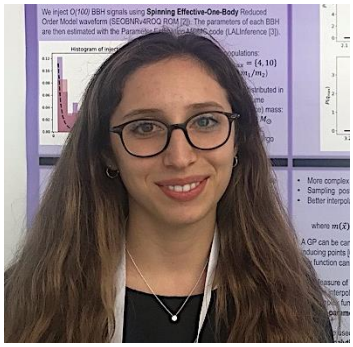

Virginia d'Emilio

Cardiff University

Gravitational Waves Astrophysics

Measuring the properties of binary black holes

Education and Background:

I am graduated in July 2018 from Royal Holloway University of London with a first class MSci degree in Astrophysics.

My research project:

I work as part of the LIGO-Virgo (LVC) Scientific Collaboration on data analyis and parameter estimation of gravitational waves sources, such as black holes and neutron stars binaries. As a member of a big collaboration, my work is always available to my colleagues and I often work on new problems within the field.
During the past few months I've been working on a package (based on TensorFlow) to reconstruct high-dimensional, complex probability distribution functions using gaussian processes (gp). The gravitational waves applications for this interpolation technique are two-fold: speeding up the parameter estimation of gravitational-waves sources (predicting good jump-proposals for MCMC sampling); cheaply generating a large number of posterior distribution of binary black hole (or binary neutron stars) parameters in order to test theoretical models of black hole populations in the Universe (Bayesian hierarchical inference).

Data Intensive Skills and interests:

I mainly work in Linux on our computing cluster (SuperComputingWales) and in Python within the Anaconda environment and I am a regular user of

- pandas
- sci-kit learn
- numpy
- seaborn

My work is under version control on my GitHub page and GitLab, which I use as part of the LVC collaboration. I am familiar with good coding practices, such as unit testing and writing documentation with *sphynx*.

I use stochatic inference techniques in my day-to-day research, from LVC's observing run duties to testing our collaboration's new inference code bilby and documenting our new Parallel Tempering MCMC code (PTMCMC).

I communicate my results using various tools:

- LaTeX (for papers/report writing)
- Tableau
- Arviz

I am interested in:

- Natural Language Processing
- Bayesian Optimisation
- Gaussian Process Regression

Future goals and desires:

My goal is to complete my PhD and move to the industry sector. My desire would be to continue doing research (in machine learning) outside of Academia, but I'm open to other possibilities.