# Dr. Paul Henderson

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## 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**
Software Engineer (R & D)

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

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

## Funding & Awards

- **Royal Society Research Grant** (£20K; sole 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

- Denoising Diffusion via Image Based Rendering. *T Anciukevičius, F Manhardt, F Tombari, **P Henderson**, ICLR 2024*
- 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)*
- 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*
- 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

- 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, 2023*
- 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 (USPO app. 16/695,642, filed 2019)*
- Systems and Methods for Processing Medical Images Using Relevancy Rules
  *R. Tweedie, **P. Henderson**, K. Houston (USPO app. 17/751,063, filed 2019)*
- 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

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| 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), since 09/2020

## PhD Theses Examined

- 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

- Structured Generative Models for Computer Vision. Invited talk, BMVA Summer School (Norwich, UK), 07/2023
- Structured Generative Models for Vision & Imaging Tasks. Invited talk, ML in Science Workshop (Glasgow, UK), 07/2022
- Structured Generative Models for Computer Vision. Invited talk, BMVA Summer School (Norwich, UK), 07/2022

## Professional Activities & Other Skills

- Programme Chair for BMVC 2024 (CORE 'A')
- Reviewer / area chair for top international conferences (CVPR, ICCV, NeurIPS, ICML, SIGGRAPH, WACV, BMVC, ACCV, …) and journals (IJCV, JMLR, TVG, …)
- Reviewing candidates for admission to the ELLIS pan-European machine learning PhD programme
- **Languages:** English (native); German (intermediate); French (intermediate)