# Zane Fink

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## Education

2020–2025 **PhD, Computer Science**, *University of Illinois at Urbana-Champaign*.
Advisor: Laxmikant V. Kale

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

## Experience

January 2021–Present **Graduate Research Assistant**, *Center for Exascale Enabled Scramjet Design*, UIUC.

August 2020–Present **Graduate Research Assistant**, *Parallel Programming Laboratory*, UIUC.

May 2019–August 2020 **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] J. Choi, **Z. Fink**, S. White, N. Bhat, D. F. Richards, and L. V. Kale. Gpu-aware communication with ucx in parallel programming models: charm++, mpi, and python. In *2021 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW) (to appear)*, 2021.

[2] M. Gowanlock, **Z. Fink**, B. Karsin, and J. Wright. A study of work distribution and contention in database primitives on heterogeneous cpu/gpu architectures. In *Proceedings of the 36th Annual ACM Symposium on Applied Computing (to appear)*, SAC '21, New York, NY, USA. Association for Computing Machinery, 2021.

[3] J. T. Ladner, S. N. Henson, A. S. Boyle, A. L. Engelbrektson, **Z. W. Fink**, F. Rahee, J. D'ambrozio, K. E. Schaecher, M. Stone, W. Dong, S. Dadwal, J. Yu, M. A. Caligiuri, P. Cieplak, M. Bjørås, M. H. Fenstad, S. A. Nordbø, D. E. Kainov, N. Muranaka, M. S. Chee, S. A. Shiryaev, and J. A. Altin. Epitope-resolved profiling of the sars-cov-2 antibody response identifies cross-reactivity with endemic human coronaviruses. *Cell Reports Medicine*, 2(1):100189, 2021. ISSN: 2666-3791. DOI: `https://doi.org/10.1016/j.xcrm.2020.100189`. URL: `https://www.sciencedirect.com/science/article/pii/S2666379120302445`.

[4] **Z. 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. *arXiv preprint arXiv:2007.05050*, 2020.

[5] M. Gowanlock, B. Karsin, **Z. Fink**, and J. Wright. Accelerating the unacceleratable: hybrid cpu/gpu algorithms for memory-bound database primitives. In *Proceedings of the 15th International Workshop on Data Management on New Hardware*, pages 1–11, 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.

## Talks

- Charm4Py: Scaling Adaptive Runtime Support in a Productive Language. 12th Workshop of the Joint Laboratory for Extreme Scale Computing.

## 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.