

CONTACT

INFORMATION

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ACADEMIC

EXPERIENCE

Lecturer in Machine Learning, University of Bath (2017–)

- Teaching Data Science MSc, including both machine learning units.
- Analysed data from LIGO to find pulsars.
- Other projects ongoing...

Research Associate, University College London (2013–2017)

- Used methods from graphics and machine learning to synthesise an individual's handwriting. Obtained visual realism, such that untrained humans are unable to tell generated samples from real examples.
- Was interviewed by the BBC, Reuters, and Associated Press about the handwriting project. This led to multiple parties interested in commercialisation.
- Working on the synthesis of landscapes by combining statistical models of real data with an artist's rough sculpt.
- Working on the automatic creation of tileable textures by preserving perceptual stationarity during re-synthesis.
- Provided a WebGL visualisation for a pseudo-panorama project, where the images have different camera centres.
- Involved with a project on multi-modal camera pose estimation for Kinect fusion using advanced belief propagation techniques.
- Collaborated with an archaeology project concerning crowd sourcing statistics on amphora over the centuries; it won the ADS Data Reuse Award 2015.
- Graph cuts, mean shift, kernel density estimation and standard machine learning algorithms (e.g. random forests) have been used.
- Successfully applied for an EPSRC Impact acceleration grant.
- Lectured at the BMVA summer school in Manchester on graph cuts and stood in for a computational photography lecture.
- Teaching assistant for the unsupervised learning and computational photography courses; prepared coursework for computational photography; assisted multiple PhD students.
- Involved in organising CGVC 2015, specifically the website and chairing a session.

Research Assistant, Queen Mary, University of London (2009–2012)

- Used machine learning and computer vision to detect abnormal behaviour in CCTV.
- Primarily focused on creating new topic models for behavioural modelling. This included semi-supervised topic models so unsupervised mistakes could be corrected.
- Also worked on background subtraction and active learning. Of particular interest was the first active learning model to provide an elegant solution when both class discovery and class boundary refinement are required.
- Non-parametric Bayesian methods were used extensively, specifically Dirichlet processes.
- Both Gibbs sampling and variational methods were used.
- An extensive machine learning library was implemented in Python, available

- from my website – it contains my published algorithms, among many others.
- Informally assisted a number of PhD students.

PhD in Computer Vision, University of York (2005–2009)

- Worked on combining stereopsis and shape from shading to obtain a better shape estimate than either method alone.
- First work focused on the core problem, created a modular approach and concluding that the modules were the limiting factor.
- Second and third works therefore improved the modules, specifically shape from shading, and light source and albedo estimation.
- Belief propagation was used extensively, as was directional statistics, with a notable contribution from combining these two for solving the shape from shading problem.
- Such a system is dependent on many support algorithms. Consequently experience has been gained in many areas, such as segmentation and stereopsis.
- A tool was created to assist – it includes the steps required to take a stereo pair to a 3D model.
- Assisted two masters students and demonstrated formal methods.

OUTREACH

Director of educational non-profit, 3Dami (www.3dami.org, 2012–)

- 3Dami is a summer school, where over seven days teams of college students create short animated films from scratch, of which I am a founder.
- Being experienced at 3D modelling and animation my primary role is to teach. I also create assets such as the idents, and wrote the book.
- Also responsible for technical support – setting up the render farm (have utilised a 2000 node cluster) and work environment, then fixing problems as they arise. Have developed software and systems to support the event, such as the render farm and asset manager backends/web interfaces.
- Am involved in running the organisation for the rest of the year, including applying for grants to run events.
- Presented 3Dami at the 2015 and 2016 Blender conferences.
- My experience with Blender 3D (as used at the event) additionally includes contributing plugins and consulting work, to create product visualisation videos.

PUBLICATIONS

W. Del Pozzo, C. Berry, A. Ghosh, T. Haines and A. Vecchio, *Dirichlet Process Gaussian-mixture model: An application to localizing coalescing binary neutron stars with gravitational-wave observations*, MNRAS, 2018.

J. Moritz, S. James, T. S. F. Haines, T. Ritschel and T. Weyrich, *Texture Stationarization: Turning Photos into Tileable Textures*, Computer Graphics Forum, 2017.

T. S. F. Haines and G. J. Brostow, *My Text in Your Handwriting*, TOG, 2016.

T. S. F. Haines and T. Xiang, *Background Subtraction with Dirichlet Process Mixture Models*, PAMI, 2014.

T. S. F. Haines and T. Xiang, *Active Rare Class Discovery and Classification using Dirichlet Processes*, IJCV, 2014.

T. S. F. Haines and T. Xiang, *Background Subtraction with Dirichlet Processes*, European Conference on Computer Vision, 2012.

T. S. F. Haines and T. Xiang, *Delta-Dual Hierarchical Dirichlet Processes: A pragmatic abnormal behaviour detector*, International Conference on Computer Vision, 2011.

T. S. F. Haines and T. Xiang, *Active Learning using Dirichlet Processes for Rare Class Discovery and Classification*, British Machine Vision Conference, 2011 (Oral, for which the acceptance rate was 11%).

T. S. F. Haines and T. Xiang, *Video Topic Modelling with Behavioural Segmentation*, ACM Multimedia Workshop on Multimodal Pervasive Video Analysis, 2010.

T. S. F. Haines and R. C. Wilson, *Belief Propagation with Directional Statistics for solving the Shape-from-Shading problem*, European Conference on Computer Vision, 2008 (Oral, for which the acceptance rate was 4.6%).

T. S. F. Haines and R. C. Wilson, *Combining Shape-From-Shading and Stereo Using Gaussian-Markov Random Fields*, International Conference on Pattern Recognition, 2008.

T. S. F. Haines and R. C. Wilson, *Integrating Stereo with Shape-from-Shading derived Orientation Information*, British Machine Vision Conference, 2007.

SKILLS

Knowledgeable on many mathematical and related areas beyond those necessarily implied by the above. These include linear algebra; statistics – typical, robust and Bayesian, including non-parametric Bayesian methods; information theory; graphical models; neural networks; projective geometry; dynamic programming, belief propagation and variants, Gibbs sampling and other MCMC methods, variational methods and numerous optimisation techniques. Am experienced with the standard machine learning scenarios – classification, regression, density estimation and the semi/weakly supervised variants.

Primary programming language choices are Python and C/C++, but have experience with OpenCL, GLSL, Java, Ada, Scheme, Pascal and PHP, plus passing knowledge of Matlab, Prolog, Erlang, Cg and Javascript.

Have experience with many *systems*, such as Linux administration, Amazon web services, clusters, assorted databases, web development and L^AT_EX. A.P.I. experience includes, among others, Gtk, OpenGL, OpenCV and Blender.