

Dr. Paul Henderson

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School of Computing Science, University of Glasgow, U.K.

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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

- RenderDiffusion: Image Diffusion for 3D Reconstruction, Inpainting and Generation. *T Anciukevicius, 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** & C.H. 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

- Denoising Diffusion via Image-Based Rendering. T Anciukevičius, F Manhardt, F Tombari, **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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| 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

- 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

- Reviewer 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
- Reviewing candidates for admission to IST Austria's graduate school and internship programme
- **Languages:** English (native); German (intermediate); French (intermediate)