Harshwardhan **Praveen**

PhD Student | Cornell University | Scientific Machine Learning, Deep Learning, Algorithms

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Education

Cornell University — *Ithaca, USA*

PhD in Civil and Environemental Engineering (GPA: 4.13/4) — *Jan. 2021 - PRESENT*

- PhD Thesis: Learning Green's functions from Data

Indian Institute of Technology, Hyderabad — *Hyderabad, India*

Dual Degree M.Tech. in Mechanical Engineering (Mehanics and Design) — *Aug. 2019 - Aug. 2020*

Indian Institute of Technology, Hyderabad — *Hyderabad, India*

B.Tech. (Honours) in Mechanical Engineering — *Jul. 2015 - Aug. 2019*

Experience

Cornell University — *Ithaca, USA*

Graduate Research Assistant — *Jan. 2021 - PRESENT*

- Broadly working on Scientific Machine Learning.
- Discovering of Green's functions from Data.

Boeing Research and Technology, Bangalore — *Bengaluru, India*

Research Intern — *Jun. 2018 - Jul. 2018*

- Worked for the Material and Manufacturing lab of Boeing R&T, Bangalore.
- Numerical modeling of Multipoint forcing using ABAQUS.

IIT, Hyderabad — *Hyderabad, India*

Teaching Assistant — *Jan. 2017 - Dec. 2019*

- Teaching Assistant for the courses: Dynamics of Chemical Systems, Digital Fabrication, Statistics, Fluid Mechanics-I, Advanced Mechanics of Solids, Thermodynamics - II, Mechanics of Solids - II

Research Projects

Crack Modeling with Floating Node Method — *Hyderabad, India*

Masters Project — *May. 2019 - Jul. 2020*

- Developed a code in C++ for modelling cracks in solids.
- Modelled crack propagation using Floating Node Method.

Finite Element Package with CUDA — *Hyderabad, India*

Undergraduate Project — *Aug. 2017 - Nov. 2017*

- Made a simple Finite Element Package with parallel processing.
- Used Nvidia CUDA for parallel processing.

Publications

Principled interpolation of Green's functions learned from data — *10.1016/J.CMA.2023.115971*

Computer Methods in Applied Mechanics and Engineering — *Mar. 10, 2023*

Talks

American Physical Society March Meeting — *Las Vegas, USA*

Data-driven discovery and interpolation of Green's functions — *Mar. 2023*

- Introduced two data-driven approaches to mathematically model unknown physical systems, by learning a Green's function for its hidden, governing partial differential equations.
- Proposed a way to interpolate between Green's functions learned for different modeling contexts, by performing principled interpolation on a manifold.
- Demonstrated our methods on 1D and 2D problems.

Skills

Machine Learning	PyTorch, Tensorflow 1 and 2, scikit-learn
Simulations	FENICS, ABAQUS, ANSYS Workbench, ICEM CFD, FLUENT
Programming	C/C++, Python, MATLAB, Basic CUDA and OpenMP, LaTeX
Operating Systems	MacOS, Linux, Windows
Languages	Hindi, English

Coursework

Cornell University	Inverse Problems, Mathematical Modelling of systems, Stochastic Processes, Data Science Numerics, Introduction to Machine Learning
IIT Hyderabad	Algorithms and Data Structures, FEM and Advanced FEM, CFD and Advanced CFD

Certificates

2020 **Deep Learning Specialization**, Coursera *PWJCGX9NE2FL*

2020 **Machine Learning with TensorFlow on Google Cloud Specialization**, Coursera *AH747CW2N5QG*

Honors & Awards

2018 **Academic Excellence**, B.Tech. Mechanical Engineering, IIT Hyderabad *Hyderabad, India*

2014 **KVPY Scholarship, All India Rank 86**, IISc Bangalore *India*

2013 **NTSE Scholarship**, National Council of Educational Research and Training *India*

Extracurricular Projects

Hult Prize | Singapore Regionals *Singapore* *Nov. 2017 - Mar. 2018*

- Worked in a team of 4, which represented IIT Hyderabad in the Singapore Regionals of Hult Prize 2018.
- Drafted a business model for a solar micro-grid with internet services for rural areas.

UAS NW Switzerland - IIT Hyderabad Joint Project *Hyderabad, India* *Mar. 2016 - Apr. 2016*

- Among the 14 students from IIT Hyderabad who worked in a cross-cultural team with UAS Northwest Switzerland.
- Drafted a framework for designing shared, open office spaces in an Indo-Swiss work context.

Hand Symbol Interpreter *Hyderabad, India* *Dec. 2015 - Jan. 2016*

- Independent group project in second semester of undergraduate degree.
- Used flex sensors to convert hand symbols into text using Arduino to make a Hand-symbol interpreter.

Positions of Responsibility

Jan. 2021 - May.2022 **Cornell University Civil & Environmental Engg. Grad. Student Association**, VP | Social Chair *Ithaca, USA*

Apr. 2017 - Apr. 2018 **Competitive Program Club, IIT Hyderabad**, Coordinator *Hyderabad, India*

Apr. 2016 - Apr. 2017 **Music Club, IIT Hyderabad**, Coordinator *Hyderabad, India*

Apr. 2016 - Apr. 2017 **Sunshine, Counselling cell of IIT Hyderabad**, Student Mentor *Hyderabad, India*

Oct. 2015 - Apr. 2016 **TEDxIITHyderabad**, Core Member (Hospitality Team) *Hyderabad, India*