

# 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  $10^8$  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 Research 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 doctoral 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 Inquiesta, 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.