VISHWESH RAMANATHAN

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EDUCATION

Doctor of Philosophy (Ph.D.), University of Toronto Sept 2021-May 2026
Ph.D. Supervisor: Dr. Anne L. Martel
Thesis Topic: Survival Prediction in Digital Pathology using Deep Learning
Research Interests: Digital Pathology, Survival Prediction, Graph representation learning, Weakly supervised learning, Self-supervised learning, AI for healthcare
Relevant Coursework: Computational Imaging, Deep Learning Theory, Biomedical Applications of AI, Machine Learning with Graphs

M.Tech in Data Sciences, Indian Institute of Technology Madras 2016 - 2021
Final Grade: 9.15/10
Relevant Coursework: Geometry & Photometry in Computer Vision, Reinforcement Learning

B.Tech in Chemical Engineering, Indian Institute of Technology Madras 2016 - 2021
Final Grade: 9.15/10
Relevant Coursework: Deep Learning, Big Data Analytics, Data Structures and Algorithms, Graph Theory

SELECTED PUBLICATIONS

* denotes equal contribution

ModalTune: Fine-Tuning Slide-Level Foundation Models with Multi-Modal Information for Multi-task Learning in Digital Pathology 2025
Vishwesh Ramanathan, Tony Xu*, Pushpak Pati, Faruk Ahmed, Maged Goubran, Anne L. Martel*
(Accepted to) International Conference on Computer Vision (ICCV) 2025

Ensemble of Prior-guided Expert Graph Models for Survival Prediction in Digital Pathology 2024
Vishwesh Ramanathan, Pushpak Pati*, Matthew McNeil, Anne L. Martel*
International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI) 2024
Early Acceptance, Poster Presentation

Detecting Noisy Labels with Repeated Cross-Validations 2024
Vishwesh Ramanathan, Jianan Chen*, Tony Xu, Anne L. Martel*
International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI) 2024
Poster Presentation

Self Supervised Multi-view Graph Representation Learning in Digital Pathology 2023
Vishwesh Ramanathan, Anne L. Martel
International Workshop on Graphs in Biomedical Image Analysis (GRAIL), MICCAI 2023
Oral Presentation

Ink removal in whole slide images using hallucinated data 2023
Vishwesh Ramanathan, Wenchao Han, Dina Bassiouny, Eileen Rakovitch, Anne L. Martel
SPIE Medical Imaging, Digital and Computational Pathology, 2023
Oral Presentation

RESEARCH PROJECTS

Evaluating Clinical Readiness of Deep Learning Models for Survival Prediction 2025

- Designed and implemented benchmarking pipelines to assess the generalizability of state-of-the-art unimodal and multi-modal survival prediction architectures built on diverse foundation model backbones.
- Developed stress-testing frameworks to evaluate model robustness and uncover limitations affecting real-world clinical deployment; currently preparing a manuscript for submission to *Breast Cancer Research*

Automated Assessment of Tumor-Infiltrating Lymphocytes score for Survival Prediction 2022

- Developed a multi-headed CNN based segmentation model as part of the TIGER Challenge to estimate Tumor-Infiltrating Lymphocytes (TIL) density and tumor-associated stroma density from whole slide images, enabling the automatic extraction of prognostic biomarkers such as the TIL score
- Achieved 6^{th} place on the public leaderboard and consistently ranked among the top 3 algorithms in multiple internal prognostic evaluations, demonstrating clinical impact; co-authored a manuscript submitted to *Nature Medicine 2025*

Data Augmentation by Coherent Deformation of Multiple Parts - M.Tech Thesis 2021

- Designed advanced data augmentation techniques by coherently deforming bird body parts in the CUBS-200-2011 dataset, improving model performance by 2% over traditional augmentation methods
- Implemented image processing techniques to find body parts like wings, head, and tail and deformed them using an architecture consisting of CNN, Deformation module, Reinforcement Learning, and Discriminator network

Identification of Error-In-Variables Model of Descriptor Systems - B.Tech Thesis 2020

- Devised a methodology combining various algorithms like Principal Component Analysis (PCA), Maximum Likelihood PCA, Iterative PCA to find the parameters of systems governed by differential and algebraic equations
- The methodology also estimates the number and order of algebraic and differential equations, as well as the error variances of the involved variables, using only the input-output data

WORK EXPERIENCE

Computer Vision Intern May 2020 - Jul 2020
Spoonshot Inc. *Bengaluru, India*

- Applied image processing and machine learning tools (object detection, OCR) to extract features from food package images to analyze key design factors for various brands
- Scraped data from social media and defined a likeness metric based on attributes such as number of followers, number of reviews, likes, etc., to determine how much the general public likes a particular brand

Data Science Intern May 2019 - Jul 2019
American Express *Gurugram, India*

- Worked on building graphs on card members' transactional data using PySpark with utilities like fuzzy matches, logical operations, and conditional edges for a robust fraud network to catch a variety of fraudsters
- Built a support tool for better fraud network analysis and visualization, capable of performing graph queries, graph updates, and extraction of graph-based features for predictive algorithms

SKILLS AND TOOLS

Programming Languages	Python, Matlab, PySpark, C++
Technical Tools	Git, Google Cloud Services, Slurm, Docker, Distributed Training
Machine Learning Tools in Python	Pytorch, Tensorflow, Pytorch Geometric, OpenCv, Networkx, Gym

AWARDS AND ACHIEVEMENTS

- Awarded the Medical Biophysics - Sunnybrook Research Institute excellence award of $10000 for the year 2024-25
- Recipient of the Best Paper Award for the paper titled *Self-Supervised Multi-View Graph Representation Learning in Digital Pathology* at the International Workshop on Graphs in Biomedical Image Analysis (GRAIL), MICCAI 2023
- Led a team of four to secure the runner-up position amongst 3000 teams in Machine Learning hackathon conducted by IITMAA Sangam in 2019

ACADEMIC CONTRIBUTIONS

- Reviewer for Medical Image Computing and Computer Assisted Intervention (MICCAI) conference and IEEE Transactions of Medical Imaging (TMI) journal