



Felix Richards

Swansea University

Research area: Deep Learning for Astronomy

Project title:

Large scale characterisation of galaxy morphology: a deep learning approach

Science/research area:

This project will develop a novel solution to galaxy morphology characterisation, combining artificial intelligence and astrophysics imaging to automate this process. As astronomical surveys have advanced it has become clear that there is a need for intelligent and purpose-designed image analysis methods. A challenge raised by new surveys is that more redshifts are being imaged at once. This project will address this by leveraging recent advancements in deep learning to develop the first image analysis techniques that are invariant to redshift.

I have a keen interest in deep learning and computer vision, and am particularly interested in designing domain specific convolutional neural network architectures. I also enjoy the integration of machine learning with web technologies.

About me:

Computers have been a lifelong interest for me; since I can remember I have been surrounded by technology. I began programming at a young age, enjoying its problem solving nature. Throughout my degree in Mathematics at the University of Bristol, I continued coding and learning new computing skills. After graduating in 2016 with upper second class honours I decided to formalise my technical skillset, moving closer to home to undertake a Masters in Computer Science at Swansea University. During my Masters degree I was introduced to artificial intelligence techniques, and particularly enjoyed its application to solve real world problems: my dissertation involved the use of CNNs to segment and classify cases of macular degeneration in elderly patients. Outside of the lab I work on projects unrelated to my research (more coding!), such as a party player for Spotify. I am also an avid guitarist and perform live often, playing funk, blues and a bit of classic rock.

Data Intensive Research Skills and Interests:

Languages: Python, C++, C, Matlab, Java, JavaScript, Bash. **OS:** Windows, Linux.

ML Toolboxes: TensorFlow, MatConvNet. **GPGPU:** OpenCL, CUDA, OpenGL. **CV:** skimage, OpenCV. **HPC:** OpenMPI. **Web:** Flask, Django, HTML, CSS, PHP, Socket.io, various APIs.

General interests: Deep learning, computer vision, data science, CNNs

