

Dr Paul Hill

Date of Birth	20 June 1968	Nationality	British
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- Doctorate in Electrical and Electronic Engineering
- Experienced senior research fellow with 5 years postdoc experience, specializing in signal, image and video processing techniques; development of published novel image and video processing techniques and patent application
- Teaching a masters course on speech and audio technology
- Industrial and academic management experience
 - Experienced supervisor of PhD, masters and undergraduate students
- 15 years experience in academic and industrial software development: Console and windows application development using C, C++, MATLAB and JAVA within UNIX and PC environments
- Industrial experience of application development from theory to implementation
- Excellent presentation and communication skills

Education

1997-2002 **PhD: Department of Electrical and Electronic Engineering, The University of Bristol**

Viva date *Texture based Segmentation and Classification for Content Based Retrieval*

10/06/2002 Development of content based image retrieval application. Test implementations and evaluations using MATLAB. Graphical user interface using JAVA and final image processing using MSVC++. Developed novel complex wavelet decomposition. This was used for image segmentation, and image fusion. Developed novel segmentation technique based upon the concept of texture gradient. Produced various, novel, rotationally invariant texture based features for robust indexing of images and image regions.

1996-1997 **MSc: Department of Computer Science, The University of Bristol (Distinction)**

Contemporary programming applications including programming for: distributed server / client systems, image and video codecs and network protocol stacks. Project: Virtual reality for special relativity using OpenGL.

1993-1995 **BSc: Computer Science, The Open University (First Class)**

Structured programming techniques, CAD, AI and OO systems. Project: Hand written character recognition using AI techniques.

1986-1989 **BSc: Physics, Kings College London (KQC)**

Project: Distance measurement by laser speckle holography.

1979-1986 **3 A Levels, 10 O Levels: Clyst Vale Community College, Devon**

Employment History

My work as a senior research fellow has given me a broad range of experience in fields such as audio analysis, image fusion, image and video coding together with an excellent background in general signal processing, machine vision and pattern recognition. I have been working with computer applications and languages on both Unix and PC platforms for 15 years in both academic and industrial settings. I therefore consider myself very experienced at solving mathematical and computer based problems in many different fields while being able to develop novel academic solutions as evidenced by my publications and patent application. Alongside my research I am currently teaching a lecture course in audio technology; a course I wholly designed and specified.

- 2006-Present **The University of Bristol.** Part Time Lecturer
 Unit and examination specification and design of full MSc unit: Audio Technology. Also part time lecturing on video technology.
- 2003-Present **The University of Bristol.** Research Fellow
 Principal researcher within the Roam4G project [development of state of the art wireless video technology]. Developed a reduced complexity, robust and real time H.264 video codec in C and assembler. Developed novel computationally efficient H.264 encoding methods. Submitted patent for interpolation-free sub-pixel motion compensation method. Supervision of PhD, MSc and BSc students.
- 2002-2003 **Provision Communications ltd.** Senior Engineer
 Developed in-house H.264 and MPEG2 video codecs in C, real time video segmentation system for sign language video phone [using Visual C++] and racing car tracking application for British-American Racing (BAR). Managed Eden project remote video link balloon project. Managed bSkyb wireless home video project.
- 2001-2002 **Research Assistant, University of Bristol.** (Sponsored by Texas-Instruments).
 Development of image segmentation and indexing techniques using texture for the implementation on DSP architecture. Supervision of undergraduate and MSc students.
- 2000-2001 **Consultant (Provision Communications).** Development of BRAHMS quality of service audio monitoring system for NTL London.
 The aim of this project was to provide quality of service alerts for over 100 digital NTL distributed TV channels using analysis of audio content. Developed audio error analysis algorithms using C++ and a JAVA based graphical user interface.
- 2006-2008 H.264 optimisation coding for DSP platform, H.264 rate-control algorithm
- 1998-2001 **Research Assistant, University of Bristol.** (Sponsored by the Digital Virtual Centre of Excellence (DVCE) in Digital Broadcasting).
 Development of texture characterisation and segmentation techniques. The segmentation methods were based on a completely new paradigm of texture gradient analysis using complex wavelets. This work lead to many journal and conference papers. This work also initiated several new research areas within the department; video coding, image retrieval and fusion. Supervision of undergraduate students.
- 1993-1996 **Systems Administrator / Webmaster / IT support, Sustrans, Bristol, UK.**
 Installation of all physical and software aspects of a local area network based on PC – Novell architecture. Designed and implemented the Sustrans website www.sustrans.org.uk.
- 1989-1993 **International Travel.** Traveled extensively in the UK and internationally.

