# Alex **Long**

Data Scientist · Particle Physicist

*Boston, MA*

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## Technical Skills

### Data Analysis Skills

Big data analysis, data wrangling, feature engineering, machine learning classification and regression, minimization/optimization, hypothesis testing, maximum likelihood estimation

### Data Analysis Tools

Python scientific computing stack (scikit-learn, pandas, scipy, numpy, matplotlib), PostgreSQL, MATLAB, Mathematica

### Programming Languages

Python, C/C++, Fortran 90, LaTeX, UNIX Shell Scripting, HTML

## Experience

### Insight Health Data Science — *Boston, MA*

Fellow — *May 2016 - Present*

- Developed application (http://areyouprofiling.me) to predict racial profiling in individual police departments with Flask and Bootstrap.
- Built PostgreSQL database of nearly 50 million traffic stops and merged with Census and Department of Justice datasets at the police department level to generate features.
- Constructed racial profiling metric from traffic stop data for classifying individual police departments.
- Predicted susceptibility to racial profiling in police departments using random forest regression in scikit-learn.

### The ATLAS Experiment — *CERN, Switzerland*

Graduate Research Fellow — *2010 - 2016*

- Implemented analysis of petabyte-scale data collected from the Large Hadron Collider using C/C++ and python as well as scientific cloud computing resources.
- Led analysis work on project searching for charged tri-boson production, an undiscovered physics process predicted by the Standard Model of particle physics, which required extensive data validation and feature engineering as well as performing signal optimization and statistical hypothesis testing.
- Developed strong communication skills reporting weekly on project status outside of the team to the larger 3000 person experimental organization.

### Triangle Universities Nuclear Laboratory — *Duke University, NC*

Research Assistant — *2008 - 2010*

- Performed Monte Carlo simulation using C/C++ to aid in the study of a new dark matter detector installed in the Kimballton Underground Research Facility.
- Built analysis software in C/C++ used for gamma-ray spectroscopy analysis of materials to be used in an experiment searching for neutrinoless double beta decay.

### Center for Beam Physics — *Lawrence-Berkeley National Lab, CA*

Research Assistant — *2009*

- Utilized the Franklin supercomputer at the National Energy Research Scientific Computing Center to perform a highly parallelized optimization study for the design of a new Free Electron Laser.
- Developed optimization algorithm using parallelized minimization techniques in Fortran 90 and C/C++.

## Honors & Awards

2011 **Outstanding Teaching Fellow of the Year**, Boston University Physics Department — *Boston, MA*

2009 **Scholarship**, Department of Energy Science Undergraduate Laboratory Internships — *Berkeley, CA*

## Education

### Boston University — *Boston, MA*

Ph.D. in Experimental Particle Physics — *2016*

### The University of North Carolina — *Chapel Hill, NC*

B.S. in Physics and Astronomy — *2010*