tyler Estro**, Anshul Gandhi, Geoff Kuenning, Mike Mesnier, Carl Waldspurger, Avani Wildani, Erez Zadok. (2023). **Persistent Memory Research in the Post-Optane Era**. In *Proc. 1st Workshop on Disruptive Memory Systems (DIMES '23)*, pp. 23–30. ACM. 23 Oct 2023, Koblenz, Germany. DOI: 10.1145/3609308.3625268

[C.3] **Tyler Estro**, Mário Antunes, Pranav Bhandari, Anshul Gandhi, Geoff Kuenning, Yifei Liu, Carl Waldspurger, Avani Wildani, Erez Zadok. (2023). **Guiding Simulations of Multi-Tier Storage Caches Using Knee Detection**. In *31st IEEE International Symposium on Modeling, Analysis & Simulation of Computer and Telecommunication Systems (MASCOTS '23)*, pp. 1–8. IEEE. 16–18 Oct 2023, Stony Brook, NY, USA. DOI: 10.1109/MASCOTS59514.2023.10387545

[J.4] Anjul Tyagi, **Tyler Estro**, Geoff Kuenning, Erez Zadok, Klaus Mueller. (2022). **PC-Expo: A Metrics-Based Interactive Axes Reordering Method for Parallel Coordinate Displays**. *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, pp. 712–722. IEEE. 16–21 Oct 2022, Oklahoma City, OK, USA. DOI: 10.1109/TVCG.2022.3209392

[J.5] Alex Borowicz, Heather Lynch, **Tyler Estro**, Catherine Foley, Bento Gonçalves, Katelyn Herman, Stephanie Adamczak, Ian Stirling, Lesley Thorne. (2021). **Social Sensors for Wildlife: Ecological Opportunities in the Era of Camera Ubiquity**. *Frontiers in Marine Science*, Vol. 8, Article 645288 (15 pp.). DOI: 10.3389/fmars.2021.645288

[T.2] **Tyler Estro**. (2021). **Accelerating Multi-Tier Cache Evaluations with Intelligent MRC Point Selection**. *Technical Report FSL-21-01*. Department of Computer Science, Stony Brook University, January 2021. Ph.D. Research Proficiency Exam.

[C.4] **Tyler Estro**, Pranav Bhandari, Avani Wildani, Erez Zadok. (2020). **Desperately Seeking ... Optimal Multi-Tier Cache Configurations**. In *12th USENIX Workshop on Hot Topics in Storage and File Systems (HotStorage '20)*, Article 6 (6 pp.). USENIX Association. 13–14 Jul 2020, Online. DOI: 10.5555/3488733.3488739

[J.6] Muhammad Wajahat, Aditya Yele, **Tyler Estro**, Anshul Gandhi, Erez Zadok. (2020). **Analyzing the Distribution Fit for Storage Workload and Internet Traffic Traces**. *Performance Evaluation (PEVA)*, Vol. 142, Article 102121 (14 pp.). DOI: 10.1016/j.peva.2020.102121

[C.5] Muhammad Wajahat, Aditya Yele, **Tyler Estro**, Anshul Gandhi, Erez Zadok. (2019). **Distribution Fitting and Performance Modeling for Storage Traces**. In *27th IEEE Intl. Symp. on Modeling, Analysis & Simulation of Computer and Telecommunication Systems (MASCOTS '19)*, pp. 138–151. IEEE. 22–25 Oct 2019, Rennes, France. DOI: 10.1109/MASCOTS.2019.00024
⋆ **Best Paper Award**

[C.6] Anjul Tyagi, Zhen Cao, **Tyler Estro**, Klaus Mueller, Erez Zadok. (2019). **ICE: Interactive Configuration Explorer for High-Dimensional Categorical Parameter Spaces**. In *IEEE Conference on Visual Analytics Science and Technology (VAST '19)*, pp. 23–34. IEEE. 20–25 Oct 2019, Vancouver, BC, Canada. DOI: 10.1109/VAST47406.2019.8986923

POSTERS

- **Computer vision for the detection and segmentation of penguin colonies in satellite imagery** *October 2019*
  Microsoft's AI for Good Summit
  ◦ **Tyler Estro**, Hieu Le, Bento Goncalves, Brad Spitzbart, Dimitris Samaras, Heather J. Lynch
- **Graphs Are Not Enough: Using Interactive Visual Analytics in Storage Research** *July 2019*
  11th USENIX Workshop on Hot Topics in Storage (HotStorage '19)
  ◦ Zhen Cao, **Tyler Estro**, Geoff Kuenning, Klaus Mueller, Anjul Tyagi, and Erez Zadok
- **Towards Better Understanding of Black-box Auto-Tuning: A Comparative Analysis for Storage Systems** *July 2018*
  2018 USENIX Annual Technical Conference (ATC '18)
  ◦ Zhen Cao, **Tyler Estro**, Vasily Tarasov, Sachin Tiwari, Erez Zadok

