

Brief Curriculum Vitae — J.F. Whidborne

Name: James Ferris WHIDBORNE
Position: Reader in Control Engineering

Education and Qualifications

1982 : BA(hons) Engineering, Cambridge University
1986 : MA, Cambridge University
1987 : MSc Systems and Control, UMIST
1992 : PhD Control Systems, UMIST

PhD Thesis

Title: Design of Critical Control Systems
Date of examination: January 1992
Supervisor: Dr V. Zakian, UMIST
Examiners: Prof P.J. Fleming, University of Sheffield and Dr J. Edmunds, UMIST

Professional Qualifications

1995: Member Institute of Electrical and Electronic Engineers
1996: Chartered Engineer, Member Institution of Electrical Engineers (now IET)
2010: Senior Member Institute of Electrical and Electronic Engineers

Employment

2013 – to date : Reader, Center of Aeronautics, School of Engineering, Cranfield University
2004 – 2013 : Senior Lecturer, Department of Aerospace Engineering, School of Engineering, Cranfield University
2002 – 2003 : Senior Lecturer, Department of Mechanical Engineering, King's College London
1995 – 2002 : Lecturer, Department of Mechanical Engineering, King's College London
1991 – 1994 : Research Associate, Department of Engineering, University of Leicester. Supervisors: Dr D.-W. Gu and Prof I. Postlethwaite
1983 – 1985 : Systems Analyst and Programmer, Dynatech Microsoftware, Guernsey

Summary of Key Achievements

- Head of Dynamics Simulation and Control Group since 2007
- Authored over 90 journal articles and over 120 refereed conference publications and book chapters
- Authored two research monographs, edited a research monograph and two conference proceedings
- Awarded 5 patents
- Extensive national and international research collaborations
- Scopus h-index of 25
- Invited to present work at numerous workshops and seminars in UK and overseas, including France, China, Japan and Canada
- Currently serve on editorial boards of three international journals
- Programme Chair of *UKACC Control 2014*, the flagship control conference in the UK, with around 200 papers
- Programme & General Chair of an international conference in 2011
- Served on the IPCs of over 40 conferences
- Delivered plenary presentation at an international conference in 2011
- Served on EPSRC Peer Review College since 2006
- Held visiting Chairs at Ecole Centrale Nantes (IRCCyN) and Ecole des Mines Nantes
- Chair of IEEE UK&RI Control Systems Chapter 2004-2010 and was awarded *IEEE Control Systems Society Outstanding Chapter Award 2006*
- Successfully supervised 13 doctoral students to completion
- Served as external PhD examiner to 28 students including 10 internationally
- Won research funding of over 1/2 million pounds
- Founder and first Course Director of MSc in *Autonomous Vehicles Dynamics and Control*
- Founder and Course Director of two short courses
- Contributes teaching to 4 different Cranfield MSc programmes

Professional Service

Prizes

- 2nd International Conference on Cyber-Physical System & Control (CPS&C2021) – “Best Paper Award”
- Cranfield Student Association Student Choice Award – “Best Research Supervisor 2019”
- UKACC International Conference on Control 2018 – “Runner-up Best Paper Award”
- Chair IEEE (UK & RI) Control Systems Chapter – “Outstanding Chapter Award, 2006”

Visiting positions

- Visiting Professor at EMN/IRCCyN, Nantes (2007)
- Visiting Professor at ECN/IRCCyN, Nantes (2006)
- Visiting Lecturer at King’s College London (2004)

Awards Bodies

- Proposal referee Research Council of Norway - 2019 & 2014
- Member of the EPSRC Peer Review College (2006-to date)

Learned societies

- Vice-Chair (Industry) of the International Federation of Automatic Control (IFAC) Technical Committee on Control Design (TC 2.1) (2017 - to date)
- Member IFAC Industry Committee (2017-2020)
- Member of the EPSRC Peer Review College (2006-to date)

- Member IFAC Technical Committee on Control Design (2006 - to date)
- Member IFAC Technical Committee on Aerospace (2009 - to date)
- Member IFAC Technical Committee on Robust Control (2009 - 2012)
- Chair IEEE (UK & RI) Control Systems Chapter (2004 - 2010)

