

The School of Mechanical, Aerospace and Civil Engineering

Issue 6 – Autumn 2014

Spotlight on:

- Nuclear Fuel Centre of Excellence
- Manufacturing concepts for non-Newtonian products
- The Role of Microbubbles in Sonoporation
- Science on the Big Screen
- Smart H₂O

Source: <http://www.wallpapersas.com/>



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It is a great pleasure to welcome you to the Autumn 14 edition of our research newsletter. In this edition, sustainability features strongly with a whole page dedicated to Tyndall Manchester. Our nuclear research grows from strength to strength and here we highlight the work carried out by Prof Tim Abram, Dr Abbie

Jones and Prof Paul Mummery. We are also delighted to inform you that Prof Lin Li is the University Researcher of the Year. The School continues to grow, it's turnover is now £35M, and the Faculty of Engineering and Physical Sciences has stepped up its investment in people and facilities. In this issue alone we introduce thirteen new members of staff and the School now has over one hundred academics across the mechanical, aerospace, civil engineering, project management and climate change disciplines. As a result we are full to capacity and we are planning a move to a new engineering campus in 2019 together with the Schools of Materials, Chemical Engineering and Electrical Engineering. There will be more about this £353M investment in a future issue.

These newsletters are circulated far and wide in the UK and overseas but we are always trying to extend our reach so we would be grateful if you could pass this newsletter onwards or provide us with new interested contacts. We would also be very interested in your feedback and ideas for future issues. I hope that you enjoy this newsletter and we hope to bring you more exciting research news in 2015.

Professor Andrew Gibson

MEng, PhD (Heriot-Watt), DSc (UMIST), FIET, SMIEEE, FIMechE, C.Eng

Research News

BIS | Department for Business Innovation & Skills

UK Nuclear Fuel Centre of Excellence

The design and manufacture of nuclear fuel provides the UK with a high-value economic activity, as well as making a major contribution to UK energy security. Moreover, as fuel is the one major item of a nuclear power station that is intended to be regularly replaced, improvements in the design and performance of fuel allows a continuous improvement in the safety and efficiency of the power station. In recognition of the importance of nuclear fuel manufacture to the UK, the Department for Business Innovation and Skills has awarded £8M to a collaboration between the University of Manchester and the National Nuclear Laboratory (NNL), in order to establish a UK National Fuel Centre of Excellence (NFCE).



Glove boxes in the NFCE's fuel manufacturing and characterisation lab

£2.5M has been awarded to **Professor Tim Abram** to establish a new fuel manufacturing and characterisation lab at Manchester. This facility, unique within UK academia, will allow the production of small quantities of novel fuel materials containing natural uranium and thorium within a suite of atmosphere-controlled glove-boxes. The lab will provide extensive facilities for materials testing and characterisation, including FEG-SEM with EBSD and EDX, x-ray computer tomography, and x-ray diffractometry. This will complement the existing fuel thermo-physical characterisation lab in Pariser Building. An official launch event for the NFCE was held in Manchester on Monday 13th October.

<http://www.cl.eps.manchester.ac.uk/medialand/mace/multimedia/research/NFCE-article.pdf>



Professor Tim Abram joined the University in 2008 as the first holder of the Westinghouse Chair in Nuclear Fuel Technology.

<http://www.manchester.ac.uk/research/Tim.abram>

Professor Peter Stansby FEng– Osborne Reynolds Chair in Fluid Mechanics



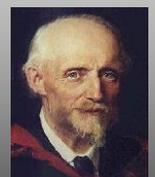
Prof Peter Stansby FEng

A celebration to mark the appointment of Professor Peter Stansby FEng as inaugural Osborne Reynolds Chair in Fluid Mechanics took place on June 24th. His speech was entitled "Hydrodynamics for the modern world". A full profile of Professor Osborne Reynolds can be found on the School's **Hall of Fame** web pages.

Professor Brian Launder FRS spoke about "Osborne Reynolds: His appointment, impact and legacy".

Please visit Professor Stansby's webpage for further information on his research:

<http://www.mace.manchester.ac.uk/people/staff/academic-staff/profile/index.htm?staffid=274>



Prof Osborne Reynolds (1842-1912)

BioEnergy Value Chains

The UK is implementing a major expansion in bioenergy to support its renewable energy and climate policy objectives. Dr Patricia Thornley's newly awarded EPSRC project "Bioenergy value chains: Whole systems analysis and optimisation" project, which is led by Imperial College, aims to support policy makers and industrialists by providing a flexible tool that will help evaluate the environmental, economic and social performance of different bioenergy options in the UK.

