Mohamed Assem Ibrahim

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RESEARCH INTERESTS

My research interests lie in all aspects of computer architecture, including data-parallel architectures (e.g., GPUs), processing-in-memory, hardware-software co-design, and interconnection networks.

EDUCATION

- **William & Mary**, *Ph.D.* in Computer Science **Spring 2016 – Spring 2021**
  Dissertation: Rethinking Cache Hierarchy and Interconnect Design for Next-generation GPUs
  Distinguished Dissertation Award in the Natural and Computational Sciences
- **Cairo University**, *M.Sc.* in Computer Engineering **Fall 2010 – Fall 2015**
  Thesis: On Enhancing the Performance of Bufferless Network-on-Chip
- **Cairo University**, *B.Sc.* in Computer Engineering **Fall 2005 – Spring 2010**

PROFESSIONAL EXPERIENCE

- **AMD Research**, *Member of Technical Staff*, Santa Clara, CA **Jul 2021 – Present**
  Exact Dates: 07/12/2021 → Present
- **AMD Research**, *Postdoctoral Researcher*, Santa Clara, CA **Jan 2021 – Jun 2021**
  Exact Dates: 01/18/2021 → 07/11/2021
  Mentors: Onur Kayiran, Shaizeen Aga
  My role was to conduct research related to analyzing machine learning workloads.
- **William & Mary**, *Research Assistant*, Williamsburg, VA **Jan 2016 – Jan 2021**
  Exact Dates: 01/14/2016 → 05/20/2018, 08/25/2018 → 05/03/2020, 12/19/2020 → 17/01/2021
  Advisor: Associate Professor Adwait Jog
  My role was to conduct research related to large-scale GPU architectures.
- **AMD Research**, *Co-Op Engineer*, Remote **May 2020 – Dec 2020**
  Exact Dates: 05/04/2020 → 12/18/2020
  Mentors: Onur Kayiran, Shaizeen Aga
  My role was to conduct research related to analyzing graphics workloads.
- **AMD Research**, *Co-Op Engineer*, Santa Clara, CA **May 2018 – Aug 2018**
  Exact Dates: 05/21/2018 → 08/24/2018
  Mentors: Onur Kayiran, Yasuko Eckert
  My role was to conduct research related to large-scale GPU cache design.
- **Cairo University**, *Research Assistant*, Giza, Egypt **Aug 2010 – Dec 2015**
  Advisor: Professor Hatem El-Boghdadi
  My role was to conduct research related to bufferless network-on-chip.
- **Nile University**, *Research Assistant*, Giza, Egypt **Jun 2012 – Jun 2013**
  Advisor: Professor Tamer ElBatt
  My role was to conduct research and create functional prototypes related to predictive loading of content on mobile phones based on user modeling.

PUBLICATIONS

[**MEMSYS 2021**] Mohamed Assem Ibrahim, Onur Kayiran, Shaizeen Aga, *Efficient Cache Utilization via Model-aware Data Placement for Recommendation Models*, In the Proceedings of The International Symposium on Memory Systems (MEMSYS), Virtual Event, September 2021

[**HPCA 2021**] Mohamed Assem Ibrahim, Onur Kayiran, Yasuko Eckert, Gabriel H. Loh, Adwait Jog, *Analyzing and Leveraging Decoupled L1 Caches in GPUs*, In the Proceedings of The 27^{th} International Symposium on High-Performance Computer Architecture (HPCA), Virtual Event, February 2021

[**PACT 2020**] Mohamed Assem Ibrahim, Onur Kayiran, Yasuko Eckert, Gabriel H. Loh, Adwait Jog, *Analyzing and Leveraging Shared L1 Caches in GPUs*, In the Proceedings of The 29^{th} International Conference on Parallel Architectures and Compilation Techniques (PACT), Virtual Event, October 2020

[**PACT 2019**] Mohamed Assem Ibrahim, Hongyuan Liu, Onur Kayiran, Adwait Jog, *Analyzing and Leveraging Remote-core Bandwidth for Enhanced Performance in GPUs*, In the Proceedings of The 28^{th} International Conference on Parallel Architectures and Compilation Techniques (PACT), Seattle, Washington, September 2019

