

PRANAV BAHL

pbahl@umich.edu | [pranavsciml.github.io](https://github.com/pranavsciml) | [linkedin.com/pranavbahldce](https://www.linkedin.com/in/pranavbahldce) | Ann Arbor MI, US

CFD | Data Science | Numerical methods | Bayesian Inference | Deep learning | Scientific Machine Learning

OBJECTIVE

Research-focused student with experience in Physics-aware Machine Learning, Deep Learning, CFD, and Scientific Computing. Skilled in data-driven decision making and applied scientific research. Seeking PhD opportunities starting January 2026.

EDUCATION

University of Michigan, Ann Arbor *Rackham Graduate Fellowship* Michigan, United States
Master of Science in Aerospace Engineering (Concentration: Computational and Data Sciences) Aug 2024 - Dec 2025

Imperial College London *Overall Distinction* London, United Kingdom
Master of Science in Advanced Computational Methods (Concentration: Machine Learning) Oct 2022 - Oct 2023

- Benchmarking of Quantum gated Recurrent Neural Networks parameterized via Variational Quantum Algorithms (VQAs).
- Robust hyper-parameter optimization of the Gated recurrent neural networks via bayesian optimization.

Delhi Technological University *Overall Distinction* Delhi, India
Bachelor of Technology in Mechanical Engineering (Concentration: Machine Learning) Aug 2017 - Aug 2021

(Relevant)** EXPERIENCE

Graduate Research Assistant *University of Michigan, Ann Arbor, MI, US* Aug 2024 - Present

- Parallelization (Data Parallel) of Conditional latent diffusion models (Denoising Diffusion Probabilistic Models) in PyTorch achieving **75% reduction in parameter count** via training on tensor network latent space.
- Training and implementation of Reinforcement learning (RL) in OpenAI Gym to generate sequential frames of Atari games.
- Conducting Star-CCM+ CFD simulations of Nuclear reactors (RPVs) for benchmarking of AI/ML models.

Computational Software Internship *Schlumberger (SIS) - SLB, Abingdon, Oxfordshire, England* April 2024 - Aug 2024

- Parallelization (multiprocessing) of Particle swarm optimization algorithm (PSO) and bayesian inference algorithms (EnKFs, EnSRKFs) via python multi-processing achieving **64x reduction in computational time** for reservoir simulations.
- Conceptualized & implemented a novel PSO + K-means clustering algorithm achieving multi-minima objective optimization.

CFD Research Internship *Carnegie Mellon University, Pittsburgh, PA, US* Mar 2021 - Oct 2021

- Benchmarking of 3D U-Net neural network based reduced order model (ROM) for spatio-temporal learning of dynamics achieving **MSE loss of the order of 10^{-4}** . (Turbulent flows, Vortex Shedding and Sea Surface Temp. Dataset)
- Demonstration of transfer learning across networks with upto **~ 9 seconds training speedup**.
- Validation of numerical simulations (CFD) with literature and achieving the agreement within **5% error bounds**.

Summer Fellowship (SFRP-2020) *Indian Institute of Technology, IIT Delhi, India* Jun 2020 - Aug 2020

- Implementation and conceptualization of a neural network based state estimation architecture achieving a **50-70% reduction in sparse measurement** at high noise levels compared to conventional shallow ML techniques.
- Implementation of a python script to post-process time series datasets extracted from netCDF meteorological databases.
- Validation of 2D CFD simulations with literature and achieving the agreement within **10% error bounds**.

CFD Software Internship *Forbes Marshall, IIT Madras Research Park, Chennai, India* May 2019 - Jul 2019

- Modeling, simulation and verification of model spray formation from a single-hole fuel injector via OpenFOAM (C++).

PUBLICATIONS (MACHINE LEARNING)

- Pant, Pranshu, Ruchit Doshi, **Pranav Bahl**, and Amir Barati Farimani. "Deep learning for reduced order modelling and efficient temporal evolution of fluid simulations." **Physics of Fluids** 33, no. 10 (2021): 107101.
- Kumar, Yash, **Pranav Bahl**, and Souvik Chakraborty. "State estimation with limited sensors—A deep learning based approach." **Journal of Computational Physics** 457 (2022): 111081.

SKILLS

Languages : Python, C and C++, OpenGL, LaTeX, SQL, Julia, OpenFOAM (C++), Fortran
Machine Learning & Deep Learning : Scikit-learn, Pandas, Numpy, Pytorch, SciPy, TensorFlow, CUDA, Azure ML
Numerical Simulations : Star-CCM+, ANSYS Fluent, OpenFOAM, Nektar++ (C++)
Other Tools : Excel, PowerPoint, PowerBI, Cloud Environments (AWS, GCP), wandb, Streamlit