Paul Hill

Machine Learning Professional

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Education and Qualifications

2002	**PhD**	University of Bristol: Electrical and Electronic Engineering
1997	**MSc (Dist)**	University of Bristol: Computer Science
1995	**BSc (1st)**	Open University: Computer Science
2006	**MA (Dist)**	Bath Spa University: Creative Music Technology

Skills

- Machine learning, data science, statistical analysis, time series analysis, signal processing: Python [+Pandas, Scikit-Learn, Matplotlib etc.], Matlab, JAVA, Javascript, SQL.
- Cloud computing (GCP, Slurm). Cloud based MLOps, DevOps and CI/CD.
- Project management, line management, team leadership, Jira, Phabricator, Confluence.
- Tensorflow, Pytorch, Caffe: Git, Docker, Poetry.
- Technical writing: Microsoft Office, Latex.
- Communication skills: Ten years of lecturing experience. Publication of textbook: https://www.amazon.co.uk/Audio-Speech-Processing-MATLAB-Paul/
- Experience in taking AI-based products from conception to market.

Positions held

2/2024-Present **Senior AI Research Fellow / Lecturer.** Electronic Engineering Dpt., Bristol University.

5/2003-12/2021 Defined and contributed to a large range of AI/ML projects over 20 years including LLMs (using BERT/Langchain), computer vision, image/video compression, geospatial AI, and time series analysis. Example projects include:

- **Geospatial AI: Harmful Algal Bloom (HAB) Detection.** I led a two year Geospatial AI project (in collaboration with MASDAR, UAE) in forecasting HABs from remote sensing data using a combined CNN-LSTM model. https://github.com/csprh/HABNetDatacube.
- **Video and Image Compression**. Multiple projects completed on visual compression standards including optimisation of video codecs such as H.264 and HEVC. Generation of combined compression and classification systems using AI tools and standards (such as HiFiC and JPEG bitstreams).
- **Ground Deformation Time Series Prediction from Satellite Data.** Developed time series forecasting methods using tools including LSTMs, Transformers, CNNs and ARIMA.
- **Image Segmentation.** I worked on many different projects involving image segmentation (remote sensing, bio-imaging etc.). Novel image segmentation methods available here: https://github.com/csprh/TextureSeg.
- **Novel Complex Wavelet Transforms.** Over a number of projects I defined and implemented a non decimated version of the dual tree complex wavelet transform: https://github.com/csprh/NDDTCWT

9/2023-2/2024 **Senior AI Research Engineer**. Samsung Research UK (SRUK). London UK.
Developed differentially private federated analytic models for heatmaps at scale (modelling billions of datapoints). Utilised tools including Pytorch, Tensorflow, Docker, Flower (for federated learning) and the SRUK GPU cluster.

- Project definition, research and implementation from inception to delivery to client.
- Leading the project and holding cross functional meetings with stakeholders.

5/2023-9/2023	**Lead AI Research Engineer**. Enoda Ltd. Edinburgh UK. Developed an electrical grid power load modelling framework using multivariate time series analysis techniques (including transformers and SARIMA) combined with federated learning for transformer based processing.
12/2022-4/2023	**Machine Learning Lead (NLP)**. Cube Global Ltd, London UK. Machine Learning manager (of 7 engineers) at financial regulation analysis company Cube Global. Utilised GCP based processing including VMs and Kubernetes front end. • Language model analysis of financial regulation feeding in to real time client alerts. These systems used LLM agents based on Langchain and BERT/GPT3. • I oversaw the project migration from hard coded and heuristic client alerts to AI/ML based analysis using up to date LLMs.
12/2021-12/2022	**Machine Learning Technical Lead (Vision Systems)**. SeeByte Ltd. Edinburgh UK. Lead engineer developing classification (Detectron2, RetinaNet etc.), image based GenAI (GANs etc.) and control (Reinforcement Learning) technology for vision applications. • Tools included Pytorch, Tensorflow, TensorRT, Phabricator (for DevOPs). • Team lead for 5 machine learning engineers.
5/2002–5/2003	**Senior Engineer**. Provision Communications ltd., Bristol, UK.
4/1998–5/2002	**Research Assistant**, University of Bristol: Department of Electrical and Electronic Engineering (Sponsored by Texas-Instruments).
3/1995–4/1998	**IT Support**, Sustrans, Bristol, UK