[**ICS 2019**] Haonan Wang, Mohamed Assem Ibrahim, Sparsh Mittal, Adwait Jog, *Address-Stride Assisted Approximate Value Prediction in GPUs*, In the Proceedings of The 33^{rd} ACM International Conference on Supercomputing (ICS), Phoenix, Arizona, June 2019

[**MICRO 2018**] Hongyuan Liu, Mohamed Assem Ibrahim, Onur Kayiran, Sreepathi Pai, Adwait Jog, *Architectural Support for Efficient Large-Scale Automata Processing*, In the Proceedings of The 51^{st} International Symposium on Microarchitecture (MICRO), Fukuoka, Japan, October 2018

[**HPCA 2018**] Haonan Wang, Fan Luo, Mohamed Assem Ibrahim, Onur Kayiran, Adwait Jog, *Efficient and Fair Multi-programming in GPUs via Effective Bandwidth Management*, In the Proceedings of The 24^{th} International Symposium on High-Performance Computer Architecture (HPCA), Vienna, Austria, February, 2018

[**AIM 2017**] Hengyu Zhao, Colin Weinshenker, Mohamed Assem Ibrahim, Adwait Jog, Jishen Zhao, *Layer-wise Performance Bottleneck Analysis of Deep Neural Networks*, In the Proceedings of The 1^{st} International Workshop on Architectures for Intelligent Machine (AIM), Portland, Oregon, September, 2017

[**HPCA 2017**] Xulong Tang, Ashutosh Pattnaik, Huaipan Jiang, Onur Kayiran, Adwait Jog, Sreepathi Pai, Mohamed Assem Ibrahim, Mahmut Kandemir, Chita Das, *Controlled Kernel Launch for Dynamic Parallelism in GPUs*, In the Proceedings of The 23^{rd} International Symposium on High-Performance Computer Architecture (HPCA), Austin, Texas, February, 2017

[**MES 2015**] Mohamed Assem Ibrahim, Hatem M El-Boghdadi, *Investigating the Viability of Maximum Flexibility Selection Function in Bufferless 2D Meshes*, In the Proceedings of The 3^{rd} International Workshop on Many-core Embedded Systems (MES), Portland, Oregon, June, 2015

[**ICC 2014**] Omar Shoukry, Mohamed Assem Ibrahim, John Tadrous, Hesham El Gamal, Tamer ElBatt, Nayer Wanas, Yaser Elnakieb, and Mohamed Khairy *Proactive Scheduling for Content Prefetching in Mobile Networks*, In the Proceedings of IEEE International Conference on Communications (ICC), Sydney, Australia, June, 2014

[**MobiSys 2013**] Mohamed Assem Ibrahim, Omar Shoukry, Hesham El Gamal, Tamer ElBatt, Nayer Wanas, Mohamed Abdel Raouf, Mohamed Zakaria, Ahmed Abdel Kader and Hakem Zayed *Demo: PAUL Proactive Automated mobile User centric content deLivery*, In the Proceedings of The 11^{th} International Conference on Mobile Systems, Applications, and Services (MobiSys), Taipei, Taiwan, June, 2013

GRANTED PATENTS

[**US11360891**] Mohamed Assem Ibrahim, Onur Kayiran, Yasuko Eckert, Gabriel H. Loh, *Adaptive Cache Reconfiguration via Clustering.*

[**US11068458**] Mohamed Assem Ibrahim, Onur Kayiran, Yasuko Eckert, *Mechanism for Distributed-system-aware Difference Encoding/Decoding in Graph Analytics.*

[**US10938709**] Mohamed Assem Ibrahim, Onur Kayiran, Yasuko Eckert, Jieming Yin, *Mechanism for Dynamic Latency-Bandwidth Trade-off for Efficient Broadcasts/Multicasts.*

Note: Twelve patent applications are filed in USPTO, and one more patent application is being drafted by AMD.

AWARDS and HONORS

- Distinguished Dissertation Award in the Natural and Computational Sciences, William & Mary **[one recipient per year]**
- Graduate Assistantship, William & Mary

REFERENCES

Available upon request.