

# Namrata Deka

PHD STUDENT · MACHINE LEARNING

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## Summary

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Ph.D. student in Machine Learning at Carnegie Mellon University developing causal/robust representation learning methods for controllable multimodal planning, generation and long video-text alignment. Strong in Python/PyTorch/TensorFlow and end-to-end research prototyping; seeking a Summer 2026 research internship / PhD mentorship in multimodal modeling and generative AI.

## Education

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### Carnegie Mellon University

PH.D., MACHINE LEARNING

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

Pittsburgh, USA

2023 - Present

### University of British Columbia

M.Sc., COMPUTER SCIENCE

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

Vancouver, Canada

2020 - 2023

### Indraprastha Institute of Information Technology

B.TECH., COMPUTER SCIENCE AND ENGINEERING

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

New Delhi, India

2013 - 2017

## Publications

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### PEER-REVIEWED CONFERENCES

Z. He, R. Pogodin, Y. Li, **N. Deka**, A. Gretton, D. Sutherland. *On the Hardness of Conditional Independence Testing in Practice*, in the 39th Annual Conference on Neural Information Processing Systems (**NeurIPS**), 2025 (**Spotlight**).

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

P. Zhu, S. Xie, Z. Li, Y. Shen, **N. Deka**, H. Shrivastava, G. Chen, K. Zhang. *MoVA: Learning Asymmetric Dual Projections for Modular Long Video-Text Alignment*.

Y. Shen, P. Zhu, Z. Li, S. Xie, **N. Deka**, Z. Liu, Z. Tang, G. Chen, K. Zhang. *Controllable Video Generation with Provable Disentanglement*.

### 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).

## Academic Research Experience

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

ADVISORS: DR. KUN ZHANG, DR. JEFF SCHNEIDER

- Developing methods to learn structured/causal representations from high-dimensional modalities (video, text) to improve robustness and controllability in generation.
- Building multimodal concept-alignment pipelines for long video/timeseries–text understanding with an emphasis on evaluation under distribution shift.
- Prototyping LLM-based multimodal scientific assistants for experiment planning in data-driven domains (fusion/tokamak control), focusing on grounding and reliability.

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

ADVISOR: DR. DANICA J. SUTHERLAND

- Developed a conditionally invariant representation learning model using kernel-based conditional independence measures; published ICLR 2023 (Oral/Top 5%).
- Developed a fair representation learning model with statistical testing guarantees; published AISTATS 2023.

## Professional Experience

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### Borealis AI

Vancouver, Canada

ML RESEARCH INTERN

Sep. 2022 - Jan. 2023

- Audited ML systems for systematic performance gaps via slice discovery; designed evaluation and diagnostic tools to surface under-represented group errors and guide mitigation.

### École Polytechnique Fédérale de Lausanne (EPFL)

Lausanne, Switzerland

COMPUTER VISION RESEARCH INTERN, SUMMER@EPFL

Jun. 2021 - Aug. 2021

- Researched articulated object modeling from video using 3D optical flow + depth; implemented training/inference pipeline and ablations.

### Wadhwani Institute for AI

Mumbai, India

AI RESEARCH FELLOW

Aug. 2018 - Aug. 2020

- Built a 3D vision system to screen low birth-weight babies with smartphone cameras for public health sectors in rural India.
- Developed a novel method to reconstruct 3D infant meshes at metric scale.

### Microsoft Research

Bengaluru, India

APPLIED ML INTERN

Jan. 2018 - Jul. 2018

- Built GDPR-oriented PII tagger for rare-sensitive categories; improved detection reliability through targeted data curation and error analysis.

## Voluntary Service

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### PEER REVIEW

- Conference on Causal Learning and Reasoning (**CLeaR**): 2026
- Conference on Neural Information Processing Systems (**NeurIPS**): 2024
- Conference on Artificial Intelligence and Statistics (**AISTATS**): 2023

## Teaching Experience

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Fall 2025 **Machine Learning in Practice**, Teaching Assistant, CMU

Fall 2022 **Intelligent Systems**, Teaching Assistant, UBC

Spring 2021 **Intelligent Systems**, Teaching Assistant, UBC

Spring 2017 **Computer Vision**, Teaching Assistant, IIIT-D

Fall 2016 **Advanced Programming**, Teaching Assistant, IIIT-D