

CONTACT	Department of Engineering University of Cambridge Cambridge, United Kingdom, CB1 1PZ	mobile: +44 7412 900177 e-mail: <a href="mailto:jjc75@cam.ac.uk">jjc75@cam.ac.uk</a> website: <a href="http://www.comp.leeds.ac.uk/scsjc/">http://www.comp.leeds.ac.uk/scsjc/</a>
RESEARCH INTERESTS	<b>Machine learning, computer vision, deep neural networks, convolutional networks</b> , random forests, probabilistic models, tracking, gesture recognition, depth data, NLP, speech synthesis.	
EDUCATION	<b>Bangor University</b> , Bangor, UK	
	<i>PhD</i> in Computer Science and Mathematics	<i>Sep 2005 – Oct 2009</i>
	<i>MMath</i> in Mathematics, <i>First-Class Honours</i>	<i>Sep 2001 – Jul 2005</i>
PROFESSIONAL EXPERIENCE	<b>Deep learning to help solve crime from video</b> <span style="float: right;"><i>Jan 2017 – present</i></span>	
	<i>Senior Research Associate</i> - University of Cambridge, Cambridge, UK	
	At the University of Cambridge I work with Prof. Roberto Cipolla on a new exciting project called "Deep Insight" funded by SeeQuestor. I am developing new deep learning based methods to quickly analyse surveillance video collected from street cameras or mobile devices with the intent to help solve or prevent crimes at an accelerated rate. (Line managers: R. Cipolla)	
	<b>Human activity recognition with a mobile robot</b> <span style="float: right;"><i>Aug 2016 – Oct 2016</i></span>	
	<i>Research Fellow</i> - University of Leeds, Leeds, UK	
	Produced a <b>human pose estimation</b> and tracking system for <b>human activity analysis</b> on-board a patrolling <b>autonomous robot</b> using <b>convolutional networks</b> . (Line managers: T. Cohn and D. Hogg)	
	<b>Human-Computer Interaction &amp; avatar synthesis</b> <span style="float: right;"><i>April 2015 – July 2016</i></span>	
	<i>Research Fellow</i> - University of Leeds, Leeds, UK	
	Creating a novel Human-Computer Interaction system by automatically learning intelligent photo realistic "talking avatars" of TV celebrities from movies. Integrating techniques from multiple disciplines including <b>machine learning, computer vision, speech analysis</b> and <b>natural language processing</b> . Building on <b>deep learning, machine learning</b> and <b>time series analysis</b> methods (e.g., deep recurrent neural networks and HMMs) and integrating data from multiple modalities (audio, video and text), to produce systems for language modeling and speech/video synthesis. (Line managers: D. Hogg and D. Magee)	
	<b>Tracking, human pose estimation, gesture recognition &amp; deep learning</b> <span style="float: right;"><i>Oct 2011 – July 2016</i></span>	
	<i>Research Fellow</i> - University of Leeds, Leeds, UK	
	Authored more than 8 publications in collaboration with the University of Oxford on an EPSRC project supported by BBC. Developed novel <b>deep learning, convolutional neural network</b> and <b>random forest</b> methods for <b>real-time tracking, detection</b> and <b>gesture recognition</b> in long video sequences. Proposed methods for learning to recognise visual content from TV broadcasts by combining data from multiple modalities such as video, sign language, subtitles and depth imagery. Shown the efficiency of these methods on large video datasets. (Line managers: A. Zisserman, D. Hogg and D. Magee)	
	<b>Tracking, 3D sensors and human pose estimation</b> <span style="float: right;"><i>Nov 2010 – Jan 2012</i></span>	
	<i>Research Fellow</i> - University of Leeds, Leeds, UK	
	Introduced a powerful "off-label" use of the <b>Microsoft Kinect</b> to learn improved probabilistic human body shape models to be used for <b>human pose estimation</b> and <b>tracking</b> with a monocular camera. Integrated depth with video data to learn a personalized generative 3D model of a human, capable of detecting human body parts and inferring part depth from a 2D image. EPSRC project: Automatic human pose estimation from weakly annotated images/videos. (Line managers: M. Everingham)	
	<b>Shape modeling and image/video content based retrieval</b> <span style="float: right;"><i>May 2010 – Dec 2010</i></span>	
	<i>Research Assistant</i> - University of Bradford, Bradford, UK	
	Through mathematical modeling of shape and automated video surveillance methods, proposed innovations in the domains of eldercare and intelligent vehicle design. (Two EU Framework Programme 7 projects)	

**Object detection and recognition in microscope images***Sep 2005 – Sep 2009**PhD Research* - Bangor University, Bangor, UK

Authored a thesis and 6 publications on novel image analysis and machine learning algorithms to aid the hydrocarbon industry in the search for oil and natural gas. Developed methods for fast automatic **object detection and recognition** in microscope images. Assisted in the commercialization process of the developed algorithms at Conwy Valley Systems Ltd.

**Software Developer** - Bangor University, Bangor, UK*2003 – 2004*

Developed software solutions for handling and analyzing experimental data concerning children with dyslexia.

**Software Developer** - Monarflex Geomembranes, St Albans, UK*2001 – 2003*

Designed a project tracking tool for civil engineers.

