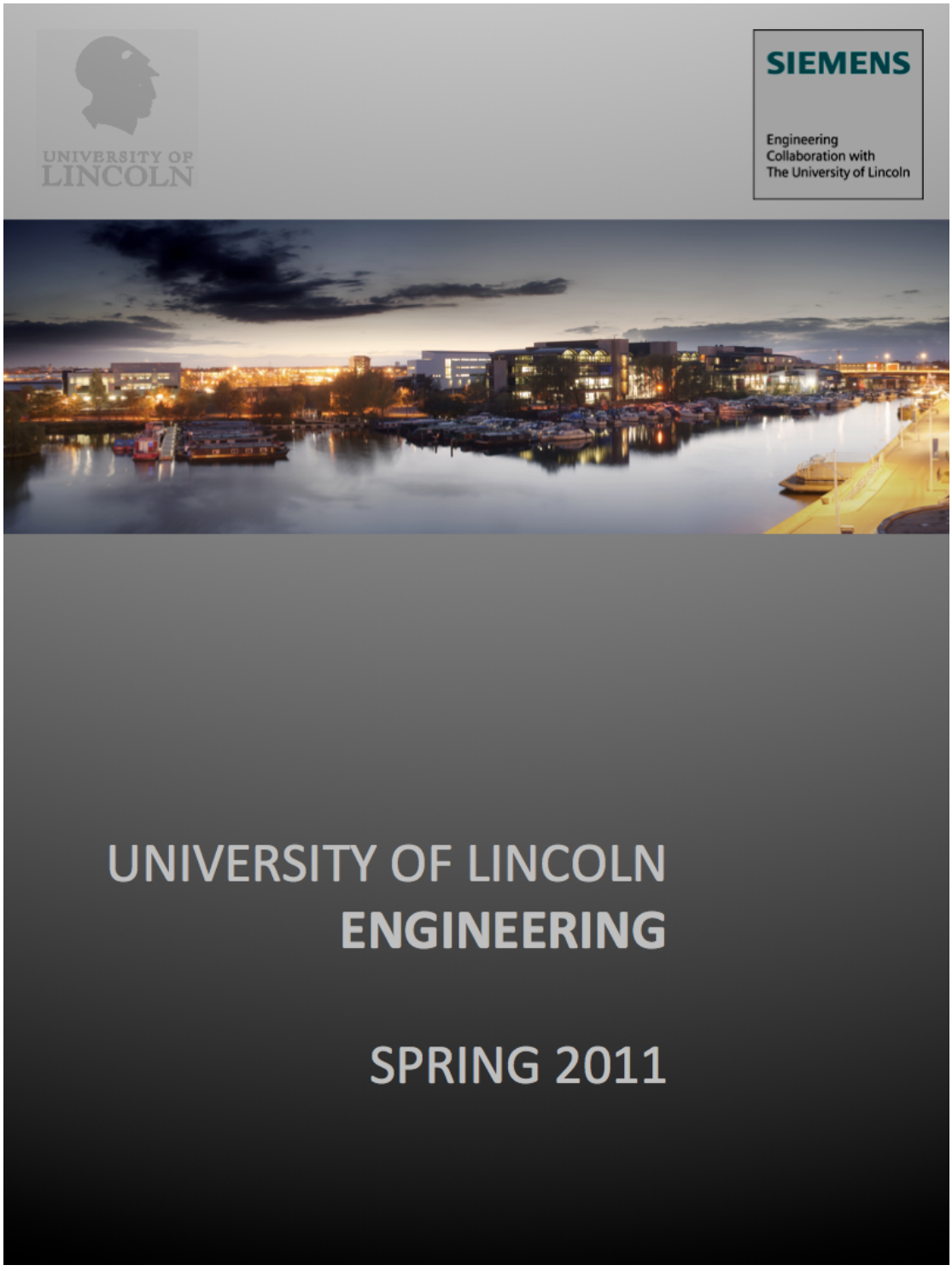

People and Research in the School of Engineering at the University of Lincoln UK.

1 Introduction

The first purpose-built School of Engineering to be created in the UK for more than 20 years was founded at the University of Lincoln in 2009. The development is a collaboration between the University and Siemens Industrial Turbomachinery Ltd. as part of a £37M development with support from HEFCE, part funded by the European Regional Development Fund (ERDF) and part funded by Lincolnshire County Council (LCC).

Industry-Ready Graduates and Skilled Workforce

The project will take shape over the next ten years, and will see Siemens investing significantly through scholarships, tuition fees and paid work-placement opportunities for undergraduates. This is a University-employer engagement model, which we are now extending to other engineering companies ranging from SMEs to multinationals.

Our aim is for our students to engage in the workplace as they study at the University so preparing them for rewarding and successful careers in industry in the future.

Siemens and other engineering companies will also send staff on part-time, post-experience undergraduate and postgraduate courses, typically on a block release basis with a work-based learning component

Research-Led Learning and Teaching

The School of Engineering is a Centre of Excellence in Industrial Power and Energy, Mechanical, Control and Electronic/Electrical Engineering, engaging in world-class fundamental and applied research, collaborating with industrial partners ranging from SMEs to Multinationals. We conduct research across an extremely broad portfolio, ranging from fundamental combustion research, to engineering applications of artificial intelligence. These programmes involve the academic and research staff and also the students, producing graduates with practical and useable skills and knowledge.

Our primary goal is to engage with industrial partners on cutting-edge R&D programmes, and channel this activity to provide the maximum benefits to our taught programmes. This approach results in industrially engaged, research informed students with all the necessary skills, aligned with enhanced competitiveness and profitability for our collaborators at both national and international level.

Taught Programmes

We currently offer:

- BEng (3yr) and MEng (4yr) Mechanical Engineering, with additional available specialism in Power and Energy, and Control Systems

From September 2011

- MSc (1 yr) in Sustainable Power and Energy

From September 2012

- BEng (3yr) and MEng (4yr) Electrical Engineering, with additional available specialism in Electrical Engineering, and Control Systems

From September 2013

- MSc (1 yr) in Sustainable Electrical Power Systems

Contributing to Economic Recovery

Andreas J. Goss, Chief Executive of Siemens in the UK and north West Europe comments on the contribution of this partnership:

'Today's students are the UK workforce and global business leaders of the future. We recognize that we must inspire, encourage and harness potential talent…..this partnership with the University of Lincoln is a significant investment for us, and the School will provide a Centre of Excellence for engineering.'

Professor Paul Stewart
Founding Head of Engineering
School of Engineering
University of Lincoln
Brayford Pool
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Web: www.lincoln.ac.uk/engineering
Blog:
http://engineering.blogs.lincoln.ac.uk/

2 Staff Research Profiles

Current Staffing

- **ACADEMIC STAFF**

Professor Paul Stewart	Chair of Control Engineering, Founding Head of Engineering
Professor Chris Bingham	Chair of Energy Conversion
Professor Ron Bickerton	Industrial Professor
Dr Jonathan Lawrence	Reader in Laser Materials Processing, Programme Leader: MSc in Sustainable Power and Energy
Dr Wing-Kuen Ling	Reader in Optimisation and Symbolic Dynamics
Dr Jill Stewart	Senior Lecturer in Thermofluids, Director of Teaching
Richard Allarton	Senior Lecturer in Gas Turbines
Dr Colin Dowding	Lecturer in Mechanical Engineering

- **PLANNED NEAR TERM ACADEMIC RECRUITMENT:**

Michael Gallimore	Lecturer in Engineering Mathematics (Early 2011), PhD Studentship
L/SL01	Lecturer/Senior Lecturer in Mechanical Engineering (Early 2011)
L/SL02	Lecturer/Senior Lecturer in Mechanical Engineering (Early 2011)
L/SL/Reader03	Lecturer/Senior Lecturer/Reader in Electronic and Electrical Engineering (Mid 2011)
L/SL04	Lecturer/Senior Lecturer in (Mid 2011)
L/SL05	Lecturer/Senior Lecturer in (Mid 2011)

- **FACULTY ADMINISTRATION**

Denise Bateman	Personal Assistant to Professor Stewart, Administrator: EPSRC Network in Airport Energy Technologies
Sarah Williams	Faculty Officer
FFO01	Faculty Finance Officer (Early 2011)

- **RESEARCH STAFF**

Dr David Waugh	EPSRC Research Fellow: Energy Recovery from Landing Aircraft (Supervisor: Prof Stewart)
Dr Jun Chen	EPSRC Research Fellow: Integrating and Automating Airport Operations (Supervisor: Prof Stewart)
RF01	Research Fellow Siemens RMS Project (Early 2011) (Supervisor Prof Bingham)
RF02	Research Fellow Siemens RMS Project (Early 2011) (Supervisor Prof Bingham)
RF03	Research Fellow Siemens Combustion Project (Early 2011) (Supervisor Dr J Stewart)
PhD01	Doctoral Student Siemens Combustion Project (Early 2011) (Supervisor Dr J Stewart)
PhD02	Doctoral Student (Supervisor Dr Ling) School DTA
RF04	Research Fellow Siemens High Speed Coupling Project (Supervisor: Dr J Stewart)

- **TECHNICAL STAFF**

Senior Experimental Officer	(Mid 2011)
Technician	(Mid 2011)

3 Professor Paul Stewart - Chair of Control Engineering, Founding Head of Engineering

Professor Stewart is currently Founding Head of the School of Engineering. Previously he was Senior Lecturer in the Electrical Machines and Drives Group, at the University of Sheffield. Subsequently he became Professor and Head of Aeronautical and Automotive Engineering at the University of Salford, where he was also co-director of the CASE Centre for control and Systems Engineering, and Associate Head Research: Engineering and Physical Sciences. He conducts research in the fields of control theory applications, electromechanical motion control, power systems, multi-objective optimisation and intelligent systems. Prior to pursuing an academic career, he worked for 14-years in the automotive industry, specialising in drivetrain development and tuning, and has also held posts in the Rolls-Royce University Technology Centres for Control Systems, and Advanced Electrical Machines.

