Steven Reyes

Personal details

Citizenship	United States of America
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Education

Syracuse University **2014-Present**
Doctor of Philosophy in Physics
PhD Advisor: Dr. Duncan Brown.
Expected Graduation date: December, 2019

University of Chicago **2010-2014**
Bachelor of Arts in Physics with Astrophysics specialization

Relevant Experience

Graduate Student Research Assistant **2015-Present**
Syracuse University, Advisor: Dr. Duncan Brown

- **Conducted high-throughput-computing workflows** based on multiple stages of data-conditioning and analysis for searching for gravitational wave signals, known as *PyCBC*, through HTCondor and Pegasus WMS. Debugged and patched these workflows. Used $\gtrsim$ 5 million CPU core hours to pursue these science goals:
  - **Classifying signals as being astrophysical or terrestrial in origin**: Automated procedures for the unbiased evaluation of the statistical significance of gravitational wave candidate signals through a Frequentist p-value analysis. This procedure is critical to identifying gravitational wave signals as 5σ significant events.
  - **Bayesian prediction and forecasting** through simulation regarding the estimated rate of mergers of expected classes of gravitational wave signals given non-detection of these classes of signals. Conducted the signal search and the injection of millions of simulated signals for Bayesian merger rate estimation.
  - **Conducting and validating** a low-latency, online search analysis whose goal was to evaluate the statistical significance of signals and automatically report these candidates to electromagnetic observers across the globe.
- **Developing cyber infrastructure** with a team for improving the integration of high-throughput-computing resources across the nation's leading research universities for gravitational-wave multi-stage analysis workflows (*PyCBC*) through the Open Science Grid. Working on further integration of Pegasus WMS dashboards into Grafana dashboards for conducting meta-analysis on workflow throughput.
- **Mentored** 5 undergraduate students and guided them to complete their scientific projects and gave occasional coursework guidance. Mentored a high school student to complete a scientific publication; she is now working in Physics as a college student. Also directed outreach events for teaching astronomy with an $8\frac{1}{2}$ inch diameter refractor telescope to the public at Syracuse University's Holden Observatory.
- **Created robust Bayesian model selection modules** from Markov Chain Monte Carlo simulation techniques for evaluating the goodness of fit for astrophysical models for gravitational-wave signals.

Honors and Awards

Gruber Cosmology Prize **2016**
The Gruber Foundation
Shared with the LIGO Scientific Collaboration

Breakthrough Prize in Fundamental Physics **2016**
Fundamental Physics Prize Foundation
Shared with the LIGO Scientific Collaboration

STEM Fellowship **2014, 2016**
Syracuse University

Skills

Programming and Software Skills:
Python (*Matplotlib, NumPy, h5py, SciPy, SciKit Learn, rpy2*), C++, Bash, Mathematica, HTCondor, PegasusWMS, Git, SVN, Microsoft Office Suite.

Languages:
English (Native), Spanish(Native)