



Professor David Bull

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Professor of Signal Processing

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Summary

David has worked widely in the fields of 1 and 2-D signal processing. He has won two IEE Premium awards for this work and has published numerous patents, several of which have been licensed and exploited commercially. His current activities are focused on the problems of image and video communications and analysis for wireless, internet, surveillance, consumer and broadcast applications. In particular he has worked on content-based video coding, error resilient source coding, linear and non-linear filterbanks, motion estimation, image and video fusion, architectural optimisation (for filters, transforms and wavelet filterbanks) and content description for video archiving. He is widely supported in these areas by both industry, Europe, MoD and EPSRC and has generated over £12M of research income in the past 10 years. He has contributed to several European Union projects including PROVISION, WINHOME, TRUST, SCOUT, MEDIANET, WCAM, ASTALS and PROVISION. He has published over 450 papers, various articles and 3 books and has also given numerous invited/keynote lectures and tutorials. His most recent book 'Communicating Pictures' was published by Academic Press in 2014.

David's most recent research contributions are in the fields of Parametric Video Compression, Anomaly Detection, Denoising and Mitigating the Effects of Atmospheric Turbulence on Surveillance Imagery. In 2012 he established the Bristol Immersive Technology Laboratory with BBC to explore the extended video parameter space needed to create 'beyond 3D experiences'.

David regularly advised governments and organisations across the world on technical issues and research strategy. He is currently a member of REF2014 subpanel 13 and of the EPSRC Strategic Advisory Network.

Biography

David R. Bull (M'94–SM'07) PhD, FIET, FIEEE, CEng received the B.Sc. degree from the University of Exeter, U.K, in 1980, the M.Sc. degree from the University of Manchester, U.K, in 1983, and the Ph.D. degree from the University of Wales, Cardiff, U.K, in 1988. He holds the Chair in Signal Processing at the University of Bristol. His previous roles include: Lecturer at the University of Wales (Cardiff) and Systems Engineer for Rolls Royce. He was Head of the Electrical and Electronic Engineering Department at Bristol between 2001 and 2006 and is now Director of Bristol Vision Institute (BVI) which he co-founded in 2008.

In 1996 David helped to establish the UK DTI Virtual Centre of Excellence in Digital Broadcasting and Multimedia Technology and was one of its Directors from 1997-2000. He was also a founder member of the UK's £50M MoD Defence Technology Centre in Data and Information Fusion, serving on its Science and Technology Board for 3 years. He was appointed as an independent member of UK Government's Defence Scientific Advisory Council (DSAC) in 2002, contributing to the UK(MoD)-US(DoD) Working Group on Persistent Surveillance (2004). He has also advised Government through membership of the UK Foresight Panel and through the DTI/EPSC steering Group on Digital Broadcasting and Multimedia Technology. He is an advisor to Khalifa University (UAE) on Research Strategy and Postgraduate Education. He is also a member of the Steering Committee for the UK Technology Strategy Board's Special Interest Group on Imaging. He currently serves as a panel member for REF2014 and is a member of the EPSRC Strategic Advisory Network.

David has contributed to the organisation of many conferences, to several technical committees and has undertaken numerous editorial duties. These include past committee membership of IEE Professional Group E10 (Circuit Theory and Design), E5 (Signal Processing) and E4 (Broadcast Technology) and IEEE Multimedia Systems and Applications Technical Committee. He is currently a member of the Technical Advisory Panel for the IET Professional Network in Visual Information Engineering (VIE). He was Chairman of the 1st IEEE/IEE workshop on Natural Algorithms in Signal Processing which led to the series of IEEE/IEEE International Conferences on Genetic Algorithms in Engineering Systems (Special Session Chair). More recently he has been on the Technical Programme Committees for conferences including IEEE ICIP 2003, IEEE ISSPA 2007, WIAMIS and was on the Executive Committee for the 13th International Conference on Information Fusion (2010). He is a past member of the Editorial Board for the Academic Press Series on Digital Signal Processing and its Applications and was Guest Editor of a Special Issue of the EURASIP Journal on Advances in Signal Processing (Wireless Video- 2008). David was the organiser of the prestigious

IEEE Themes Workshop in 2011. He was also the Lead Editor for a recent Special Issue of the IEEE Journal on Selected Topics in Signal Processing on the topic of 'Emerging Technologies for Video Compression'.

Throughout his career, David has acted as a consultant to many companies and acted as an expert advisor on high definition video coding formats for the UK HDTV. In 2004 David was selected as a DTI Distinguished Professor, In 2001, he co-founded ProVision Communication Technologies Ltd., a University spin-out specialising in wireless video communications. This has undertaken various projects for numerous high profile clients. ProVision launched the world's first robust multisource wireless HD sender for consumer use at CES in 2009.