Manchester's role will focus on the lifecycle, techno-economic and socio-technical evaluation of biomass value chains associated with a material level of bioenergy in the UK.

<http://www.supergen-bioenergy.net/home/Research%20Projects/Bioenergy%20value%20chains:%20Whole%20systems%20analysis%20and%20optimisation>



Andrew Welfle receives University of Manchester Distinguished Achievement Medal for Postgraduate of the Year

The award is made on the recommendation of staff and students within the University, particularly the School of MACE, in recognition of the considerable contribution he has made to the life of the University. In addition, the Faculty panel was very impressed by the sheer breadth of Andrew's engagement across the university.

Andrew's PhD project, carried out within the Tyndall Centre for Climate Change Research, focussed on Bioenergy, Resource Modelling and Energy Scenarios. From his thesis, three research papers will be published in international peer-reviewed journals.



Andrew Welfle

New Report: High Seas, High Stakes

Avoiding dangerous levels of climate change requires a radical rethink of the shipping system, according to a new report "High Seas, High Stakes" released by academics at the Tyndall Centre for Climate Change Research.

If global shipping is to make its fair contribution to avoiding the 2°C of warming associated with dangerous climate change, CO₂ emissions need to be cut within the next decade and fall by at least 80% by 2050 compared to 1990 levels.

The report's findings highlight that much more needs to be done to even just curb the rate of growth in emissions, with slow-steaming – where ships run at lower speeds during their voyages in order to reduce fuel burn – an essential part of the push towards cutting CO₂.

One high profile policy area currently in the minds of the shipping industry is how to cut the sulphur content of fuels. New regulations that encourage the uptake of fuels that are lower in sulphur, such as low sulphur diesel, may ultimately release higher levels of CO₂. This new report covers research completed under the Engineering and Physical Sciences Research Council (EPSRC) project entitled 'High Seas', led by Dr Alice Bows-Larkin in the School of Mechanical, Aerospace and Civil Engineering at the University of Manchester. The project aimed to devise new methods and models for quantifying the CO₂ emissions from the shipping sector, with a focus on UK imports and exports. It also had within its remit to identify technical, operational and demand-side changes necessary to decarbonise the shipping system, as well as investigate practical barriers to implementation.

"What was most striking when doing this research, particularly when compared with previous studies on decarbonising other sectors like aviation, is the wealth of opportunities available for reducing CO₂ from shipping", said Dr Alice Bows-Larkin, University of Manchester. "The problem with cutting CO₂ in the shipping sector is that the system is so complex that influencing change becomes the greatest challenge, even if the political will were there."

Full Report ['High Seas, High Stakes'](#)



New study identifies diverse examples of low-carbon human development

One of Tyndall Manchester's PhD researchers, [William Lamb](#), and colleagues have published a paper that shows that nations with different drivers of CO₂ can have low levels of emissions per capita as well as high levels of life expectancy. Clearly, no two countries are the same, with diverse challenges for decarbonisation. Underlying factors such as cold climates, patterns of trade and industrial output may all hinder low-carbon transitions. However, these new results raise expectations that many nations can nevertheless achieve high levels of human development without the need for ever increasing CO₂ emissions.

Full Paper [Transitions in pathways of human development and carbon emissions](#)

A case study of UK wheat production under climate change constraints



A new paper by [Mirjam Roeder](#), [Patricia Thornley](#), [Alice Bows-Larkin](#) and colleagues, highlighting wheat production and climate change constraints, is published in [Environmental Science & Policy](#). The paper [Emissions associated with meeting the future global wheat demand: A case study of UK production under climate change constraints](#) looks at the conflicts between adapting agricultural production to climate change, food security and reducing emissions. It provides lifecycle assessments for different wheat production options and discusses increasing total production emissions and that consumption-based inventories would be supportive for global food security.

Tyndall Manchester academics write to The Guardian in response to letter claiming that Lancashire's shale gas can fill UK energy gap

[Prof Kevin Anderson](#) and [Dr John Broderick](#) responded to a letter published in [The Guardian](#), countersigned by 50 geoscience academics, claiming that shale gas development in the UK would have "undeniable" economic, environmental and security benefits.