FUNDED RESEARCH AS PI

- EPSRC Grant: GR/S97507/01 **'Zero Constraint Free Piston Energy Converter'** PI: Paul Stewart. Co-Investigator: D. Howe. (University of Sheffield) Collaborating University: Dr Rui Chen, Dept. Aeronautical and Automotive Engineering, University of Loughborough UK. Collaborating Company: Lotus Engineering, Consortium Project Manager: Paul Stewart. P. Stewart: £326,00, Lboro £260,000, Lotus Engineering Contribution: £330,000
- Yorkshire Forward RDA Grant. **'Self-Powering, Active Valve'** PI: Paul Stewart, Co-Investigators: Dr Chris Bingham, Dr Dave Stone. (University of Sheffield) Collaborating Company: Pegler Ltd. P. Stewart: £331,000 / 2 years, Pegler Ltd Contribution: £700,00
- **EU R&D Support Scheme. 'Electronically Actuated Valve Systems (ELTRAV) for distributed intelligent heating control.** Co-investigators: Paul Stewart and Dr Chris Bingham - University of Sheffield: (£120k/6 months)
- **Electric Vehicle – Energy Management Systems**: PIs Paul Stewart and Dr Chris Bingham - University of Sheffield Collaborating Companies: Lotus Engineering Ltd. And ITI Energy Consultancy Project
- **EU Framework 6 More Open Electrical Technologies (MOET) work package 3.2.2** Optimised power systems, architecture and energy storage for the more electric aircraft. Collaborating Company: Airbus Toulouse Fr. PI Paul Stewart £143,000
- **Carbon Trust: Electric/hybrid vehicle energy storage systems scoping study** In collaboration with Dr Chris Bingham - University of Sheffield, Lotus Engineering Ltd., and E4Tech Ltd. Consultancy

Current funding

- EPSRC Grant: EP/H004351/1 **Feasibility Study, Energy Recovery from Landing Aircraft**. Collaborating Universities: Dr. M Eftekhari, Loughborough University and Dr. QC Zhong, Liverpool University Collaborating company: Airbus/EADS Innovation Works PI (University of Lincoln) Paul Stewart £199,224
- EPSRC Grant: EP/H003150/1 **Airport energy technologies network** 20 Academic and 17 Industrial Partners Collaborating University: Dr. Tim Ryley, University of Loughborough PI (University of Lincoln) Paul Stewart £201,103
- EPSRC Grant: EP/H004424/1 **Integrating and Automating Low Carbon Airport Operations.** Collaborating companies: Manchester and Zurich Airports Collaborating Universities: Dr. M Eftekhari, Loughborough University and Dr. QC Zhong, Liverpool University Lead RO: Professor E.K. Burke, University of Nottingham £681,924 PI (University of Lincoln): Paul Stewart £169,857
- United States Air Force European Office of Aeronautical Research and Development Sensor Fusion, Prognostics, **Diagnostics and Failure Mode Control for Complex systems** 1 year personal research grant. PI (University of Lincoln): Paul Stewart £17,071

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Published

- **Stewart P.** and Kadirkamanathan V., "Dynamic model reference PI control of flux weakened permanent magnet AC motor drives" *IFAC Journal of Control Engineering Practice.* Vol. 9, no. 11, pp.1255-1263. November 2001.
- Clark R.E., **Stewart P.,** Jewell G.W. and Howe D., " Tailoring force-stroke characteristics in medium-stroke linear reluctance actuators" *IEEE Transactions on Magnetics*, Vol.38, No.5, pp.3267-3269 2002.
- Model reduction for control system design *IEEE Control Systems Magazine,* Volume: 23 Issue: 1 , Feb 2003 Page(s): 104 –104
- **Stewart P.,** "Torque maximisation of the PMAC motor for high speed, low inertia operation" *Asian Journal of Control.* Vol. 5, No. 1, pp.58-64, May 2003.
- **Stewart P.** and Kadirkamanathan V., "Commutation of permanent magnet synchronous AC motors for military and traction applications" *IEEE Transactions on Industrial Electronics.* Vol.50, No.3, pp. 629-631, June 2003.
- **Stewart P.,** Fleming P.J. and MacKenzie S.A., "Real Time Simulation and Control Systems Design by the Response Surface Methodology and Designed Experiments", *International Journal of Systems Science,* Vol. 34, No. 14-15, pp. 837-850, Nov.-Dec. 2003.
- **Stewart P.** and Kadirkamanathan V., "Dynamic model tracking design for low inertia, high speed permanent magnet AC motors", *Institute of Instrumentation, Systems and Automation Transactions,* vol.43, no.1, pp. 111-122, January 2004.
- **Stewart P.,** Stone D.A. and Fleming P.J. "Design of robust fuzzy-logic control systems by multi-objective evolutionary methods with hardware in the loop" *IFAC Journal of Engineering Applications of Artificial Intelligence,* Vol.70, no.3, pp.275-284, May 2004.
- **Stewart P.** and Fleming P.J., "Drive by wire control of automotive driveline oscillations by response surface methodology" *IEEE Transactions on Control Systems Technology.* Vol.12(5), pp.737-41, Sept. 2004
- **Stewart P.,** Zavala J.C. and Fleming P.J., "Automotive drive by wire controller design by multi objective techniques" *IFAC Journal of Control Engineering Practice*. Vol.13/2, pp.257-264. Feb. 2005.
- Neural networks and intellect-using model based concepts. *IFAC Journal of Control Engineering Practice.* Vol 13/5 pp 667-668. May 2005.
- **Stewart P.,** Gladwin D. and Fleming P.J., "Multiobjective analysis for the design and control of an electromagnetic valve actuator" *Proceedings of the Institute of Mechanical Engineers, Part D: Journal of Automobile Engineering.* Vol. 221(5), pp. 567-577, 2007.
- Gladwin D., **Stewart P.,** Stewart J. and Cowley C., "DC Voltage Stabilisation For The Series Hybrid Electric Vehicle" *Transactions of the Institute of Instrumentation, Systems and Automation*, Vol 47/2 pp 222-228, April 2008.
- **Stewart P.,** Gladwin D., Stewart J., Chen R. and Winward E., "Improved decision support for engine in the loop experimental design optimisation. Part I and Part II.", *Proceedings of the Institute of Mechanical Engineers Part D - Automobile Engineering* Vol.224, No.2, pp. 201-218, 2009.
- Wilson D, **Stewart P.,** Jewell G, Taylor B, "Methods of resistance estimation in permanent magnet synchronous motors for real-time thermal management." *IEEE Transactions on Energy Conversion* Vol.25, No.3. pp. 698-707, 2010
- Gladwin D., **Stewart P.,** Parr M. and Stewart J., "Multiobjective evolutionary-fuzzy augmented flight controller for an F16 Aircraft." *Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering.* Vol.224, No.3, pp 293-309, 2010.
- Kan Liu, Q. Zhang, Z.Q. Zhu, J. Zhang, A.W. Shen, **Stewart P**., "Two Novel MRAS Strategies for Identification of Parameters in Permanent Magnet Synchronous Motors ", *International Journal of Automation and Computing.* Vol. 7, No. 4, pp. 526-524, November 2010.
- Gladwin D**, Stewart P.,** Stewart J., "Internal combustion engine control for series-hybrid electric vehicles by evolutionary programming methods" *International Journal of Systems Science - Computational Intelligence for Modelling and Control of Advanced Automotive Drivetrains*, 42 (2). pp. 249-261. ISSN 0020-7721 (2011).

- Gladwin D., **Stewart P.** and Stewart J., "A Controlled Migration Genetic Algorithm Operator for Hardware-in-the-Loop Experimentation", *IFAC Journal of Engineering Applications of Artificial Intelligence.* In Press (2011).
- Gladwin D., **Stewart P.** and Stewart J., "A novel Genetic Programming approach to the design of engine control systems for the voltage stabilisation of Hybrid Electric Vehicle generator outputs", *Proceedings of the Institute of Mechanical Engineers Part D - Automobile Engineering.* In Press (2011).
- Gladwin D., **Stewart P.** and Taylor B., "Real-time thermal management of Permanent Magnet Synchronous Motors by resistance estimation", *IET Transactions in Electric Power Applications.* In Press (2011).

Invited Seminars

- "*Model reference control of multivariable systems with hard saturation limits – a case study"* Department of Automatic Control and Systems Engineering, University of Sheffield, Oct 2002.
- "*Metamodels for real-time control - an automotive design study."* Department of Mathematics Operational Research Group, University of Southampton, February 2003.
- November 2003 (14 day) Royal Society funded lecture tour of Taiwan Universities and research centres – "*System design by multiobjective methodologies"*
- "*Multiobjective evolutionary optimisation and contemporary control"* University of Nottingham Department of Computer Science, June 2004.
- FABIAN Network, Wednesday 27th April 2005 at MIRA, Nuneaton. Latest Developments in UK Fuel Cell and Hybrid Electric Technology, and Examples of Vehicle Applications: *A four stroke free-piston energy converter"*
- *"Multiobjective optimisation for automotive applications"* IEEE colloquium on optimisation for control. 24th April 2006, Sheffield AC&SE
- *"Automotive control by wire optimisation using evolutionary multiobjective techniques"* Applied Control Technology Consortium (University of Strathclyde). National Instruments, Newbury, 3rd May 2007.
- "*Multiobjective augmented flight controller design for an F16 Aircraft.",* **Plenary Lecture**: *6th International Congress of Mechatronics Engineering*, Monterrey, Mexico, April 9th-12th 2008
- "*Search Methodologies in automotive control applications"* IMechE Symposium on Control and Modelling in Automotive Systems, *UKACC Control 2008 conference,* Manchester/Salford University, 3rd September 2008.
- *'Automotive Power Electronics',* Seminar: Electronics Yorkshire and Innovative Electronics Manufacturing Research Centre, 14th May 2009.
- *'Electrical Storm – Novel Hybrid Electric Vehicle R&D',* Seminar: IMechE/Lotus Engineering Ltd. Hethel Engineering Centre, Norwich. 'Integrating Technologies for Low Carbon', 29th September 2009
- '*Optimising The System – Challenges in More Electric Aircraft Power System Simulation',* Seminar: IMechE Aerospace Division, IET Austin Court Birmingham, 'Energy and Optimisation'10th November 2009
- '*Advanced engine control methodologies for the series hybrid electric vehicle'* 2010 Advanced Engine Control Symposium, State Key Engine Laboratories, Tianjin, P.R. China, 3-5 November 2010.
- *'Looking for Clues - Solving Complex Problems with Biologically Inspired Heuristics'* Institute of Integrative Biology, University of Liverpool, 21st February 2011.
- *'Bio:Eng Bridging the gaps between engineering and biology'* ICMAT2011 26th June-July 1st 2011. **Symposium AA:** Frontiers in Optical Bio-imaging and Microscopy" Suntec, Singapore.

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- **Stewart P.** and Kadirkamanathan V., "On the steady state and dynamic performance of model reference control for a permanent magnet synchronous motor" *UKACC*

International Conference on Control 98. University of Wales, Swansea UK. vol.455, pp.664-669, 1-4 September, 1998.

