

Satya Prakash Dash

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EDUCATION

The University of Manchester	Jan 2023 - July 2026
<i>PhD in Computer Science</i>	
Indian Institute Of Technology, Kharagpur	2015 - 2020
<i>B.Sc. & M.Sc. in Physics (Hons) First Class</i>	GPA: 7.61/10
Central Board of Secondary Education, India	2013 - 2014
<i>Senior Secondary in Computer Science Stream</i>	Percent: 89.6%

RESEARCH EXPERIENCE

University of Manchester	Jan 2023 - Jul 2026
<i>PhD Term</i>	
<ul style="list-style-type: none">Supervised by Prof Sami Kaski, Mingfei Sun & Wei Pan and fully funded via Dean's Doctoral Scholarship.Working towards understanding the second-order optimizer's trajectory using Fisher Information Matrix and devising fast second-order optimizers for training LLMs.Recent Paper submitted to AISTATS 2026 on using Gradient regularized Fisher Information for Fast Adaptation of LLM in transfer learning setting.	

WORK EXPERIENCE

Visionify.AI	Mar 2022 - Sep 2022
<i>Sr. Machine Learning Research Engineer</i>	
<ul style="list-style-type: none">Integrated wandb.ai into classification and object detection model training pipeline.Built and deployed perspective correction algorithm for real time footage to improve the accuracy of classification model on stock/out-of-stock classification.Built blur detection pipeline to remove blur from hazy capture to improve out-of-stock accuracy for retail supermarkets.Worked on quality control of deep-image model which captures and selects high quality image to run object detection, segmentation and classification.	
Expand-AI Pvt Ltd	Feb 2021 - Mar 2022
<i>Machine Learning Research Engineer</i>	
<ul style="list-style-type: none">Established pipeline for data annotation using few-shot ML where we could give 70% faster turn-around time than manual annotation in image classification, object detection, instance segmentation, semantic segmentation in CV and text classification, NER for NLP.On boarded three clients, Ludimos, Scion and Mingle Sports and completed tasks in instance and semantic segmentation and produced a million annotations.Managed and assessed a team of ten data associates during projects.	

INTERNSHIPS

Brain-Feed Pvt. Ltd.	Jan 2025 - July 2025
<i>LLM for Nutritional Science</i>	
<ul style="list-style-type: none">Built Prompt-Tuning and RAG Pipeline for nutritional supplement data for internal research help for clinicians (using AWS BedRock).Built pipeline for in-depth meta-data analysis for clinicians.Built fine-tuning methods for adapting Claude LLM to core nutritional supplement data.	
CYENS, Cyprus	April 2022 - Sep 2022
<i>Advanced Quadrupedal Locomotion from Vision through Deep RL</i>	
<ul style="list-style-type: none">Worked on IsaacGym simulator for quadruped locomotion of ANYmal and Unitree-A1 robot and added stone and ball collision simulation to the environment.	

- Built vision module (CNN + LSTM) which learns height information from the depth image to assist the robot in obstacle avoidance.
- Built new terrains with holes and pillars of random sizes to check the robustness of controller and compared the performance with a blind controller.

IIT Kharagpur

June 2018 - July 2019

Spatial Variability of Ammonia & Particulate Matter Hotspots in India

- Collected a decade of data for Ammonia in netCDF4 format of the Polar Orbiting Metop-A satellite and three decades of PM data by National Air Quality Monitoring (NADP).
- Built pipelines for pre-processing and visualize data using Google's Geo-encoding API.

RESEARCH PAPERS

Rank-1 Approximation of Inverse Fisher for Natural Policy Gradients in Deep Reinforcement Learning (Accepted to TMLR 2025 [LINK])

Yingxiao Huo, Satya Prakash Dash, Radu Stoican, Samuel Kaski, Mingfei Sun.

Gradient Regularized Natural Gradient (Submitted to AISTATS 2025)

Satya Prakash Dash, Hossein Abdi, Wei Pan, Samuel Kaski, Mingfei Sun - AISTATS 2026

Guided Riemannian Optimization (GuRO): Bridging Model Predictive Control and Decision Transformers (submitted to ICRA 2025)

Hossei Abdi, Satya Prakash Dash, Wei Pan, Mingfei Sun.