Full Article: ['Fossil fuels, research funding and academic independence'](#)

Follow Prof Kevin Anderson on Twitter: <https://twitter.com/KevinClimate>



Grants & Awards

WISE-UP to Climate

[Professor Julien Harou](#) is participating in a global partnership that is working on the WISE-UP to Climate project and will demonstrate natural infrastructure as a 'nature-based solution' for climate change adaptation and sustainable development. The project is funded by the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

The project's name stands for 'Water Infrastructure Solutions from Ecosystem Services Underpinning Climate Resilient Policies and Programmes'. The objective is to develop knowledge on how to use portfolios of built water infrastructure (eg. dams, levees, irrigation channels) and natural infrastructure (eg. wetlands, floodplains, watersheds) for poverty reduction, water-energy-food security, biodiversity conservation, and climate resilience. WISE-UP will run over a four-year period (2013-2017) and links ecosystem services more directly into water infrastructure development, starting with work in the Tana (Kenya) and Volta (Ghana-Burkina Faso) river basins.

http://www.iucn.org/about/work/programmes/water/wp_our_work/wise_up_to_climate/



From left to right: Dr Evgenii Matrosov, Mr Akwasi Opong-Fosu (Ghanian Minister for Environment, Science and Technology) and Prof Julien Harou

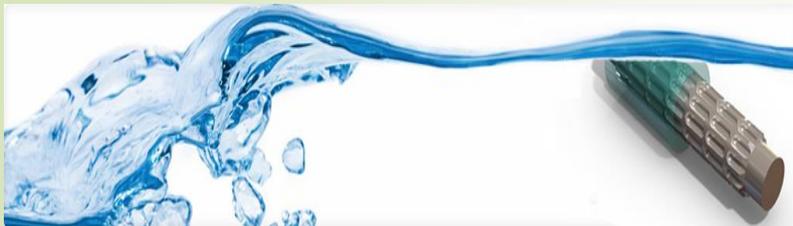
Manufacturing Process Simulations

[Dr Rob Prosser](#) has been awarded an EPSRC grant entitled "In silico evaluation of manufacturing concepts for non-Newtonian products".

The main aim of the work is to establish the optimal geometric configuration for a Controlled Deformation Dynamic Mixer (CDDM). The project will seek to understand the unique flow dynamics found inside the mixer itself and, through that understanding, improve the quality of the mixture that the device produces.

The work is of considerable academic interest as the evolving rheology represents an application of multiphysics; it couples together CFD, rheology and (in the longer term) meso-scale modelling. The wider goal of the project is to accelerate the introduction of new and better products into the market by the simulation of manufacturing processes for complex multiphase liquid products for fast moving consumer goods (FMCG). The project further unifies computational fluid dynamics (CFD), rapid prototyping (RP) and experimental evaluation.

<http://gow.epsrc.ac.uk/NGBOViewGrant.aspx?GrantRef=EP/M506795/1>



An atomistic polyethylene chain and its course-grain representation

SmartH₂O

Società Elettrica Sopracenerina (SES) is a power utility based in Locarno, which has already run a test on multi-utility (water, gas and electricity) smart metering in Gambarogno, on the shores of Lake Maggiore. SES is interested in developing innovative metering techniques for electricity, gas and water, and the vision is to make the customer an active and self-aware actor in the rational use of water and energy.

[Prof Julien Harou](#) is collaborating with SES on the SmartH₂O project. SES will install 400 smart meters in selected locations in the Locarno region. A first batch is expected to be installed during Autumn 2014 and a another one during the Winter. Smart H₂O will proactively engage citizens by means of cooperative awareness tools, such as water consumption profiling and feedback, persuasive games for behaviour change, and computer-supported community work. Results will be deployed in two challenging use cases, in London (UK) and Locarno (CH), potentially reaching millions of users.

<http://www.smarth2o-fp7.eu/>

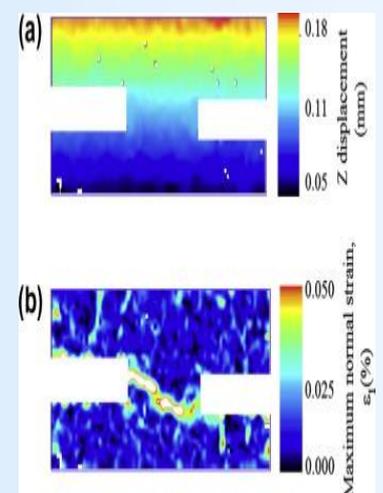


Influence of creep and geometry on strength of irradiated graphite components

[Professor Paul Mummery](#) has been awarded an Innovate UK (aka TSB) grant to the value of £ 469K. In collaboration with EdF and the National Nuclear Laboratory, this project looks to get a greater understanding of crack growth and stress analysis of the core and assesses the graphite properties which degrade through lifetime operation.

