

TYLER N. ALLEN
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EDUCATION

Clemson University
M.S. Computer Science
Ph.D. Computer Science
- 3.78 Overall GPA

Clemson, SC
Dec. 2018
In Progress

Western Carolina University
B.S. in Computer Science
B.S. in Applied Mathematics
- 3.86 Overall GPA
- Honors College at Western Carolina University

Cullowhee, NC
May 2015
May 2015

RESEARCH EXPERIENCE

Clemson University
Research Assistant

Clemson, SC
Summer 2016-Present

- Studied energy-efficient and power bounded high performance computing with NVIDIA GPUs. Characterized memory accesses for power and performance using empirical research methods. Designed and implemented framework for dynamic co-scheduling for improved resource utilization and throughput on GPUs. Also studied task-based parallel application performance on manycore architectures and improving utilization and usability of heterogeneous memory systems. Currently work on analyzing performance for demand-paged memory for heterogeneous systems with unified address spaces; also machine-learning inspired prefetching for heterogeneous devices.

Oak Ridge National Laboratory
Short-term Research Appointee, Future Technology Group
- Studied performance and use-cases for Intel Apache Pass NVDIMM hardware.

Oak Ridge, TN
Summer 2019

Lawrence Berkeley National Lab
NERSC Advanced Technology Group Research Intern

Berkeley, CA
Summer 2017, 2018

- Studied performance and energy usage of DoE HPC applications on Intel Knight's Landing Manycore CPUs used in Cori Supercomputer. Added energy monitoring for Cray systems to IPM open-source utility.
- Modeling of unified memory performance for NVIDIA GPUs and underlying hardware impacts. This is an ongoing collaboration.

Research Assistant

Summer 2015-Spring 2016

- Studied synthesizing realistic eye motion and studying the resultant perceptual realism. Developed synthetic eye model based on pink noise from biology research. Developed a 9-point eye test and reading model.

Data-Intensive Computing REU

Summer 2014

- Developed a proof of concept web application to be used as a tool in the classroom to teach heterogeneous network concepts. Tool treats network as linear program and optimizes based on economic and performance conditions.

TEACHING EXPERIENCE

Instructor of Record

Fall 2019

- Course: Computer Organization and Design
- Roster: 57 Students
- This course takes a bottom-up approach, instructing students on the design and organization of modern computers starting at basic wires and circuits and working their way up to the 5-stage pipeline MIPS processor as designed by Patterson & Hennessey. Performance analysis and design for performance are given heavy emphasis.

Graduate Teaching Assistant

Spring 2018, 2019, 2020

- Course: Undergraduate/Graduate Advanced Operating Systems
- Create and grade student implementation projects focused on extending the XV6 kernel.
- Assist students during office hours and appointment with OS concepts and C programming.

Computer Science Lab Assistant/Tutor

Fall 2012-Spring 2015

- Assisted students during lab sessions alongside the instructor.
- Provided students with assistance as necessary with their lab programming projects.
- Tutored students in Java and Computer Science concepts during non-lab hours.

WORK EXPERIENCE

IT Services, Harris Regional Hospital

Sylva, NC

IT Associate

Summer 2010-Fall 2011

- Repaired malfunctioning equipment.
- Deployed new equipment and retired old equipment.
- Deployed hardware, installed software and operating system, and performed on-site and in-office repairs.
- Took repair and service calls and provided over-the-phone support.

AWARDS AND SCHOLARSHIPS

- Outstanding Graduate Teaching Assistant, School of Computing, Clemson University, 2019-2020
- Student Volunteer Travel Grant, Supercomputing, 2017-2019
- Student Author Travel Grant, IPDPS, 2019
- Upsilon Pi Epsilon Member, 2016-Present
- Upsilon Pi Epsilon ACM Student Chapter Scholarship Award (Merit Based Scholarship), 2013-2014
- Dean's Outstanding Scholar Award (College of Arts and Sciences), Western Carolina University, 2013-2014
- Proffitt's Pecuniary Propitiousness Protocol (Computer Science Academic Scholarship), 2013-2014
- Senior Computer Science Award, Western Carolina University, 2013-2014
- Sophomore Computer Science Award, Western Carolina University, 2012-2013
- Dean's List of Distinguished Students, Western Carolina University, Fall 2011-Spring 2015

