Ian Glen Neal

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Research Interests

I develop new methods for automatically reasoning about the reliability and performance of real-world systems. My work focuses on building tools that leverage information about bugs and program behavior that has been gathered using principled, data-driven techniques, such as automated inference or proof-based mechanisms. My work in collaboration with Microsoft Research is on applying data-driven techniques to develop techniques for automatically reproducing incidents to enable experimentation with new methods of automated incident prevention and auto-mitigation processes. My current work at the University of Michigan is on applying this general methodology to persistent memory systems, networking systems, and concurrent systems. I am also broadly interested in hardware-software co-design and the design of secure systems.

Education

The University of Michigan   Sept. 2018–Present

    Ph.D. in **Computer Science and Engineering** (Candidate)

        Professional Development Certificate: Diversity, Equity, and Inclusion

    Advisor: Assistant Professor **Baris Kasikci**

    GPA: 3.961

The University of Michigan   Sept. 2018–Jan. 2021

    M.Sc.E. in **Computer Science and Engineering**

    GPA: 3.961

The University of Texas at Austin   Aug. 2013–May 2018

    B.Sc. in **Computer Science**

        Special Honors: Turing Scholars Honors Program

        Thesis: The Advantages of a Transactional Interface: Porting Applications to TxFS

    B.Sc. in **Electrical Engineering**

        Minor in **Biblical Hebrew**

Peer-Reviewed Publications

[1] Kevin Loughlin, **Ian Neal**, Jiacheng Ma, Elisa Tsai, Ofir Weisse, Satish Narayanasamy, Baris Kasikci. Dolma: Securing Speculation with the Principle of Transient Non-Observability. In Proceedings of the 30th USENIX Security Symposium (USENIX Security '21). August 2021.

[2] Tanvir Ahmed Khan, **Ian Neal**, Gilles Pokam, Barzan Mozafari, Baris Kasikci. DMon: Efficient Detection and Correction of Data Locality Problems Using Selective Profiling. In Proceedings of the 15th USENIX Symposium on Operating Systems Design and Implementation (OSDI '21). July 2021.

[3] **Ian Neal**, Andrew Quinn, Baris Kasikci. Hippocrates: Healing Persistent Memory Bugs Without Doing Any Harm. In Proceedings of the 26th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS '21). April 2021.

[4] **Ian Neal**, Gefei Zuo, Eric Shiple, Tanvir Ahmed Khan, Youngjin Kwon, Simon Peter, Baris Kasikci. Rethinking File Mapping for Persistent Memory. In Proceedings of the 19th USENIX Conference on File and Storage Technologies (FAST '21). February 2021.

[5] **Ian Neal**, Ben Reeves, Ben Stoler, Andrew Quinn, Youngjin Kwon, Simon Peter, Baris Kasikci. AGAMOTTO: How Persistent is your Persistent Memory Application?. In Proceedings of the 14th USENIX Symposium on Operating Systems Design and Implementation (OSDI '20). November 2020. **IEEE Micro 2021 Top Picks Honorable Mention.**

[6] Ofir Weisse, **Ian Neal**, Kevin Loughlin, Thomas F. Wenisch, and Baris Kasikci. NDA: Preventing Speculative Execution Attacks at Their Source. In Proceedings of the 52nd Annual IEEE/ACM International Symposium on Microarchitecture (MICRO '19). October 2019. **IEEE Micro 2019 Top Picks Honorable Mention.**

[7] Yige Hu, Zhiting Zhu, **Ian Neal**, Youngjin Kwon, Tianyu Cheng, Vijay Chidambaram, and Emmett Witchel. TxFS: Leveraging File-System Crash Consistency to Provide ACID Transactions. In 2018 USENIX Annual Technical Conference (USENIX ATC '18). July 2018. **Awarded Best Paper.**

Workshop Presentations

[8] **Ian Neal**, Andrew Quinn, Baris Kasikci. Towards Bug-free Persistent Memory Applications. In the 12th Annual Non-Volatile Memories Workshop (NVMW '21). March 2021.