The structural integrity of nuclear graphite is fundamental to the continued safe operation of the UK's nuclear fleet which provides about 20% of the UK's electrical energy. The safety assessments performed by the Licencees are used to justify continued operation to the Office for Nuclear Regulation. This project may ultimately lead to improved structural integrity assessment methods that will more accurately define the margins of continued safe operation, enabling reliable life extension of the current nuclear fleet. In particular, the behaviour of materials that have been in reactors for long lifetimes will be assessed. The impact of the work is both socioeconomic and scientific. By increasing the lifetime of existing AGRs, and thus securing the supply of low-carbon electric power, the project will benefit the whole of the UK population. The research also helps industry plan for growth, stimulate the economy, establish a cap on energy price rises for the population and aids the Government's Climate Change obligations.

Figure: Visualisation of the crack following DVC analysis (a) contour of z displacement (i.e. perpendicular to notch plane) in the γ -z plane at $x = 3$ mm from the tip of the notch and (b) contour of maximum normal strain at the same position



***the* PACIFIC (but not as you know it)**

From the earliest days of nuclear power, the UK established an authoritative and world-leading research capability across almost all of the nuclear fuel cycle. This capability waned during the 1990s, but in its recent Long-Term Nuclear Energy Strategy (BIS-13-360), the Government has acknowledged the importance of reinvigorating research in this crucial field. EPSRC has also recognised the importance of growing academic capability in the nuclear fuel cycle, and has awarded a £3M grant to the PACIFIC project: a consortium of 12 leading UK Universities and 5 industry partners, led by Professor Tim Abram at Manchester. For the first time in a major UK academic research programme, the two themes of Nuclear Fuel and Nuclear Separations Technology are being integrated into a single co-ordinated programme to deliver world-class research into the manufacture, performance, and recycle of current and advanced nuclear fuels.

The Fuels Theme

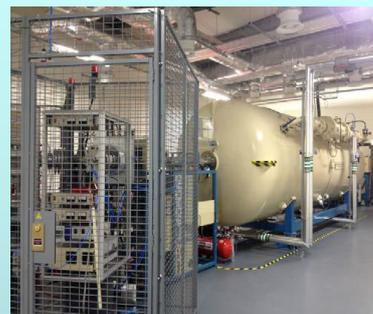
In the Fuels Theme, the aim is to provide a scientific and technological underpinning to understanding the damage mechanisms that occur in nuclear fuel and cladding materials throughout their operational life and during storage. The nuclear fuels research will make extensive use of the new experimental facilities within the Nuclear Fuel Centre of Excellence at Manchester and NNL, as well as the ion-beam and gamma irradiation capabilities of Manchester's Dalton Cumbria Facility.

The Separations Theme

In the Separations theme, the project's aim is to develop an integrated reprocessing flow-sheet capable of providing a product suitable for fast reactor fuels. PACIFIC will link the two themes by considering the conversion of recycled materials back to new nuclear fuel, and will develop the fundamental molten salt technology to take the product from a current PUREX reprocessing plant and convert it efficiently through direct reduction to metal. As well as process optimization, the research will also consider aspects such as proliferation resistance, waste minimization, decontamination, and immobilization of wastes.

<http://www.cl.eps.manchester.ac.uk/medialand/mace/multimedia/research/PACIFIC-article.pdf>

<http://gow.epsrc.ac.uk/NGBOViewGrant.aspx?GrantRef=EP/L018616/1>



The Pelletron 5 MV tandem ion beam accelerator at Manchester's Dalton Cumbria Facility

Microbubbles

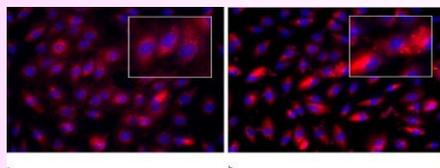
The EPSRC have awarded Dr Steven Lind £ 95K under the First Grant Scheme for his research into microbubbles. For over 100 years the damaging capabilities of collapsing bubbles and cavities have been known. Originally, the focus of research was on maritime applications (ie water), but today the fields of interest are far more wide ranging. In recent years, there has been a great deal of interest in sonoporation - the process of increasing cell permeability through the application of ultrasound to enable the delivery of large molecules, such as genes and drugs, to cells for the purposes of gene therapy or cancer treatment.