- **Stewart P.** and Kadirkamanathan V., "Dynamic control of permanent magnet synchronous motors in automotive drive applications" *1999 IEEE American Control Conference,* San Diego, USA. pp.1677-1681, June 2-4, 1999.
- **Stewart P.** and Kadirkamanathan V., "Model reference PI control of a multivariable system with saturation - a case study" *IFAC Workshop on Digital Control - PID 2000,* Terrassa, Spain. pp.547-552, April 5-7, 2000.
- **Stewart P.** and Kadirkamanathan V., "Dynamic model reference control of a PMAC motor for automotive traction drives" *UKACC International Conference on Control 2000,* Cambridge UK. CDRom 073.PDF. September 4-7, 2000.
- **Stewart P.** and Kadirkamanathan V., "Position estimation for the PMAC motor in automotive drive applications" *UKACC International Conference on Control 2000,* Cambridge UK. CDRom 252.PDF. September 4-7, 2000.
- **Stewart P.** and Fleming P.J., "The Response Surface Methodology for real-time distributed simulation" *IFAC Conference on New Technologies for Computer Control.,* Hong Kong, China. pp. 128-133, November 19-22, 2001.
- Clark R.E., **Stewart P.,** Jewell G.W. and Howe D., " Tailoring force-stroke characteristics in medium-stroke linear reluctance actuators" *IEEE INTERMAG International Conference on Magnetics*. Amsterdam, Holland. Paper GU08, April 28-May 02, 2002.
- **Stewart P** and Fleming P.J., "The Response Surface Methodology for rapid prototyping of real-time control systems" *2002 IEEE American Control Conference,* Anchorage, Alaska, USA. Pp.3343-3348, May 8-10, 2002. *Awarded prize for best paper*.
- **Stewart P.,** Mackenzie S. and Fleming P.J., "A neural network based approach to computationally intense distributed aerospace simulations", Conference paper commissioned and sponsored by QINETIQ*.. IASTED International Conference on Artificial Intelligence and Applications.* Malaga, Spain. September 9-12, 2002. ISBN:0-88986-352-0, ISSN:1482-7913, pp.533-538.
- Zavala J.C., **Stewart P.,** and Fleming P.J., "Multiobjective automotive drive by wire controller design." *IEE / IEEE International Conference on Computer aided Control System Design*, Glasgow, Scotland, pp.69-73, 18-20 September 2002.
- **Stewart P.,** Clark R.E., Jewell G.W. and Fleming P.J., "Controllability analysis of multi objective control systems" *IEE / IEEE International Conference on Computer aided Control System Design*, Glasgow, Scotland, pp.74-79, 18-20 September, 2002.
- **Stewart P.,** Mackenzie S. and Fleming P.J., "On the response surface methodology for computationally intensive distributed aerospace simulations" Conference paper commissioned and sponsored by QINETIQ. *IEEE Winter Simulation Conference.* San Diego, USA. pp.476-482, December 8-11, 2002.
- **Stewart P.,** Mackenzie S. and Fleming P.J., "Metamodelling of multivariable engine models for real-time flight simulation". *9th CEAS European Propulsion Forum,* 15-17 October 2003, Roma, Italy.
- **Stewart P**., Stone, D. A. and Fleming, P.A. (2004) On-line multiobjective automatic control system generation by evolutionary algorithms. In: 2004 *IEEE International Symposium on Industrial Electronics*, 4-7 May 2004, Palais de Congres Expositions, Ajaccio, France.
- **Stewart P.,** Stone D.A. and Fleming P.J., "On-line design of robust fuzzy-logic motion control systems by multi-objective evolutionary methods*", 2004 American Control Conference*
- S. D. Wilson, G. W. Jewell and **P. Stewart**, " Resistance Estimation for Temperature Determination in PMSMs through Signal Injection" *International Electric Machines and Drives Conference* May 15-18, 2005, San Antonio, TX
- **Stewart P.,** Gladwin D., Parr M. and Stewart J., "A multiobjective G.A. fuzzy logic augmented flight controller for an F16 Aircraft." *IEEE International Conference on Fuzzy Systems,* pp.865-870, 23-26 July 2007, London UK. (*Invited Paper).*
- Gladwin D., **Stewart P.** and Stewart N., "Automatic controller design and optimization using Simulink", *The 16th IASTED International Conference on Applied Simulation and Modelling ~ASM* 2007~ August 29-31, 2007 Palma de Mallorca, Spain

- **Stewart P.,** Gladwin D., Stewart J. and Cowley R., "Generator voltage stabilisation for the series-hybrid vehicle", *33rd Annual Conference of the IEEE Industrial Electronics Society (IECON 2007)*, Taipei, Taiwan, 5-8th November 2007. (*Invited Paper)*
- **Stewart P.,** "Multiobjective augmented flight controller design for an F16 Aircraft.", **Plenary Lecture**: *6th International Congress of Mechatronics Engineering*, Monterrey, Mexico, April 9th-12th 2008
- Gladwin D., **Stewart P.** and Stewart J., "Optimal engine control for series-hybrid electric vehicles by evolutionary programming methods", *SAE International 2008 Powertrains, Fuels and Lubricants Congress,* June 23-25, 2008 Shanghai, China 08SFL-0258
- **Stewart P.** "Search Methodologies and decision support in automotive control applications" IMechE Symposium on Control and Modelling in Automotive Systems, *UKACC Control 2008 conference,* Manchester/Salford University, 3rd September 2008.
- Gladwin D., **Stewart P.,** Stewart J., Chen R. and Winward E., "An adaptive decision support methodology for process-in-the-loop optimisation", *SCS/IEEE International Workshop on Modelling and Applied simulation* (MAS2008), Calabria, Italy September 17-19, 2008
- Stone D. A., Foster M. P., Bingham C. M. & **Stewart P..** "Digitally Controlled Converter with an Adaptive Step Size for Maximum Power Point Tracking for Photovoltaic Applications.", *IECON-2008, 34th Annual Conference of the IEEE Industrial Electronics Society.* Florida Hotel & Conference Center, Orlando, Florida, USA. 10-13 November 2008
- Chen R. ,Winward E., **Stewart P.** and Taylor B., "Quasi-Constant Volume (QCV) Spark Ignition Combustion", *2009 SAE World Congress,* April 20-23, 2009, Cobo Center, Detroit, MI, USA.
- Molina Cristobal A. and **Stewart P,** "Optimisation of Reduced Order Flight Controllers using Multiobjective Genetic Algorithms and Linear Matrix Inequalities". CEAS 2009, Manchester.
- Gladwin D., **Stewart P**. and Stewart J., "Automatic Generation of Control Systems: a Hardware in the Loop Experimental Study", International Conference on Systems Engineering ICSE 2009, University of Coventry UK, September 2009.
- D.Gladwin, D. Rogers, C. Bingham and **Stewart P.,** "Building Heating Simulation Design for Control Analysis", MIC 2010

PATENTS

- Professor Howe and Dr. Stewart,

United Kingdom Patent Application No.220686.0
ACTIVE CRANK TRAIN Invention: ref: AWP/P61242/000

- C.Maerky (Johnson Controls), G. Jewell, R. Clark, P. Stewart

Patent filing number 02-15130 (02/12/2002)
VEOCITY SENSOR OF A MOBILE PART

- C.Maerky (Johnson Controls), G. Jewell, R. Clark, P. Stewart

Patent filing number 02-15129 (02/12/2002)
PROCEDURE FOR THE POSITION EVALUATION OF AN ARMATURE OF AN EMVT ACTUATOR

- C.Maerky (Johnson Controls), G. Jewell, R. Clark, P. Stewart

Patent filing number 02-16520 (23/12/2002)
EMVT ACTUATOR WITH ADDITIONAL ACTIVE SURFACES

- P. Bentley, P. Stewart, C. Bingham – patent filed

GENERATOR FOR USE IN FLUID FLOW CONDUIT

4 Professor Chris Bingham – Chair of Energy Conversion

Chris Bingham was previously Senior Lecturer in The Department of Electronic and Electrical Engineering, The University of Sheffield, UK., where he was senior member of the Electrical Machines and Drives Research Group (EMD). Professor Bingham was appointed specifically to enhance our expertise in advanced systems control and power systems.
During his academic career, Prof. Bingham has made significant contributions to a diverse range of EPSRC, EC, DTI and industrially funded research, including researching and realising advanced control techniques and novel actuation systems for the control of autonomous underwater vehicles and advanced missiles, electromechanical and electro-hydraulic aircraft flight control surfaces, magnetically-loaded carbon-fibre composite roller systems for multi-axis sheet material handling applications, active magnetic bearings for high–speed flywheel energy storage systems, high performance electromechanically actuated vibratory pile-drivers, and modelling/control of modular induction heater systems

FUNDED RESEARCH

- High torque, 3-degree of freedom spherical permanent magnet actuators', EPSRC; G.Jewell & C.M.Bingham, £175k, 1999
- 'Enabling technologies for 'more electric' aircraft', EPSRC Platform Grant; D. Howe; G W Jewell; P H Mellor; C M Bingham., £510k, Jan. 2000.
- 'Model Predictive Control for Energy Management in All/More-Electric Vehicles', EPSRC; C M Bingham, £60k, 2001
- 'Novel power electronic converters for deep-sea underwater vehicles'; CASE award in association with Perry Slingsby Engineering Ltd), to 2002, £12k.
- 'Reduction of torsional oscillations using direct torque feedback for automotive and industrial applications'; C M Bingham, £6.6k.
- 'Free-Piston Energy Converter (FPEC)'; EC-Framework V, D.Howe, J.Wang, C.M.Bingham, 520k€ (total project funding 2.5M€), 2002
- 'Zero Emission Small vehicle with integrated high Temperature battery and FUel CelL' (ZESTFUL), N. Schofield, D.A.Stone, C.M.Bingham, 2003, £185k.
- 'Energy Efficient Electric Urban Transport'; DTI Programme on Environmentally Friendly Transport, lead collaborator, Zytek Electric Vehicles. Total project £1M. C. M. Bingham, R. Clark, 2004, £105k.
- 'SECTOR-optimised sensorless control systems for rare-earth brushless traction motors '; DTI Programme on Electrical/Electronic Control and Power systems, lead collaborator, EMD drive systems Ltd. Total project £1.3M. D. Howe, D.A Stone, C. M. Bingham £342k, 2006.
- 'Development of a new electronic heating control system for domestic applications', Yorkshire Forward—Pegler Ltd., P. G. Stewart, D. A. Stone & C. M. Bingham, £331k, 2006.
- 'Advanced cell state of function models for HEV operation', D. A. Stone, C. M. Bingham, EPSRC Responsive mode, £148k, 2006, EP/D079527/1.
- 'Intelligent Building Temperature Control'; in association with Pegler Ltd, EU Objective 1: Research and Development subsidies scheme, C. M. Bingham, £100k, June 2008.
- 'Ultra-efficient electrical machines and drives for EVs and HEVs; TSB Technology Programme, Nissan (UK), Nissan (Japan), Z.Q.Zhu, C. M. Bingham, £307k, 2009.
- 'Direct Drive Generators', Siemens Wind Power, Denmark, Z. Q. Zhu, C. M. Bingham, £550k.
- 'Wind-power Permanent-magnet Generation Systems of High Reliability, Efficiency and Power-Density', The Northern Wind innovation Programme, Z.Q.Zhu, C M Bingham £440k, 2009.