LEADERSHIP & SERVICE TO THE COMMUNITY

- *School of Computing Representative*, College of Engineering, Computing and Applied Sciences Dean's Graduate Student Advisory Board, 2019-2020
- *Lead Student Volunteer*, Supercomputing 2019, 2020
- *Student Volunteer*, Supercomputing 2017, 2018
- *President*, School of Computing Graduate Student Association, Clemson, 2017-2019
- *Clinic & IT Volunteer*, Harris Regional Hospital, 2008 & 2009
- *Bebras Computing Challenge Volunteer*, Clemson, SC, Spring 2017, 2018
- *President*, WCU Association of Computing Machinery (ACM) Chapter, 2013-2015
- *Volunteer*, Lego Summit, Western Carolina University, Spring 2013

PUBLICATIONS

Peer-Reviewed Papers

- **Tyler Allen**, Xizhou Feng, Rong Ge, "Slate: Enabling Workload-Aware Efficient Multiprocessing", In Proceedings of the International Parallel & Distributed Processing Symposium (IPDPS 2019).
- **Tyler Allen**, Christopher Daley, Doug Doerfler, Brian Austin, Nicholas Wright, "Performance and Energy Usage of Workloads on KNL and Haswell Architectures", In Proceedings of the International Workshop

on Performance Modeling, Benchmarking and Simulation of High Performance Computing Systems (PMBS 2017).

- Pengfei Zou, **Tyler Allen**, Claude H. Davis IV, Xizhou Feng Rong Ge, “CLIP: Cluster-Level Intelligent Power Coordination for Power-Bounded Systems”, In Proceedings of the International Conference on Cluster Computing (CLUSTER 2017).
- **Tyler Allen**, Rong Ge, “Characterizing Power and Performance of GPU Memory Access”, In Proceedings of the 4th International Workshop on Energy Efficient Supercomputing (E2SC 2016).
- Andrew T. Duchowski, Sophie Jörg, **Tyler N. Allen**, Ioannis Giannopoulos, Krzysztof Krejtz. “Eye movement synthesis”, In Proceedings of the Ninth Biennial ACM Symposium on Eye Tracking Research & Applications (ETRA 2016).

Under Review

- Thomas Randall, **Tyler Allen**, Rong Ge, “Fill-W2V: Fine Grain Parallelism for Word2Vec on GPU-Accelerated Systems”, The 35th IEEE International Parallel & Distributed Processing Symposium (IPDPS), May 2021
- **Tyler Allen**, Rong Ge, “Demystifying GPU UVM Cost with Deep Runtime and Workload Analysis”, The 35th IEEE International Parallel & Distributed Processing Symposium (IPDPS), May 2021
- Rong Ge, Xizhou Feng, **Tyler Allen**, Pengfei Zou, “The Case for Cross-Component Power Coordination on Power Bounded Systems”, IEEE Transactions on Parallel and Distributed Systems

In Preparation

- **Tyler Allen**, Bennett Cooper, Derek Rodriguez, Rong Ge, “Predicting GPU Page Faults with Deep Learning”, IEEE International Parallel & Distributed Processing Symposium 2020

Accepted Posters

- Bennett Cooper, Derek Rodriguez, **Tyler Allen**, Thomas Randall, Rong Ge, “Learning Page Access Patterns for Algorithms Programmed with GPU UVM”, ACM Undergraduate Research Poster Competition, Supercomputing 2019
- **Tyler Allen**, Xizhou Feng, Rong Ge, “Optimizing Performance in Power Bounded GPU Computing”, ACM Graduate Student Research Poster Competition, Supercomputing 2020

INVITED TALKS

- “Slate: Enabling Workload-Aware Efficient Multiprocessing”, The 34th IEEE International Parallel and Distributed Processing Symposium (IPDPS), May 2019
- “Beyond Moore’s Law with Heterogeneous Computing”, Western Carolina University, August 2018
- “Performance and Energy Usage of Workloads on KNL and Haswell Architectures”, The International Workshop on Performance Modeling, Benchmarking and Simulation of High Performance Computing Systems, November 2017
- “Characterizing Power and Performance of GPU Memory Access”, 4th International Workshop on Energy Efficient Supercomputing, November 2016