Namrata Deka

PhD Student · Machine Learning

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Summary

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

Carnegie Mellon University   *Pittsburgh, USA*
PH.D., MACHINE LEARNING   *2023 - Present*
- Advisors: Dr. Kun Zhang, Dr. Jeff Schneider

University of British Columbia   *Vancouver, 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 advisors: Dr. Saket Anand, Dr. Sanjit K. Kaul

Publications

PEER-REVIEWED CONFERENCES

Y. Shen, P. Zhu, Z. Li, S. Xie, **N. Deka**, Z. Liu, Z. Tang, G. Chen, K. Zhang. *Controllable Video Generation with Provable Disentanglement*, in the 14th International Conference on Learning Representations (**ICLR**), 2026.

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*, 2026.

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

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

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

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

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