Current funding

- 'Remote Monitoring, Sensing and Sensor Validation Projects', 2010-2012 Rolling Programme. PI University of Lincoln: Prof. Chris Bingham, Co-Investigator: Prof. Paul Stewart, Siemens Industrial Turbomachinery Research Grant, Total value: £425,000

Learned Society Journal Papers In-print / In-press:

- MOSELY, I; MELLOR, P.H.; **BINGHAM, C.M**.: 'Effect of dead-time on harmonic distortion in class-D audio power amplifiers', IEE Electronics Letters, Vol 35, No 12, pp. 950-952, 1999.
- **BINGHAM, C.M.**, STONE, D.A., SCHOFIELD, N.S., HOWE, D. & PEEL, D,: 'Amplitude and frequency control of a vibratory pile-driver'; IEEE Transactions On Industrial Electronics, Vol. 47, No.3, pp. 623-631, 2000.
- MUSGRAVE, D.; **BINGHAM, C.M.**; STONE, D.A.; HOWE, D.: 'Modelling and multivariable control of a gear-less, electrically actuated vibratory system'; IEE Electric Power Applications, Vol. 147, No. 5, pp. 345-352, 2000.
- KHATUN, P.; **BINGHAM, C.M.**; MELLOR, P.H.: 'Comparison of control methods for electric vehicle anti-lock braking/traction control systems'; SAE Technical Paper Series, 2001-01-0596, ISSN 0148-7191, 2001.
- SEWELL, H.I.; STONE, D.A.; **BINGHAM, C.M**.: 'Novel 3-phase unity power factor modular induction heater'. IEE Electric Power Applications, Vol. 147, No.5, pp. 371-378, 2000. DUAN, G.R., WU, Z.Y., **BINGHAM, C.M.**, HOWE, D.: 'Robust magnetic bearing control using stabilizing dynamic compensators'; IEEE Transactions On Industry Applications, Vol. 36, No.6, pp.1654-1660, 2000.
- FOSTER, M.P.; SEWELL, H.I.; **BINGHAM, C.M**.; STONE, D.; 'State variable modelling of LCC voltage-output resonant converters' IEE Electronics Letters, Vol.37, No.17, pp. 1065-1066, 2001.
- HOWE, D.; SCHOFIELD, N.; **BINGHAM, C.M**.: 'Energy optimised traction system for all-electric vehicles', IEE Power Engineering Journal, Vol.16, No.1, pp. 32, 2002.
- PEEL,D.; WU, Y.; **BINGHAM, C.M**.; HOWE, D.H.; 'Simplified transferable active magnetic bearing characteristics'; Proceedings of IMechE, Journal of Mechanical Engineering Science, Vol. 216, Part C, pp. 623-8, 2002.
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- FOSTER, M.P.; STONE, D. A.; **BINGHAM, C.M.**: 'An automated design methodology for LLC resonant converters using a genetic algorithm', PCIM 2009, Nurnberg, Germany, May 2009.
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5 Professor Ron Bickerton – Industrial Chair (0.2FTE)

Ron has joined the University from Industry where he has held senior positions with a number of major international companies, generally specialising in industrial engines and their applications. Most of the research undertaken has been on a commercial basis and in general has centred around combustion from both solid, liquid and gaseous fuels. Ron's position as an Industry Based Professor is to further the links to Industry into the University's portfolio of research.

- **Bickerton, R. A.,** Such, C. H., Sorum, P. A., Floysand, S. A., "The Development of a Method for Evaluating the Effect of Fuel Quality on the Cold Starting of a Range of Diesel Engines" SAE Cold Conditions Engineering Conference; Helsinki Feb 1992, Paper Number 921748
- **Bickerton, R.A.** "The design and development of Single Cyl engine for Heavy Duty Engine Oil testing." 1996 Co-ordinating European Council symposium.
- **Bickerton, R.A.** "The use of single cylinder engines as a low cost screening test of lubricant oil quality" Lubrizol Company Symposium – Wycliffe Ohio USA 1997
- **Bickerton, R.A.** "European Engines and the emissions challenge" Lubrizol Company Symposium – Wycliffe Ohio USA 1997
- **Bickerton, R.A.,** Patterson, J., Clarke, A. and Al-Khayat, N. ''Use of Hybrid Vehicle Technology in Industrial Applications'' , IMechE 3rd International conference on Total Vehicle Technology, Finding the Radical, Implementing the Practical , P.R.N. Childs and R.K. Stobart (Eds) , University of Sussex, 2004, pp 197-208, ISBN 186 058 4608
- **Bickerton, R.A.,** Patterson, J., Clarke, A. and Al-Khayat, N "The Transient response characteristics of variable speed generator/diesel engine combinations meeting or exceeding current ISO standards."I Mech E, Internal Combustion Engine Performance and Emissions, London Headquarters 7-8 December 2004.
- **Bickerton, R.A.,** "Design and Manufacture of high speed industrial engines", Institution of Diesel and Gas Turbine Engineers (IDGTE), 9(4) pp 547. Winner of the Ackroyd Stuart memorial prize for technical content (2005)
- **Bickerton, R.A.** "Practical Experience of Bio diesel in Industrial Engines" Institution of Diesel and Gas Turbine Engineers (IDGTE)London meeting Dec 2006 (Voted best paper in the conference)
- **Bickerton, R.A.,** Pike.A ,Price.N "The Development of the Deutz TD2010 Engine Concept", Institution of Diesel and Gas Turbine Engineers (IDGTE), 11(4) pp 560. Winner of the Ackroyd Stuart memorial prize for technical content (2007)
- **Bickerton, R.A.,** "Small High Speed Industrial Engine Development to meet Emissions Challenges" Institution of Diesel & Gas Turbine Engineers, 2nd March 2009
- **Bickerton, R.A.** "Small Industrial Engine Development" Institution of Mechanical Engineers South West Division 11th Nov 2008 Repeat Paper to Institution of Mechanical Engineers South Eastern Division 28th Jan 2009

6 Dr Jonathan Lawrence – Reader in Laser Materials Processing, Programme Leader: MSC in Sustainable Power and Energy

Dr. Jonathan Lawrence PhD, BEng, PGDipHE, CEng, MIMechE is currently a Reader at the University of Lincoln School of Engineering. He has been teaching and conducting world class research at top level universities for over 15 years. As an established researcher in the Wolfson School of Mechanical Engineering at the University of Loughborough he has attracted over £1.3M in funding from industry, and national and internal funding bodies to research laser materials processing and laser technology, as well as advanced manufacturing technologies His achievements to date are demonstrated by the publication of four books, over 100 journal papers in international journals of repute and over 50 conference papers. Dr. Lawrence's work has also generated five international patents. He is the Editor-in-Chief for the journal Lasers in Engineering, has sat on the Organizing/Programme Committees of various international conferences and is a referee for numerous international journals

Recent Research Funding

- Singapore Ministry of the Environment (ENV) - Nanyang Technological University Research Fund: ENV-NTU2/01 Laser Surface Treatment of the Refractory Materials and Grouts Used as Linings for Waste Incinerator PI Jonathan Lawrence, S$70,200.00.
- University Research Council of Singapore Start-up Research Grant: SUG13/02 Laser Augmentation of the Wettability Characteristics of Selected Medical and Dental Bio-materials for Improved Biocompatibility PI Jonathan Lawrence, S$98,970.00.
- Singapore Ministry of Education Academic Research Fund/Joint Collaboration with Industry (ARF/JCI) - Coherent Inc. High Power Diode Laser (HPDL) Plastic Welding for Telecommunications Applications PI Jonathan Lawrence, S$22,000.00 and US$50,000.00.
- DTI - JCB Ltd. KTP Grant: KTP001310 Development of Laser Processing Technologies for Improved Performance and Service Life of Off-Highway Vehicle Engines PI: Karen Williams (Loughborough University); CI: Jonathan Lawrence, £108,750.00.
- EPSRC Platform Grant: GR/T25040/01 Enhancement of Wear and Corrosion Resistance of NiTi Medical Implants by means of Laser Surface Modification PI: Jonathan Lawrence, £8,625.00.
- Microkerf Ltd Optimization of Fibre Laser Beam Delivery Devices for Hermetic Welding of Controlled Expansion Metal Alloys PI: Jonathan Lawrence, £30,000.00.
- EPSRC First Grant: EP/E046851/1 Laser Surface Treatment of Polymeric Biomaterials for Enhanced Cell Response PI: Jonathan Lawrence, £216,073.00.
- EPSRC IMCRC Grant: EP/E002323/1 - IMCRC275 Smart MaterialsStructures by U ltrasonic Consolidation PI: Russell Harris (Loughborough University); CI: Jonathan Lawrence, £774,042.00.
- EPSRC Platform Grant: GR/T25040/01 An In-line Debris Removal System for Laser Micromachining PI: Jonathan Lawrence, £18,000.00.

Books

- D.G. Waugh & **J. Lawrence**, (2011), *Laser Surface Treatment of Bio-implant materials: Wettability Characteristics and Osteoblast Cell Response Modulation for Nylon 6,6*. Philadelphia: Old City Publishing.
- M. Kozłowski, **J. Lawrence** & J. Marciak-Kozłowska, (2011), *From Quarks to Neurons: Physics and Engineering with Ultra-short Laser Pulses*. Philadelphia: Old City Publishing.
- **J. Lawrence**, J. Pou, D.K.Y. Low & E. Toyserkani (Eds.), (2010), *Advances in Laser Materials Processing: Technology, Research and Applications*. Cambridge: Woodhead Publishing/CRC Press.
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Book Chapters

- D.G. Waugh & **J. Lawrence** (2010), "*Laser Surface Processing of Polymers for Biomedical Applications*", in J. Dutta Majumdar (Ed.) *Laser Assisted Fabrication of Materials*, pp. xxx-xxx. Berlin: Springer-Verlag.
- C.F. Dowding & **J. Lawrence** (2010), "*Ablation: A Broad Term*", in J. Lawrence, J. Pou, D.K.Y. Low & E. Toyserkani (Eds.) *Laser Materials Processing Technology: Research and Applications*, pp. 575-628. Cambridge: Woodhead Publishing/CRC Press.
- L. Hao & **J. Lawrence**, (2003), "*Wettability characteristics modification of a magnesia partially stabilized zirconia using laser treatment and fundamental mechanism analysis*", in J.J. Moore, G.G. Richards & H.Y. Sohn (Eds.) *Recent Research Developments in Materials Science & Engineering*, pp. 159-184. Trivandrum: Transworld Research Network
- **J. Lawrence**, M.J.J. Schmidt, L. Li, R.E. Edwards & A.W. Gale, (2002), "A high power diode laser-based ceramic tile grout sealing system: Grout characteristics, hand-held sealing system development and associated safety aspects", in J.J. Moore, G.G. Richards and H.Y. Sohn (Eds.) Recent Research Developments in Materials Science & Engineering, pp. 41-67. Trivandrum: Transworld Research Network.

Invited Seminar and Meeting Presentations

- L. Hao and **J. Lawrence**, (2003), "Laser treatment of magnesia partially stabilized zirconia (MgO-PSZ) for improved biocompatibility", *Innovation in Engineering*, Singapore, 25-26 July 2003.
- **J. Lawrence** and L. Li, (2000), "Modification of the wettability characteristics of carbon steel by means of CO2, Nd:YAG, excimer and high power diode laser radiation", *The Institute of Physics Optical Group Laser Materials Processing Meeting*, London, 8 March 2000.
- **J. Lawrence** and L. Li, (1999), "Laser modification of material surface properties for improved wettability and adhesion", *The Institute of Physics Optical Group Laser Materials Processing Meeting*, London, 19 February 1999.

