Zane Fink

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zwfink

Education

2020–2025 **PhD, Computer Science**, *University of Illinois at Urbana-Champaign*.

2016–2020 **B.S., Computer Science**, *Northern Arizona University*, GPA: 3.67.

Experience

May 2019–Present **Undergraduate Research Assistant**, *Community-Aware Networks & Information Systems (CANIS) Lab*, NAU.

- Conducting research on low-bandwidth, long-ranged network architectures for resource-constrained environments.
- Designing architecture at the application/transport layers to support delay-tolerant user access to online services.
- Supervisor: Morgan Vigil-Hayes

Jan 2019–June 2020 **Undergraduate Research Assistant**, *Gowanlock Lab*, NAU.

- Investigating the acceleration of systems utilizing response-based cryptography using the GPU.
- Investigated hybrid algorithms to accelerate memory-bound algorithms on heterogeneous CPU/GPU platforms.
- Implemented Hybrid CPU/GPU multiway merge and linear scan, achieving up to $2.50\times$ speedup with low load imbalance.
- Supervisor: Michael Gowanlock

March 2018–May 2020 **Undergraduate Research Assistant**, *The Pathogen and Microbiome Institute*, NAU.

- Designed and implemented algorithms for efficient analyses to comprehensively determine an individual's viral exposure history. This algorithm achieves similar levels of coverage of the human virome with $37 - 54\%$ fewer probes than other algorithms.
- Proposed and received funding for the *PepSIRF* software package implementing these algorithms.
- Engaged in outreach activities to attract more students to participate in undergraduate research.
- Supervisor: Jason Ladner

Publications

[1] M. Gowanlock, **Z. Fink**, B. Karsin, and J. Wright. A study of work distribution and contention in database primitives on heterogeneous cpu/gpu architectures. *Proc. VLDB Endow. (Under Review)*, 2020.

[2] **Z. Fink***, J. Wright*, M. Gowanlock, C. Philabaum, B. Donnelly, and B. Cambou. An aes response-based cryptography engine accelerated using gpgpu. In *Proceedings of the 36th Annual Computer Security Applications Conference (Under Review)*, ACSAC 2020, Austin, TX, USA, 2020.

[3] **Zane W. Fink**, V. Martinez, J. Altin, and J. T. Ladner. Pepsirf: a flexible and comprehensive tool for the analysis of data from highly-multiplexed dna-barcoded peptide assays, 2020. arXiv: `2007.05050 [q-bio.QM]`.

[4] M. Gowanlock, B. Karsin, **Z. Fink**, and J. Wright. Accelerating the unaccelerateable: hybrid cpu/gpu algorithms for memory-bound database primitives. In *Proceedings of the 15th International Workshop on Data Management on New Hardware*, DaMoN'19, Amsterdam, Netherlands. Association for Computing Machinery, 2019.

Posters

- **Zane Fink**, Jordan Wright, & Michael Gowanlock. The Acceleration of Algorithms With Low Compute to Memory Access Ratios on Heterogeneous CPU/GPU Platforms. Northern Arizona Planetary Science Alliance STEM Poster Session.
- **Zane Fink** & Jason Ladner. (2019) Panviral PepSeq: A Highly Multiplexed Serological Diagnostic. 58^{th} Annual ASM Regional Branch Conference.

Grants and Awards

April 2020 **2020 Keim Award for Excellence in Undergraduate Research — Runner Up**.

April 2019 **Hooper Undergraduate Research Award**, $\$3,500$.
Introducing PepSIRF: PEPtide-Based Serological Immune Response Framework

March 2019 **Jean Shuler Research Mini-Grant**, $\$500$.

Teaching Experience

August 2019–December 2019 — **CS-499: Principles of Parallel Programming Grader**, *Northern Arizona University*.

- Read parallel programs to find race conditions and incorrect behavior.
- Helped students understand mistakes by providing feedback and fixing segmentation faults in submitted assignments.
- Submitted the grade each student earned as determined by a rubric.

Jan 2018–May 2018 — **Computer Science *II* Lab Instructor**, *Northern Arizona University*.

- Presented and explained lab information to a class of 40 students.
- Explained technical details and helped guide students toward the proper solutions.
- Held office hours to further advance student understanding.

Extracurricular Activities

Jan 2019–Present — **Student Representative, Academic Integrity Hearing Board**, *NAU's College of Engineering, Informatics, and Applied Sciences*.

- Listened to the cases of students who have either appealed alleged academic integrity violations, or who have been referred to the AIHB for multiple violations.
- Helped determine appropriate course of action for students who are found in violation of NAU's academic integrity policy.