Bradley McDanel

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EMPLOYMENT

Franklin & Marshall College July 2020 - Current
Assistant Professor of Computer Science

Harvard University May 2019 - July 2020
Postdoctoral Fellow

EDUCATION

Harvard University
Ph.D., Computer Science, May 2019
Advisor: H. T. Kung
Thesis: Efficient Implementations of Sparse and Quantized Deep Neural Networks using Systolic Arrays

Wake Forest University
M. Sc. Computer Science, May 2012
Advisor: William Turkett
Thesis: Discovering User Intent through Flow-level Statistics and Network Motifs

Wake Forest University
B. Sc. Computer Science, May 2010

TEACHING

Franklin & Marshall College

CPS 111: Computer Science I	F21, F20
CPS 112: Computer Science II	S21
CPS 242: Computer Organization	S22
CPS 373: Computer Networks	S22, F20
CPS 376: Parallel Computing	F21

Harvard School of Engineering and Applied Sciences

CS 144r/244r: Computer Networks (*Teaching Fellow*)	S14, F16

Wake Forest University

CS 111: Introduction to Computer Science (*Teaching Assistant*)	F11

PUBLICATIONS

Conference Papers
(***** indicates equal contribution)

B. McDanel, H. T. Kung, S. Zhang. *Saturation RRAM Leveraging Bit-level Sparsity Resulting from Term Quantization.* IEEE International Symposium on Circuits and Systems (ISCAS), 2021.

S. Zhang, B. McDanel, H. T. Kung, X. Dong. *Field-Configurable Multi-resolution Inference: Rethinking Quantization.* 26th ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2021.

H. T. Kung*****, B. McDanel*****, S. Zhang*****. *Term Revealing: Furthering Quantization at*

Run Time on Quantized DNNs. Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (SC), 2020.

H. T. Kung*, B. McDanel*, S. Zhang*, X. Dong, C. Chen. *Maestro: A Memory-on-Logic Architecture for Coordinated Parallel Use of Many Systolic Arrays.* The 30th IEEE International Conference on Application-specific Systems, Architectures and Processors (ASAP), 2019.

B. McDanel*, S. Zhang*, H. T. Kung, X. Dong. *Full-stack Optimization for Accelerating CNNs with FPGA Validation.* 32nd ACM International Conference on Supercomputing (ICS), 2019.

H. T. Kung*, B. McDanel*, S. Zhang*, C. T. Wang, J. Cai, C. Y. Chen, V. Chang, M. F. Chen, J. Sun, D. Yu. *Systolic Building Block for Logic-on-Logic 3D-IC Implementations of Convolutional Neural Networks.* IEEE International Symposium on Circuits and Systems (ISCAS), 2019.

H. T. Kung*, B. McDanel*, S. Zhang*. *Packing Sparse Convolutional Neural Networks for Efficient Systolic Array Implementations: Column Combining Under Joint Optimization.* 24th ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2019.

H. T. Kung*, B. McDanel*, S. Zhang*. *Mapping Systolic Arrays Onto 3D Circuit Structures: Accelerating Convolutional Neural Network Inference.* IEEE Workshop on Signal Processing Systems (SiPS), 2018.

H. T. Kung*, B. McDanel*, S. Zhang*. *Adaptive Tiling: Applying Fixed-size Systolic Arrays To Sparse Convolutional Neural Networks.* International Conference on Pattern Recognition (ICPR), 2018.

B. McDanel, S. Teerapittayanon, H. T. Kung. *Incomplete Dot Products for Dynamic Computation Scaling in Neural Network Inference.* International Conference On Machine Learning And Applications (ICMLA), 2017.

S. Teerapittayanon, B. McDanel, H. T. Kung. *Distributed Deep Neural Networks over the Cloud, the Edge and End Devices.* International Conference on Distributed Computing Systems (ICDCS), 2017.

B. McDanel, S. Teerapittayanon, H. T. Kung. *Embedded Binarized Neural Networks.* International Conference on Embedded Wireless Systems and Networks (EWSN), 2017.

S. Teerapittayanon, B. McDanel, H. T. Kung. *BranchyNet: Fast Inference via Early Exiting from Deep Neural Networks.* International Conference on Pattern Recognition (ICPR), 2016.

A. Jauhri*, B. McDanel*, C. Connor. *Outlier Detection for Large Scale Manufacturing Processes.* IEEE Big Data for Advanced Manufacturing Workshop, 2015.

H. T. Kung*, B. McDanel*, S. Teerapittayanon*. *PNNU: Parallel Nearest-Neighbor Units for Learned Dictionaries.* International Workshop on Languages and Compilers for Parallel Computing, 2015.

H. Chen*, M. Z. Comiter*, H. T. Kung*, B. McDanel*. *Sparse Coding Trees with Application to Emotion Classification.* IEEE Workshop on Analysis and Modeling of

Faces and Gestures, 2015. **Best Paper Award**.

S. J. Tarsa, M. Z. Comiter, M. B. Crouse, B. McDanel, H. T. Kung. *Taming Wireless Fluctuations by Predictive Queuing Using a Sparse-Coding Link-State Model.* ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc), 2015.

ACADEMIC TALKS

Conference Presentations

IEEE International Symposium on Circuits and Systems (ISCAS), Daegu, Korea, 2021.

IEEE International Conference on Application-specific Systems, Architectures and Processors (ASAP), New York City, New York, 2019.

ACM International Conference on Supercomputing (ICS), Phoenix, Arizona, 2019.

ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), Providence, Rhode Island, 2019.

IEEE International Conference On Machine Learning And Applications (ICMLA), Cancun, Mexico, 2018.

International Conference on Embedded Wireless Systems and Networks (EWSN), Uppsala, Sweden, 2017.

International Conference on Pattern Recognition (ICPR), Cancun, Mexico, 2016.

HONORS AND AWARDS

Siebel Scholar Class of 2019

Teaching Award, *Harvard University* Fall 2016

Mou-Shiung Lin Fellow, *Harvard University* 2014

PROFESSIONAL ACTIVITIES

Ad Hoc Conference Reviewer

- IEEE Transactions on Very Large Scale Integration Systems (TVLSI), 2020.
- IEEE Global Conference on AI and Internet of Things (GCAIoT), 2020.
- IEEE International Conference on Robotics and Automation (ICRA), 2020.

Ad Hoc Journal Reviewer

- Journal of Systems Architecture, 2021.
- Entropy, 2021.
- Energies, 2020.
- Sensors, 2020.
- Electronics, 2020.
- PLOS One, 2020.

- International Journal of Computer Vision (IJCV), 2019.
- Transactions on Mobile Computing, 2019.
- JSAC Special Issue on Advances in Artificial Intelligence and Machine Learning for Networking, 2019.

Student Researchers

- Helia Dinh (Hackman Scholar at F&M College) Summer 2021
- John Magallanes (Hackman Scholar at F&M College) Summer 2021

Undergraduate Independent Study

- Phyo Thuta Aung (F&M College) Spring 21
- Eric Andrews (F&M College) Spring 21

Masters Committee Membership

- Caio J. B. V. Guimares (Federal University of Rio Grande do Norte, Oct. 2020)