Editorial

- Member Editorial Board of the *International Journal of Systems Science* (2000 - to date)
- International Member of the Editorial Committee of the *Chinese Journal of Aeronautics* (2008 - to date)
- Associate Editor for Control Engineering Practice in the field of aerospace control applications (2017-to date)
- Associate Editor, Proceedings of the Institution of Mechanical Engineers, Part I: Journal of Systems and Control (2020 - to date)
- Member Editorial Board of the *International Journal of Automation and Computing* (2003 - 2021)

Examining

- October 2013 - October 2017: External Examiner, MSc in Control and Systems Engineering and MSc in Computational Intelligence and Robotics, Department of Automatic Control & Systems Engineering, University of Sheffield
- October 2010 - Sept 2013: External Examiner, Mechanical Engineering MSc Programmes, Division of Engineering, King's College London
- External PhD examiner: Universidad Politécnica de Madrid (2017), Milan Politecnico (2009), Hamburg Technical University (2016, 2007), Indian Institute of Technology, Madras (2014), University of Bucharest (2016, 2015, 2012), University of Nantes (2020, 2006), University of Limerick (2008), Bristol University (2009), University of Glasgow (2017), Imperial College (2012, 2009), King's College London (2011), University of Loughborough (2015, 2012), Leicester University (2016, 2010, 2009, 2008), University of Sheffield (2013, 2009, 2005), University of Southampton (2021, 2014, 2005), University of Hull (2013)

Selected Conference Chair, IPC Service, Special Session & Workshop Organization

- National Organizing Committee (NOC), 21st IFAC Symposium on Automatic Control in Aerospace (ACA 2019), 27-30 August 2019 Cranfield, U.K.
- Associate Editor, 2019 International Conference on Unmanned Aircraft Systems (ICUAS'19), 11-14 June 2019, Atlanta, GA
- Technical Associate Editor, 20th IFAC World Congress, 9-14 July 2017, Toulouse, France
- Associate Editor, 2017 International Conference on Unmanned Aircraft Systems (ICUAS'17), 13-16 June 2017, Miami, FL
- International Program Committee, 11th UKACC International Conference on Control, Belfast, 31 August - 2 September 2016
- International Program Committee, 16th IFAC WORKSHOP ON Control Applications of Optimization (CAO'2015), 6-9 October 2015, Garmisch-Partenkirchen, Germany
- International Program Committee, 3rd CEAS EUROGNC Conference, 13-15 April 2015, Toulouse, France
- Programme Chair, UKACC CONTROL 2012, 9-11 July 2014, Loughborough, UK
- Publicity Chair, 3rd IFAC International Conference on Intelligent Control and Automation Science (ICONS 2013), 2-4 September 2013, Chengdu, China
- International Program Committee, 19th IFAC Symposium on Automatic Control in Aerospace, 2-6 September 2013, Würzburg, Germany
- Chair of Invited Sessions, UKACC CONTROL 2012, 3-5 September 2012, Cardiff, UK

- Conference Chair, 13th IASTED International Conference on Intelligent Systems and Control (ISC 2011), 11-13 July, 2011, Cambridge, UK
- International Program Committee, UKACC CONTROL 2010, 7-10 September 2010, Coventry, UK
- International Program Committee, 2007 IEEE Congress on Evolutionary Computation (CEC 2007) September 25-28, Singapore
- International Program Committee, 2007 IEEE International Symposium on Intelligent Control, October 1-3, Singapore
- International Program Committee, 2007 IEEE International Conference On Networking, Sensing and Control (ICNSC07), April 15-17, London, United Kingdom
- Co-editor of Special Section on “Control Systems Design Using the Method of Inequalities and the Principle of Matching”, International Journal of Automation and Computing (IJAC), Vol. 6, No. 1, 2009
- Special Session Co-organizer, UKACC Control Conference, Manchester, August 2008, entitled “Control System Design in an Advanced Framework”
- Special Session Organizer, IEEE Conference on Computer Aided Control System Design CACSD’02, Glasgow, September 2002, entitled “Recent Advances in Multi-Objective Control Systems Design”
- Special Session Organizer, Asian Control Conference, Shanghai, July 2000, entitled “Control System Design in an Advanced Framework”
- Special Session Co-organizer, 1999 American Control Conference, San Diego, California, entitled “New Methodologies for Finite-Precision Digital Controller Structures”
- Organized and co-organized numerous IEEE (UK & RI) Control Systems Chapter events, including IEEE Distinguished Speaker lectures, workshops and postgraduate student seminars