Talks

Towards Accurate and Efficient Application-Specific Bug Detection

- Microsoft Research Cambridge (Invited Talk) — Oct. 2021

Preview: Persistent Memory

- USENIX Symposium on Operating Systems Design and Implementation (OSDI '21) (Invited Talk) — Jul. 2021

Towards Bug-free Persistent Memory Applications

- IBM Hybrid Cloud Infrastructure Research (Invited Talk) — Jun. 2021
- Non-Volatile Memories Workshop (NVMW '21) — Mar. 2021

HIPPOCRATES: Healing Persistent Memory Bugs Without Doing Any Harm

- Conf. on Architectural Support for Programming Languages and Operating Systems (ASPLOS '21) — Apr. 2021

Rethinking File Mapping for Persistent Memory

- Applications Driving Architectures Center (Liaison Meeting) — Feb. 2021
- USENIX Conference on File and Storage Technologies (FAST '21) — Feb. 2021
- Applications Driving Architectures Center (Liaison Meeting) — Aug. 2019
- Applications Driving Architectures Center (Liaison Meeting) — Feb. 2019

AGAMOTTO: How Persistent is your Persistent Memory Application?

- University of Washington (Invited Talk) — Jan. 2021
- USENIX Symposium on Operating Systems Design and Implementation (OSDI '20) — Nov. 2020
- Applications Driving Architectures Center (Liaison Meeting) — Sept. 2020
- Applications Driving Architectures Center Symposium — May. 2020

Recent Employment

Microsoft Research — Virtual, USA

Research Intern in Microsoft Systems Research Group and Microsoft Azure — May 2022–Present
- Automating incident reproduction for services running on Microsoft Azure
- Investigating techniques for using automated reproduction to reduce DRI (Designated Response Individual) workload

IBM Research — Virtual, USA

Research Intern in Hybrid Cloud — May 2021–Aug. 2021
- Led development of novel testing infrastructure to verify network functions across hardware and software
- Created novel extensions to the KLEE symbolic execution framework to support testing network applications

Honors and Awards

Richard F. and Eleanor A. Towner Prize for Distinguished Academic Achievement	2022
Facebook Fellowship Finalist	2021
IEEE Micro 2021 IEEE Top Picks Honorable Mention	2021
IEEE Micro 2019 IEEE Top Picks Honorable Mention	2019
Richard H. Orenstein Graduate Fellowship in Memory of Murray Orenstein	2018–2019
USENIX Annual Technical Conference Best Paper Award	2018
National Science Foundation (NSF) Research Experiences for Undergraduates (REU) Grant	2018
CRA Outstanding Undergraduate Researcher Award (Honorable Mention)	2017
Dusty and Doris Duesterhoeft Endowed Presidential Scholarship	2017
Leola W. and Charles H. Hugg Trust Scholarship	2013–2016
College of Natural Sciences Book Award for Academic Excellence	2016
Boyce Family Scholarship	2016
Carl R. Trull Endowed Presidential Scholarship	2015
Edward Morgan and Rebecca Brown Case Endowed Presidential Scholarship	2014

Professional Service

Diversity Committee

University of Michigan Computer Science and Engineering	Oct. 2021–Current

Diversity, Equity and Inclusion Student Advisory Board

University of Michigan College of Engineering	Oct. 2021–Current

External Review Committee

2022 Intl. Conf. on Architectural Support for Programming Languages and Operating Systems (ASPLOS)	2021

Artifact Evaluation Committee

28th ACM Symposium on Operating Systems Principles (SOSP 2021 Artifacts)	2021

Student Editorial Board

Journal of Systems Research (JSys)	2021–2022

Administration

Systems Reading Group, Systems Student Seminar (University of Michigan)	Sept. 2018–Current

Patents

Video Frame Brightness Filter	US Patent 10,909,403
User-Specific Video Frame Brightness Filter	US Patent 10,778,932
Color-Specific Video Frame Brightness Filter	US Patent App. 16/210,667