

Bhavesk Khamesra

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Education

- **Ph.D. (Physics), Georgia Tech** August 2015: May 2021
CGPA - 3.94/4.0,
- **BS-MS Dual Degree, IISER Pune** August 2009: May 2014
CGPA - 9.0/10.0 (Dean's List),
- **SQL Basics for Data Science, UC Davis** March 2020: May 2020
Coursera Specialization,
- **Deep Learning Specialization** Jan 2021: Present
Coursera Specialization,

Technical Skills

- Programming Languages – Python (numpy, scipy, pandas, scikit-learn, Tensorflow), C++, SQL, Perl, Bash.
- Machine Learning - Random Forest, Neural Network, SVM, Naive Bayes, Linear and Logistic Regression, PCA, ICA, FFT
- Tools – Jupyter, Git, Latex, Databricks, Visit, Plotly, yt, PBS, Condor, OSG
- Mathematical – Differential Equations, Linear Algebra, Multivariable Calculus, Statistics, Machine Learning Theory
- Communication – Grant Proposals (XSEDE, ~\$700k), Journal publications (15+), Conference Presentations and Public Talks (5+)

Work Experience

- **Research Fellow** UT Austin August 2021 - Present
Statistical Analysis and Machine Learning
 - Led a Bayesian inference study that uncovered regions in parameter space with inaccuracies $> 60\%$ in the current models of gravitational waves using Markov chain Monte Carlo simulations.
 - Creating a deep learning model to predict the source of gravitational wave signals, initial results have accuracy of $> 85\%$.
- **Graduate Assistant** Georgia Tech August 2016 - April 2021
Modelling and Data Analytics
 - Developed a new **mathematical framework** to solve differential equations which expanded the modeling capabilities and improved the performance of the Einstein Toolkit software and accomplished a key goal in a NSF grant worth \$2 million.
 - Contributed to 5+ collaborative projects as part of the LIGO scientific collaboration by performing relativistic hydrodynamical simulations of astrophysical systems on 4+ HPC clusters which led to **peer-reviewed scientific publications**.
 - Designed a new method to reduce the noise impact in simulations which improved the model efficiency by a factor of 10.
 - Developed a **data analysis** infrastructure to clean and transform raw simulation data (ASCII, 2 GB) into a processed format (HDF5, 25 MB) compatible with downstream pipelines, which led to contributions in 5+ **scientific publications**.
 - Created an open source **data visualization** pipeline in python (Plotly, yt and Matplotlib) to provide real time analysis of black hole simulations with capability to analyze >100 GB of data within a few minutes.
- **Personal Projects** August 2021 - Present
Machine Learning
 - Developed a linear regression model (tensorflow) for warehouse rental price prediction with an average error $\sim 5\%$.
 - Increased the interpretability of deep learning model by analytically quantifying the effects of feature perturbation on trained neural network.

Leadership

- Undergraduate Research Team Lead (2018-2020) – Supervised 3 teams of students in various projects involving research and visualization. Led to one publication (+one in draft).
- Einstein Toolkit (ET) Workshop Organizer (2018) – Core organizer of ET collaboration workshop with 30 participants from 10 different institutes across USA.