In 2007 David co-founded the Bristol Vision Institute (BVI). BVI functions as a virtual research institute and has been highly successful in stimulating research interaction and collaboration across the University of Bristol. BVI brings together engineers and scientists from a range of academic disciplines (from 14 Departments) together with external partners such as the Bristol Eye Hospital and the Bristol Robotics Laboratory. BVI currently represents a grouping of around 120 researchers.

David leads the Signal Processing activities within the Centre for Communications Research at Bristol. He is Director of the new EPSRC Centre for Doctoral Training in Communications which is located at Bristol.

Teaching

David has taught numerous subjects during his career including:

Image and Video Coding 3/4E, MSc

Optimum Signal processing

Digital Filters and Spectrum Analysis,

Neural Networks

Digital Design

Research Methods

Keywords

- Image and video compression
- image and video processing
- denoising
- segmentation
- tracking
- video coding and video communications
- motion estimation

Expertise

I am Head of the Electrical and Electronic Engineering Department at the University of Bristol. I lead the Signal Processing activities within the Centre for Communications Research where I am Deputy Director. I have sat on the UK Foresight Panel and the EPSRC Communications College. I am a past director of the VCE in Digital Broadcasting and Multimedia Technology and am currently Chairman of ProVision Communication Technologies Ltd. I am currently involved in establishing a new DTI funded (£7.62M) Centre for Communications Computing and Content. My research interests include image and video compression, motion compensation and content analysis for broadcast and network applications; robust and scalable video coding for wireless communications. My current research is focused on the problems of image and video communications for both low bit rate wireless, internet and broadcast applications, content description for video archiving and image authentication using digital watermarks

- image and video coding
- image analysis
- signal processing
- image and video communications

Memberships

Organisations

[Department of Electrical & Electronic Engineering](#)

Other sites

- [Engineering](#)

Recent publications

- Zhang, A, Afonso, M & Bull, D, 2019, '[Enhanced Video Compression based on Effective Bit depth Adaptation](#)'. in: *2019 26th IEEE International Conference on Image Processing (ICIP 2019)*. Institute of Electrical and Electronics Engineers (IEEE)
- Mackin, A, Zhang, A & Bull, D, 2019, '[A Frame Rate Conversion Method Based on a Virtual Shutter Angle](#)'. in: *2019 26th IEEE International Conference on Image Processing (ICIP 2019)*. Institute of Electrical and Electronics Engineers (IEEE)
- Boyle, S, Zhang, A & Bull, D, 2019, '[A Subjective Study of Viewing Experience for Drone Videos](#)'. in: *2019 26th IEEE International Conference on Image Processing (ICIP 2019)*. Institute of Electrical and Electronics Engineers (IEEE)
- Katsenou, A, Zhang, A, Afonso, M & Bull, D, 2019, '[A SUBJECTIVE COMPARISON OF AV1 AND HEVC FOR ADAPTIVE VIDEO STREAMING](#)'.
- Afonso, M, Zhang, A & Bull, D, 2019, '[Video Compression based on Spatio-Temporal Resolution Adaptation](#)'. *IEEE Transactions on Circuits and Systems for Video Technology*, vol 29., pp. 275-280
- Pappas, O, Achim, A & Bull, D, 2018, '[Superpixel-Level CFAR Detectors for Ship Detection in SAR Imagery](#)'. *IEEE Geoscience and Remote Sensing Letters*.
- Katsenou, AV, Ma, D & Bull, DR, 2018, '[Perceptually-Aligned Frame Rate Selection Using Spatio-Temporal Features](#)'. in: *2018 IEEE Picture Coding Symposium (PCS 2018): Proceedings of a meeting held 24-27 June 2018, San Francisco, California, USA.*. Institute of Electrical and Electronics Engineers (IEEE), pp. 288-292
- Zhang, A & Bull, D, 2018, '[Rate-distortion Optimization Using Adaptive Lagrange Multipliers](#)'. *IEEE Transactions on Circuits and Systems for Video Technology*.
- Anantrasirichai, P, Biggs, J, Albino, F, Hill, P & Bull, D, 2018, '[Application of Machine Learning to Classification of Volcanic Deformation in Routinely-Generated InSAR data](#)'. *Journal of Geophysical Research: Solid Earth*, vol 15.
- Xu, Y, Bull, D & Damen, D, 2018, '[Unsupervised Long-Term Routine Modelling Using Dynamic Bayesian Networks](#)'. in: *2017 International Conference on Digital Image Computing: Techniques and Applications (DICTA 2017): Proceedings of a meeting held 29 November - 1 December 2017, Sydney, Australia*. Institute of Electrical and Electronics Engineers (IEEE), pp. 46-53

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