Kilian Walsh

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Physics PhD with strengths in statistical modeling and inference; programming in julia, python, and C/C++ in Linux; numerical simulation; and data-hacking. Open source enthusiast and contributor, passionate about the latest technology, developments in software tools and data science methods. Experienced educator and team worker, communicating complex topics at technical and lay levels. Speaks English and German fluently, some French and basic Mandarin. Enjoys sports (esp. swimming, cycling), woodwork (incl. musical instruments - have built a celtic harp), gardening, brewing, baking, reading, and civic engagement.

Education

New York University
Sep 2011 - Present

Ph.D. Candidate in Physics

- Research Topics: Astrophysics / Observational Cosmology (working thesis title: "The Galaxy-Halo Connection as a Statistical Probe for Cosmological Inference")
- Funded by NYU Scholarship, NSF, and teaching assistantships

Trinity College Dublin
Sep 2007 - Jun 2011

B.A. Moderatorship in Natural Science with First Class Honours

- Concentration in Physics and Astrophysics, achieving highest possible grade
- Final year dissertation project completed at University of Aarhus in Denmark
- Awarded prestigious Foundation Scholarship, granting 5 years of tuition, housing, meals, and stipend, based on performance in voluntary advanced exams

Research & Projects

New York University
May 2013 - Present

Studying cosmological large scale structure in the clustering statistics of galaxies (with Prof. Jeremy Tinker)

- Projects involving statistical modeling of galaxy data from the largest survey made to date (SDSS) as part of a large scientific collaboration (1000s of researchers), in order to understand the universe's underlying dark matter structure and how it affects the galaxy distribution
- *Skills:* Mathematical modeling, Bayesian inference, large datasets, MCMC, numerical simulation, parallel computing
- *Achievements:* Made scientific-grade measurements and analysis for several papers, presented at conferences across USA, mentored student researchers
- *Tools:* julia, python (scipy, cython, emcee, matplotlib...), C, bash, PBS, MPI, SQL

Various Locations
2012 - Present

Data-hacking projects

- Participated (in groups and alone) in several hackathons, classwork, and personal projects with diverse datasets (astronomy, web, NYC public, financial, hardware sensors) to study trends and to understand and test novel techniques and models. Have made contributions to widely-used astronomy software.
- *Skills:* Data-mining, statistical modeling, machine learning, data visualisation, financial modeling, deep learning, project presentation
- *Tools:* python, git, javascript, julia, R, SQL, Hadoop, AWS, pytorch, raspberry pi, and more, generally staying current on developments in tech tools

New York University
Mar 2012 - Aug 2013

Probabilistic Sky Catalogue (with Prof. David Hogg)

- Modeling crowdsourced astronomical images with tools from astrometry.net and thetractor.org to build a probabilistic catalogue of astronomical objects from 100k+ images
- *Skills:* Statistical modeling, data mining, visualisation, model selection

University of Aarhus, Denmark
Sep 2010 - Jan 2011

Asteroseismology thesis project (with Prof. Jørgen Christensen-Dalsgaard)

- *Skills:* Numerical simulation, data analysis of simulation output using IDL, comparison with physical models of stellar seismic behaviour, presentation
- Research resulted in important corrections to widely-used simulation code and secured an excellent grade in project

UC Santa Barbara, California
Jun 2010 - Sep 2010

Studying structure and function of Proteorhodopsin

- *Skills:* lab skills for genetic mutation and expression of proteins, monitoring/verifying samples, electron paramagnetic resonance with MRI and signal analysis, communication skills for shared lab resources and presentations
- This project was done as part of a competitive research experience funded by Biomedical Diagnostics Institute in Dublin City University, Ireland