Grant Wilkins

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Education

University of Cambridge, Churchill College — Cambridge, UK
M.Phil in Advanced Computer Science — Expected July 2024

- Thesis: "Online Optimization towards Environmental Equitable AI in Cluster Design"
- Advisor: Profs. Richard Mortier, Srinivasan Keshav
- Relevant Coursework: Federated Learning, Large Data Processing, Networking, Machine Learning

Clemson University — Clemson, SC
Dual B.S in Computer Engineering and Mathematical Sciences — May 2023

- Thesis: "Green HPC: Optimizing Software Stack Energy Efficiency of Large Data Systems"
- Distinctions: Norris Medal, Summa Cum Laude, General and Departmental Honors
- Relevant Coursework: Control Systems, Linear Optimization, Algorithms, FPGAs, Embedded Systems, Operating Systems, Functional Programming, Algebra, Topology

Research Experience

Argonne National Laboratory, Graduate Research Assistant — Summer 2023
Advisors: Sheng Di, Franck Cappello

- Principal investigator for FedSZ: a lossy compression scheme to cut federated learning communication overhead.
- Contibuted to APPFL, SZx, SZ3 projects through expanded ML capabilities and library compatibility.

Clemson University, Undergraduate Researcher — Fall 2020 –Summer 2023
Advisor: Jon Calhoun

- Explored lossy compression for HPC and edge towards reducing system I/O energy and runtime overhead.
- Examined and modeled relevant HPC data checkpointing strategies and exploited 4× energy savings.

NSF-REU: HPC Data Reduction, Clemson University — Summer 2020
Advisor: Jon Calhoun

- Created ab initio prediction models for floating-point lossy compressor energy consumption using DVFS.

USMA Department of Chemistry Research Assistant — Spring 2018 - Spring 2019
Advisor: Gary Washington

- Tested claims of room-temperature superconductivity in Au-Ag wires, finding no superconductivity in our variation over large voltage ranges.
- Simulated the conductivity of lithium nanowires by varying electrode composition using SIESTA and NWChem, leading to predictions of post-Moore's law behavior.

Industry Experience

Tesla, Inc., Software Engineering Intern — Summer 2021
Energy IoT Cloud Platforms Team — Palo Alto, CA

- Created mobile notifications service to over 20,000 California home batteries for Tesla Virtual Power Plant
- Implemented metrics pipeline for data analysis from over 500,000 IoT devices
- Expanded functionality for the Storm Watcher 2 application by integrating NWS weather alert ingestion

Publications

[1] S. Di, J. Liu, K. Zhao, X. Liang, R. Underwood, D. Tao, J. Tian, Y. Huang, J. Huang, X. Yu, J. C. Cahoun, M. Shah, B. Zhang, **G. Wilkins**, Z. Zhang, G. Li, K. A. Alharthi, and F. Cappello, "A survey on error-bounded lossy compression for parallel and distributed use-cases", *ACM Computing Surveys*, In Submission, 2024.

[2] **G. Wilkins**, S. Di, J. C. Calhoun, K. Kim, R. Underwood, and F. Cappello, "FedSZ: Leveraging lossy compression for federated learning communications", in *2024 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPS)*, Jun. 2024, In Submission.

[3] **G. Wilkins** and J. C. Calhoun, "Modeling power consumption of lossy compressed i/o for exascale hpc systems", in *2022 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW)*, Jun. 2022, pp. 1118–1126.

[4] **G. Wilkins**, M. J. Gossman, B. Nicolae, M. C. Smith, and J. C. Calhoun, "Analyzing the energy consumption of synchronous and asynchronous checkpointing strategies", in *2022 IEEE/ACM Third International Symposium on Checkpointing for Supercomputing (SuperCheck)*, Nov. 2022, pp. 1–9.

[5] **G. Wilkins** and J. C. Calhoun, "Modeling Energy Consumption for the SZ Compressor on HPC Systems", in *ACM 32nd International Conference for High Performance Computing, Networking, Storage, and Analysis Proceedings*, Oct. 2020.

[6] **G. Wilkins**, "Temperature Independent, Computational Conductivity in Au-Ag Nanowire with Varying Magnetic Fields", *AP Research*, May 2019.

[7] **G. Wilkins** and G. Washington, "Variances in Quantum Electronic Characteristics: The Effects of Differing Li, Be, and Na Electrodes with Constant Scattering Regions", *Pioneer Academics*, vol. 5, no. 1, Jul. 2018.

Selected Presentations

[1] G. Wilkins (Presenter), "Analyzing the Energy Consumption of Synchronous and Asynchronous Checkpointing Strategies", International Conference on Supercomputing 2022, Nov. 2022.

[2] G. Wilkins (Presenter), "Modeling Power Consumption of Lossy Compressed I/O for Exascale HPC Systems", IPDPS: 3rd Workshop on Extreme-Scale Storage and Analysis, Jun. 2022.

[3] G. Wilkins (Presenter), "ACM SRC: Modeling Energy Consumption for the SZ Compressor on HPC Systems", SC20: ACM Student Research Competition, Oct. 2020.

Teaching

- **Undergraduate Teaching Assistant** at Clemson University — Fall 2020 - Fall 2021
  Held office hours, graded, and led class sessions for over 50 students each semester in ENGR 1410.

Skills

- **Programming Languages:** C/C++, Python, Scala/Java, VHDL, Go, OCaml, FORTRAN, Bash, SQL
- **Tools/Software:** MPI, CUDA, PyTorch, Kakfa, Tensorflow, MATLAB, OpenCL, Mathematica, LaTeX, Git, Excel
- **Embedded Systems:** Arduino, Raspberry Pi, NVIDIA Jetson, DE10 (FPGA), Onion Omega 2

Honors and Awards

- **Churchill Scholarship** Fully-funded Masters study at the University of Cambridge 2023
- **NSF Graduate Research Fellowship** Three years of full funding for doctoral research 2023
- **Norris Medal** Clemson University's highest honor awarded to one best all-around graduating senior 2023
- **National Scholars Program** Full academic scholarship and enrichment program at Clemson University 2019
- **Goldwater Scholar** 1 of 64 Engineering students within the national cohort of 417. 2022
- **Astronaut Scholar** 1 of 68 national STEM students awarded on basis of research and aptitude. 2022
- **Most Outstanding Undergraduate in Research: Clemson University College of Science** 2023
- **Dixon Global Policy Scholars** Public policy focused discussions with faculty. 2020
- **Most Outstanding Junior: Clemson University College of Science** 2022
- **Most Outstanding Junior: Computer Engineering and Mathematics** 2022
- **National Merit Scholar** 2019
- **Eagle Scout Award** 2016

Leadership and Service

- Ring Ceremony Director of Student Alumni Council 2021–Present
  Coordinated and organized the ordering and distribution of 2000 Clemson class rings each semester. Managed $2.5 million in ordering costs and sales, and coordinated ceremonies with 5000+ attendees.
- Vice President of Blue Key Honor Society 2021–Present
  Raised $25,000 for scholarships and student emergency funds each semester through student programming.
- Mentor in Seniors Advising Sophomores in Honors 2022–Present
  Advised 10 Honors College sophomores about research, summer internships, and navigating involvement and service at Clemson University.
- Retreat Team Leader of National Scholars Program 2020–2022
  Leads retreat team that introduces incoming first-year students of the National Scholars' Program to Clemson University. Works on team building and different activities to ensure a cohesive cohort mentality.