Selected Publications

International Journals

- S. G. Nnabuife, H. Tandoh, and J. F. Whidborne. Slug flow control using topside measurements: A review. *Chemical Engineering Journal Advances*, vol. 9, no. 100204, Art. no. 100204, 2022, doi: 10.1016/j.cej.2021.100204.
- B Kuang, S. G. Nnabuife, J. F. Whidborne, and Z. Rana. Classification of Flow Regimes Using a Neural Network and a Non-Invasive Ultrasonic Sensor in an S-shaped Pipeline-Riser System. *Chemical Engineering Journal Advances*, vol. 9, no. 100215, Art. no. 100215, 2022, doi: 10.1016/j.cej.2021.100215.
- S. G. Nnabuife, H. Tandoh, and J. F. Whidborne. Slug flow control in an S-shape pipeline-riser system using an ultrasonic sensor. *Digital Chemical Engineering*, vol. 2, no. 100005, Art. no. 100005, 2022, doi: 10.1016/j.dche.2021.100005.
- S. Liu, J. F. Whidborne, S. Song, and W. Lyu. Nonsingular terminal sliding-mode attitude control of flexible airships with actuator faults. *Aerospace*, vol. 9, no. 4, Art. no. 4, 2022, doi: 10.3390/aerospace9040209.
- S. Liu, J. F. Whidborne, and L. He. Backstepping sliding-mode control of stratospheric airships using disturbance-observer. *Advances in Space Research*, 63(3):1174–1187, 2021.
- J. R. Duran, J. F. Whidborne, M. Carrizales Rodriguez, and A. Pontillo. A benchtop flight control demonstrator. *International Journal of Mechanical Engineering Education*, 49(1):80–97, 2021.
- S. G. Nnabuife, B Kuang, S. Sun, J. F. Whidborne, and Z. Rana. Gas-liquid flow regimes identification using non-intrusive doppler ultrasonic sensor and convolutional recurrent neural networks in an S-shaped riser. *Chemical Engineering Journal*, 403(126401):18 pages, 2021.
- S. Liu, J. F. Whidborne, and X. Jia. Adaptive backstepping fault tolerant control for an unmanned airship with multi-vector thrusts. *I Mech E - Journal of Aerospace Engineering.*, 235(11):1507–1520, 2021.
- M. Biczyski, R. Sehab, J.F. Whidborne, G. Krebs, and P. Luk. Multirotor sizing methodology with flight time estimation. *Journal of Advanced Transportation*, 2020(9689604), 2020.
- H. Isakhani, N. Aouf, O. Kechagias-Stamatis, and J.F. Whidborne. A furcated visual collision avoidance system for an autonomous microrobot. *IEEE Transactions on Cognitive and Developmental Systems*, 12(1):1–11, 2020.