A detailed study of the interaction of multiple bubbles with adjacent cellular matter is extremely difficult to perform experimentally, especially within *in vivo* environments. To aid a complete understanding of the fluid mechanical processes involved, this research project will develop a computational modelling tool capable of providing robust and accurate quantitative predictions of bubble dynamics relevant to the sonoporation process.

For further information:

<http://gow.epsrc.ac.uk/NGBOViewGrant.aspx?GrantRef=EP/L011549/1>

Figure: Uptake of red fluorescent nanospheres by cultured H9C2 myocardial cells after exposure to (a) nanospheres and (b) microbubbles loaded with nanospheres. Nucleus: blue staining; nanospheres: red staining. Copyright 2014 European Society of Cardiology



Wind Turbines



Dr Jyoti K. Sinha has been awarded an EPSRC IAA grant of £154,809 (24 months) for the Development of an Integrated Combined Approach for Operational Fatigue Life and Condition Monitoring for EDF UK Wind Turbine towers and foundations.

The project commenced 1st August 2014 and is due to finish in July 2016. The project will enable EDF to predict degradation in turbine structures, hence failure avoidance is a key benefit.

It is important to note that the cost per turbine of extending the lifespan of the wind farm by one year would be approx. £150,000, while the additional revenue generated per turbine for one year would be approx. £1,000,000 (yield value).

Turbine Governor Valves

Recently Dr Jyoti K. Sinha and Dr Alistair Revell have been awarded a TSB grant of £174,336 (30 months) for the research project "To embed and exploit capability enabling early stage fault detection in main turbine governor valves to prevent failures by development of condition monitoring technology and standard test procedures". Costs associated with the valve failures are associated with loss of generation while repairs are made and the cost of repairs themselves. EDF expects a minimum of 2 failures per year, this project will eliminate these failures and allow benefits from the increased on load time. This is estimated to have a value to the company in excess of £3M per annum. The development research involves both CFD analysis and *in-situ* vibration measurements of the governor valves.

Novel Thermal Treatment of Irradiated Graphite

This TSB funded project (£307K) is focused on the research and development which is required to underpin a new, innovative, approach for the management of the UK's large volume of irradiated graphite (136,000 m³) which is approximately 30% of the total inventory of the UK's Intermediate Level Waste.

The method will reduce the volume of graphite material to be stored by 90-95%. This will achieve a significant reduction in costs for encapsulation, interim storage and disposal and, because the approach can be applied in the near future, would provide the key to achieving Early Final Site Clearance of graphite moderated reactors.

The three industrial organisations involved in this consortium are Costain, Tetronics and Mdecon. The Principal Investigator in the School is Dr Abbie Jones.



It's time to do things differently ...

Recent Appointments

Dr Imran Afgan

Lecturer in Marine Energy



Dr Afgan completed his BSc in Mechanical Engineering from GIKI Pakistan in 1999. After working in R&D for a few years, he secured the Higher Education Commission fellowship

for doctoral studies at UMIST. He completed his PhD in Mechanical Engineering (LES and Turbulence Modelling) in 2007 and returned to Pakistan to teach at the postgraduate institute of IAA at Air University Islamabad. Later he worked for 2 years as a researcher at Electricite de France R&D and Université Pierre et Marie CURIE on uncertainty quantification in CFD.

He joined back The University of Manchester in May 2011 and is now working on HPC in nuclear (KNOO-II) and renewable energy (ReDAPT) sectors.

<http://www.mace.manchester.ac.uk/people/staff/academic-staff/profile/index.htm?staffid=639>

Dr Andrea Bottacin-Busolin

Lecturer in Water Engineering

Dr Bottacin-Busolin has an MSc in Environmental Engineering and a PhD in Civil and Environmental Engineering Sciences from the University of Padua, Italy.



After completing his PhD studies, he worked for a year as a private engineering consultant specializing in hydraulic engineering services and micro-hydropower technologies. He later joined the Royal Institute of Technology (KTH), Stockholm, where he served as Assistant Professor until taking up his current appointment in 2014.

