# Kevin Ghorbani


## Contact Information

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I am a **Data Scientist** with a experience in Quantitative Analysis, Big Data Queries, Data Mining, Statistics, Predictive Modeling, and Data Visualization. I have worked with many types of large datasets in the past 10 years in both small and large teams.

## Education

**Ph.D.** in Physics – Data Analysis – University of Wisconsin-Madison (2014-2018)

**M.S.** in Physics – Computational – Leiden University (2012-2014)

**B.S.** in Physics – Sharif University of Technology (2007-2011)

## Experience

*2014 – present*

**Wisconsin IceCube Particle Astrophysics Center**
*Research Assistant*

- Produced an analysis with the tightest statistical constrains ever to discover a new elementary particle
- Increased the efficiency of particle selection by over 100% using machine learning techniques and eliminating the background events to one in one billion
- Utilized numerous statistical techniques, including sensitivity analysis, likelihood fits, hypothesis testing
- Implemented a novel technique using machine learning classifiers to separate different types of events seen by the detector modules to be able to identify 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 of O(100TB) per year of data 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
- 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 cleaning noisy data to retrieved useful information
- Analyzing galactic image channels to determine their properties via photometry
- Performing statistical analysis on cluster data to obtain dark matter properties

## Programing Skills

**Languages:** *Expert:* Python, C/C++, SQL, Shell script, *Prior-experience: R*, Matlab, HTML

**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 notebook, Subversion, Git, condor, UNIX/Linux, *Prior-experience:* Flask

## 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 its relation to police activities
- Developed a web app (with Google maps APIs) and used machine learning regressors to predict travel time at a given time in New York City and achieved the accuracy of a few minutes

## Honors and Awards

- Research Assistantship – WIAC (2014-present)
- Groesbeek-Assenbroek Scholarship (2013)
- Curatorenfonds Universiteit (2012 and 2013)
- Leiden University Excellence Scholarship – Golden Award (2012 and 2013)

## Selected Talks

- IC86-II Sterile Neutrino Search, Madison, WI, May 4, 2017
- Sterile Neutrino Search in IceCube using starting tracks, American Physical Society, Washington, DC, January 30, 2017
- Sterile Neutrino Search, Mainz, Germany, September 27, 2016
- Starting Track Sterile Neutrino Search, Stony Brook, NY, April 20, 2016
- IC86-I DeltaT Analysis, Stony Brook, NY, April 19, 2016
- Sterile Neutrino Search in IceCube, Madison, WI, June 11, 2015
- Cosmic Strings Interaction, Instituut-Lorentz, Leiden, January 7, 2014
- Black Holes in General Relativity, Leiden, October 17, 2013
- Cosmic Strings Interaction, KTH, Stockholm, September 12, 2013
- Photometric Redshift, IPM, April 28, 2009

## Selected Workshops

- C++ Advanced Bootcamp, Madison, WI (Summer-2016)
- Neutrino R&D workshop, Fermi National Laboratory, IL (Winter-2016)
- Stanford Linear Accelerator Center Summer Institute, Palo Alto, CA (Summer-2015)
- Invisibles School, Madrid, Spain (Summer-2015)
- NuSTEC 2014, Fermi National Laboratory, IL (summer-2014)
- Computational Physics, Leiden Univ. (Spring-2012)

## Personal Interests

Swimming, Rowing, Mountaineering (personal record of 18,602 ft elevation), Traveling, Kayaking, Semi-professional Photography, and digging into random data