

# Kanad Pardeshi

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kanad-pardeshi

KanPard005

kanpard005.github.io

## Research Interests

Statistics, Online Learning, Game Theory, Machine Learning Theory, Machine Learning Algorithms

## Education

### Carnegie Mellon University

Ph.D. in Machine Learning

Advisors: Bryan Wilder, Aarti Singh | QPA: 4.03 / 4.00

Selected Coursework: Statistical Optimal Transport, Causal Inference, Advanced Statistical Theory, Convex Optimization

Pittsburgh, PA

Present (Expected 2029)

### Carnegie Mellon University

Master of Science in Machine Learning

QPA: 4.11 / 4.00

Pittsburgh, PA

August 2024

### Indian Institute of Technology Bombay

Bachelor of Technology (Honors) in Computer Science and Engineering, Minor in Statistics

CGPA : 9.75/10 | Honors GPA: 10/10 | Minor GPA: 9.75/10

Mumbai, India

July 2023

## Publications

- Kanad Pardeshi, Bryan Wilder, and Aarti Singh. OEUVRE: Online Unbiased Variance-Reduced loss Estimation. *AISTATS 2026 Spotlight*
- Kanad Pardeshi, Itai Shapira, Ariel Procaccia, and Aarti Singh. Learning Social Welfare Functions. *NeurIPS 2024 Spotlight*
- Kanad Pardeshi, Samsara Foubert, and Aarti Singh. Online Social Welfare Function-based Resource Allocation. *arXiv preprint, arXiv:2602.01400 (2026)*
- Kanad Pardeshi, Shrey Singla, and Sunita Sarawagi. Staged Diffusion Models with Analytically Designed Hyperparameters. *NeurIPS 2023 Workshop on Diffusion Models*

## Research Experience

### Online Social Welfare Function-based Resource Allocation.

Carnegie Mellon University | Guide: Aarti Singh

Pittsburgh, PA

October 2025 - January 2026

- Proposed a framework for learning and anytime-valid inference for online allocation of resources in a population.
- Instantiated the framework for weighted power mean, Kolm, and generalized Gini social welfare functions (SWFs), designing efficient oracle algorithms for each SWF.
- Designed SWF-UCB, a near-optimal learning algorithm for online SWF maximization, along with outlining inference applications.

### OEUVRE: Online Unbiased Variance-Reduced loss Estimation

Carnegie Mellon University | Guides: Bryan Wilder, Aarti Singh

Pittsburgh, PA

October 2024 - October 2025

- Developed a novel online loss estimation technique using **algorithmic stability** to reduce the variance of loss estimates.
- Established first results on  $L^2$  consistency, closed-form convergence rates, asymptotic convergence, and time-uniform bounds for online loss estimation, with rates closely related to stability properties of the underlying algorithm.
- Designed a method for adaptive estimation of constant factors, making the estimator **hyperparameter-free** in practice.

### Learning Social Welfare Functions

Carnegie Mellon University | Guides: Aarti Singh, Ariel Procaccia

Pittsburgh, PA

September 2023 - Present

- Demonstrated learnability of decision-making functions given feature vectors for actions and their output decision utilities.
- Established **PAC guarantees** for learning decision-making functions from pairwise action preferences with utility vectors, providing bounds for both equal and different decision weights on different features.
- Proved **convergence bounds** for learning decision-making functions for action preferences given noise from a logistic model.

### Research Internship, Adobe Research

May 2022 - July 2022

- Reviewed literature and devised a novel problem statement in image captioning as part of a team of four interns, defending relevance of problem, its proposed solution, and implemented solution in front of other lab members.
- Implemented BERT-based model with user-controllable detail for image captions, with detail as input on a scale of 1 to 5.
- Collaborated on patent application 'Image Description Generation with Varying Levels of Detail', filed as a US Patent.

## Honors and Awards

- All India Rank **36** (of 935,000 candidates) in National JEE Mains, 2019.
- All India Rank **54** (of 161,000 candidates) in National JEE Advanced, 2019.
- Kishore Vaigyanik Protsahan Yojana (KVPY) fellowship, All India Rank **18**, 2017.