HONORS AND  
AWARDS**Best Poster**, British Machine Vision Conference, 2014**Best Paper Honorable Mention**, British Machine Vision Conference, 2012**Best Video**, British Machine Vision Conference, 2012

The Royal Academy of Engineering Travel Grant, Bangor University, 2006

JH Gee Prize for Outstanding Performance in Mathematics, Bangor University, 2005

Drapers Company Awards Three Year Bursary, Bangor University, 2002

Scholarship for Mathematical Achievement, Bangor University, 2001

EESW Prize for Most Commercially Viable Device, Ysgol Syr Thomas Jones, 2000

TEACHING AND  
ADMINISTRATION**Research Fellow** - University of Leeds*2011 – 2016*

Reviewer for computer vision conferences and journals, e.g., BMVC, PAMI, IET Computer Vision.

Organizer of the Vision Group Journal Club.

Dissemination of research through webpages, videos and talks.

**Research Assistant** - University of Bradford*May 2010 – Dec 2010*

Work package leader on EU Framework Programme 7 project HERMES and collaborator on a further EU project. Organized and presented research at international project meetings.

**Teaching Assistant** - Bangor University*2006 – 2008*

Held the Machine Learning lecture for undergraduate mathematicians and computer scientists.

Conducted practicals and assessments for the Mathematical Methods module.

**PhD researcher** - Bangor University*2005 – 2008*

Organized meetings and held presentations for collaborators from a multi-disciplinary team of mathematicians, engineers, computer scientists, geologists and company managers.

COMPUTER  
SKILLS**Matlab, R, Python, C, C++, C#, Java, SQL**, Lua, VB, HTML5**Deep learning frameworks: Caffe, Theano and Torch7**

Windows, Linux OS, Registered Nvidia GPU Developer, HPC use, LaTeX, MS Office

## PUBLICATIONS

1. **Charles, J.**, Magee, D. and Hogg, D. Virtual Immortality: Reanimating characters from TV shows. In Proc. ECCV Workshop on Virtual/Augmented Reality for Visual Artificial Intelligence, 2016.
2. **Charles, J.**, Pfister, T., Magee, D., Hogg, D., and Zisserman A. Personalized Human Video Pose Estimation. In Proc. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016. —Oral
3. Pfister, T., **Charles, J.** and Zisserman A. Flowing ConvNets for Human Pose Estimation in Videos. In Proc. International Conference on Computer Vision (ICCV), 2015.
4. **Charles, J.**, Pfister, T., Everingham, M. and Zisserman A. Automatic and Efficient Human Pose Estimation for Sign Language Videos. International Journal of Computer Vision 110 (1), 70-90, 2014.
5. **Charles, J.**, Pfister, T., Magee, D., Hogg D. and Zisserman A. Upper Body Pose Estimation with Temporal Sequential Forests. In Proc. British Machine Vision Conference (BMVC), 2014.

6. Pfister, T., Simonyan, K., **Charles, J.** and Zisserman A. Deep Convolutional Neural Networks for Efficient Pose Estimation in Gesture Videos. In Proc. Asian Conference on Computer Vision (ACCV), 2014.
7. Pfister, T., **Charles, J.** and Zisserman A. Domain-adaptive Discriminative One-shot Learning of Gestures. In Proc. European Conference on Computer Vision (ECCV), 2014.
8. **Charles, J.**, Pfister, T., Magee, D., Hogg D. and Zisserman A. Domain Adaptation for Upper Body Pose Tracking in Signed TV Broadcasts. In Proc. British Machine Vision Conference (BMVC), 2013.

PUBLICATIONS  
(CONTINUED)

9. Pfister, T., **Charles, J.** and Zisserman A. Large-scale Learning of Sign Language by Watching TV (Using Co-occurrences). In Proc. British Machine Vision Conference (BMVC), 2013.
10. Pfister, T., **Charles, J.**, Everingham, M. and Zisserman A. Automatic and Efficient Long Term Arm and Hand Tracking for Continuous Sign Language TV Broadcasts. In Proc. British Machine Vision Conference (BMVC), 2012.
11. **Charles, J.** and Everingham, M. Learning shape models for monocular human pose estimation from the Microsoft Xbox Kinect. In Proc. IEEE Workshop on Consumer Depth Cameras for Computer Vision (CDC4CV), in conjunction with ICCV 2011.
12. Jiang, J., **Charles, J.** and Demestichas, K. EcoGem: A European Framework-7 project towards cooperative and intelligent optimization of travel planning and energy saving for drivers of fully electric vehicles, Vehicular Technology Magazine, IEEE 6 (3), 22-26, 2011.
13. **Charles, J.** Automatic recognition of complete palynomorphs in digital images. Machine Vision and Applications 22 (1), 53-60, 2009.
14. **Charles, J.**, Kuncheva, L., Wells, B., and Lim, I. Stability of kerogen classification with regard to image segmentation. Mathematical Geology 41 (4), 475-486, 2009.
15. **Charles, J.**, Kuncheva, L., Wells, B., and Lim, I. Object segmentation within microscope images of palynofacies. Computers & Geosciences 34 (6), 688-698, 2008.
16. **Charles, J.**, Kuncheva, L., Wells, B., and Lim, I. Background segmentation in microscope images. In Proc. International Conference on Computer Vision Theory and Applications (VISAPP), 2008.
17. Kuncheva, L., **Charles, J.**, Miles, N., Collins, A., Wells, B., and Lim, I. Automated kerogen classification in microscope images of dispersed kerogen preparation. Mathematical Geology 40 (6), 639-652, 2008.
18. **Charles, J.**, Kuncheva, L., Wells, B., and Lim, I. An evaluation measure of image segmentation based on object centres. LNCS Image analysis and recognition 4141, 283-294, 2006.