Paul J. Wright, PhD
e: paul@pauljwright.co.uk **w**: pauljwright.co.uk **in**: linkedin.com/in/pauljwright91 **t**: +1 (xxx)-xxx-xxxx

EXPERIENCE

Postdoctoral Scholar (Hansen Experimental Physics Lab), Stanford University 2019 – present
Department of Physics, Stanford University, Stanford, CA, USA

- Supporting operations of a flagship NASA mission: The Solar Dynamics Observatory (∼$1B).f
- Modifying state-of-the-art convolutional neural networks (CNNs) for scientific applications.
- Collaborating with 9 researchers (5 time zones) to complete an applied deep learning project.

Courses Audited: CS229 (Machine Learning [ML]; Autumn 2019)

Team Lead & Core Domain Mentor, NASA Frontier Development Lab (FDL) 2019 – present
SETI Institute/NASA Ames Research Center, Mountain View, CA, USA
NASA FDL is an 8-week applied artificial intelligence (AI) research accelerator that applies ML techniques to challenges in space science and exploration.

- Designed and developed a project to up-scale and convert data between space-based instruments using state-of-the-art deep learning architectures for super-resolution.
- **Facilitated a 3-day Design Sprint at Google Cloud HQ** to define the project deliverables.
- **Recruited, led, and managed a multi-national team of 12** (four PhD/Postdoctoral-level researchers and eight mentors, including two super-resolution experts from Element AI).
- Communicated and managed expectations of stakeholders (Google Cloud, Intel AI, NASA).
- Presented an *invited* talk at the American Geophysical Union Fall Meeting ($\sim 30,000$ attendees), and **guided two NeurIPS**(/NIPS) **(peer-reviewed) workshop papers** (in *Machine Learning and the Physical Sciences*, and *Bayesian Deep Learning*) **to submission**.

Post-Graduate Research Assistant (PhD Student), University of Glasgow 2014 – 2019
SUPA School of Physics and Astronomy, University of Glasgow, Glasgow, UK

- Developed Python code to analyse observations of the Sun with a telescope that was not designed for heliophysics; this enabled numerous highly-collaborative peer-reviewed publications.
- Generated a **press-release image** that was **published by numerous news outlets**, included in books, and is one of the five iconic images from *NuSTAR*'s first five years in space.
- Analysed time-series with Fourier analysis, wavelet analysis, and local intermittency measure.
- Studied the temperature distribution of the solar atmosphere through the recovery of an ill-posed inverse problem using ridge regression, Markov chain Monte Carlo (MCMC), and sparse inversion (basis pursuit).

Researcher, NASA Frontier Development Lab (FDL) 2018
SETI Institute/NASA Ames Research Center, Mountain View, CA, USA

- **Cleaned and curated 12 PB of raw (science) data** to produce a 6.5 TB ML-ready data set.
- Implemented and modified CNNs such as U-Net, AlexNet, and ResNet to predict a 14-element vector (spectral line intensities) from narrowband images ($4096 \times 4096 \times 9$).
- Nowcast spectral line intensity with median absolute relative uncertainties of less than 1.6% per emission line using a CNN augmented with a Multi-Layer Perceptron (MLP), **saving $280M on a new instrument**; the results were published in *Science Advances* (a high-impact journal).
- Developed and wrote an ebook chapter (Jupyter Notebook) on how to implement a 1×1 CNN in PyTorch to solve an ill-posed inverse problem (supervised learning; $10\times$ speed increase).

EDUCATION

PhD Physics, University of Glasgow, UK 2014 – 2019
MPhys Physics & Astrophysics (First-Class Honours), University of Southampton, UK 2010 – 2014
Visiting Student: Harvard University; Smithsonian Institution; NASA Goddard Space Flight Center

ADDITIONAL SKILLS

Adobe InDesign, Algorithms, Bash, Computer Vision, Data Analysis, Data Science, Data Visualization, Experimental Design, Git, Google Cloud Platform, Jupyter, MCMC, Python (matplotlib, pandas, scikit-learn), PyTorch, R, Shell scripting.