

Fran Bartolić

PhD candidate in astrophysics working on probabilistic modelling of time-series data. Interested in applying my skills to solving exciting new problems in an industry setting.

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location: Oxford, UK

Personal information

Nationality Croatian
Languages English (Fluent), Croatian (Native)

Experience

- 09/2017–today **Ph.D. project**, *School of Physics & Astronomy, University of St Andrews, Scotland.*
In my ongoing PhD work I build probabilistic models of astrophysical time series data using advanced Bayesian statistical methods for the purpose of inferring properties of exoplanets. To implement the models I write open-source [code](#) in Python. I am particularly interested in building interpretable models in a regime where prior information and expert knowledge cannot be neglected. The methods I use in my research include Hamiltonian Monte Carlo, Gaussian Processes, linear models, Variational Inference and automatic differentiation.
- 02/2020–06/2020 **Research analyst**, *Center for Computational Astrophysics (CCA), Flatiron Institute (Simons Foundation), New York, USA.*
I spent 5 months working in a team with two other scientists on a probabilistic model for inferring two-dimensional surface maps of exoplanets given only one-dimensional time series measurements. This [project](#) incorporated cutting edge methods on the intersection of statistics, machine learning and computational astrophysics.

Skills

- Programming Python, C/C++.
- Tools and libraries PyMC3, Pyro, JAX, theano, Stan, scikit-learn, PyTorch, Jupyter, Pandas, matplotlib.
- Statistics & ML Probabilistic modelling, general linear models, MCMC, variational inference, Bayesian decision making, Gaussian processes, frequentist statistics, neural networks.
- Other technical Git, continuous integration, Vim, Linux, HTML & CSS.
- Communication I have given [talks](#) at international conferences and meetings, along with working on projects at different scales. As part of my PhD I have tutored undergraduates in astronomy and have given talks to members of the public, having to describe complex statistical methods to non-experts.

Education

- 2017–2022 **Ph.D. Astrophysics**, *University of St Andrews*, St Andrews, Scotland.
(expected) This position is a part of a [scheme](#) funded by the UK government whose goal is to produce PhD graduates with data science skills relevant to industry positions.
- 2015–2017 **M.Sc. Physics with Astrophysics**, *University of Rijeka*, Rijeka, Croatia.
Cumulative GPA: 4.7/5. Courses in theoretical physics. Exchange [project](#) at Lund University in Sweden where I worked on an independent research project for 7 months.
- 2012–2015 **B.Sc. Physics**, *University of Split*, Split, Croatia.
Cumulative GPA: 4.5/5. Courses in theoretical physics and programming. Exchange semester in Lund, Sweden.

Publications

- 2021 **F. Bartolić** & M. Dominik (in prep). Statistical challenges in modelling gravitational microlensing events.
- 2021 **F. Bartolić**, R. Luger, D. Foreman-Mackey (in prep). Occultation mapping of Io's surface in the near-infrared II: Inferring dynamic maps
- 2021 **F. Bartolić**, R. Luger, D. Foreman-Mackey (in prep). Occultation mapping of Io's surface in the near-infrared I: Inferring static maps
- 2021 R. Luger, E. Agol, **F. Bartolić**, D. Foreman-Mackey (in prep). Analytic Light Curves in Reflected Light: Phase Curves, Occultations, and Non-Lambertian Scattering for Spherical Planets and Moons.
- 2020 N. Golovich, W. Dawson, **F. Bartolić**, et al. A Reanalysis of Public OGLE-III and IV Gravitational Microlensing Events, [arXiv:2009.07927](#)
- 2018 V. Bozza, E. Bachelet, **F. Bartolić**, T. M. Heintz, A. R. Hoag, and M. Hundertmark. *VBBINARYLENSING: a public package for microlensing light-curve computation.*, 2018, *MNRAS*, 479, 5157. doi:10.1093/mnras/sty1791

Awards, Competitions and Honors

- 2019 *Arthur Maitland Prize* for the best talk, University of St Andrews.
- 2015 *Dean's Award for undergraduate academic excellence*, University of Split.

Hobbies & Interests

Cooking, reading, complexity science, localism, Effective Altruism.