



Aman Pawar

PhD Researcher — MP-AIX Programme
Max Planck Institute
Magdeburg & Tübingen, Germany
Siemens Healthineers Fellow, IISc Alumnus

pawar@mpi-magdeburg.mpg.de
github.com/AmanPawar9
linkedin.com/in/amanpawar1
MPI Research Profile / Website

PROFILE

- PhD researcher in the MP-AIX programme jointly, under the supervision of Prof. Dr. Peter Benner and Prof. Dr. Philipp Hennig. Developed mathematically grounded machine learning algorithms for complex dynamical systems. Core expertise spans probabilistic machine learning, scientific machine learning, Bayesian inference, Bayesian inverse problems, uncertainty quantification, causal discovery, operator learning, and numerical methods for differential equations. Experienced in translating foundational architectural models into robust deployment strategy and validation workflows across clinical, industrial, and vehicle-scale platforms.

EDUCATION

- **Max Planck Institute for Dynamics of Complex Technical System** *July 2026 – Present*
PhD Candidate (MP-AIX) Magdeburg & Tübingen, Germany
 - **Thesis:** Probabilistic Causal Inference in Complex Dynamical Systems
 - **Supervisors:** Prof. Dr. Peter Benner (Max Planck Institute), Prof. Dr. Philipp Hennig (University of Tübingen)
 - **Research Focus:** Scientific ML, Bayesian Inference, Operator Learning, Probabilistic Numerical Methods, Uncertainty Quantification, Causal Discovery.
- **Indian Institute of Science (IISc)** *Aug 2023 – May 2025*
Masters of Technology in Bioengineering – Graduated May 2025 Bengaluru, India
 - **CGPA:** 9.4 / 10.0
 - **Thesis:** Electronic Health Records for Individuals with Diabetes is All You Need.
 - **Relevant Coursework:** Reinforcement Learning; Mathematical Foundations for Machine Learning; Systems Biology; Advanced Robotics; Computational Fabrication.
- **Oxford Machine Learning Summer School (OxML)** *June 2024*
MLx Health & Bio, Representation Learning United Kingdom
 - Selected participant; advanced coursework focused on Representation Learning, Reinforcement Learning, Causal Inference, Foundation Models, and Machine Learning for Healthcare.
- **Delhi Technological University (DTU)** *Aug 2018 – July 2022*
B.Tech in Civil Engineering New Delhi, India
 - **CGPA:** 8.33 / 10.0
 - **Mathematical Background:** Finite Element Analysis, Numerical Methods, Differential Equations, Optimization, Mechanics.

INTELLECTUAL PROPERTY

- **2024:** Systems, Apparatuses, And Methods For Disease Prediction. (Filed via Siemens Healthineers).
- **2025:** Field-Trainable Smart Camera System with Automated AI Optimization and Generative AI Capabilities. (Filed via Intelligent Edge Systems).
- **2025:** Automated Synthesis of Optimized Data Streaming Pipelines for Deep Learning Model Deployment. (Filed via Intelligent Edge Systems).
- **2025:** Vendor-Agnostic IoT Platform: Generative AI Development and Modular Hardware Adaptation. (Filed via Intelligent Edge Systems).
- **Granted: DEEP LEARNING-ENHANCED MEDICAL IMAGING DEVICE FOR REAL-TIME DIAGNOSIS.** (Granted). [Link](#)

TECHNICAL SKILLS

- **Languages & Tools:** Python, C++, Julia, SQL, Docker, Git, Linux, SLURM
- **Frameworks:** PyTorch, PyTorch-Geometric, TensorFlow, JAX/Flax, Isaac Gym, Scikit-Learn
- **Scientific ML & Compute:** Neural ODEs, Neural SDEs, Physics-Informed Learning, Differentiable Simulation, High Performance Computing, CUDA
- **Mathematics & Theory:** Bayesian Statistics, Probability Theory, Numerical Linear Algebra, Optimization, Functional Analysis, Operator Theory, Koopman Theory, Causal Inference, Graph Neural Networks, Operator Learning, Neural Operators, Uncertainty Quantification, Robustness & Explainability

PUBLICATIONS (SELECTED)

- **2024:** Sarkar, R., Sujeewon, B.C., **Pawar, A.** (2024). Landslide Susceptibility Mapping Using Satellite Images and GIS-Based Statistical Approaches in Part of Kullu District, Himachal Pradesh, India. In: Sarkar, R., Saha, S., Adhikari, B.R., Shaw, R. (eds) *Geomorphic Risk Reduction Using Geospatial Methods and Tools*. Disaster Risk Reduction. Springer, Singapore. DOI: 10.1007/978-981-99-7707-9_14.
- **2023:** **Pawar, A.**, Jolly, A., Pandey, V., et al. (2023). Artificial intelligence algorithms for prediction of cyclic stress ratio of soil for environment conservation. *Environmental Challenges*, 12, 100730. DOI: 10.1016/j.envc.2023.100730.
- **2021:** Sarkar, R., Gupta, D., **Pawar, A.**, et al. (Eds.). (2021). Geotechnical Characteristics of Soils and Rocks of India. *CRC Press*. Chapter: Nagaland. DOI: 10.1201/9781003177159-26.