TALKS

- **Teaching Storage Systems with Interactive Courselets on Chameleon** *April 2026*
  Chameleon Cloud Webinar
- **Understanding and Optimizing Tiered Memory and Storage Systems** *January 2026*
  Department of Computer Science, Stony Brook University
- **Guest Lectures in CSE-590-T02: Special Topics – Storage Systems** *March 2025*
  Department of Computer Science, Stony Brook University
- **Guiding Simulations of Multi-Tier Storage Caches Using Knee Detection** *October 2023*
  31st IEEE International Symposium on Modeling, Analysis & Simulation of Computer and Telecommunication Systems (MASCOTS '23)
- **Mini-symposium on education using Chameleon** *May 2023*
  Chameleon User Meeting 2023
- **Accelerating Multi-Tier Cache Evaluations with Intelligent MRC Point Selection** *January 2021*
  Department of Computer Science, Stony Brook University
- **Desperately Seeking . . . Optimal Multi-Tier Cache Configurations** *July 2020*
  12th USENIX Workshop on Hot Topics in Storage and File Systems (HotStorage '20)
- **Guest Lectures in CSE-564: Visualization** *October 2018*
  Department of Computer Science, Stony Brook University

- **XSEDE HPC Workshop: Big Data** *February 2018*
  Institute for Advanced Computational Science

PROJECTS

- **CXL-based live virtual machine migration in QEMU/KVM** *2025 – Current*
  Tools: QEMU/KVM, C, Bash, CXL, RDMA [*(private)*]
  - Designed CXL-based migration reducing migration time, blackout, and data transfer vs. network-based migration
  - Implemented transparent DAX-backed guest memory tiering
  - Developed in QEMU/KVM and evaluated on CXL 2.0 hardware
  - Paper under submission to a top systems venue through a collaboration with Azure Research
- **FOUNT: Scaffolded Hands-On Learning for a Data-Centric Future** *2023 – Current*
  Tools: Chameleon Cloud, Jupyter Notebook, C, C++, Python, Bash [ ]
  - Contributed to FOUNT, a framework for reusable hands-on systems and data education on cloud infrastructure
  - Developed Jupyter-based "courselets" for graduate storage-systems instruction, including 17 published on Trovi
  - Co-hosted Chameleon Webinar: Teaching Storage Systems with Interactive Courselets on Chameleon (Apr 2026)
  - Presented a demonstration at the educational symposium of the Chameleon User Meeting 2023
  - Collaborating on a cross-institutional paper on using Chameleon Cloud infrastructure in systems and data courses
- **Kneeliverse: A Universal Knee/Elbow Detection Library for Performance Curves** *2023 – 2025*
  Tools: Python, NumPy [ ]
  - Co-developed a Python library for knee detection in performance curves to identify optimal tradeoff points
  - Extended existing single-knee methods for recursive multi-knee detection
  - Designed Z-Method, a multi-knee detection algorithm based on statistical outlier detection
  - Built pre- and post-processing techniques for point reduction, clustering, filtering, and ranking of points
- **Open CAS tiered-storage workload tracing tool** *2022 – Current*
  Tools: Open CAS, ftrace, FIO, C, Bash, Python [*(private)*]
  - Enhanced Open CAS and Linux kernel drivers to capture low-level traces of multi-tiered caching operations
  - Instrumented kernel tracing to capture response time, service time, and inter-arrival data for queuing models
- **Multi-tier cache simulator** *2019 – Current*
  Tools: PyMimircache, C, Python, NumPy, Pandas [*(private)*]
  - Extended PyMimircache to simulate multi-tier caches
  - Built an evaluation engine for performance and dollar-cost trade-off analysis
  - Conducted large-scale simulations on hundreds of real-world traces across millions of cache

configurations

Honors and Awards

- **Best Paper Award — *"Distribution Fitting and Performance Modeling for Storage Traces"*** *Oct 2019*
  27th International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS '19)
- **Computer Science, Engineering, and Mathematics Scholarship (CSEMS)** *2012*
  National Science Foundation (NSF)
  ◦ Advised by Professor Ben Chen of Suffolk County Community College
- **Battle of the Brains Programming Competition** *2012*
  Suffolk County Community College
  ◦ Awarded first place for designing an educational application to assist chemistry students

Additional Information

- **Affiliations:** File Systems and Storage Lab (FSL) and AI Innovation Institute at Stony Brook University
- **Markets:** Independent equities/options trader with multi-year experience in short-horizon trading
- **Peer Reviews:** ACM Transactions on Storage (TOS) 2024
- **Residency & Citizenship:** United States citizen and lifelong New York State resident
- **Languages:** Native English and beginner Japanese (actively learning)