Dr. Paul Henderson

https://www.pmh47.net

School of Computing Science, University of Glasgow, U.K. paul@pmh47.net

Education & Employment

2022 – **University of Glasgow**
Assistant Professor (Lecturer) in Machine Learning

2019 – 2021 **Institute of Science and Technology Austria (ISTA)**
Postdoctoral Researcher in MLCV Group

2017 – 2018 **ETH Zürich**
Research visit (6mo) in Computer Vision & Geometry Group

2014 – 2018 **University of Edinburgh**
PhD in Informatics (machine learning for computer vision)
- Thesis: *Advances in Scene Understanding: Object Detection, Reconstruction, Layouts, and Inference*
- Advisor: Prof. Vittorio Ferrari

2010 – 2014 **Blackford Analysis, Edinburgh**
Research Software Engineer (3D medical imaging)

2009 – 2010 **University of Edinburgh**
MSc in Artificial Intelligence (awarded with distinction)

2006 – 2009 **University of Cambridge**
BA (Hons) in Mathematics

Funding & Awards

- **Vesuvius Challenge Autosegmentation Prize** ($30K, sole PI), 01/2025
- **EPSRC Impact Acceleration Award** (£2K, PI), 08/2024 – 11/2024
- **Royal Society Research Grant** (£20K, PI), 10/2022 – 10/2023
- **University of Glasgow *Rewards for Excellence*** (£10K), 02/2023
- **EPSRC Doctoral Training Award** (approx. £50K), 08/2014
- **Howe Prize for Top Performance in MSc Artificial Intelligence**
  Edinburgh University School of Informatics, 7/2010

Peer-reviewed Journal & Conference Publications

- Certainty-Guided Cross Contrastive Learning for Semi-Supervised Medical Image Segmentation. *Q Liu, X Gu, **P Henderson**, H Dai and F Deligianni, IEEE Trans. on Biomedical Engineering (TBME), 2025*

- Flat'n'Fold: A Diverse Multi-Modal Dataset for Garment Perception and Manipulation. *L Zhuang, S Fan, Y Ru, F Audonnet,* ***P Henderson,*** *G Aragon-Camarasa, ICRA 2025*
- ARTeFACT: Benchmarking Segmentation Models on Diverse Analogue Media Damage. *D Ivanova, M Aversa,* ***P Henderson****, J Williamson, WACV 2025*
- Learning Semi-Supervised Medical Image Segmentation from Spatial Registration. Q *Liu,* ***P Henderson****, X Gu, H Dai, F Deligianni*, WACV 2025*
- Detail-Enhanced Intra-and Inter-modal Interaction for Audio-Visual Emotion Recognition. *T Shi, X Ge, J Jose, N Pugeault,* ***P Henderson****, ICPR 2025*
- Elucidating and Overcoming the Challenges of Label Noise in Supervised Contrastive Learning. *Z Long, G Killick, L Zhuang, R McCreadie, G Aragon-Camarasa,* ***P Henderson****, ECCV 2024*
- Denoising Diffusion via Image Based Rendering. *T Anciukevičius, F Manhardt, F Tombari,* ***P Henderson****, ICLR 2024*
- Deep learning extraction of band structure parameters from density of states: A case study on trilayer graphene. ***P Henderson****, A Ghazaryan, AA Zibrov, AF Young, M Serbyn, APS Physical Review B, 2023*
- Multi-Scale Cross Contrastive Learning for Semi-Supervised Medical Image Segmentation. *Q Liu, X Gu,* ***P Henderson****, F Deligianni, BMVC 2023*
- Foveation in the Era of Deep Learning. *G Killick,* ***P Henderson****, P Siebert, G Aragon-Camarasa, BMVC 2023*
- RenderDiffusion: Image Diffusion for 3D Reconstruction, Inpainting and Generation. *T Anciukevičius, Z Xu, M Fisher,* ***P Henderson****, H Bilen, NJ Mitra, P Guerrero, CVPR 2023*
- Simulating analogue film damage to analyse and improve artefact restoration on high-resolution scans. *D Ivanova, JH Williamson,* ***P Henderson****, Computer Graphics Forum (Proc. Eurographics 2023)*
- Unsupervised Causal Generative Understanding of Images. *T Anciukevičius, P Fox-Roberts, E Rosten &* ***P Henderson****, NeurIPS 2022*
- Learning to Predict Keypoints and Structure of Articulated Objects without Supervision. *T Anciukevičius,* ***P Henderson*** *& H Bilen, ICPR 2022*
- Unsupervised object-centric video generation and decomposition in 3D.
  P Henderson *& CH Lampert, Advances in Neural Information Processing Systems (NeurIPS) 2020*
- Computational Design of Cold Bent Glass Façades. *K. Gavriil, R. Guseinov, J. Perez, D. Pellis,* ***P. Henderson****, F. Rist, H. Pottmann, B. Bickel, ACM Transactions on Graphics 39(6) (Proc. SIGGRAPH Asia), 2020*
- Leveraging 2D Data to Learn Textured 3D Mesh Generation. ***P. Henderson****, V. Tsiminaki & C.H. Lampert, IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2020; oral presentation*

