

# 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 Language Models
  - Helped lead teams of contractors red-team LLMs and curate datasets such as [DAFT Math](#) 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  
Lee Nano-Optics Lab at UC Irvine *Irvine, CA*
- Scaled 2D ITO fabrication from mm<sup>2</sup> to multi-cm<sup>2</sup> 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  
*B.S. in Physics & Computer Science* *In progress*
- University High School** Irvine, CA  
*High School Diploma* *Sep 2020 — Jun 2024*

## SELECTED PUBLICATIONS

1. A. Deng\*, S. Von Arx\*, B. Snodin, [S. Kunnavakkam](#), T. Lanham, “CoT May Be Highly Informative Despite “Unfaithfulness”” by *METR*
2. K. Agarwal, V. Teo, J. Vaquez, [S. Kunnavakkam](#), 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\*, [S. Kunnavakkam\\*](#), 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](#) [2025](#)
- 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

2025

- 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

### Circuit Simulator

2025

- 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

2024

- Soft-token embedding technique for adversarial text generation
- Orthogonal Procrustes Alignment for token mapping
- Demonstrated attack generalization across models (PyTorch)

### **Scanning Tunneling Microscope**

2024

- Built working STM for \$1,000 using open-source design
- Achieved atomic-resolution imaging capabilities (Circuit Design, Signal Processing, Mechanical Engineering)

### AWARDS

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**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