

# Kanan Gupta

Email: [kanan.g@pitt.edu](mailto:kanan.g@pitt.edu) • Phone: (979) 464-9761

## EDUCATION

---

|   |                   |
|---|-------------------|
| <b>Doctor of Philosophy, Mathematics</b> , University of Pittsburgh                           | Expected May 2026 |
| <i>Research Area:</i> Theory of Deep Learning, Optimization Algorithms for Machine Learning   |                   |
| <b>Master of Science, Mathematics</b> , Texas A&M University, (GPA: 3.94)                     | Aug 2023          |
| <b>Bachelor of Science, Mathematics and Computer Science</b> , Ashoka University, (GPA: 3.85) | May 2020          |

## RELEVANT COURSEWORK

- 
- Carnegie Mellon University:* Advanced Deep Learning, Machine Learning with Large Datasets
  - Texas A&M:* Scientific ML, Mathematical Principles of Deep Learning, Stochastic Differential Equations
  - Ashoka University:* Computer Architecture, Advanced Algorithms, Cryptography, Theory of Computation

## PUBLICATIONS

- 
- Kanan Gupta, Jonathan Siegel, and Stephan Wojtowytsch. "Nesterov acceleration despite very noisy gradients." *Advances in Neural Information Processing Systems (NeurIPS) 2024*. [arxiv.org/abs/2302.05515](https://arxiv.org/abs/2302.05515)
  - Kanan Gupta and Stephan Wojtowytsch. "Nesterov acceleration in benignly non-convex landscapes." [Preprint, under review] [arxiv.org/abs/2410.08395](https://arxiv.org/abs/2410.08395)

## PROJECTS

---

**AGNES: a momentum-based optimization algorithm** 2023  
Implemented a novel optimization algorithm using PyTorch's optimizer class. Extensively tested it against other optimizers on training of neural networks for various tasks. Parallelized the training across multiple nodes on the university cluster.

**Finetuning a language model for poetry generation** 2024  
Scraped a large poetry database and fine-tuned an LLM (Gemma-2B) using QLoRA and HuggingFace API, for poetry generation and completion based on the metrical patterns of Urdu ghazals.

## EXPERIENCE

---

Graduate Researcher and Teaching Assistant, **University of Pittsburgh** Aug 2023 – Present

- Researched optimization algorithms and theory of deep learning; proved mathematical results and coded simulations.
- Presented results at international conferences; collaborated with other professors and researchers.
- Taught recitations and graded for advanced mathematics courses.

Hindi Expert (Contract), **Duolingo** Feb 2016 – Dec 2020

- Designed several iterations of English<>Hindi courses, leading to 15-20% increase in user retention with each iteration.
- Conducted user studies in India; improved Hindi localization and style guide to better connect with the users.
- Wrote ad copies and contributed to improving the app's Play Store ranking to #2 among education apps in India.

## SKILLS

---

*Programming and tools:* Python, NumPy, Pandas, PyTorch, Scikit-learn, PySpark, AWS, Slurm, Git, GitHub, MLlib, SQL  
*General Skills:* Natural Language Processing (NLP), Computer Vision, Deep Learning, Optimization

## AWARDS AND HONORS

- 
- NeurIPS 2024 Scholar Award Oct 2024
  - SIAM Travel Award for the Conference on Mathematics of Data Science Sep 2024
  - Data Science Ambassador Scholarship, Texas A&M Institute for Data Science 2022–2023
  - Ashoka University Prize for Outstanding Graduating Student in Mathematics May 2020
  - Placed on the Dean's List for seven semesters consecutively, Ashoka University 2017-2020

## SELECTED TALKS AND PRESENTATIONS

- 
- International Congress on Industrial and Applied Mathematics 2023, Tokyo  
Minisymposium: At the interface of neural networks and differential equations (Talk) Aug 2023
  - Foundations of Computational Mathematics 2023, Paris  
Workshop: Foundations of Data Science and Machine Learning (Poster) Jul 2023