Sudarsh Kunnavakkam

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WORK EXPERIENCE

Research Assistant (Contract)

Sep 2023 — Present

Model Evaluation and Threat Research (METR)

Berkeley, CA

- Lead engineer for internal project to estimate the agentic time horizon of LLMs at much lower cost
- Co-lead engineer of a state of the art evaluation for Chain-of-Thought Faithfulness of Large Langauge Models
- Helped lead teams of contractors red-team LLMs and curate datasets such as <u>DAFT Math</u> of difficult, free-response questions

Undergraduate Research Intern

Nov 2024 — Present

ShapiroLab at Caltech

Pasadena, CA

- Building better BCIs by engineering towards 10ms response time ultrasound reporters
- Built a high throughput ultrasound screening platform to scale to 1000s of variants per day
- Designed custom proteins with RFDiffusion, Alphafold, and ESM3 for 10x faster kinetics

Research Fellow Feb 2025 — May 2025

Supervised Program for Alignment Research

Remote

- Implemented a complex, continuous double auction agent arena as a model environment for LLM collusion
- Benchmarked emergent collusion between LLMs under various pressures
- Work accepted to ICML 2025

High School Research Intern

Dec 2022 — Jun 2024

Irvine, CA

Lee Nano-Optics Lab at UC Irvine

- Scaled 2D ITO fabrication from mm² to multi-cm² sizes
- Developed new transmission matrix method replacing repeated ellipsometry
- Created transfer-matrix reverse solver to easily get refractive index information under nonlinear conditions

EDUCATION

California Institute of Technology

Pasadena, CA

In progress

B.S. in Physics & Computer Science

Irvine, CA

High School Diploma

University High School

Sep 2020 — Jun 2024

SELECTED PUBLICATIONS

- 1. A. Deng*, S. Von Arx*, B. Snodin, <u>S. Kunnavakkam</u>, T. Lanham, "CoT May Be Highly Informative Despite "Unfaithfulness" by *METR*
- 2. K. Agarwal, V. Teo, J. Vaquez, <u>S. Kunnavakkam</u>, V. Srikanth, A. Liu, "Evaluating LLM Agent Collusion in Double Auctions" at *ICML 2025 Workshop on Multi-Agent Systems in the Era of Foundation Models*, Vancouver, Canada, July 2025.
- 3. C. J. Effarah*, T. Chen*, <u>S. Kunnavakkam</u>*, C. M. Gonzalez, H. W. Lee, "Liquid Metal Printed 2D ITO for Nanophotonic Applications," in *California-US Government Workshop on 2D Materials*, Irvine, California, USA, Sep 2023

PROJECTS

METR: Faithfulness and Monitorability Eval

2025

• Co-lead engineer on METR research report on chain-of-thought (CoT) faithfulness (Aug 2025), extending Anthropic's seminal evaluation to three frontier models and publishing findings for the wider safety community

LLM Agent Collusion Arena

<u>2025</u>

- Implemented a continuous double auction system for agents
- Implemented oversight, monitors, and other experimental conditions to test influence on collusion
- Added logging and metrics with WandB
- Accepted to ICML 2025 Workshop on Multi-agent Systemsa

EM Simulator	
 Reverse mode differentiable FDFD simulators in Jax for inverse design Forward and backward diffusion models trained with DDPM and Physics-inspired reward functions to approximate steady state solutions Implemented fast FDTD for transient events + implemented Fourier Neural Operators for speedup 	
• Reverse-mode autodiff for RLC network optimization	
• Gradient-based optimization for component selection	
• Works in time domain, as well as just to do component selection	
• Implemented custom spsolver that is differentiable in JaX	
Adversarial Attack Using Soft Tokens	
• Soft-token embedding technique for adversarial text generation	
• Orthogonal Procrustes Alignment for token mapping	
• Demonstrated attack generalization across models (PyTorch) Scanning Tunneling Microscope	2024
$\bullet \ \ \text{Achieved atomic-resolution imaging capabilities (Circuit Design, Signal Processing, Mechanical Engineering)}$	
Awards	
ARENA 6.0 Attendee	2025
Non-trivial Fellow	2024
Physics Brawl, top 10 US High School Teams	2024, 2023
USACO Silver	2023
AIME Qualifier	2023