Record-high levels of Atmospheric Ammonia over India: Spatial and Temporal Analysis 2020.

J. Kuttippurath, Ajay Singh, S. P. Dash, N. Mallick, C. Clerbaux, M. Van Damme, L. Clarisse, P-F. Coheur and H. Varikoden - Science of Total Environment, Elsevier.

CONFERENCES & SUMMER SCHOOLS

University of Cambridge Summer School: Selected for Cambridge Ellis Unit Summer School on Probabilistic Machine Learning (July 2023).

NeuroMatch Academy: Selected & Participated at NeuroMatch Academy! Deep Learning Course (August 2021).

RLVS (Virtual School): Attended RLVS (Virtual School) by ANITI Toulouse Institute and DeepMind (Mar 2021 - Apr 2021).

ACCMS-ICMG 2020: Gave a talk on the Advances and the Future of Meta Reinforcement Learning in continuous control tasks and in Material Informatics at (ACCMS-ICMG 2020).

PROJECTS

Fixed-Fisher for Pre-Training LLMs | July 2025 - Sept 2025

- This project has been selected for RAEng Research Ready Summer internship by the **Royal Academy of Engineering**.
- Propose the use of scalable Natural Gradient Descent for faster pre-training of LLMs.
- Work was conducted for pre-training of GPT2 and ViT and gives superior performance than AdamW training.

Policy Gradient Algorithms in PyTorch - RL.Fun.Do | Jan 2019 - July 2020

- Implemented RL algorithms like DDPG, PPO, TRPO and SAC for OpenAI Gym and also on TORCS.
- Formulated a theoretical framework for RL based on Statistical Physics where, I formulated a state dependent partition function to generate bellman equations and used them to find state value function, Q-value and policy in deterministic as well as stochastic setting.
- Masters' thesis: Continuous Control in Deep Reinforcement Learning and a connection to Statistical Physics.

Computational Neuroscience | Jan 2018 - Apr 2019

- Simulated the rate response and tuning curves of Auditory Nerve Fibre through tones and actual speech, using the model provided in the paper: Zilany et al.
- Examined and coded the non-linear dynamical spiking of neurons through Morris-Lecar equations and Hodgkin-Huxley Model by simulating them in Matlab.

REVIEWER

ICML 2025: Reviewed papers related to multi-objective optimization for ICML 2025.

Reproducibility Challenge, RC 2020: Reviewer position at Reproducibility Challenge, RC 2020.

SCHOLARSHIP

Dean's Doctoral Scholarship: (2023) awarded by the University of Manchester for the full term of PhD.

Inspire Scholarship: (2015-2020) by DST, Government of India through JEE Advanced 2015.

CERTIFICATIONS & ACHIEVEMENTS

CUDA Certification: Completed NVIDIA certification on CUDA C++ Applications with multi-GPUs.

Social & Cultural Secretary: of Azad Hall of Residence, IIT Kharagpur (2016-2017)

INMO: Selected for INMO and INMO Camp and cleared Regional Mathematical Olympiad 2014.

RELEVANT SKILLS

Programming Languages: Python (PyTorch, Keras, Tensorflow2, OpenCV, Numpy, Scikit-Learn, Flask), C++ (STL, CUDA, OpenMP)

Tools: ROS, MuJoCo, PyBullet, VS Code, JupyterLab, GCP, AWS-Bedrock, Docker, Git, Matlab, LATEX

RELEVANT COURSES

Major coursework: Programming & Data Structure & Lab, Design and Analysis of Algorithms & Lab, Probability and Statistics, Stochastic Processes, Statistical Physics, Deep Learning Foundation and Application, Artificial Intelligence, Computational Physics & Lab, Neuronal Coding of Sensory Information, Computational Neuroscience, Optimal Control, Order and Chaos (Non-Linear Dynamics)