His research addresses topics in environmental fluid mechanics, hydrology and water resources management, and focuses on the modelling of mixing and transport processes in surface waters. He has also carried out research on the operation of high-head hydropower systems in collaboration with SMHI, Vattenfall, Fortum and Swedish local authorities.

<http://www.mace.manchester.ac.uk/people/staff/academic-staff/profile/index.htm?staffid=709>

Mrs Helen Dobson

Lecturer in Project Management



Mrs Helen E. Dobson is a graduate Chemical and Environmental Engineer. She joined academia in 2000 from the petrochemicals industry, where her responsibilities included ensuring environmental regulatory compliance, developing site improvement projects and health and safety (risk management).

Employed by UMIST and then by the University of Manchester in a teaching focused-role, Helen has been involved in educating interdisciplinary cohorts of students at all levels in environmental management and technology and sustainable development. She has now joined the "Project Management & Sustainability" Group in the School and she also contributes to several sustainability committees and initiatives for the University as a whole.

<http://www.mace.manchester.ac.uk/people/staff/academic-staff/profile/index.htm?staffid=545>

Dr Steven Lind

Lecturer in Smooth Particle Hydrodynamics

Dr Lind read mathematics and physics at the University of Bath before completing a PhD in applied mathematics at Cardiff University. He held research and teaching positions at the University of Manchester and MMU prior to his appointment as a lecturer in MACE in 2014.

Dr Lind was recently awarded an EPSRC grant with the title "Determining the Role of Microbubbles in Sonoporation through Numerical Simulations" (see page 4 of this Research Newsletter) .

<http://www.manchester.ac.uk/research/steven.lind/>



Dr Nick Bojdo

Honorary Lecturer in Aerospace Engineering



Dr Bojdo's expertise is in modelling and simulation of fluid flows, with particular application to particle transport, porous media, and gas-turbine thermodynamics. Dr Bojdo's current research applies this expertise to predict engine power loss due to installation effects or degradation by ingested particulate such as dust or volcanic ash.

Dr Bojdo graduated from the University of Manchester in 2008, with an MEng in Aerospace Engineering. After a year abroad studying language, he returned in 2009 to begin his doctorate, which he completed three years later. He was awarded the EPSRC Doctoral Prize in 2012 which allowed him to develop his research and work closely with industry on numerous projects.

<http://www.mace.manchester.ac.uk/people/staff/academic-staff/profile/index.htm?staffid=697>

Dr Ben Parslew

Honorary Lecturer in Aerospace Engineering



Dr Parslew's academic background is in aerospace engineering, fluid dynamics and bio-mechanics. His research lies at the interface of engineering and biology, with particular interests in animal locomotion, unmanned air vehicles, robotics and computer animation. Dr Parslew obtained his first degree in Aerospace Engineering from UMIST, followed by a Master's in Fluid Dynamics from The University of Manchester. He then moved to Thailand where he was working at numerous HE institutions including Kasetsart University in Bangkok. He later returned to Manchester to complete his PhD in animal flight biomechanics. Dr Parslew was awarded an EPSRC Doctoral Prize Fellowship in 2011 and then worked as a Research Associate on a project funded by BAE Systems.

<http://www.mace.manchester.ac.uk/people/staff/academic-staff/profile/index.htm?staffid=686>

Dr Kali-babu Katnam

Lecturer in Structural Engineering (Aerospace Composites)



Dr Katnam obtained his BEng degree in Civil Engineering from Andhra University, India and an MTech degree in Structural Engineering from the Indian Institute of Technology Bombay. He completed his PhD in Structural Engineering at Ghent University, Belgium. In 2007, he joined the University of Surrey as a Post-doctoral Research Fellow and conducted research in collaboration with Imperial College, BAE Systems and Airbus UK. In 2009, he joined the Irish Centre for Composites Research (IComp, University of Limerick) as Post-doctoral Research Fellow and performed industry-oriented research with Henkel Adhesives and Bombardier UK. His research interests are broadly in the area of polymer composite structures, with emphasis on experimental characterization and damage modelling of structural bonded joints/repairs and toughened adhesives.