Interests

I am a musician, playing acoustic and electric guitar, 5 string banjo and double bass. I also have a keen interest in electronic music producing many tracks in this genre. Examples of my music are available on my website. I am also a keen cyclist, cycle touring nationally and internationally. I also take an interest in open source development communities, making contributions to such projects as the x264 video codec.

Dr Paul Hill List of Publications

Patent Applications

GB 050035.5: Interpolation Free Sub-Pixel Accuracy Motion Compensation

Publications: Journals / Book Chapters

- [1] Hill, P.R. and Bull, D.R., "Kernel Based Sub-Pixel Motion Estimation", submitted to IEEE Transactions on Circuits and Systems, December 2007
- [2] Hill, P.R., Chiew, T.K., Bull, D.R., Canagarajah, C.N., "Interpolation Free Subpixel Accuracy Motion Compensation", IEEE Transactions on Circuits and Systems, Volume 16, Issue 12, December 2006, page(s): 1519-1526
- [3] Hill, P.R., Canagarajah, N., Bull, D., "Image Segmentation Using a Texture Based Watershed Transform", IEEE Transactions on Image Processing, Volume 12, Issue 12, December 2003, page(s): 1618-1633
- [4] Hill, P.R., Nikolov, S., Canagarajah, N., Bull, D., "Wavelets for Image Fusion", Wavelets in Signal and Image Analysis, from Theory to Practice, Ed. A. Petrosian and F. Meyer, Kluwer Academic Publishers, 2001, page(s): 213-244

Publications: Conference Proceedings

- [5] Hill, P.R., Bull, D.R., "Spatio-Temporal Texture Synthesis Using a Statistical-Parametric Model", Submitted to IEEE International Conference on Image Processing (ICIP), November 2007
- [6] Hill, P.R., Bull, D.R., "Sub-pixel Motion Estimation using Kernel Methods", Submitted to IEEE International Conference on Image Processing (ICIP), December 2007
- [7] Hill, P.R., T-K. Chiew, Bull, D.R., "Interpolation Free Sub-Pixel Motion Estimation for H.264", IEEE International Conference on Image Processing (ICIP), October 2006, page(s): 1337 - 1340
- [8] Hill, P.R., Bull, D.R., Canagarajah, C.N., "Image Fusion Using a New Framework for Complex Wavelet Transforms", IEEE International Conference on Image Processing (ICIP), September 2005, page(s): 1338-1341
- [9] T-K. Chiew, Hill, P.R., Ferre, P., Agrafiotis, D., Chung-How, J.T., Nix, A., Bull, D., "Error-resilient low-delay H.264/802.11 transmission via cross-layer coding with feedback channel", Visual Communications and Image Processing (VCIP) 2005, SPIE Vol. 5960, July 2005, page(s): 1868-1879
- [10] T-K. Chiew, Hill, P.R., Bull, D.R., Canagarajah, C.N., "Robust global motion estimation using the Hough transform for real time video coding", Picture Coding Symposium (PCS) 2004, December 2004
- [11] Hill, P.R., Canagarajah, N., Bull, D.R., "Texture Gradient based Watershed Segmentation", IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), May 2002, page(s): 3381-3385
- [12] Hill, P.R., Canagarajah, N., Bull, D.R., "Image Fusion Using Complex Wavelets", British Machine Vision Conference (BMVC), September 2002, page(s): 487-496

- [13] Hill, P.R., Canagarajah, N., Bull, D.R., "Statistical Wavelet Subband Modelling for Texture Classification", IEEE International Conference on Image Processing (ICIP), September 2001, page(s): 165-168
- [14] Hill, P.R., Canagarajah, N., Bull, D., "Rotationally Invariant Texture Based Features", IEEE International Conference on Image Processing (ICIP), September 2001, page(s): 141-144
- [15] Hill, P.R., Canagarajah, N., Bull, D.R., "Rotationally Invariant Texture Features Using the Dual-tree Complex Wavelet Transform", IEEE International Conference on Image Processing (ICIP), September 2000, page(s): 901-904
- [16] Hill, P.R., Canagarajah, N., Bull, D.R., "Rotationally Invariant Texture Classification", IEE Seminar on Time-Scale, Time-Frequency Analysis and Applications, February 2000, page(s): 20/1-20/5