Journal Papers

- D.G. Waugh and **J. Lawrence.** "Wettability and osteoblast cell response modulation through UV laser processing of nylon 6,6", *Applied Surface Science*. Submitted for publication 13 January 2011.
- D.G. Waugh and **J. Lawrence,** "Osteoblast cell response to a laser modified polymeric material", *Proceedings of the Institution of Mechanical Engineers Part H: Journal of Engineering in Medicine*. Submitted for publication 4 January 2011.
- P.P. Shukla and **J. Lawrence,** "Distribution of residual stress within selected engineering ceramic after CO2 and fibre laser surface processing", *Far East Journal of Mechanical Engineering and Physics*. Submitted for publication 30 December 2010.
- P.P. Shukla and **J. Lawrence,** "A comparison of fibre and Nd:YAG laser beam brightness influences after surface processing of a Si3N4 engineering ceramic", *Journal of Laser Applications*. Submitted for publication 18 December 2010.
- P.P. Shukla and **J. Lawrence,** "Investigation of temperature distribution during CO2 and Fibre laser processing of Si3N4 engineering ceramic by means of computational and experimental approach", *Journal of Manufacturing Processes*. Submitted for publication 15 December 2010.
- P.P. Shukla and **J. Lawrence,** "Characterization and compositional study of a zirconia engineering ceramic irradiated with a fibre laser beam", *Optics & Laser Technology*. Submitted for publication 8 May 2010.
- P.P. Shukla and **J. Lawrence**, "A comparative study of the effects of CO2 and a fibre laser surface treatment on the fracture toughness of selected engineering ceramics", *Journal of Laser Applications*. Submitted for publication 5 May 2010.

- P.P. Shukla and **J. Lawrence,** "Examination of temperature distribution and the thermal effects on phase transformation of Si3N4 engineering ceramics during fibre laser surface treatment", *Optics and Lasers in Engineering*. Accepted for publication 17 January 2011.
- P.P. Shukla and **J. Lawrence,** "Modification of fracture toughness parameter (K1c) following CO2 laser surface treatment of Si3N4 engineering ceramic", *Surface Engineering*. Accepted for publication 7 January 2011.
- P.P. Shukla and **J. Lawrence,** "Mathematical modelling of the fibre laser surface processing of a zirconia engineering ceramic by means of three-dimensional finite element analysis", *Proceedings of the Institution of Mechanical Engineers Part C: Journal of Mechanical Engineering Science*. Accepted for publication 11 August 2010.
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- D.G. Waugh and **J. Lawrence,** "CO2 laser surface patterning of nylon 6,6 and the subsequent effects on wettability characteristics and apatite response", *Surface Engineering*. Accepted for publication 10 December 2010.
- C.F. Dowding and **J. Lawrence**, "Analysis of KrF excimer laser beam modification resulting from ablation under closed thick film flowing filtered water", *Optics & Laser Technology*. Accepted for publication 19 October 2010.
- P.P. Shukla and **J. Lawrence,** (2011), "Evaluation of fracture toughness of ZrO2 and Si3N4 engineering ceramics following CO2 and a fibre laser surface treatment", *Optics and Lasers* in Engineering, 49(2), 229-239.
- D.G. Waugh and **J. Lawrence,** (2011), "The enhancement of biomimetic apatite coatings on a nylon 6,6 biopolymer by means of KrF excimer laser surface treatment", *Lasers in Engineering*, 21(1-2), 95-114.
- P.P. Shukla and **J. Lawrence,** (2010), "Surface Characterization and compositional evaluation and characterization of a fibre laser processed silicon nitride (Si3N4) engineering ceramic", *Lasers in Engineering*, 20(5-6), 359-380.
- P.P. Shukla and **J. Lawrence**, (2010), "Fracture toughness modification by using a fibre laser surface treatment of a silicon nitride engineering ceramic", *Journal of Materials Science*, 45(23), 6540-6555.
- P.P. Shukla, **J. Lawrence** and H. Wu, (2010), "On the fracture toughness of a zirconia engineering ceramic and the effects thereon of surface processing with fibre laser radiation", *Proceedings of the Institution of Mechanical Engineers Part B: Journal of Engineering Manufacture*, 224(10), 1555-1569.
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- C.F. Dowding and **J. Lawrence**, (2010), "Topography of features machined into bisphenol A polycarbonate using closed thick film flowing filtered water immersed KrF excimer laser ablation", *Lasers in Engineering*, 20(3-4), 241-262.
- D.G. Waugh and **J. Lawrence**, (2010), "On the use of CO2 laser induced surface patterns to modify the wettability of polymethyl methacrylate (PMMA)", *Optics and Lasers in Engineering*, 48(6), 707-715.
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- D.G. Waugh, **J. Lawrence,** D.J. Morgan and C.L. Thomas, (2009), "Interaction of CO2 laser-modified nylon with osteoblast cells in relation to wettability", *Materials Science & Engineering C: Biomimetic and Supramolecular Systems*, 29(8), 2514-2524.
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- K.W. Ng, H.C. Man, **J. Lawrence** and T.M. Yue, (2009), "Parametrical optimization of laser surface alloyed NiTi shape memory alloy with Co and Nb by the Taguchi method", *Proceedings of the Institution of Mechanical Engineers Part B: Journal of Engineering Manufacture*, 223(8), 969-979.
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- L. Hao and **J. Lawrence**, (2007), "Wettability modification and the subsequent manipulation of protein adsorption on a Ti6Al4V alloy by means of CO2 laser surface treatment", *Journal of Materials Science: Materials in Medicine*, 18(5), 807-817
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- L. Hao and **J. Lawrence**, (2006), "Melt depth prediction for laser irradiated magnesia partially stabilized zirconia", *Journal of Materials Processing Technology*, 180(1-3), 110-116.
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- L. Hao and **J. Lawrence**, (2006), "Effects of Nd:YAG laser treatment on the wettability characteristics of a zirconia-based bioceramic", *Optics and Lasers in Engineering*, 44(8), 803-814.
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- L. Hao, **J. Lawrence**, Y.F. Phua, K.S. Chian, G.C. Lim, H.Y. Zheng, (2005), "The effects of CO2 laser irradiation on human osteoblast cell adhesion and proliferation on 316 LS stainless steel", *Journal of Biomedical Materials Research Part B: Applied Biomaterials*, 73B(1), 148-156.
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4. L. Li, **J. Lawrence** and J.T. Spencer; Applicant: British Nuclear Fuels (BNFL) Plc. Method and Apparatus for Marking of Monumental Works. UK Patent No GB9621258.4, 11th October 1996.
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7 Dr Jill Stewart Senior Lecturer in Thermofluids, Director of Taught Programmes

Jill Stewart received the MEng and PhD degrees from the University of Loughborough, where she also worked as a post-doctoral research associate. Jill Stewart's research interests are primarily connected with combustion and prime movers in industrial power and energy applications. She has collaborated on a number of EPSRC and DTI projects conducting fundamental research into IC engine combustion processes, emissions and performance for diesel, gasoline, HCCI, free-piston and dual fuel engines including research into alternative fuels. Jill has recently been awarded substantial funding by Siemens to conduct fundamental research into gas turbine combustion and ignition processes. Jill has also been recently involved in eco-hydrological modelling as art of a NERC and NSF funded research effort towards understanding landscape and ecosystem change in semi-arid regions. This approach has involved spatially explicit modelling of multi-phase and multi-scale fluid flows, stochastic rainfall modelling, statically modelling and statistical data analysis.

Current funding

- Fundamental Gas Turbine Combustion Research Project. PI University of Lincoln: Dr Jill Stewart, Co-Investigator: Prof. Paul Stewart, 2010-2012 Rolling programme, Siemens Industrial Turbomachinery Research Grant, Funding: £295,000
- High Speed Coupling vibration Project. PI University of Lincoln: Dr Jill Stewart, Co-Investigator: Prof. Paul Stewart & Prof Ron Bickerton, 2010-2012 Rolling programme, Siemens Industrial Turbomachinery Research Grant, Funding: £287,500
- High Speed Coupling vibration Feasibility Project. PI University of Lincoln: Dr Jill Stewart, 2010-2012, Siemens Industrial Turbomachinery Research Grant, Funding: £10,000
- Glen Farrow Combustion Consultancy: PI University of Lincoln: Dr Jill Stewart, Funding: £10,000

Refereed Journals

- **Stewart, J.,** Clarke, A. and Chen, R., ''An experimental study of the dual-fuel performance of a small compression ignition diesel engine operating with three gaseous fuels'', Proceedings of the Institution of Mechanical Engineers, Part D: Journal of Automobile Engineering, 221(8), 2007, pp 943-956, ISSN 0954-4070.
- Gazis, A., Panousakis, D., **Patterson, J.,** Chen, W., Chen, R. and Turner, J. ''Using In-Cylinder Gas Internal Energy Balance to Calibrate Cylinder Pressure Data and Estimate Residual Gas Amount in Gasoline Homogeneous Charge Compression Ignition Combustion'', Experimental Heat Transfer, 21(4), October 2008, pp 257-280, ISSN: 0891-6152.
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- **Stewart, J.** and Clarke, A. "A Three-Zone Heat-Release Rate Model for Dual-Fuel Combustion" *Institute of Mechanical Engineers Part C – Journal of Mechanical Engineering Science*, Volume 224, Number 11, 2423-2434, 2010

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- **Patterson, J.,** Hassan, M. G., Clarke, A. Sharma, G., Hellgardt, K. and Chen, R. "Experimental Study of DI Diesel Engine Performance Using Three Different Biodiesel Fuels", SAE World Congress, 2006, Paper No. 2006-01-0234
- **Patterson, J.,** Clarke, A. and Chen, R., "Experimental Study of the Performance and Emissions Characteristics of a Small Diesel Genset Operating in Dual Fuel Mode with Three Different Primary Fuels", SAE World Congress, 2006, Paper No. 2006-01-0234
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- Gladwin D., Stewart P., Parr M. and **Stewart J.,** "A multiobjective G.A. fuzzy logic augmented flight controller for an F16 Aircraft." IEEE International Conference on Fuzzy Systems, pp.865-870, 23-26 July 2007, London UK. (Invited Paper)
- Stewart P., Gladwin D., **Stewart J.** and Cowley R., "Generator voltage stabilisation for the series-hybrid vehicle", 33rd Annual Conference of the IEEE Industrial Electronics Society (IECON 2007), Taipei, Taiwan, 5-8th November 2007. (Invited Paper)

