

# ZACHARY JENNINGS

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## SUMMARY

PhD candidate in astronomy & astrophysics with extensive training in graduate-level statistics, especially Bayesian statistical modelling. Worked on many projects requiring one to start with raw astronomical data and independently identify interesting questions, calibrate data, make measurements, perform statistical modelling and inference, and create publications/presentations from results. Experience working both on individual projects and as part of large, international collaborations.

## SELECTED SKILLS

**Statistics/Machine Learning:** probability, Bayesian modelling and inference, classical confidence intervals and hypothesis testing, regression, classification.

**Computer Skills:** Python (including scipy, scikit-learn, pandas, ipython, seaborn), Unix, R, SQL, HTML.

## EDUCATION

**PhD, Astronomy and Astrophysics with Designated Emphasis in Statistics** *(Expected June 2017)*

University of California, Santa Cruz. Advisors: Dr. Jean Brodie, Dr. Aaron Romanowsky

**Relevant Coursework:** probability theory, classical inference, Bayesian inference, Bayesian modelling, non-parametric Bayesian statistics, extensive coursework in astrophysics.

**MS, Astronomy and Astrophysics**

*June 2014*

University of California, Santa Cruz

**BS, Physics and Astronomy, Honors**

*June 2012*

University of Washington, Seattle

## RESEARCH EXPERIENCE

**Graduate Student Researcher, UC Santa Cruz**

*Summer 2012 - Current*

- Created fully-Bayesian model for probabilistic selection of sources of interest among population of contaminants in astronomical data. Model implemented fully in object-oriented Python, using MCMC to sample parameter spaces.
- Performed image calibration and source detection for hundreds of astronomical images of up to a GB each. Created source catalogs containing data for thousands of sources for each imaging dataset.
- Led three successful proposals for highly competitive cutting-edge telescope time, and contributed to numerous other successful proposals for both telescope time and for funding from the National Science Foundation.
- Planned and executed telescope observations for ~20 nights on world's largest telescopes. Made on-the-fly scheduling optimizations in response to changing weather patterns, where inefficiently used time could waste thousands of dollars per night.
- Member of international collaboration featuring over two dozen researchers, experience working on several simultaneous collaborative projects with diverse research goals. Coordinated raw data storage for this collaboration and helped maintain pipeline code for data analysis.
- Four published lead-author papers, eleven more as contributing author in top astrophysics journals (full list on website). Presented scientific results both to expert and non-expert audiences in various settings.

**Undergraduate Researcher, University of Washington, Seattle**

***Fall 2010 - Summer 2012***

- Fit over 100 multivariate data sets each containing thousands of datapoints using novel technique to measure mass of specific type of star. Quantified uncertainties using Monte Carlo methods. Quintupled the number of such measurements in the literature.
- Contributed to multiple successful Hubble Telescope funding proposals providing ~\$100k total funding.
- Planned and led telescope observation program spanning dozens of nights, carried out by several groups of undergraduates with very minimal faculty supervision.

**SELECTED HONORS AND AWARDS**

**National Science Foundation Graduate Research Fellow**

***Fall 2013 - Summer 2016***

Highly competitive fellowship providing three years full support, worth ~\$130k, to a doctoral student for a specific research proposal. Awarded to top ~5% of science and engineering doctoral students across US.

**Whitford Prize, UC Santa Cruz**

***Summer 2014***

Department prize awarded to top graduate student following completion of second year requirements.

**Mary Gates Research Scholar, University of Washington**

***Winter 2012***

Competitive scholarship granted to provide funding for student's own research proposal.

**SELECTED OUTREACH AND TEACHING**

**Telescope Club Coordinator, UC Santa Cruz**

***Fall 2012 - Current***

Organized and led several dozen amateur astronomy nights for local schools, companies, intro astronomy classes at UC Santa Cruz, and general public. Gave several public talks on astronomy as components of these.

**Teaching Assistant, Introduction to Scientific Computing, UC Santa Cruz**

***Winter 2013***

Taught basic scientific computing skills to advanced science undergraduates.