Dr. Paul Henderson

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

Education & Employment

2022 – **University of Glasgow**
Lecturer in Machine Learning

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

- Research and teaching on deep probabilistic models
- Strong publication record on unsupervised machine learning from image and video data, using structured variational autoencoders
- Collaborations on ML for architectural design, and quantum physics
- Co-supervision of Honours and PhD projects

2017 – 2018 **ETH Zürich**
Research visit in Department of Computer Science

- Two visits of three months each, 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
- Developed novel deep generative models of 3D object shapes and layouts, a meta-learning method for inference in graphical models, and a new technique for training CNN object detectors

2010 – 2014 **Blackford Analysis, Edinburgh**
Software Engineer (R&D)

- Developed and productised algorithms for efficient analysis of large-scale 2D and 3D medical imaging data

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

- Focus: Bayesian machine learning and computer vision

2006 – 2009 **University of Cambridge**
BA (Hons) in Mathematics (2ii)

1999 – 2006 **Pate's Grammar School, Cheltenham, UK**
A-levels: Maths (A), Further Maths (A), Computing (A), Physics (A), Chemistry (A), General Studies (A)

Peer-reviewed Journal & Conference Publications

- 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

- 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*

Teaching & Supervision

Spring 2022	**Lecturer:** Advanced Programming (MSc course)
Spring 2021	**Lecturer:** Probabilistic Graphical Models (graduate-level course)
Summer 2019	**Co-supervisor**: Honours project of Titas Anciukevičius (on structured probabilistic models of images; presented at an ICML workshop)
Spring 2019	**Teaching Assistant**: Data Science and Scientific Computing (graduate-level course)

Patents & Patents Pending

- Systems and Methods for Processing Medical Images For In-Progress Studies
  *R. Tweedie, **P. Henderson**, K. Houston (filed 2019)*
- Systems and Methods for Processing Medical Images Using Relevancy Rules
  *R. Tweedie, **P. Henderson**, K. Houston (filed 2019)*
- Image data processing
  *R. Tweedie, **P. Henderson**, B. Panter, P. Maxwell, R. Moffett (granted 2017)*
- Process and apparatus for data registration
  *B. Panter, R. Tweedie, **P. Henderson** (granted 2015)*

Funding & Awards

- **EPSRC Doctoral Training Award**, covering PhD fees and living costs (approx. £48,000)
  UK EPSRC / Edinburgh University School of Informatics, 2014
- **Howe Prize for Top Performance in MSc Artificial Intelligence**
  Edinburgh University School of Informatics, 2010

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)

- **Extra-curricular:** Scottish dancing (society president & class teacher); classical guitar