

Leo Han

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RESEARCH INTERESTS

I am a third-year Ph.D. student at Cornell Tech focused on advancing the efficiency and sustainability of data centers across the full computing stack: from physical hardware to resource scheduling and software optimization. My research addresses critical challenges in sustainable cloud computing, including the fair attribution of carbon footprints to individual cloud applications (Fair-CO₂, ISCA'25) and uncertainty quantification in embodied carbon estimates for computing hardware (CarbonClarity, ICCAD'25). Currently, I am developing novel approaches to optimize resource efficiency in cloud services for AI agent workloads through cross-stack co-optimization at the agent-service interface.

EDUCATION

Cornell Tech

New York, NY

Ph.D., Electrical and Computer Engineering

September 2023 – Present

Relevant Coursework: Machine Learning Systems, Algorithmic Game Theory, FPGA Architecture, ASIC Design

University of Toronto

Toronto, ON

B.A.Sc., Engineering Science

September 2018 – April 2023

Relevant Coursework: Computer Architecture, Operating Systems, Computer Security, Electronic Devices

PROFESSIONAL EXPERIENCE

Cornell Tech

New York, NY

Graduate Student Researcher

September 2023 – Present

- Developed Fair-CO₂, a game-theoretic framework for equitable and efficient attribution of data center carbon footprints to individual users, incorporating colocation interference effects and the impact of dynamic demand on hardware provisioning (ISCA'25).
- Enhanced hardware carbon modeling tools through probabilistic methods that quantify data and model uncertainties in embodied carbon estimates (CarbonClarity, ICCAD'25).
- Designing optimized agent-to-service interfaces for cloud software services that serve AI agent users, focusing on system-level resource efficiency and performance.

University of Toronto

Toronto, ON

Undergraduate Student Researcher

May 2023 – August 2023

- Designed FPGA-based accelerator for residual belief propagation, a Bayesian inference algorithm, leveraging task-level speculative parallelism to achieve scalable performance across many cores.

Intel

Toronto, ON

GPU Power Delivery Intern (Professional Experience Year)

May 2021 – August 2022

- Led end-to-end design of a tool for precision testing of GPU compliance to PCIe specifications for input voltage.
- Led enablement of key platform-wide power management and hardware power telemetry features on desktop and datacenter GPUs and accelerators which reduced power excursions by over 95%.
- Improved gaming performance (frames-per-second) by 40% while enabling stricter compliance to power limits on GPUs by tuning power management control loops.

National University of Singapore

Singapore

Undergraduate Student Researcher

May 2019 – August 2019

- Optimized design of dielectric elastomer generator (DEG) to increase energy harvesting conversion efficiency by 14 times while decreasing prototype size by 4 times.
- Modularized DEG prototype to quickly and easily change between different biasing voltages and different dielectric elastomer capacitances, significantly reducing time required for experimental trials.

PUBLICATIONS

Refereed Conference Publications

Fair-CO2: Fair Attribution for Cloud Carbon Emissions

Leo Han, Jash Kakadia, Benjamin C. Lee, and Udit Gupta

ISCA’25

Acceptance rate: 23%

CarbonClarity: Understanding and Addressing Uncertainty in Embodied Carbon for Sustainable Computing

Xuesi Chen, *Leo Han*, Anvita Bhagavathula, and Udit Gupta

ICCAD’25

Acceptance rate: 25%

Refereed Workshop Publications

Metrics for Data Center Embodied Carbon

Leo Han, Yueying Li, and Udit Gupta

CarbonMetrics’25

Fair, Practical, and Efficient Carbon Accounting for LLM Serving

Yueying Li, *Leo Han*, Edward Suh, Christina Delimitrou, Fiodar Kazhamiaka, Esha Choukse, Rodrigo Fonseca, Liangcheng Yu, Jonathan Mace, and Udit Gupta

CarbonMetrics’25

Towards Game-Theoretic Approaches to Attributing Carbon in Cloud Data Centers

Leo Han, Jash Kakadia, Benjamin C. Lee, and Udit Gupta

HotCarbon’24

Understanding the Implications of Uncertainty in Embodied Carbon Models for Sustainable Computing

Anvita Bhagavathula, *Leo Han*, and Udit Gupta

HotCarbon’24

LEADERSHIP & ACTIVITIES

University of Toronto Solar Racing Design Team

Toronto, ON

Team Leader

November 2019 – August 2022

- Led a team of over 40 dedicated undergraduate and graduate students to design and build a solar-powered race vehicle for the 2023 World Solar Challenge, a 3000 km endurance race in Australia.
- Coordinated technical and business teams to meet project milestones and resource needs.
- Procured over \$190 000 in funding and sponsorships through grants and industry sponsorships.
- Co-led design and manufacturing efforts with chief engineer and sub-system leads.

Electrical and Fabrication Team Member

September 2018 – October 2019

- Assembled and validated solar race vehicle’s electrical systems for the 2019 World Solar Challenge.
- Designed, simulated, and built major composite structural components for solar race car.

SKILLS

Programming Languages: C, C++, Python, Go

Cloud Computing: Docker, gRPC, Kubernetes

Machine Learning Systems: PyTorch, Nvidia Nsight Systems/Compute

Digital Design: Verilog, SystemVerilog, Xilinx Vitis/Vivado

Laboratory: function generators, power supplies, oscilloscopes, micro-soldering

AWARDS

- Cornell Tech Digital Life Initiative (DLI) Doctoral Research Fellowship (5000 USD)
- Irwin Jacobs Doctoral Fellowship (20147 USD)
- NSERC Undergraduate Summer Research Award (7500 CAD)
- Engineering Science Research Opportunity Program – Global – Research Fellowship (4000 CAD)