- Gladwin D., Stewart P. and **Stewart J.,** "Optimal engine control for series-hybrid electric vehicles by evolutionary programming methods" SAE International 2008 Powertrains, Fuels and Lubricants Congress June 23-25, 2008 Shanghai, China 08SFL-0258
- Gladwin D., Stewart P., **Stewart J.,** Chen R. and Winward E. "An adaptive decision support methodology for process-in-the-loop optimisation", SCS/IEEE International Workshop on Modelling and Applied simulation (MAS2008), Calabria, Italy September 17-19, 2008 **Stewart, J.,** Okin, G. S., Parsons, A. J., Wainwright, J., Bestelmeyer, B., Fredrickson, E., Schlesinger, W. H. "Modelling Emergent Patterns of Dynamic Desert Ecosystems as a Function of Changing Landscape Connectivity" EGU General Assembly, Vienna, April, 2007
- Wainwright, J., Parsons, A. J., **Stewart, J.,** Okin, G., Turnbull, L., Mueller, E.N., Brazier, R.E. "Holistic approaches to a patchy problem: ecohydrological interactions in desertification." British Ecological Society Annual Meeting, 2007 Invited Presentation
- Wainwright, J., **Stewart, J.,** Parsons, A.J., Okin, G., Bestelmeyer, B., Fredrickson, E., and Schlesinger, W. "Cellular Modelling of Emergent Patterson of Dynamic Desert Ecosystems: The Role of Changing Landscape Connectivity", British Society for Geomorphology Annual Meeting, Exeter, 2008
- Wainwright, J., Turnbull, L., Parsons, A.J., **Stewart, J.,** Okin, G., Brazier, R.E. and Mueller, E.N. "Patchiness, scale and connectivity understanding ecohydrological interactions in desertification", EURECO – GFOE, Leipzig, 2008
- Bryant, R.G., Reynolds, R.L., Yount, J.C., Reheis, M., Goldstein, H., Chavez Jr., P., Whitney, J., Breit, G.N., Velasco, M.G., Bogle, R.C. and **Stewart, J.** "Mapping Aeolian Erosion on Mesquite Lake, California/Nevada, USA", Windy Day, London, 2008
- **Stewart, J.,** Parsons, A. J., Wainwright, J., Okin, G. S., Bestelmeyer, B., Fredrickson, E., Schlesinger, W. H. "Dynamics and Resilience of Desert Ecosystems under Changing Climate" AGU Fall Meeting, San Francisco, December 2008
- Wainwright, J., Parsons, A. J., **Stewart, J.,** Okin, G., Turnbull, L. and Brazier, R.E. "Ecogeomorphology and Scale: Desertification due to Woody Shrub Encroachment in the US Southwest", IAG, Melbourne, February 2009
- Okin, G. S., **Stewart, J.,** Herrick, J. E., Parsons, A. J., Wainwright, J., Peters, J. P. C., Bestelmeyer, B. T., "Connectivity and Ecohydrological Feedbacks in Desertification" AGU Chapman Conference, Boise, October 2009 Invited Presentation
- **Stewart, J** "Combustion Diagnostics of a Dual Fuel Engine via a Three-Zone Model for Heat Release Rate Analysis." Current Research in Combustion, Institute of Physics, Loughborough, 22 September 2009
- EPSRC "Geoengineering Scoping Workshop" London, 19 October 2009

8 Dr Wing-Kuen Ling – Principal Lecturer in Optimisation and symbolic Dynamics

Wing-Kuen Ling received the B.Eng. (Hons) and M.Phil. degrees from the department of Electronic and Computer Engineering, the Hong Kong University of Science and Technology, in 1997 and 2000, respectively, and the Ph.D. degree from the department of Electronic and Information Engineering, the Hong Kong Polytechnic University in 2003. After that, he obtained a post-doctorial fellowship from the Department of Applied Mathematics, the Hong Kong Polytechnic University. Between 2004 and 2010, he was a Lecturer of the Centre for Digital Signal Processing Research, King's College London. In 2010, he joined the University of Lincoln as Reader in Optimisation and Symbolic Dynamics

Academic Awards, Grants and Funding

- Co-investigator of an Australian Research Council (ARC) grant (2009-2014).
- DTA from School of Engineering, University of Lincoln (2010-2013) (An oversea PhD studentship)
- Innovation Fund from Enterprise@Lincoln (2010) (Amount £2000)
- International Travel Grant Scheme from Royal Academy of Engineering 2008 (Amount: £400)
- International Travel Grant Scheme from Royal Academy of Engineering 2006 (Amount: £400)
- International Travel Grant Scheme from Royal Academy of Engineering 2005 (Amount: £500)

Books

- Bingo Wing-Kuen LING, Herbert Ho-Ching IU and Hak-Keung LAM, "Control of Chaos in Nonlinear Circuits and Systems, Nonlinear Scientific Series of Nonlinear Science Series A, World Scientific Publishing, vol. 64, 2009.
- Bingo Wing-Kuen LING, Nonlinear Digital Filters: Analysis and Applications, Elsevier, 2007.

Book Chapters and Reviews

- **Bingo Wing-Kuen LING**, Book Review on "Controlling Chaos: Suppression, Synchronization and Chaotification," by Huaguang Zhang, Derong Liu, and Zhiliang Wang (Springer, London, 2009), IEEE Computational Intelligence Magazine, vol. 6, no. 1, pp. 68-69, 2011.
- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING** and Joshua D. REISS, "Control of Sigma Delta Modulators via Fuzzy Impulsive Approach," *Control of Chaos in Nonlinear Circuits and Systems, Nonlinear Scientific Series of Nonlinear Science Series A, World Scientific Publishing*, vol. 64, pp. 245-270, 2009.

Invited Seminars

- *29/7/2010 Recent works on optimization for signal processing,* Center for Multimedia Signal Processing, Department of Electronic and Information Engineering, Hong Kong Polytechnic University.
- *4/4/2008 Introduction to nonlinear dynamical systems and nonlinear control strategies,* Intelligent Systems and Control Group, Divisional of Engineering, King's College London.
- *20/3/2008 Introduction to linear dynamical systems and linear control strategies,* Intelligent Systems and Control Group, Divisional of Engineering, King's College London.
- *27/2/2008 Optimization approach for solving problems in signal processing and communications systems, Department of Electronic Engineering,* Divisional of Engineering, King's College London.

- 18/09/2007 Nonuniform filter banks: challenges and solutions, Center for Multimedia Signal Processing, Department of Electronic and Information Engineering, Hong Kong Polytechnic University.
- *11/09/2007 Discrete-time symmetric/anti-symmetric FIR filter design,* Center for Multimedia Signal Processing, Department of Electronic and Information Engineering, Hong Kong Polytechnic University.
- *18/01/2006 UWB Seminar SeriesTopics: Pulse Design for UWB Systems, Center for Ultra* Wideband Communications Group Department of Electronic Engineering, King's College London.
- *02/02/2005 DSP Seminar Series Topics: Theory and Practical Issues of Sigma Delta Modulators¾Part I: Theory* Center for Digital Signal Processing Research Department of Electronic Engineering, King's College London.
- *14/11/2003 Chaos Seminar Series Topic: Nonlinear Behaviors of Digital Filters,* Center for Chaos Control and Synchronization, Department of Electronic Engineering, City University of Hong Kong.

Journal Papers

- Ruiyang YU, Man-Hay PONG, **Bingo Wing-Kuen LING** and James LAM, "Two-Stage Optimization Method for Efficient Power Converter Design Including Light Load Operation," *to appear in IEEE Transactions on Power Electronics*, 2011.
- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING**, Joshua D. REISS and Xinghuo YU, "Global Stability, Limit Cycles and Chaotic Behaviors of Second Order Interpolative Sigma Delta Modulators," *to appear International Journal of Bifurcation and Chaos*, vol. 20, 2011.
- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING**, Lamia BENMESBAH, Ted Chi-Wah KOK, Wan-Chi SIU and Kok-Lay TEO, "Two-Channel Linear Phase FIR QMF Bank Minimax Design via Global Nonconvex Optimization Programming," *IEEE Transactions on Signal Processing,* vol. 58, no. 8, pp. 4436-4441, 2010.
- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING** and Herbert Ho-Ching IU, "Invariant Set of Weight of Perceptron Trained by Perceptron Training Algorithm," *IEEE Transactions on Systems, Man, and Cybernetics¾Part B: Cybernetics*, vol. 40, no. 6, pp. 1521-1530, 2010.
- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING** and Herbert Ho-Ching IU, "Symbolic Dynamical Model of Average Queue Size of Random Early Detection Algorithm," *International Journal of Bifurcation and Chaos*, vol. 20, no. 5, pp. 1415-1437, 2010.
- Charlotte Yuk-Fan HO and **Bingo Wing-Kuen LING**, "Initiation of HIV," I*nternational Journal of Bifurcation and Chaos*, vol. 20, no. 4, pp. 1279-1292, 2010.
- Xiangjun LI, Xinghuo YU, Changhong WANG and **Bingo Wing-Kuen LING**, "Periodic Input Response of a Second-Order Digital Filter with two's Complement Arithmetic," *IEEE Transactions on Circuits and Systems¾II: Express Briefs*, vol. 56, no. 3, pp. 225-229, 2009.
- Ryan C. LOXTON, Kok-Lay TEO, Volker REHBOCK and **Bingo Wing-Kuen LING**, "Optimal Switching Instants for a Switched-Capacitor DC/DC Power Converters," *Automatica*, vol. 45, no. 4, pp. 973-980, 2009.
- Alex C. H. LEE, Daniel S. ELSON, Mark A. NEIL, Sunil KUMAR, **Bingo Wing-Kuen LING**, Fernando ELLO and George B. HANNA, "Solid-State Semiconductors Are Better Alternatives to Arc-Lamps for Efficient And Uniform Illumination in Minimal Access Surgery," *Surgical Endoscopy*, vol. 23, no. 3, pp. 518-526, 2009.
- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING**, Yan-Qun LIU, Peter Kwong-Shun TAM and Kok-Lay TEO, "Optimal PWM Control of Switched-Capacitor DC-DC Power Converters via Model Transformation and Enhancing Control Techniques," *IEEE Transactions on Circuits and Systems¾I: Regular Papers*, vol. 55, no. 5, pp. 1382-1391, 2008. (Citation: 4)
- Hak Keung LAM, **Bingo Wing-Kuen LING**, Herbert Ho-Ching IU and Steve Sai-Ho LING, "Synchronization of Chaotic Systems Using Time-Delayed Fuzzy State-Feedback Controller," *IEEE Transactions on Circuits and Systems¾I: Regular Papers*, vol. 55, no. 3, pp. 893-903, 2008. (Citation: 2)

- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING**, Zhi-Wei CHI, Mohammad SHIK-BAHAEI, Yan-Qun LIU and Kok-Lay TEO, "Design of Near Allpass Strictly Stable Minimal Phase Real Valued Rational IIR Filters," *IEEE Transactions on Circuits and Systems¾II: Transactions Briefs*, vol. 55, no. 8, pp. 781-785, 2008.
- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING** and Peter Kwong-Shun TAM, "Representations of Linear Dual Rate System via Single SISO LTI Filter, Conventional Sampler and Block Sampler," *IEEE Transactions on Circuits and Systems¾II: Transactions Briefs*, vol. 55, no. 2, pp. 168-172, 2008.
- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING**, Hak-Keung LAM and Muhammad H U NASIR, "Global Convergence and Limit Cycle Behavior of Weights of Perceptron," *IEEE Transactions on Neural Networks*, vol. 19, no. 6, pp. 938-947, 2008. (citation: 1)
- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING**, Yan-Qun LIU, Peter Kwong-Shun TAM and Kok-Lay TEO, "Optimum Design of Discrete-time Differentiators via Semi-infinite Programming Approach," *IEEE Transactions on Instrumentation and Measurement*, vol. 57, no. 10, pp.2226-2230, 2008.
- Hak Keung LAM and **Bingo Wing-Kuen LING**, "Sampled-Data Fuzzy Controller for Continuous Nonlinear Systems," *IET Proceedings: Control Theory and Applications*, vol. 2, no. 1, pp. 32-39, 2008. (Citation: 1)
- J. H. C. NGA, Herbert Ho-Ching IU, **Bingo Wing-Kuen LING** and Hak-Keung LAM, "Analysis and Control of Bifurcation and Chaos in Averaged Queue Length in TCP/RED Model," *International Journal of Bifurcations and Chaos*, vol. 18, no. 8, pp. 2449-2459, 2008.
- Hak-Keung LAM and **Bingo Wing-Kuen LING**, "Computational Effective Stability Conditions for Time-Delay Fuzzy Systems," *International Journal of Fuzzy Systems*, vol. 10, no. 1, pp. 321-330, 2008.
- Charlotte Yuk-Fan HO, Tai-Chiu HSUNG, Daniel Pak-Kong LUN, **Bingo Wing-Kuen LING**, Peter Kwong-Shun TAM and Wan-Chi SIU, "Regularity Scalable Image Coding Based on Wavelet Singularity Detection," *International Journal of Image and Graphics*, vol. 8, no. 1, pp. 109-134, 2008.
- Charlotte Yuk-Fan HO and **Bingo Wing-Kuen LING**, "Can a Second Order Bandpass Sigma Delta Modulator Achieve High Signal-to-Noise Ratio for Lowpass Inputs," *Chaos, Solitons and Fractals*, vol. 37, pp. 928-930, 2008.
- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING** and Joshua D. REISS, "Difference between Irregular Chaotic Patterns of Second-Order Double-loop SD Modulators and Second-Order Interpolative Bandpass SD Modulators," *Chaos, Solitons and Fractals*, vol. 33, no. 5, pp. 1777-1782, 2007.
- **Bingo Wing-Kuen LING**, Charlotte Yuk-Fan HO and Peter Kwong-Shun TAM, "Chaotic Filter Bank for Computer Cryptography," *Chaos, Solitons and Fractals*, vol. 34, no. 3, pp. 817-824, 2007.
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- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING**, Blasi S. GIOVANNI, Zhi-Wei CHI and Wan-Chi SIU, "Single Step Optimal Block Matched Motion Estimation with Motion Vectors Having Arbitrary Pixel Precisions," I*nternational Symposium on Communication Systems, Networks, and Digital Signal Processing, CSNDSP*, pp. 364-374, 21-23 July, 2010. (Newcastle).
- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING**, Herbert Ho-Ching IU, Hak-Keung LAM and Ornifer Ekwalanga EKOZE, "Asymptotical Stability of Random Early Detection Algorithm for Internet Congestion Problem," *The 2nd International Conference on Information and Systems Sciences*, ICISS, December, 2008. (Dalian).
- J. H. C. NGA, Herbert Ho-Ching IU, **Bingo Wing-Kuen LING** and Hak-Keung LAM, "Control of Bifurcation and Chaos in TCP/RED Model," *The 2nd International Conference on Information and Systems Sciences*, ICISS, December, 2008. (Dalian).
- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING** and Zhi-Wei CHI, "Linear Phase FIR Two-Channel Uniform Maximally Decimated Modulated Filter Bank Design via a Weightless Multi-Criterion Functional Inequality Constrained Optimization Approach," *The 2nd International Conference on Information and Systems Sciences*, ICISS, December,

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- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING**, Muhammad Habib Ullah NASIR, Hak-Keung LAM and Herbert H. C. IU, "Characterization of Set of vectors Represented by Lattices," *International Symposium on Communication Systems, Networks, and Digital Signal Processing*, CSNDSP, pp. 711-715, July, 2008. (Graz).
- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING**, Muhammad Habib Ullah NASIR, Hak-Keung LAM and Herbert H. C. IU, "Properties of an Invariant Set of Weights of Perceptrons," *International Joint Conference on Neural Networks*, IJCNN, pp. 1630-1635, June, 2008. (Hong Kong).
- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING**, Hak-Keung LAM, Thomas Pak Lin WONG, Albert Yick Po CHAN, and Peter Kwong-Shun TAM, "Fuzzy Rule Based Multiwavelet ECG Signal Processing," *International Conference on Fuzzy Systems*, IEEE-FUZZ, pp. 1064-1068, June, 2008. (Hong Kong).
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- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING**, Hak-Keung LAM and Muhammad H. U. NASIR, "Boundedness of Weighted Coefficients of Perceptron Learning Algorithm and Global Convergence of Fixed Point and Limit Cycle Behaviors," *Shanghai International Symposium on Nonlinear Science and Application,* pp. 58-63, June, 2007. (Shanghai).
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- **Bingo Wing-Kuen LING**, Charlotte Yuk-Fan HO, Xinghuo YU and Joshua D. REISS, "Nonlinear Behaviors of Bandpass Sigma Delta Modulators with Stable System Matrices," *International Conference of Acoustics, Speech and Signal Processing*, ICASSP, vol. 4, pp. 73-76, March, 2005. (Philadelphia).
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- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING**, Yan-Qun LIU, Peter Kwong-Shun TAM

and Kok-Lay TEO, “Optimum Nonuniform Transmultiplexer Design,” *International Conference on Neural Networks and Signal Processing*, ICNNSP, pp. 740-743, December, 2003. (Nanjing, China.) *(Invited Special Session)*

- Charlotte Yuk-Fan HO, **Bingo Wing-Kuen LING** and Peter Kwong-Shun TAM, “Denoising by Multiwavelet Singularity Detection,” *International Conference on Neural Networks and Signal Processing*, ICNNSP, pp. 616-619, December, 2003. (Nanjing, China.) *(Invited Special Session)*
- **Bingo Wing-Kuen LING**, Charlotte Yuk-Fan HO and Peter Kwong-Shun TAM, “Nonlinear Behaviors of Second-Order Digital Filters with Two’s Complement Arithmetic,” *The 4th ACM Postgraduate Research Day*, pp. 21-30, January, 2003. (Hong Kong).
- **Bingo Wing-Kuen LING** and Peter Kwong-Shun TAM, "Edge Detection Using Fuzzy Switch," *SPIE Symposium¾Image Processing: Algorithms and Systems*, pp.323-333, January, 2002. (San Jose, U.S.A.)
- **Bingo Wing-Kuen LING** and Peter Kwong-Shun TAM, "Closed Boundary Extraction of Cancer Cells Using Fuzzy Edge Linking Technique," *SPIE Symposium¾Image Processing: Algorithms and Systems*, pp. 43-54, January, 2002. (San Jose, U.S.A.)
- **Bingo Wing-Kuen LING** and Peter Kwong-Shun TAM, "Piecewise Periodized Wavelet Transform and Its Realization, Properties and Applications," *The Second International Conference on Wavelet Analysis and Its Applications*, ICWAA, pp. 398-403, December, 2001. (Hong Kong)
- **Bingo Wing-Kuen LING** and Peter Kwong-Shun TAM, "Set of Perfect Reconstruction Non-Uniform Filter Banks via a Tree Structure," *The Second International Conference on Wavelet Analysis and Its Applications*, ICWAA, pp. 341-346, December, 2001. (Hong Kong)
- **Bingo Wing-Kuen LING** and Peter Kwong-Shun TAM, "Set of Decimators for Tree Structure Filter Banks," *The Second International Conference on Wavelet Analysis and Its Applications*, ICWAA, pp. 336-340, December, 2001. (Hong Kong)
- **Bingo Wing-Kuen LING** and Peter Kwong-Shun TAM, "Realization of Perfect Reconstruction Non-Uniform Filter Banks via a Tree Structure," *The Second International Conference on Wavelet Analysis and Its Applications*, ICWAA, pp. 331-335, December, 2001. (Hong Kong)
- **Bingo Wing-Kuen LING** and Peter Kwong-Shun TAM, "Simple and Fast Subband De-Blocking Technique by Discarding the High Band Signals," *The Second International Conference on Wavelet Analysis and Its Applications*, ICWAA, pp. 44-48, December, 2001. (Hong Kong)
- **Bingo Wing-Kuen LING** and Peter Kwong-Shun TAM, "Reduction of Blocking Artifacts in Both Spatial Domain and Transformed Domain," *The Second International Conference on Wavelet Analysis and Its Applications*, ICWAA, pp. 37-43, December, 2001. (Hong Kong)
- **Bingo Wing-Kuen LING** and Peter Kwong-Shun TAM, "Video Denoising Using Fuzzy-Connectedness Principles," *International Symposium on Intelligent Multimedia, Video and Speech Processing*, ISIMP, pp. 531-534, May, 2001. (Hong Kong) (Citation: 4)
- **Bingo Wing-Kuen LING** and Peter Kwong-Shun TAM, "Fast Implementation of a General L/M Rate Changer by a Filter Bank Structure," *International Symposium on Intelligent Multimedia, Video and Speech Processing*, ISIMP, pp. 236-238, May, 2001. (Hong Kong)
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- **Bingo Wing-Kuen LING** and Peter Kwong-Shun TAM, "Effect of Non-Polynomial Input to a Switching Circuit," *Student Conference of Research and Development*, SCOReD, pp. 84-87, February, 2001. (Kuala Lumpur, Malaysia)
- **Bingo Wing-Kuen LING** and Peter Kwong-Shun TAM, "Stabilization of (L,M) Shift Invariant Plant," *Student Conference of Research and Development*, SCOReD, pp. 208-209, February, 2001. (Kuala Lumpur, Malaysia
- **Bingo Wing-Kuen LING** and Bing ZENG, "A Novel Method for Blocking Effect Reduction in DCT-Coded Images," *International Symposium on Circuits and Systems*, ISCAS, pp. 46-49, vol. 4, May, 1999. (Orlando, U.S.A.)

9 Dr Colin Dowding – Lecturer in Mechanical Engineering

Dr Colin Dowding joined us as Lecturer in Mechanical Engineering in December 2010. His research interests centre on the control of laser ablation generated debris during laser machining; thus, offering increased performance during machining and removing the need for post-process cleaning following manufacture. Furthermore, the use of such immersion techniques allows the potential of controlling ablation performance independent of laser parameters.
He read for a Ph.D. at Loughborough University: 'The Characteristics and Feasibility Of An In-Line Debris Control Technique For KrF Excimer Laser Ablative Micromachining'. Supervised by Dr. Jonathan Lawrence and funded by a university school bursary, which resulted in publication of 7 journal papers and a total of 5 presentations at 2 international conferences (ICALEO 2008 & 2009). He also gained a BEng (Hons) Mechanical Engineering at Loughborough University which was a 4 year sandwich course with 1 year mandatory industrial placement.

