



Devansh Tripathi

Roll No.: IMS22090

Integrated BS-MS Programme

IISER Thiruvananthapuram

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EDUCATION

- Indian Institute of Science Education and Research (IISER), Thiruvananthapuram** 2022 ~ Present
Integrated BS-MS Programme, Applied Mathematics major CGPA: 9.14/10
- V.K.S Saraswati Vidya Niketan Inter College, Gola (Kheri)** 2008 ~ 2022
Secondary and Higher Secondary Schooling, Mathematics and Computer Science

RESEARCH EXPERIENCE

- Universal Approximation Theorem for Geometry Aware Operator Transformer (GAOT)** May ~ August, 2025
ETH Zürich, Prof. Dr. Siddhartha Mishra, ETH Zürich, Switzerland
 - Proved Universal Approximation property (UAP) for Geometry Aware Operator Transformer (GAOT). UAP is the density result that says: GAOT can approximate any continuous solution operator between L^p spaces with arbitrary accuracy.
 - GAOT is the deep learning-based PDE solver that uses operator learning and transformers to numerically solve PDEs.
 - GAOT learns the solution operators of PDEs on arbitrary domains accurately and efficiently for CFD simulations. Hence theoretical foundations for GAOT are of great importance.
 - I learned classical PDE analysis, measure theory, functional and Fourier analysis and applied techniques from these areas to prove universal approximation property.
- Distributed memory parallelization of Lax-Wendroff Flux Reconstruction** June ~ July, 2024
TIFR-CAM SSRP Program, Prof. Praveen Chandrashekar, TIFR-CAM, Bangalore
 - Performed parallelisation of the code for Lax-Wendroff Flux Reconstruction method for solving hyperbolic conservation laws for 1D and 2D cases using Message Passing Interface (MPI).
 - Improved execution time of code by 13 times on a multicore architecture with efficiency of 82 % on cartesian and curvilinear meshes.
 - Implemented Remote Memory Access (RMA) for parallelizing the code for numerically solving linear advection equation for 1D and 2D cases.
 - Link of the github issue for which I contributed can be found [here](#) and project report can be found on this [link](#).

SIDE-PROJECTS

- MPI-based Finite Difference Method for Parallel Numerical Simulation of Linear ODEs in C++**
Dr. K.R. Arun, IISER Thiruvananthapuram
 - Applied master-worker parallel algorithm in solving linear boundary value problems with Dirichlet, Neumann, and mixed boundary conditions
 - Code for parallel implementation of ordinary differential equation solver can be accessed [here](#).
- Serial Numerical Simulation of Linear ODEs using Finite Difference Method in C++**
Dr. K.R. Arun, IISER Thiruvananthapuram
 - Studied Finite difference method, derivative approximations for boundary value problems with Dirichlet, Neumann and mixed boundary conditions.
 - Code for serial implementation of ordinary differential equation solver can be accessed [here](#).
- Reading Project on Advance C++ and Message Passing Interface (MPI)**
Dr. K.R. Arun, IISER Thiruvananthapuram
 - Studied point-to-point and collective communication as well as blocking and non-blocking communication routines in MPI.
 - Reading includes the book "Guide to Scientific Computing in C++" by Dr. Joe Pitt-Francis and Prof. Jonathan Whiteley and some online mpi-tutorial websites.
 - A parallel and serial implementation of Gauss Elimination using MPI can be found [here](#) and few other related codes can be found [here](#).

PRESENTATION

- Distributed memory parallelization of Lax-Wendroff Flux Reconstruction**
 - Presented my summer project to Computational PDEs research group of Prof. Praveen Chandrashekar at TIFR-CAM, India on August 11, 2024
 - Slides for the presentation can be found on this [link](#).

RELEVANT COURSES

Current Semester: Measure Theory, Partial Differential Equations, Analysis on Manifold, Numerical Solutions of Differential Equations, Applied Stochastic Analysis.

Completed: Real Analysis, Theory of Groups and Rings, Numerical Analysis, Linear Algebra, Mathematical Statistics, General Topology, Theory of ODE, Complex Analysis, Probability and Stochastic Processes, Scientific Computing.

TECHNICAL SKILLS AND INTERESTS

Languages: C++, C, Julia, Python, Latex

Developer Tools: Command line, Linux, Git, VSCode.

Libraries: Python Libraries - Numpy, Pandas, Matplotlib

C++/C - OpenMPI

Human Languages: English, Hindi

Areas of Interest: Mathematical analysis of PDE, Harmonic/Fourier analysis in PDEs, and related areas of analysis.

ACHIEVEMENTS

- **Awarded ETH For Development (ETH4D) Fellowship**, *ETH Zürich, Switzerland.* 2025
- **Awarded Summer Student Research Fellowship 2024**, *TIFR-CAM, Bangalore.* 2024
- **Innovation in Science Pursuit for Inspired Research (INSPIRE) Fellowship**, *Government of India.* 2022
Given to top 1 % candidates in the state.
- **Awarded by Chief Minister, Government of Uttar Pradesh for academic excellence in higher secondary school.** 2022

REFERENCES

- **Prof. Dr. Siddhartha Mishra**, Full Professor of Mathematics
Seminar for Applied Mathematics, D-Math, ETH Zürich,
Zürich, Switzerland
Website: <https://camlab.ethz.ch/the-group/group-head.html>
Email: siddhartha.mishra@sam.math.ethz.ch
- **Dr. K.R Arun**, Associate Professor of Mathematics
Indian Institute of Science Education and Research (IISER),
Thiruvananthapuram, India
Website: <https://www.iisertvm.ac.in/faculty/arun>
Email: arun@iisertvm.ac.in
- **Prof. Praveen Chandrashekar**, Full Professor of Mathematics
Centre for Applicable Mathematics, Tata Institute of Fundamental Research (TIFR),
Bangalore, India
Website: <https://cpraveen.github.io/>
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