

NEELAPPAGOUDA V HIREGOUDAR

Graduate student

Pennsylvania State University, USA.

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EXPERIENCE

Junior Researcher

07, 2022 – 06, 2023

École Centrale School of Engineering

Hyderabad, India

- Designed the system level software architecture for PINNs.
- Developed a framework for turbulence modelling using **Physics Informed Neural Networks**.
- Addressed the **Spectral Bias** in **turbulence modeling** using Fourier Neural Networks.
- Implemented the NVIDIA modulus or open-source approach to resolve the Kolmogorov scale using Physics Informed Neural Networks.

Junior Research Fellow

10, 2021 – 07, 2022

Indian Institutes of Technology

Kharagpur, India

- Implemented the deep learning based solution for Poisson's equation into Multi-scale flow solver.
- Built the container environment to run the codes on different machines.
- Attempted to improve the neural network architecture using neural architecture search.

Research Assistant

04, 2021 – 10, 2021

Indian Institutes of Technology

Bombay, India

- Understood the usage of Meso-NH (Fortran) and PyCLES (Python) framework for Optical Turbulence.
- Built the Python modules for PyCLES using existing Fortran (Meso-NH) subroutines.

TECHNICAL SKILLS

Languages: Python (excellent), Bash (excellent), MATLAB/Simulink (good), C++ (beginner)

D/L framework: Tensorflow, PyTorch

CFD Framework: SU2 (excellent), OpenFOAM (moderate), Ansys (moderate), FEniCS (moderate)

Developer Tools: Git, Docker, VS Code, PyCharm

Others: Linux OS, HPC usage

EDUCATION

Pennsylvania State University (Penn State)

University Park, PA

Doctor of Philosophy, specialization in Information Sciences and Technology

08, 2027 (tentative)

Indian Institute of Space Science and Technology (IIST)

Trivandrum, India

Master of Technology, specialization in Aerodynamics and Flight Mechanics

08, 2020

Sri Jayachamarajendra College of Engineering

Mysuru, India

Bachelor of Engineering, specialization in Mechanical Engineering

05, 2017

PROJECT WORK EXPERIENCE

Multimodal shape optimization of a wing using gradient free methods.

07, 2019 – 08, 2020

- Implemented differential evolution based niching algorithms to obtain multiple local optima.
- Reduced problem dimension to **ten** using free-form deformation box and principal component analysis.
- Aligned SU2 solver with Pointwise (meshing software) and Python to create perturbed wings and analyzed for subsonic and inviscid condition.

- Total of four optima are obtained with objective function varying less than 8%.
- Tools used: *Pointwise*, *SU2*, *Linux shell script*, *Python*, *SLURM*.

Aircraft Climb Optimization.

10, 2019

- Assisted the bachelor student to implement gradient-free algorithm.
- Achieved the project goals: to optimize the fuel consumption subject to constraints like maximum weight carrying capacity, service ceiling, the maximum angle of attack, to name a few.

Variable-Thrust Optimization of Ascent Trajectory of a Launch Vehicle.

03, 2020 – 04, 2020

- Assisted the graduate student to implement the problem objective and constraints.
- Implemented the parallel computation of computational expensive objective function using Python and HPC resources.

Experimental Investigation of Heat pipes.

07, 2016 – 05, 2017

- Compared the performance of Heat pipe when subjected to various working fluids.
- Heat dissipation for nanofluids is maximum than other fluids.

CERTIFICATIONS

Neural Networks and Deep Learning

12, 2021

Certificate course conducted by DeepLearning.AI

- Certificate Issuing Organization : Coursera.

Using Python to Interact with the Operating System

09, 2020

Certificate course conducted by Google

- Certificate Issuing Organization : Coursera.

Operating Systems and You: Becoming a Power User

05, 2020

Certificate course conducted by Google

- Certificate Issuing Organization : Coursera.

Introduction to Git and GitHub

05, 2020

Certificate course conducted by Google

- Certificate Issuing Organization : Coursera.

STUDENT ACTIVITIES

Photographic Chronicler

Penn State, USA

Indian Graduate Student Association (IGSA)

08, 2023 – Present

- Organized events like Mela, movie night, DJ night, and others.
- Engaged in the role of a photographer.

Event Coordinator

IIST, India

Graduate Student Association (GSA)

07, 2018 – 05, 2020

- Incharge of events conducted during junior students induction program.
- Conducted farewell event for graduate students.