Academic Awards and Funding

- £1275; 2010; Post Doctoral Travel Grant: Retrospectively awarded for my travel and contribution to ICALEO 2009. Awarded by *The Royal Society*, based upon my publication record and my activities at ICALEO.
- £73,250; HEFCE Research Capital Fund (RCF): I was involved in the application processed for a grant awarded to purchase and install an Excimer Laser micromachining centre for the Wolfson School Annex.

Book Chapters

- **Dowding, C. F.**, "Laser Ablation" In Eds. Lawrence, J., Pou, J., Low, D. K. Y., Toyserkani, E. Advances in laser materials processing technology, 2010, *Woodhead Publishing*, Cambridge, UK.

Journal Papers

- **Dowding, C. F.**, Lawrence, J. "Use of thin laminar liquid flows above ablation area for control of ejected material during excimer machining", *Proceedings of the Institution of Mechanical Engineers Part B: Journal of Engineering Manufacture*, 2009, 223 (7) pp.759-775.
- **Dowding, C. F.**, Lawrence, J. "Impact of open de-ionized water thin film laminar immersion on the liquid immersed ablation threshold and ablation rate of features machined by KrF excimer laser ablation of bisphenol A polycarbonate", *Optics and Lasers in engineering*, 2009, 47 (11) pp.1169-1176.
- **Dowding, C. F.**, Lawrence, J. "Effects of closed immersion filtered water flow velocity on the ablation threshold of bisphenol A polycarbonate during excimer laser machining", *Applied Surface Science*, 2010, 256 (12), pp.3705-3713.
- **Dowding, C. F.**, Lawrence, J. "Ablation debris control by means of closed thick film filtered water immersion", *Proceedings of the Institution of Mechanical Engineers Part B: Journal of Engineering Manufacture*, 2010, 224 (5), pp.753-768.
- **Dowding, C. F.**, Lawrence, J. "Topography of features machined into bisphenol A polycarbonate using closed thick film flowing filtered water immersed KrF excimer laser ablation.", *Lasers in Engineering*. In Print.
- **Dowding, C. F.**, Lawrence, J. "The impact of medium chemistry to flowing liquid closed immersion ablation of bisphenol A polycarbonate", *Lasers In Engineering.* In Print.
- **Dowding, C. F.,** Lawrence, J. "Excimer laser machining of bisphenol A polycarbonate under closed immersion filtered water with varying flow velocities and the effects thereof on etch rate", *Proceedings of the Institution of Mechanical Engineers Part B: Journal of Engineering Manufacture.* In Print
- **Dowding, C. F.**, Lawrence, J. "Analysis of beam modification caused by the closed thick film immersed KrF excimer laser ablation technique", *Optics and Laser Technology*. Accepted for publication 18th October 2010.

Conference Papers

- **Dowding, C. F.** and Lawrence, J. "Use of thin laminar liquid flows above ablation area for control of ejected material during excimer machining", T*he proceedings of The 27th International Congress on Application of Lasers and Electro-Optics: Laser Materials Processing Section*, Temecula, CA, Laser Institute of America, 20th-23rd October 2008, pp.872-880.
- **Dowding, C. F.**, and Lawrence, J. Analysis of the excimer laser ablation characteristics of bisphenol A polycarbonate in ambient air and under thin film laminar flow water immersion. *The proceedings of The 27th International Congress on Application of Lasers and Electro-Optics: Laser Materials Processing Section*, Temecula, CA, Laser Institute of America, 20th-23rd October 2008, pp.202-211.
- **Dowding, C. F.**, and Lawrence, J. "Impact Of Closed Thick Film Flowing Filtered Water Immersion On Krf Excimer Laser Ablation Characteristics", *The proceedings of The 28th International Congress on Application of Lasers and Electro-Optics: Laser Materials Processing Section*, Orlando, FL, Laser Institute of America, 2nd – 5th November 2009. pp.
- **Dowding, C. F.**, and Lawrence, J. "Use Of Enclosed Thin Laminar Liquid Flows Above Ablation Area For Control Of Ejected Material During Excimer Machining", *The proceedings of The 28th International Congress on Application of Lasers and Electro-Optics: Laser Materials Processing Section*, Orlando, FL, Laser Institute of America, 2nd – 5th November 2009. pp.893-902.

10 Richard Allarton – Senior Lecturer in Gas Turbines

Richard Allarton received an MSc, Computer Network Engineering and Bsc(hons), Computer Studies from Sheffield Hallam University subsequent to Aircraft Apprenticeship, No1 School of Technical Training, RAF Halton (1974-1977). Previously he was Research and Teaching Fellow – High Integrity Systems Engineering group, The Department of Computer Science, The University of York (2005-2010). He has also held the posts of: AWACS Mechanical Projects Manager andAWACS Airframe Trade Manager – RAF Waddington, Senior Propulsion Instructor – RAF Harrier Maintenance School, Engineering Manager / Mentor – RAF College, Cranwell, Engineering Supervisor – RAF Marham/RAF Binbrook/RAF Wildenrath/RAF Finningley/ (1977-1992)

11 Dr David Waugh EPSRC Research Fellow: Feasibility Study into Harvesting the Kinetic Energy from Landing Aircraft

- EPSRC funded project EP/H004351/1: *Feasibility Study, Energy Recovery from Landing Aircraft. (PI: Prof. P. Stewart).*

Academic Awards and Funding

- Institute of Physics C.R.Barber Travel Fund 2008 (£175)
- R.A.Eng. Travel Grant 2009 (£600)
- John Guest Phillips Award 2009 (£500)
- R.A.Eng. Travel Grant 2010 (£500)
- Wolfson Travel Grant 2010 (£200)
- Institute of Physics Research Student Conference Fund 2010 (£200).

Books

Waugh D.G., Lawrence, J. (late 2011) Laser Surface Treatment of Biomaterials: Wettability characteristics and osteoblast cell response modulation on nylon 6,6, *Old City Publishing*. **Planned for late 2011**.

Journal Papers

- **Waugh D.G.**, Lawrence, J., CO2 laser surface patterning of nylon 6,6 and the subsequent effects on wettability characteristics and apatite response, *MAT10 Special Issue, Surface Engineering*, **Accepted 10/12/2010.**

- **Waugh D.G.**, Lawrence J. (2011) The enhancement of biomimetic apatite coatings by means of KrF excimer laser surface treatment of nylon 6,6. *Lasers in Engineering* 21 95-114.
- **Waugh D.G.**, Lawrence J. (2010) On the use of CO2 laser induced surface patterns to modify the wettability of poly(methyl methacrylate) (PMMA). *Optics and Lasers in Engineering* 48 707-715.
- **Waugh D.G.**, Lawrence J., Walton C.D., Zakaria R.B. (2009) On the effects of using CO2 and F2 lasers to modify the wettability of a polymeric biomaterial. *Optics and Laser Technology* 42 347-356
- **Waugh D.G.**, Lawrence J., Morgan D.J., Thomas C.L. (2009) Interaction of CO2 laser-modified nylon with osteoblast cells in relation to wettability. *Materials Science and Engineering C* 29 2514-2524.

Conference Papers

- **Waugh D.G.**, Lawrence J. (2011) Generic parameters governing the wettability characteristics of laser-modified polymers. *ICALEO 2011*, Orlando, Florida, USA. **To be Submitted.**
- **Waugh D.G.**, Lawrence J. (2011) Modulation of osteoblast cell response through laser surface processing of nylon 6,6. *ICALEO 2011*, Orlando, Florida, USA. To be Submitted.
- **Waugh D.G.**, Lawrence J. (2010) Using UV laser surface treatment to modify the wettability of polyamide 6,6 and its effects on cytotoxicity and alkaline leukocyte phosphatase activity of osteoblast cells. *ICALEO 2010*, Anaheim, CA, USA.
- **Waugh D.G.**, Lawrence J. (2010) CO2 whole area irradiative processing and patterning of nylon 6,6 and the effects thereof on osteoblast cell response in relation to wettability. *ICALEO 2010*, Anaheim, CA, USA.
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- **Waugh D.G.**, Lawrence J. (2008) Wettability characteristics variation of nylon 6,6 by means of CO2 laser generated surface patterns. *ICALEO 2008 Proceedings*, Pechanga, CA, USA Vol 101 61.
- **Waugh D.G.**, Lawrence J., Walton C.D., Zakaria R.B., (2008) Investigation into the efficacy of CO2 lasers for modifying the factors influencing biocompatibility of a polymeric biomaterial in comparison with an F2 excimer laser. *ICALEO 2008 Proceedings*, Pechanga, CA, USA Vol 101 295.

12 Dr Jun Chen EPSRC Research Fellow - Integrating and Automating Airport Operations Project

Book Chapter:

- **J. Chen** and M. Mahfouf (2008): Artificial Immune Systems as a Bio-inspired Optimization Technique and Its Engineering Applications. in Artificial Immune Systems and Natural Computing: Applying complex Adaptive Technologies, Eds. Hongwei Mo, IGI press, 2008.

Refereed Journal Articles:

- **Jun Chen** (2004): The application and analysis of Hook mechanism in WINDOWS. Fenglin Gazette, 2004 1(1): 33-40. ISBN 7-5608-2868-X.

Refereed Conference Papers:

- **J. Chen** and M. Mahfouf (2010): Interpretable Fuzzy Modeling using Multi-Objective Immune Inspired Optimisation Algorithms. 2010 IEEE World Congress on Computational Intelligence, Fuzzy-IEEE 2010, Spain, 2010 (accepted).

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- **J. Chen** and M. Mahfouf (2010): The Best of Both Worlds-Extracting Knowledge from Prediction Models. In IMMPETUS Colloquium 2010, Sheffield.
- **J. Chen** and M. Mahfouf (2009): The best of both worlds-transparent models can lead to accurate predictions too! In IMMPETUS Research Highlight 2009, Sheffield.
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- **J. Chen** and M. Mahfouf (2008): An Immune Algorithm Based Fuzzy Predictive Modeling Mechanism using Variable Length Coding and Multi-objective Optimization Allied to Engineering Materials Processing. In IMMPETUS Colloquium 2008. Sheffield.

Invited Seminar

- **J. Chen** (2009): Multi-objective Optimisation and Fuzzy Systems for Prediction, Bridging the Gaps – deriving knowledge from data for water distribution systems, Sheffield.

Thesis and Dissertation:

- **J. Chen** (2009): Biological Inspired Optimisation Algorithms for Transparent Knowledge Extraction Allied to Engineering Materials Process, Department of Automatic Control and Systems Engineering, The University of Sheffield, Ph.D. Thesis, 2009.
- **J. Chen** (2005): Grey-box Modeling Relating to Subjects under Physical and Mental Stress, Department of Automatic Control and Systems Engineering, The University of Sheffield, MSc. Dissertation, 2005 (2nd best MSc. Dissertation of the year).