- Learning Single-Image 3D Reconstruction by Generative Modelling of Shape, Pose and Shading. ***P. Henderson*** *& V. Ferrari, International Journal of Computer Vision, 2019*
- Learning to generate and reconstruct 3D meshes with only 2D supervision.
  P. Henderson *& V. Ferrari, British Machine Vision Conference (BMVC) 2018; oral presentation*
- Automatically selecting inference algorithms for discrete energy minimisation.
  P. Henderson *& V. Ferrari, European Conference on Computer Vision (ECCV) 2016*
- End-to-end training of object class detectors for mean average precision.
  P. Henderson *& V. Ferrari, Asian Conference on Computer Vision (ACCV) 2016*

Peer-reviewed Workshop Papers

- Structured Generative Modeling of Images with Object Depths and Locations
  T. Anciukevičius, C.H. Lampert & ***P. Henderson****, Workshop on Object-Oriented Learning at International Conference on Machine Learning (ICML) 2020*

Technical Reports & Papers Under Review

- Sampling 3D Gaussian Scenes in Seconds with Latent Diffusion Models. ***P Henderson****, M de Almeida, D Ivanova, T Anciukevičius*
- Unsupervised Video Prediction from a Single Frame by Estimating 3D Dynamic Scene Structure. ***P. Henderson****, C.H. Lampert, B. Bickel, 2021*
- Object-Centric Image Generation with Factored Depths, Locations, and Appearances. *T. Anciukevičius, C.H. Lampert,* ***P. Henderson****, 2020*
- Automatic Generation of Constrained Furniture Layouts. ***P Henderson****, K Subr, V. Ferrari, 2017*

Patents

- Systems and Methods for Processing Medical Images For In-Progress Studies
  R. Tweedie, ***P. Henderson****, K. Houston (US Patent 11,961,606, granted 2024)*
- Systems and Methods for Processing Medical Images Using Relevancy Rules
  R. Tweedie, ***P. Henderson****, K. Houston (USPO app. 17/751,063, filed 2022)*
- Image data processing. *R. Tweedie,* ***P. Henderson****, B. Panter, P. Maxwell, R. Moffett (US Patent 9,684,674, granted 2017)*
- Process and apparatus for data registration
  B. Panter, R. Tweedie, ***P. Henderson*** *(US Patent 9,224,229, granted 2015)*

Teaching

Spring 2025	**Lecturer:** Advanced Programming (University of Glasgow; MSc)
Fall 2024	**Lecturer:** Machine Learning (University of Glasgow; Hons)
Spring 2024	**Lecturer:** Advanced Programming (University of Glasgow; MSc)

Fall 2023	**Lecturer:** Machine Learning (University of Glasgow; Hons)
Spring 2023	**Lecturer:** Advanced Programming (University of Glasgow; MSc)
Fall 2022	**Lecturer:** Machine Learning (University of Glasgow; Hons)
Spring 2022	**Lecturer:** Advanced Programming (University of Glasgow; MSc)
Spring 2021	**Lecturer:** Probabilistic Graphical Models (ISTA; post-grad)
Spring 2019	**Teaching Assistant**: Data Science and Scientific Computing (ISTA; post-grad)

PhD Supervision

Primary/joint supervisor

- Melonie de Almeida (University of Glasgow), since 01/2024
- Paul McHard (University of Glasgow / HAL Robotics), since 10/2023
- Tong Shi (University of Glasgow), since 08/2023
- Tanatta Chaichakan (University of Glasgow), since 01/2023
- Daniela Ivanova (University of Glasgow), since 02/2022

Collaboration / mentoring (not formal advisor)

- Titas Anciukevičius (University of Edinburgh), 09/2020 – 09/2024

PhD Examinations

- Soon Yau Cheong (University of Surrey), Multimodal Conditioning for Controllable Image and Video Generation. 01/2025
- Qianyu Long (University of Glasgow), Collaborative Distributed Machine Learning: From Knowledge Reuse to Sparsification in Federated Learning. 11/2024
- Owen Anderson (University of Glasgow), Deep Learning for Lung Cancer Analysis. 08/2023
- Adalberto Claudio Quiros (University of Glasgow), Deep unsupervised learning of cancer tissue representations. 11/2022

Invited Talks

- Invited talk: Unsupervised 3D Vision with Generative Models. University of Surrey, January 2025
- Invited talk: Unsupervised 3D Vision with Generative Models. ETH Zürich, August 2024
- Invited talks: Structured Generative Models for Computer Vision. BMVA Summer School (Durham, UK, July 2024; Norwich, UK, July 2023 & 2022)
- Structured Generative Models for Vision & Imaging Tasks. Invited talk, ML in Science Workshop (Glasgow, UK), July 2022

Professional Activities

- Programme Chair, 35th British Machine Vision Conference (BMVC 2024, Glasgow, UK, CORE 'A')
- Organiser, *Artificial & Biological Intelligence* workshop, Glasgow, 01/2024
- Reviewer / Area Chair for top international conferences (CVPR, ICCV, NeurIPS, ICML, SIGGRAPH, WACV, BMVC, ACCV, …) and journals (IJCV, JMLR, TVG, …)