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Owen "Tanner" Wilkerson

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EE, CPE, and CS graduate who is passionate about solving modern problems through algorithm engineering and computational sciences seeking full-time employment in the firmware or software industries starting in Sept. 2019.

EDUCATION

University of Kentucky | August 2019
MS, Electrical Engineering
Thesis (in progress): "Sparse Matrix Factorization and Matrix Algebra via Random Projections for Integral Equation Formulations in Electromagnetics"
Overall GPA: 3.9/4.0

University of Kentucky | Dec. 2018
BS, Computer Engineering (Summa Cum Laude)
BS, Computer Science (Summa Cum Laude)
Minor: Mathematics
Overall GPA: 3.9/4.0 | Major GPA: 4.0/4.0

RELEVANT COURSEWORK

Software Focused:
Graduate Artificial Intelligence | Graduate Machine Learning
Honors Algorithm Design and Analysis | Compiler Design
Software Engineering Techniques | Optimizing Compilers
Hardware Focused:
Graduate Computer Architecture | Embedded Systems
Graduate System Verilog course | Grad HW/SW Design for IoT
Fundamental Importance:
Graduate Deterministic Systems Analysis | Quantum Physics
Graduate Stochastic Systems | Linear Algebra and Its Applications
Numerical Methods | Signals and Systems Analysis

SKILLS

Programming
Experience in: C++ (5.5 yrs) • C (4 yrs) • Bash (4 yrs) • Python (3.5 yrs) • Matlab (3 yrs) • MPI, Intel MKL, and OpenMP (2.5 yrs) • Verilog and System Verilog (2 yrs) • CUDA (2 yrs)

Technical Expertise
Experience in and knowledge of: Algorithm development and optimization • Computational Science • Developing on high performance parallel computers (Sbatch, Slurm, MPI, OpenMP) • Linux, Mac OSX, and Windows operating systems • Developing on FPGAs and microcontrollers • Task automation via scripting • Developing and optimizing computer system architectures • Agile Development

Research and Analysis Expertise
Experience in (professional and academia) and knowledge of: Research and development life cycles • Estimation of algorithm space and time complexities per Big-O notation • Software testing methods and test case development • Data analysis and science

PROFESSIONAL EXPERIENCE

Research Assistant under Dr. Robert Adams at The University of Kentucky | May 2016 - Current

- Currently working as a research assistant in the field of Computational Electromagnetics. For over 3 years, I have been a part of continuous collaborative efforts on the topics of fast direct solvers, multi-level recursive H2 data structure operations, and fast memory-efficient linear algebra methods via random projection. My fellow collaborators and industry partners consist of several notable bodies, such as NASA's EV8-11 Division, The Office of Naval Research, The U.S. D.o.D, and ANSYS Inc.
- Currently finishing my thesis work, which involves developing an H2 algebra toolkit and an accompanying H2 matrix fill methodology that utilizes random projections to achieve an $O(n \log n)$ fill, which is a significant improvement over the $O(n^2)$ ACA based H2 fill alternative. More generally, the random projection-based H2 algebra toolkit enables efficient error-controllable construction of H2 representations of matrix products and/or sums. To our knowledge, my work is the first to utilize random projections to manipulate H2 data structures in this manner.
- Provided significant algorithm engineering contributions in the development of an $O(n)$ binormalized diagonal matrix factorization method for large, ill-conditioned matrices represented using H2/FMM data structures. This was a significant breakthrough for us and our partners; previously, the only way to solve these severely ill-conditioned problems was using dense, $O(n^3)$ solvers.

Systems Software Engineer Internship at 10up | June 2018 - Aug 2018

- While working on my research over summer 2018, I also worked part-time for 10up - a fully-distributed, web development company.
- Developed server-side software that allows for the preconditioning of Elasticsearch queries before entering into Elasticsearch clusters.

Massachusetts Institute of Technology (MIT) Lincoln Lab R&D Engineer Internship | May 2017 - Aug 2017

- Spent the summer working for MIT Lincoln Laboratory's Open and Embedded Systems Group (Group 102).
- Specific project details must be omitted, so the following is a list of topics that were significantly covered during my summer: High-performance embedded and real-time computing | Developing multi-threaded/parallel software | Computational mathematics in real-time applications | Analysis of quantization within state-of-the-art algorithms | Some integration work regarding real-time robotics

EXTRAPROFESSIONAL PROJECTS

Recent Projects | Find a complete list of projects at otwilkerson.com/projects and find some of my code at github.com/TannerW

- **Software** - Implementation of K-Means Image Segmentation that runs on Nvidia GPUs | Verilog model of a General Purpose Processor that uses the log number system rather than floating-point | Software implementation of Finite Impulse Response Filters
- **Hardware** - IoT, computer vision based door lock monitoring system | Prototyped a camera that utilizes LEDs as its light sensor