

# Namrata Deka

MACHINE LEARNING · PH.D. STUDENT

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## Summary

I am a Machine Learning Ph.D. student at Carnegie Mellon University. My research interest spans the intersection of machine learning, causality and computer vision for learning robust representations. I am proficient in Python and work extensively with deep learning frameworks like PyTorch and Tensorflow. **Actively seeking student research positions starting May 2024.** *I have authorization to work full-time in Canada (PGWP) and can obtain authorization to work in the USA (CPT).*

## Education

### Carnegie Mellon University

PH.D., MACHINE LEARNING

Pittsburgh, USA

2023 - Present

### University of British Columbia

M.SC., COMPUTER SCIENCE

Vancouver, Canada

2020 - 2023

- GPA: 91.33/100

### Indraprastha Institute of Information Technology

B.TECH., COMPUTER SCIENCE AND ENGINEERING

New Delhi, India

2013 - 2017

- GPA: 8.41/10
- Among the 10% in the class to graduate with Honors

## Publications

### Peer-Reviewed Conferences

- R. Pogodin\*, **N. Deka**\*, Y. Li\*, D. Sutherland, V. Veitch, A. Gretton. Efficient Conditionally Invariant Representation Learning. *In Proceedings of the 11th International Conference on Learning Representations (ICLR), 2023. (Oral/Top 5%)* \*Equal Contribution. [arXiv:2212.08645](https://arxiv.org/abs/2212.08645)
- **N. Deka**, D. Sutherland. MMD-B-Fair: Learning Fair Representations with Statistical Testing. *In Proceedings of the 26th International Conference on Artificial Intelligence and Statistics (AISTATS), 2023.* [arXiv:2211.07907](https://arxiv.org/abs/2211.07907)

### Workshops & Technical Reports

- **N. Deka**, D. Sutherland. Learning Privacy-Preserving Deep Kernels with Known Demographics. *In Proceedings of the 36th AAAI Conference on Artificial Intelligence. Workshop on Privacy-Preserving Artificial Intelligence, 2022.* [aaai-ppai22.github.io/files/30.pdf](https://aaai-ppai22.github.io/files/30.pdf)
- D. Sutherland, **N. Deka**. Unbiased estimators for the variance of MMD estimators. *Technical report, 2022.* [arXiv:1906.02104](https://arxiv.org/abs/1906.02104)

## Experience

### Borealis AI

MACHINE LEARNING RESEARCH INTERN

Vancouver, Canada

September 2022 - January 2023

- Advisor: [DR. FREDERICK TUNG](#)
- Audited deep learning models for automated discovery of systematic errors in under-represented groups

### University of British Columbia

GRADUATE RESEARCH ASSISTANT

Vancouver, Canada

September 2020 - April 2023

- Advisor: [DR. DANICA J. SUTHERLAND](#)
- Worked in the intersection of representation learning and kernel methods with applications in invariance and fairness.
- Developed a novel fair representation learning paradigm using statistical two-sample tests.
- Developed kernel measures of conditional independence to learn counterfactually invariant representations.

### École Polytechnique Fédérale de Lausanne (EPFL)

RESEARCH INTERN, SUMMER@EPFL

Lausanne, Switzerland

June 2021 - August 2021

- Advisor: [DR. AMIR ZAMIR](#)
- Conducted research to learn articulated object models from video using 3D optical flow and depth estimates.

## Wadhvani Institute for Artificial Intelligence

RESEARCH FELLOW

Mumbai, India

August 2018 - August 2020

- Advisors: [DR. RAHUL PANICKER](#) and [DR. ALPAN RAVAL](#)
- Built a 3D vision-based solution to screen low birth-weight babies using smartphone-captured videos for public health sectors in rural India.
- Built a pipeline to generate and annotate synthetic videos of infants using a differentiable renderer.
- Developed a novel deep learning algorithm to reconstruct 3D infant meshes to metric scale with deform-able models of reference objects.
- Mentored and managed intern research projects.

## Microsoft Research

RESEARCH INTERN

Bengaluru, India

January 2018 - July 2018

- Advisor: [DR. SREANGSU ACHARYYA](#)
- Built a classifier to identify very rare personally identifiable information (P.I.I.) of customers using a pairwise-AUROC optimization method.
- Achieved an AUROC of 99.8% for the rarest P.I.I. tag which accounted for only 0.54% of the entire dataset.
- Resulting model was adopted by internal teams across Microsoft to comply with the EU-GDPR mandate.

## Invited Talks

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### Perceiving Systems Department, Max Planck Institute for Intelligent Systems (MPI-IS)

Tübingen, Germany

NEONATAL ANTHROPOMETRY AND GROWTH TRACKING VIA MODEL BASED 3D RECONSTRUCTION FROM VIDEO

November 2019

## Projects

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### Open-ended Evolution of Embodied Intelligence in Mutating Environments

Vancouver, Canada

GRADUATE COURSE PROJECT, UBC

October 2021 - December 2021

- Mentor: [DR. JEFF CLUNE](#)
- Developed an open-ended algorithm using reinforcement learning and evolutionary strategies to continuously co-evolve agent morphologies and environmental complexities to create a diverse population of agents that can learn to perform tasks faster and better.
- Tools & Frameworks: PyTorch, OpenAI Gym

### Push-Nav: Self-Supervised Learning of Task-Based Object Representations for Navigation Through Clutter

Vancouver, Canada

GRADUATE COURSE PROJECT, UBC

October 2020 - December 2020

- Mentor: [DR. IAN MITCHELL](#)
- Developed a reinforcement learning-based system where a robot can learn task-based physical properties of objects that can maximize expected rewards.
- Augmented policy learning with a self-supervised dense optical flow objective to incentivise the learning of physical representations.
- Tools & Frameworks: PyBullet, OpenAI Gym, PyTorch, Weights & Biases

### Novel Scene Generation via Decomposition

Vancouver, Canada

GRADUATE COURSE PROJECT, UBC

September 2020 - December 2020

- Mentor: [DR. HELGE RHODIN](#)
- Developed a deep generative model to synthesize novel scenes by rearranging objects in images.
- Used a stacked VAE architecture with W-GANs to learn plausible distributions of object-centric shifts for each object in the image.
- Tools & Frameworks: PyTorch, Weights & Biases

## Teaching

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### University of British Columbia

Vancouver, Canada

GRADUATE TEACHING ASSISTANT

Multiple Semesters

- Intelligent Systems - Level 400 (>100 students)

### Indraprastha Institute of Information Technology (IIITD)

New Delhi, India

TEACHING ASSISTANT

Multiple Semesters

- Computer Vision - Graduate Level (42 students)
- Advanced Programming - Undergraduate Level (200 students)