

# Andrew Matas

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## PROFILE

Results-oriented, self-driven physicist and data scientist. Member of the Laser Interferometer Gravitational-wave Observatory (LIGO), a big-data project that won the 2016 Nobel Prize in Physics. Experience with applying machine learning to large data sets, statistically assessing model performance, and producing visualizations and reports. Collaborative mindset. Enjoys teamwork, leadership, and liaising between groups with diverse expertise.

## RESEARCH EXPERIENCE

**Postdoctoral Researcher**, Max Planck Institute for Gravitational Physics, September 2018 - Present  
Potsdam, Germany (Remote)

- Developed and fit a regression model to large data set of simulations of black-hole-neutron-star systems. Used this model to learn astrophysical parameters for a new type of LIGO signal using Bayesian inference.
- Currently building next-generation model by applying Gaussian Process Regression to larger data set.
- Led project searching for gravitational-wave signals from Big Bang on LIGO data. Developed new method to identify and remove bad time series data, improving statistical power of search by 50%. Managed team of 10 scientists. Led writing for LIGO paper with 1000 co-authors. Moderated live webinar with 350 views.
- Wrote tutorial documentation and mentored 3 PhD students.
- Co-chair of waveform group. Set priorities for and manage international team of 20 scientists.

**Postdoctoral Researcher**, University of Minnesota, Minneapolis MN June 2016 - August 2018

- Led data analysis teams which produced 3 high-impact LIGO papers with 1000 co-authors, and 400 citations. Produced upper limits on early Universe gravitational-wave signal with LIGO data. Estimated future sensitivity.
- Developed novel Bayesian inference approach to search for gravitational-wave signals in our galaxy.
- Gave guest lectures for physics courses on gravitational waves and quantum mechanics.
- Co-chair of stochastic group, one of four data analysis groups in LIGO. Led international team of 20 scientists.

**Research Assistant**, Case Western Reserve University, Cleveland OH September 2011 - May 2016

- Mathematical modeling for alternative theory of gravity. 8 publications.

## EDUCATION

**Ph.D. in Physics**, Case Western Reserve University, Cleveland, OH May 2016  
*Thesis: Foundations of Massive Gravity*

**BA with distinction in Physics, *summa cum laude***, University of Pennsylvania, Philadelphia, PA May 2011  
Minor in Computer and Information Science. Member of Phi Beta Kappa.

## TECHNICAL SKILLS

- **Programming:** python (sklearn, pandas, numpy, scipy, matplotlib), SQL, C/C++, MATLAB, Unix, git, svn.
- **Big data:** Parallel computing using HTCondor, PySpark, Slurm. Experience with TB-size data sets.
- **Data analysis:** developing machine learning models, time-series analysis, data cleaning and transformation.
- **Statistical methods:** Bayesian inference, MCMC sampling, A/B hypothesis testing, error estimation.
- **Communication:** 34 scientific presentations. Moderated public webinar on youtube with over 350 views.
- **Technical writing:** 18 peer-reviewed short-author-list publications with over 600 citations.

## SELECTED AWARDS

- 2020: Institute of Physics "Trusted Reviewer" awarded for high-quality evaluation of technical articles.
- 2018: Paper I led for LIGO selected as Editor's Choice by prestigious journal Physical Review Letters.
- 2011: NSF Graduate Research Fellowship Program (competitive award covering stipend for 3 years).
- 2009: 2nd place in UPenn GRASP Lab for Machine vision project.