EMPLOYMENT HISTORY

- **All India Institute of Medical Sciences (AIIMS-Delhi) & TANUH** March 2026 – May 2026
AI Researcher & Early-Stage Researcher (AI-CoE) New Delhi, India
 - Co-developed and validated "Arogya Sankalp," an AI-powered oral cancer screening mobile application designed for early detection at the Primary Health Center (PHC) level by frontline health workers.
 - Drafted a clinical cluster randomized controlled trial (cRCT) and funding-ready research proposal for the Evidence for AI in Health (EVAH) initiative, positioning AIIMS Delhi as the clinical lead alongside partners like ICMR, IISc, and the Ministry of Ayush.
 - Collaborated with clinical leads (including Prof. Deepika Mishra) to benchmark and integrate computer vision models with histological ground truths and National Cancer Grid referral pathways to optimize clinical triage and referral efficiency.
- **Ola Electric Technologies Pvt. Ltd. (CEO's Office)** July 2025 – March 2026
AI Research & Strategy Bengaluru, India
 - Authored a 25-page AI product strategy and hardware–software specification guiding Krutrim's custom AI silicon, vehicle perception modules, and MoveOS 6 features (spec includes quantization strategy, inference pipelines, graph transformations, and validation criteria).
 - Led a cross-functional squad of 10 engineers across AI/ML, embedded vehicle software, Android/iOS applications, and hardware design to deliver synchronized feature roadmaps and PoC artifacts.
 - Defined inference and quantization design that reduced projected on-device latency by $\sim 2.7\times$ and improved energy efficiency by $\sim 12\%$ on benchmark vehicle workloads (internal simulation estimates).
- **Intelligent Edge Systems Pvt. Ltd.** May 2025 – June 2025
Research Intern Bengaluru, India
 - Implemented prototype modules for automated data-stream orchestration and adaptive model quantization, reducing end-to-end deployment overhead by an estimated $\sim 35\%$ on resource-constrained hardware.
 - Contributed to multiple IP disclosures focused on automated pipeline synthesis, generative-AI-driven on-device adaptation, and field-trainable inference systems.
- **Siemens Healthineers** May 2024 – Aug 2024
Deep Learning Research Fellow Bengaluru, India
 - Developed graph-based causal discovery pipelines evaluated on longitudinal Electronic Health Records using MIMIC-IV ($\sim 70k$ patient records) and proprietary multi-ethnicity datasets; achieved $\sim 18\%$ improvement in structural recovery F1 vs classical temporal-causal baselines on synthetic benchmarks.
 - Designed uncertainty-aware deep learning pipelines for medical diagnostics under noisy or incomplete observations, and produced interpretability artifacts to support internal clinical validation workflows.

•Indian Institute of Technology (IIT) Delhi

Aug 2022 – Jun 2023

Sr. Project Assistant, Mechanics and Computation Group

New Delhi, India

- Designed physics-informed and Hamiltonian Graph Neural Networks for learning physically consistent dynamics of articulated rigid-body systems, achieving <3% long-horizon energy drift vs >15% for unconstrained baselines.
- Integrated differentiable ML-driven topology optimization and truss design into the lab's workflow, cutting simulation-to-design iteration time by ~22%.

RESEARCH PROJECTS: CAUSALITY & DYNAMICAL SYSTEMS

•Graph-Based Synthesis of Instrumental Variables for Confounded Treatment Effect Estimation [Link](#)

Course Project

- Modeled treatments, outcomes, and instruments as observational causal graphs containing unobserved confounders; trained a GAT-based embedding to construct synthetic instrumental variables with exogeneity constraints, reducing bias in ATE estimates by ~18% (n=10k samples).
- Research Interests: Causal Inference, Graph Neural Networks, Treatment Effect Estimation, Bayesian Learning, Representation Learning.

•Causal Discovery in Spatio-Temporal Systems via Self-Supervised GNNs

[Link](#)

Course Project

- Represented spatiotemporal systems as dynamic graphs and applied ST-GNN embeddings paired with a constraint-based discovery step to capture spatial and temporal directed dependencies beyond Granger causality; improved edge-recovery F1 by ~15%.
- Research Interests: Graph Neural Networks, Scientific Machine Learning, Representation Learning, Causal Inference, Dynamical Systems.

•Graph-Informed Signature Kernels for Causal Discovery in Multivariate Clinical Time-Series [Link](#)

Course Project

- Extended signature-kernel conditional independence testing using rough path theory combined with GNN-derived biomedical knowledge graphs; benchmarked on MIMIC-III subsets, improving sample efficiency by ~30% under sparse/noisy observations.
- Research Interests: Kernel Methods, Rough Path Theory, Graph Learning, Bayesian Statistics, Healthcare AI.

OTHER PROJECTS

•Decentralized Multi-Agent Path Planning with GNNs

[Link](#)

Course Project

- Designed a decentralized navigation policy using Graph Attention Networks (GATs); demonstrated scalability to 100+ agents in simulation and improved throughput by ~15% vs ORCA in dense scenarios.

•Predictive Human-Robot Collaboration using ST-GNNs

[Link](#)

Course Project

- Built an ST-GNN predictor for human motion; integrated with a UR5e motion planner and demonstrated ~99.5% collision-avoidance reliability in closed-loop tests (n=200 scenarios).

•Real-time 3D Scene Reconstruction for Robotic Grasping

[Link](#)

Course Project

- Perception pipeline using Intel RealSense and PointNet++; trained instance segmentation and 6-DoF pose estimation models achieving ~90% successful grasp pose generation in cluttered bin-picking tests (test set n=1k).

HONORS & AWARDS

- **ANRF Travel Grant**, Awarded by Anusandhan National Research Foundation, Govt. of India 2024
- **Siemens Healthineers Fellowship**, Selected from Dept. of Bioengineering, IISc, for Research Excellence 2023
- **Innova Techno-management Festival**, 2nd Position in CAD CRAFT Competition, DTU 2021
- **IOT Challenge 2020**, Merit Certificate, IIT Bombay & I3 India technologies 2019

PROFESSIONAL MEMBERSHIPS

- **Networks**: MP-AIX Doctoral Network, Max Planck AI Network
- **Communities**: ELLIS Society (Research Community), Scientific Machine Learning Community