

# Namrata Deka

PHD STUDENT · MACHINE LEARNING

✉ [ndeka@cs.cmu.edu](mailto:ndeka@cs.cmu.edu) | 🏠 [namratadeka.github.io](https://namratadeka.github.io) | 📷 [namratadeka](#) | 📺 [namrata-deka](#)

## Summary

Ph.D. student in Machine Learning at Carnegie Mellon University, specializing in causal representation learning for computer vision, generative AI, and time-series modeling. My research focuses on developing robust ML systems that understand underlying data-generating processes. With experience in both academia and industry, I am proficient in Python, PyTorch, and TensorFlow. **Actively seeking student research opportunities for Summer 2025.**

## Education

### Carnegie Mellon University

Pittsburgh, PA, USA

PH.D., MACHINE LEARNING

2023 - Present

- Advisors: Dr. Kun Zhang, Dr. Jeff Schneider
- Dissertation: TBD

### University of British Columbia

Vancouver, BC, Canada

M.SC., COMPUTER SCIENCE

2020 - 2023

- Advisor: Dr. Danica J. Sutherland
- Thesis: Kernel Methods for Invariant Representation Learning: Enforcing Fairness and Conditional Independence

### Indraprastha Institute of Information Technology

New Delhi, India

B.TECH., COMPUTER SCIENCE AND ENGINEERING

2013 - 2017

- Honors thesis/undergrad research advisor: Dr. Saket Anand, Dr. Sanjit K. Kaul

## Publications

### PEER-REVIEWED CONFERENCES

R. Pogodin\*, **N. Deka**\*, Y. Li\*, D.J. Sutherland, V. Veitch, A. Gretton. *Efficient Conditionally Invariant Representation Learning*, in the 11th International Conference on Learning Representations (ICLR), 2023 (Oral/Top 5%). \*Equal Contribution.

**N. Deka**, D.J. Sutherland. *MMD-B-Fair: Learning Fair Representations with Statistical Testing*, in the 26th International Conference on Artificial Intelligence and Statistics (AISTATS), 2023.

### CURRENTLY UNDER REVIEW

Y. Shen, P. Zhu, Z. Li, S. Zie, Z. Tang, **N. Deka**, Z. Liu, G. Chen, K. Zhang. *Controllable Video Generation with Provable Disentanglement*. Preprint 2025 (arXiv:2502.02690).

### WORKSHOPS & TECHNICAL REPORTS

Y. Khandelwal, M. Arvind, S. Kumar, A. Gupta, S.K. Danisetty, P. Bagad, A. Madan, M. Lunayach, A. Annavajjala, A. Maiti, S. Jain, A. Dalmia, **N. Deka**, J. White, J. Doshi, A. Kanazawa, R. Panicker, A. Raval, S. Rana, M. Tapaswi. *NurtureNet: A Multi-task Video-based Approach for Newborn Anthropometry*, in the 7th CVPR Workshop on Computer Vision for Physiological Measurements (CVPM), 2024 (Best Paper).

**N. Deka**, D. Sutherland. *Learning Privacy-Preserving Deep Kernels with Known Demographics*, in the 36th AAAI Conference on Artificial Intelligence. Workshop on Privacy-Preserving Artificial Intelligence (PPAI), 2022.

D. Sutherland, **N. Deka**. *Unbiased estimators for the variance of MMD estimators*. Technical report 2022 (arXiv:1906.02104).

## Talks and Presentations

April 2023. *MMD-B-Fair: Learning Fair Representations with Statistical Testing*. Conference Poster Presentation. 26th International Conference on Artificial Intelligence and Statistics, Valencia, Spain.

November 2019. *Neonatal Anthropometry and Growth Tracking via model based 3D Reconstruction from Video*. Seminar Talk. Perceiving Systems Department, Max Planck Institute for Intelligent Systems, Tübingen, Germany.

## Professional Experience

---

- 2023 **ML Researcher**, University of British Columbia
- 2022 **ML Research Intern (Fair ML)**, Borealis AI
- 2021 **Summer@EPFL Research Fellow (Visual Intelligence Lab)**, École Polytechnique Fédérale de Lausanne (EPFL)
- 2018-2020 **ML Research Fellow (3D Vision Team)**, Wadhvani Institute for AI
- 2018 **Applied ML Research Intern (Data Privacy Team)**, Microsoft Research

## Academic Research Experience

---

### Carnegie Mellon University - Dept. of Machine Learning

Pittsburgh, PA

ADVISOR: DR. KUN ZHANG, DR. JEFF SCHNEIDER

Sep. 2023 - Present

- Conducting research on learning causal representations from high-dimensional and unstructured data (eg. videos) with a focus on:
  - robust and accurate generative modelling,
  - causal understanding of events and anomalies in captioned videos.
- Developing multi-modal foundation models for scientific discovery and experimental design with applications in data-driven nuclear fusion research and tokamak control.

### University of British Columbia - Dept. of Computer Science

Vancouver, BC

ADVISORS: DR. DANICA J. SUTHERLAND

Sep. 2020 - April 2023

- Developed a novel fair representation learning method using statistical two-sample testing.
- Developed a kernel-based measure of conditional independence to learn counterfactually invariant deep neural representations.

## Teaching Experience

---

- |             |  |           |
|-------------|--|-----------|
| Fall 2022   | Intelligent Systems, Teaching Assistant, University of British Columbia                    | Vancouver |
| Spring 2021 | Intelligent Systems, Teaching Assistant, University of British Columbia                    | Vancouver |
| Spring 2017 | Computer Vision, Teaching Assistant, Indraprastha Institute of Information Technology      | New Delhi |
| Fall 2016   | Advanced Programming, Teaching Assistant, Indraprastha Institute of Information Technology | New Delhi |

## Voluntary Service

---

### PEER REVIEW

- Conference on Neural Information Processing Systems (**NeurIPS**): 2024
- Conference on Artificial Intelligence and Statistics (**AISTATS**): 2023