Awards

- NVIDIA GPU Grant 2018: Award of NVIDIA Titan Xp card for use in remote sensing projects
- Huawei Denoising AI Competition UK 2018 - Top 5 prize

Patent Application

- GB 050035.5: Interpolation-Free Sub-Pixel Accuracy Motion Compensation

Volunteering in Research Community

- Organising committee member of the Grand Challenge “Encoding in the Dark” in IEEE International Conference on Multimedia and Expo (ICME 2020), London, U.K.
- Organising committee member (local organisation) of the Picture Coding Symposium (PCS 2021), Bristol, U.K.
- Reviewer for Journals and Conference including: IEEE Transactions on Image Processing, IEEE Signal Processing Letters, IEEE Transactions on Multimedia, ICIP, ICASSP, PCS, BMVC etc.

Outreach

2019	Presentation and organisation of the School’s **Headstart Summer School** (sponsored by UKESF): Talk for A-level students on the Topic: “Mathematics of Music”.
2011–	Volunteer at the Department’s open day.
2007–2008	Demonstrator at the **Science Alive** project within the University’s outreach programme (Broadmead shopping centre, Bristol).

Invited Presentations and Talks

11/09/2019	**ACRC Symposium**	Talk on the use of Bristol's HPC facilities: Machine learning for the detection of Harmful Algal Blooms
31/01/2018	**NERC: Volcano Symposium**	Machine Learning, Image Processing and their Potential Application to Volcano Applications
10/05/2018	**Changing Ice, Cabot Institute workshop on Climate Change**	Machine Learning and Remote Sensing
31/01/2018	**Workshop on Image Processing and Machine Learning in Volcano Remote Sensing**	Image Processing and Machine Learning
23/02/2017	**BVI Presentation**	Perceptually Based Image Fusion
31/01/2017	**FRED Talk (EEng Dept Bristol)**	The Well Tempered Integral: The Maths of Music
01/06/2016	**Workshop for Sony R&D**	Image Segmentation and Fusion
09/11/2015	**VSAP Workshop: KUSTAR, Abu Dhabi**	Image and Video Fusion
01/09/2014	**BVI Presentation**	Wavelets and Complex Wavelets for Image Processing

Consultancy

2018 Volunteer consultancy: Denoising on Blue Planet II, the BBC. I provided advice and research for denoising an underwater sequence for the BBC in Bristol.

2008 Consultant in patent infringement case for lawyers Wragge and Co: MPEG-2 Technology - Patent Review.

2002 Car video tracking: British American Racing (BAR). I provided tracking methods for on car video from the BAR Formula 1 car.

2001 Audio monitoring of NTL (Virgin Media) video distribution centre. I developed the BRAHMS audio monitoring system that simultaneously monitored over 100 channels for the Virgin Media video distribution centre.

Publications

Since 2001 I have authored 60 journal papers, conference papers, chapters, and a book. A list of selected publications appears below. I have an h-index of 20 with over 2100 citations. Please see my Google Scholar page: scholar.google.com/citations?user=luxEujEAAAAJ

References

David Bull (dave.bull@bristol.ac.uk) Professor, Post-doc Supervisor, *Department of Electrical & Electronic Engineering*, University of Bristol, Bristol, UK.

Alin Achim (alin.achim@bristol.ac.uk) Professor, Research Collaborator, *Department of Electrical & Electronic Engineering*, University of Bristol, Bristol, UK.