- S. Q. Liu, Y.J. Sang, and J. F. Whidborne. Adaptive sliding-mode-backstepping trajectory tracking control of underactuated airships. *Aerospace Science and Technology*, 97(105610), 2020.
- H. Alturbeh and J. F. Whidborne. Visual flight rules-based collision avoidance systems for UAV flying in civil aerospace. *Robotics*, 9(1):9:35 Pages, 2020.
- I.J. Inyang and J.F. Whidborne. Bilinear modelling, control and stability of directional drilling. *Control Engineering Practice*, 82:161–172, 2019. L. Chen, J. F. Whidborne, Q. Dong, D. P. Duan, and J. Liu. Degraded planary tracking control of an omni-directional vectored-thruster aerostat. *ASCE Journal of Aerospace Engineering*, 32(4):04019026, 2019.
- O. Dababneh, T. Kipouros, and J. F. Whidborne. Application of an efficient gradient-based optimization strategy to aircraft wing structures. *Aerospace*, 5(1):pages 27, 2018.
- L. Chen, J. F. Whidborne, Q. Dong, and D. P. Duan. Application of Lyapunov matrix inequality based unsymmetrical saturated control to a multi-vectored propeller airship. *Proc. Inst. Mech. Eng. G*, 232(5):884–901, 2018.
- Q. McEnteggart and J. F. Whidborne. Multiobjective environmental departure procedure optimization. *J. Aircraft*, 55(3):905–917, 2018.
- S. Armanini, M. Polak, J. E. Gautrey, A. Lucas, and J. F. Whidborne. Decision-making for unmanned flight in icing conditions. *CEAS Aeronautical Journal*, 7(4):663–675, 2016.
- M. T. Bayliss and J. F. Whidborne. Mixed uncertainty analysis of pole placement and H-infinity controllers for directional drilling attitude tracking. *ASME J. Dyn. Syst.*, 137(12):121008.1-121008.8, 2015.
- P. R. Thomas, S. Bullock, T. S. Richardson, and J. F. Whidborne. The application of collaborative control to a flying-boom air to air refuelling simulation. *J. Guid. Control Dyn.*, 38(7):1274-1289, 2015.
- S. Aldhafer, P. C. K. Luk, W. Fei, and J. F. Whidborne. State-space modelling of a class E2 converter for inductive links. *IEEE Trans. Power Electron.*, 30(6):3242-3251, 2015.
- S. Aldhafer, P. C. K. Luk, K. El Khamlichi Drissi, and J. F. Whidborne. High input voltage high frequency class E rectifiers for resonant inductive links. *IEEE Trans. Power Electron.*, 30(3):1328-1335, 2015.
- S. Chumalee and J. F. Whidborne. Gain-scheduled H_∞ control via parameter-dependent Lyapunov functions. *Int. J. Systems Sci.*, 46(1):125–138, 2015.
- S. Chumalee and J. F. Whidborne. Gain-scheduled H_∞ control for tensor product convex polytopic plants. *Asian J. Control*, 17(2):417-431, 2015.
- S. Aldhafer, P. C. K. Luk, A. Bati, and J. F. Whidborne. Wireless power transfer using class E inverter with saturable DC feed inductance. *IEEE Transactions on Industry Applications*, 50(4):2710–2718, 2014.
- S. Aldhafer, P. C. K. Luk, and J. F. Whidborne. Tuning class E inverters applied in inductive links using saturable reactor. *IEEE Trans. Power Electron.*, 29(6):2969–2978, 2014.
- N. Panchal, M. T. Bayliss, and J. F. Whidborne. Attitude control system for directional drilling bottom hole assemblies. *IET Proc. Control Theory and Appl.*, 6(7):884-892, 2012.
- N. Akhtar, J. F. Whidborne, and A. K. Cooke. Real-time optimal techniques for UAVs fuel saving. *Proc. IMechE J. Aero. Eng.* 226(10):1315-1328, 2012.
- K. Michail, A.C. Zolotas, R.M. Goodall, and J. F. Whidborne. Optimised configuration of sensors for fault tolerant control of an electro-magnetic suspension system. *Int. J. Systems Sci.* 43(10):1785-1804, 2012.
- N. Akhtar, J. F. Whidborne, and A. K. Cooke. Real-time optimal techniques for UAVs fuel saving. *Proc. IMechE J. Aero. Eng.* 226(10):1315-1328, 2012.
- N. Akhtar, A. K. Cooke, and J. F. Whidborne. A positioning algorithm for autonomous thermal soaring. *AIAA J. Aircraft*, 49(2):472-482, 2012.
- N. Panchal, M. T. Bayliss, and J. F. Whidborne. Attitude control system for directional drilling bottom hole assemblies. *IET Proc. Control Theory and Appl.*, 6(7):884-892, 2012.
- K. T. Leung, J. F. Whidborne, D. Purdy, and A. Dunoyer. A review of ground vehicle dynamic state estimations utilising GPS/INS. *Vehicle System Dynamics*, 49(1-2):29–58, 2011.
- K. T. Leung, J. F. Whidborne, D. Purdy, and P. Barber. Road vehicle state estimation using low-cost GPS/INS. *Mechanical Systems and Signal Processing*, 25:1988–2004, 2011.

