Manas Vishal

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# SKILLS

**Programming Languages**: Expert in Python, C, C++, R, HTML & TeX and proficient in Julia, SQL & PHP

**Computer Software**: MATLAB, Mathematica, Origin, Gnuplot, ImageJ, LaTeX, Android Studio

# EDUCATION

## University of Massachusetts Dartmouth

## PhD, Computational Sciences and Engineering (Theoretical Physics) Expected May 2025

Award: Distinguished Doctoral Fellowship | GPA: 4.0

## Indian Institute of Science Education and Research Kolkata

## Bachelor and Master of Science, Physics June 2021

Award: Merit-based scholarship | GPA: 3.5

Relevant coursework: Linear algebra, Statistics, Mathematical Modeling, Advanced Machine Learning,

Numerical Methods and Algorithms, Computational Physics, High Performance Computing

**EXPERIENCE**

**Center for Scientific Computing and Data Science Research,** UMass Dartmouth

***Research Assistant*  Sep 2021 - Present**

* Formulate a robust mathematical model to simulate astrophysical binaries.
* Develop a codebase with new algorithm from scratch for numerical simulations of astrophysical binaries using high performance mathematical models.
* Prototype MATLAB code runs 90 times faster and 108 times more accurate than current state of art
* Assist junior researchers to develop quantitative and analytical skills for black holes simulations.

**Advanced Data Mining,** UMass Dartmouth

***Python Programmer and Data Analyst* Jan 2024 – Apr 2024**

* Spearheaded the team of 3 to analyze credit card fraud data using R and Python
* Curated a codebase using R and Python libraries (Scikit-learn, numpy, pandas, seaborn, matplotlib) to perform a predictive analysis and classify the time series data for fraudulent transaction
* Trained several algorithms like XGBoost, Logistic Regression, Decision Tree, and Neural Networks on the dataset
* Utilized different metrics like F1 Score, AUC ROC, Recall, Precision to benchmark different algorithms, rendering us with a logistic algorithm with 95% accuracy

**Albert Einstein Institute,** Max Planck Institute of Gravitational Physics, Potsdam, Germany

***Data Scientist*  Jun 2023 – Jul 2023**

* Accelerated the simulation time of binary black holes using a data driven approach
* Analyzed time series datasets in frequency domain for a faster and efficient surrogate approach
* Polished the algorithm to generate black hole physics data 6 times faster

**NSF Careers,** Yale Center for Resea​rch Computing

***High Performance Computing Student Facilitator* May 2023 – Jun 2023**

* Translated a prototype MATLAB code to an efficient C++ codebase
* Benchmarked and profiled C++ codebase across multiple platforms by deploying high performance computing techniques
* Implemented unit and regression tests to the codebase using *Git*

# PUBLICATIONS and PRESENTATIONS

* First author paper on highly efficient simulation of astrophysical objects (<https://arxiv.org/abs/2307.01349>) [with referee]
* Invited talk at MIT on September 11, 2023
* Invited talk at Infinity on a Gridshell workshop held in Copenhagen, Denmark
* Presented my research on astrophysics simulations at Albert Einstein Institute in Potsdam, Germany

# AWARDS

## Dissertation Research Award

## University of Massachusetts Dartmouth May 2024

Recognition for exceptional performance in doctorial research in Physics

## LISA Symposium Travel Grant

## National Aeronautics and Space Administration (NASA) Apr 2024

Grant offered to highly motivated scientists to attend the space-borne telescope, LISA, symposium in Dublin, Ireland

## Distinguished Doctoral Fellowship

## University of Massachusetts Dartmouth Sep 2021

Highest fellowship offered to only 10 students by UMass Dartmouth that aided my doctoral research in black hole physics

# LEADERSHIP and OUTREACH

* Organized the first ever hackathon of University of Massachusetts Dartmouth on April 13, 2024.
* Led the multimedia and web technology team of Inquivesta, the largest science fest of India. Moreover, developed the android application for the event that handled transactions.
* Utilized python modules (ipyvolume, numpy, matplotlib, scipy, sci-kit-learn, pandas) to analyze the time series data to extract physics of black holes and make Augmented Reality/Virtual Reality simulations that got a first prize in Brown University’s hackathon.