<http://www.manchester.ac.uk/research/kali-babu.katnam/>

Recent Appointments



Dr Marco Domingos

Lecturer in Advanced Manufacturing

Dr Domingos holds a PhD Cum Laude in Mechanical Engineering awarded by the University of Girona, Spain, with a thesis on Mechanical and Biological Characterisation of scaffolds produced with Biocell Printing. Prior to joining the University of Manchester, Dr Domingos was Scientific Advisor in Dias de Sousa SA, in Portugal where he was mainly responsible for the areas of MRI, micro CT and melt extrusion. He was also Research member at the Centre for Rapid and Sustainable Product Development (CDRSP), Leiria, Portugal, where he carried out his research activities in the area of Additive Manufacturing, Biomanufacturing, Polymer Processing and Product Development. His main research interests are in the areas of Additive Manufacturing, Biomaterials, Biomanufacturing, Organ Printing, Stem cells, Drug delivery systems and Bone and Cartilage Regeneration.

<http://www.mace.manchester.ac.uk/people/staff/academic-staff/profile/index.htm?staffid=716>



Dr Martin Gillie

Reader in Structural Engineering

Dr Gillie's main research interests are in numerical modelling of structures, structures in fire and sustainability of structures.

His teaching interests are mainly in structural design and engineering problem solving, although he has also taught engineering analysis, engineering mathematics and specialist courses in structural fire engineering.

Following a degree in Civil Engineering from the University of Edinburgh (1st Class, 1997) he studied the behaviour of the Cardington Structure in fire and obtained my PhD in 2000, also from Edinburgh. He then spent some time working on silo structures as a researcher before moving to Aberdeen to work in offshore design for Andrew Palmer and Associates. In 2003 he returned to academia as lecturer at the University of Nottingham before a move back to Edinburgh in 2005.

<http://www.mace.manchester.ac.uk/people/staff/academic-staff/profile/index.htm?staffid=701>



Professor Paulo Bartolo

Professor of Advanced Manufacturing

Paulo Bartolo holds a PhD degree in Polymer Physics from the University of Reading (UK, 2001), a Master of Science in Mechanical Engineering (1996) and a Licenciatura in Mechanical Engineering (1993), both from the Technical University of Lisbon (Portugal).

He is a CIRP (The International Academy of Production Engineering) fellow, Vice-Chairman of the CIRP Scientific Technical Committee on Electro-Physical and Chemical Processes, GARPA (Global Alliance of Rapid Prototyping Associations) Portuguese Representative and Member of the Direction Board of the International Society of Biomanufacturing, Scientific advisor of the Research Institute in Biofabrication (BIOFABRIS) funded by the Brazilian Government and regional coordinator of the working group of Rapid Manufacturing Platform.

Paulo Bartolo is Adjunct Professor at Queensland University of Technology (Australia), Visiting Professor at Nanyang University (Singapore), and Professor of Biomaterials (Catedra UNESCO) at the University of Habana (Cuba). He was a member of a Commission appointed by the Portuguese Parliament to prepare a Portuguese Strategic Plan for Science & Research (2010-2011). He also was the Director of the Centre for Rapid and Sustainable Product Development, Polytechnic Institute of Leiria, Portugal, a Centre of Excellence in Mechanical Engineering of the Portuguese Foundation for Science and Technology and Vice-Chairman of the CIRP Collaborative Working Group on Biomanufacturing (2010-2012), Coordinator of the Iberoamerican Network on Biomanufacturing (BIOFAB Network), funded by CYTED (2008-2010). This research network engaged more than 200 researchers from 20 Universities and Research Institutes in Argentina, Brazil, Cuba, Mexico, Paraguay, Portugal, Spain and Venezuela.

<http://www.mace.manchester.ac.uk/people/staff/academic-staff/profile/index.htm?staffid=706>

Dr Eric Lou

Lecturer in Project Management



Dr Lou joined MACE as a Lecturer in Project Management. Prior joining the University, Dr Lou was the Environmental Manager with Create Construction Ltd; Research Manager in the Research Institute of the Built and Human Environment University of Salford; Senior Information Officer with CIDB E-Construct Malaysia; and positions in the computer programming and quantity surveying.

His research interest encompasses the trichotomy of people-process-technology in the areas of project management, sustainability and environmental planning, corporate responsibility, BIM and IT management within the built environment industry.

Dr Lou obtained his degree in Computer Science (Universiti Teknologi Malaysia), and MSc in IT Management in Construction with Distinction (University of Salford). He completed his PhD in E-Readiness in Construction from the University of Salford. