# Kevin Ghorbani

## Contact Information

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List of Publications: inspirehep.net/author/profile/Kevin.Ghorbani.1

## Skills

**Expertise:** Data Science and Quantitative Analysis, Big Data Queries, Data Mining, Statistics, Predictive Modeling, Data Visualization, Research and Problem Solving, Public Speaking

**Languages:** *Expert:* Python (3.5 and 2.7), C/C++, Shell (bash script), SQL *Prior-experience: R*, Matlab

**Machine Learning Techniques:** *Expert:* AdaBoost, Regression, Decision Tree, Random Forest, Support Vector Machine using scikit-learn, TensorFlow and Keras

**Tools:** *Expert:* NumPy, SciPy, pandas, Matplotlib, Jupyter, Subversion, Git, condor, UNIX/Linux, *Prior-experience:* Flask, HTML

## Experiences

*2014 – present*

**WIPAC/University of Wisconsin-Madison**
*Research Assistant*

- Testing a hypothesis to discover a non-standard particle with IceCube neutrino detector data in an international collaboration of over 350 scientists
- Produced an analysis with the tightest constrains ever for statistical fit of such particles
- Increased the efficiency of particle event selection by over 100% using machine learning techniques and eliminating the background events to one in one billion
- Implemented a new technique using machine learning classifiers to separate different types of events seen by the detector modules to be able to detect over 12,000 neutrino events per year (from previously 2,000 by the collaboration)
- Developed a new reconstruction technique to increase the energy resolution
- Working with large datasets and massive computational processes on CPU and GPU clusters
- Performed detector data calibration using statistical methods
- Teaching Python and machine learning to graduate students and post-doctoral researchers

*2012 – 2014*

**Lorentz Institute**
*Research Assistant*

- Produced complex simulations and studied cosmic strings and their interactions using C++
- Created a model to predict cosmic strings' behavior during interactions

*2008 - 2011*

**Institute for Research in Fundamental Sciences**
*Researcher*

- Data reduction of raw images from Hubble Space Telescope and retrieved scientific data
- Analyzing galactic image channels to determine their redshift properties via photometry
- Performing statistical analysis on galaxy cluster images to obtain dark matter properties

## Independent Data Science Projects

- Analyzed Chicago crime rate over 15 years of police database in order to explain recent increase in the city's homicide rate and it relation to police activities
- Developed a web app (with Google maps APIs) using machine learning regressors to predict travel time at a given time in New York City and achieved the accuracy of a few minutes

## Education

**Ph.D. in Physics** (2014-present)
Wisconsin IceCube Particle Astrophysics Center
University of Wisconsin-Madison

**Master of Science in Physics** (2012-2014)
Leiden University

**Bachelor of Science in Physics** (2007-2011)
Sharif University of Technology