- J. F. Whidborne and N. Amar. Computing the maximum transient energy growth. *BIT Numerical Mathematics*, 51(2):447–557, 2011.
- F. Martinelli, M. Quadrio, J. McKernan, and J. F. Whidborne. Linear feedback control of transient energy growth and control performance limitations in subcritical plane Poiseuille flow. *Physics of Fluids*, 23:014103(9 pages), 2011.
- S. Chumalee and J.F. Whidborne. Unmanned aerial vehicle aerodynamic model identification from a racetrack manoeuvre. *Proc. IMechE J. Aero. Eng.*, 224(7):831–842, 2010.
- I.D. Cowling, O.A. Yakimenko, J.F. Whidborne, and A.K. Cooke. Direct method based control system for an autonomous quadrotor. *Journal of Intelligent and Robotic Systems*, 60:285 - 316, 2010.
- N.U. Rahman and J.F. Whidborne. Propulsion and flight controls integration for a blended wing body transport aircraft. *AIAA J. Aircraft*, 47(3):895–903, 2010.
- D. Saban, J.F. Whidborne, and A.K. Cooke. Simulation of wake vortex effects for UAVs in close formation flight. *Aeronautical Journal*, 113(1149):727–738, November 2009.
- N.U. Rahman and J.F. Whidborne. Real-time transient three spool turbofan engine simulation : A hybrid approach,. *J. Eng. Gas. Turbines Power-Trans. ASME*, 131(5):051602 (8 pages), 2009.
- R.G. Drury and J.F. Whidborne. A quaternion-based inverse dynamics model for expressing aerobatic aircraft trajectories. *J. Guid. Control Dyn.*, 32(4):1388–1391, 2009.
- J. McKernan, G. Papadakis, and J.F. Whidborne. Linear and non-linear simulations of feedback control in plane Poiseuille flow. *Int. J. Numer. Methods Fluids*, 59(8):907–925, 2009.
- N.U. Rahman and J.F. Whidborne. A numerical investigation into the effect of engine bleed on performance of a single spool turbojet engine. *Proc. IMechE J. Aero. Eng.*, 222:939–949, 2008.
- J. McKernan, J.F. Whidborne, and G. Papadakis. Linear quadratic control of plane Poiseuille flow - the transient behaviour. *Int. J. Control*, 80(12):1912–1930, 2007.
- J.F. Whidborne and J. McKernan. On minimizing maximum transient energy growth. *IEEE Trans. Autom. Control*, 52(9), Sept 2007.
- T. Hilaire, P. Chevrel, and J.F. Whidborne. A unifying framework for finite wordlength realizations. *IEEE Trans. Circuits & Syst. - Part I: Reg. Papers*, 54(8):1765–1774, 2007.
- J. Wu, S. Chen, J.F. Whidborne, and J. Chu. A unified closed-loop stability measure for finite-precision digital controller realizations implemented in different realization schemes. *IEEE Trans. Autom. Control*, 48(5):816–822, 2003.
- J.F. Whidborne, R.S.H. Istepanian, and J. Wu. Reduction of controller fragility by pole sensitivity minimization. *IEEE Trans. Autom. Control*, 46(2):320–325, 2001.
- R.S.H. Istepanian, J. Wu, and J.F. Whidborne. Controller realizations of a teleoperated dual-wrist assembly system with finite word length considerations. *IEEE Trans. Control Syst. Technology*, 9(4):624–628, 2001.
- J.F. Whidborne, J. Wu, R.H. Istepanian, and J. Chu. Comments on “On the structure of digital controllers with finite word length consideration”. *IEEE Trans. Autom. Control*, 45(2):344, 2000.
- J.F. Whidborne, I. Postlethwaite, and D.-W. Gu. Robust control of a paper machine. *Control Engg Practice*, 3(10):1475–1478, 1995.
- J.F. Whidborne, I. Postlethwaite, and D.-W. Gu. Robust controller design using H_∞ loop-shaping and the method of inequalities. *IEEE Trans. Control Syst. Technology*, 2(4):455–461, 1994.
- I. Postlethwaite, J.F. Whidborne, G. Murad, and D.-W. Gu. Robust control of the benchmark problem using H_∞ methods and numerical optimization techniques. *Automatica*, 30(4):615–619, 1994.
- J.F. Whidborne. EMS control system design for a maglev vehicle - A critical system. *Automatica*, 29(5):1345–1349, 1993.

Books, Monographs and Edited Works

- J. F. Whidborne and P. Willis, editors. *Proceedings of the 13th IASTED International Conference on Intelligent Systems and Control*, Cambridge, UK, July 2011. IASTED, ACTA Press.

G.P. Liu, J.B. Yang, and J.F. Whidborne. *Multiobjective Optimisation and Control*. Research Studies Press, Baldock, UK, 2002. ISBN: 0863802648.

R.S.H. Istepanian and J.F. Whidborne, editors. *Digital Controller Implementation and Fragility: A Modern Perspective*. Springer-Verlag, London, UK, September 2001. ISBN: 1852333901.

J.F. Whidborne and G.P. Liu. *Critical Control Systems: Theory, Design and Applications*. Research Studies Press, Taunton, U.K., 1993. ISBN: 0863801536.

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