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About

Bob Cripps is Senior lecturer, Head of Geometric Modelling Group and Head of Learning & Teaching for Mechanical Engineering.

Bob is a leading expert in Geometric Modelling with over 25 years' industrial and academic experience in the field of CADCAM and Geometric Modelling. He is a founder member and current Head of the Geometric Modelling Group which was started at Loughborough University by Prof Alan Ball and transferred to Birmingham in 1989.

He has been involved in several highly rated EPSRC and DTi collaborative research projects with a range of manufacturing industries including BAeSystems, Rolls Royce and Jaguar. GMG has a well established and strong research association with Delcam.

Qualifications

- PhD Mathematical Modelling 1986
- MSc Mathematical Statistics 1979
- BSc Statistics 1978
- FRSS 1978 -
- MBCS CITP 1982 -

Biography

Bob qualified with a BSc (Hons) in Statistics from Sheffield in 1978. He went on to study for an MSc in Mathematical statistics from the University of Kent at Canterbury in 1979.

After a brief spell in industry working as a scientific programmer, he joined the School of Engineering Mathematics at Loughborough University, firstly as a demonstrator and then as a research assistant working on an EPSRC funded project in collaboration with Austin Rover to predict springback in drawn panels.

At this time he also registered for a PhD in Mathematical Modelling under the supervision for Prof. Alan Ball. Bob graduated with a PhD in 1986 and became a member of staff at Loughborough before moving to the School of Mechanical Engineering at Birmingham in 1989.

In 2007, Bob became a Senior lecturer and is now Head of the Geometric Modelling Research Group.

Bob has successfully supervised over 10 PhD students and supervised a number of Research Fellows on a variety of research projects.

During his time at Birmingham, Bob has taught on a range of courses to students from the School of Mechanical Engineering and the School of Mathematics. These include modules on Computational Geometry, Computer Aided Engineering, Computer Aided Design, Computer Aided Modelling, Numerical Methods and Computer Programming.

Teaching

Teaching Programmes

- Computational Geometry
- C for Engineers

Postgraduate supervision

Current:

Ben Cross, GCS Approximation.

Recent:

Sudheer Parwana, Triangulation and the downstream effects on engineering applications. EPSRC CASE supported. Submitted 2011.

Research

Research Themes

The Geometric Modelling Group undertakes fundamental research in computer aided engineering (CAE) and aims to provide robust solutions to industrial problems, specialising in the design and manufacture of components with sculptured free-form surfaces. Over the last five years, the group has broadened it profile beyond that of surface modelling and geometric computing to include CNC Machining.

Research Activity

The group has pioneered a purely geometric approach to surface modelling which leads to improved quality and reliability of existing CAE software. Other developments include high quality surface wrapping for manufacture; robust mesh generation for FEA and CFD; and cutter path generation for ultra-high precision machining. Prototype software has been developed for 3-axis machining and the extension to 5-axis machining will fully exploit the bounding of curvatures in the point-based construction.

Other activities

- Member of Geometric Modelling Society.
- Invited presentation to Airbus, UK on point-based surfaces, April 2010.
- Invited to join consortium for Airbus/EPSRC funded research project into CFMS Smart Systems, Aug 2010.
- Invited to participate in UK-Korea 2011 Workshop on Geometric Modelling and Computer Graphics (Prof. Deok-Soo Kim Korea & Prof. R. Martin Cardiff University).
- Invited to Organise and host next Mathematics of Surfaces Conference, in association with IMA (Institute of Mathematics and its Applications), 2014.
- Invited guest speaker at School of Mathematical Sciences, International Conference on Mathematics, Lahore, Pakistan Feb 2011.

Publications

- A robust efficient tracing scheme for triangulating trimmed parametric surfaces. R J Cripps and S S Parwana. Computer-Aided Design. Accepted manuscript (unedited version) available online: 15-SEP-2010 DOI information: 10.1016/j.cad.2010.08.009. **http://dx.doi.org/10.1016/j.cad.2010.08.009 (http://dx.doi.org/10.1016/j.cad.2010.08.009)**
- Smooth polynomial approximation of spiral arcs, R J Cripps, M Z Hussain and S Zhu, Journal of Computational and Applied Mathematics, 233 (2010), pp. 2227-2234. **http://dx.doi.org/10.1016/j.cam.2009.10.008 (http://dx.doi.org/10.1016/j.cam.2009.10.008)**
- Point-based approach to enhance the quality of geometric data for CAE, A A Ball, R J Cripps, J Lin and M Loftus, International Journal of Production Research, Vol No xxx-xxx, 2009.
  International Journal of Production Research, 1366-588X, First published on 01 April 2009
- Accurate support vector machines for data classification, E A Zantay, S. Alijahdali and R. J. Cripps, International Journal of Rapid Manufacture, Vol. 1 No. 2 114 – 127, 2009.
- C2 Rational Quintic Function. M. Hussain, M. Z. Hussain and R. J. Cripps. Journal of Prime Research in Mathematics Vol.5,115-123,2009.
- Surface triangulation and the downstream effects on flattening. S S Parwana and R J Cripps, The Mathematics of Surfaces XIII, York, September, 2009.

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