Grant Wilkins

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Education

Stanford University — Palo Alto, CA
Ph.D. in Electrical Engineering — Anticipated July 2029

- Areas of Focus: Energy Systems, Distributed Systems, Federated Learning

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

- Thesis: "Online Workload Allocation and Energy Optimization in Large Language Model Inference Systems"
- Advisors: Profs. Richard Mortier, Srinivasan Keshav

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

Research Experience

Argonne National Lab, Graduate Research Assistant — Summer 2024
Advisors: Sheng Di, Franck Cappello

- Quantified the energy-savings that lossy compression can introduce for exascale computing systems.

University of Cambridge, Graduate Research Student — Fall 2023–Summer 2024
Advisors: Richard Mortier, Srinivasan Keshav

- Developed an energy-aware online scheduling framework for LLM inference.

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

- 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.

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
- 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, Z. Zhang, M. Shah, Y. Huang, J. Huang, X. Yu, C. Ren, H. Guo, **G. Wilkins**, D. Tao, J. Tian, S. Jin, Z. Jian, D. Wang, M. H. Rahman, B. Zhang, J. C. Calhoun, G. Li, K. Yoshii, K. A. Alharthi, and F. Cappello, "A survey on error-bounded lossy compression for scientific datasets", 2024. arXiv: 2404.02840 [cs.DC].

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

[3] **G. Wilkins**, S. Di, J. C. Calhoun, Z. Li, K. Kim, R. Underwood, R. Mortier, and F. Cappello, "FedSZ: Leveraging error-bounded lossy compression for federated learning communications", in *2024 IEEE International Conference on Distributed Computing Systems (ICDCS)*, Jul. 2024.

[4] **G. Wilkins**, S. Keshav, and R. Mortier, "Hybrid heterogeneous clusters can lower the energy consumption of llm inference workloads", in *Proceedings of the 15th ACM International Conference on Future and Sustainable Energy Systems*, ser. e-Energy '24, New York, NY, USA: Association for Computing Machinery, 2024, pp. 506–513, ISBN: 9798400704802.

[5] **G. Wilkins**, S. Keshav, and R. Mortier, "Offline energy-optimal llm serving: Workload-based energy models for llm inference on heterogeneous systems", in *Proceedings of the 3rd Workshop on Sustainable Computer Systems*, ser. HotCarbon'24, New York, NY, USA: Association for Computing Machinery, 2024.

[6] **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.

[7] **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.

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.
  **Awarded but vacated for Churchill Scholarship.* 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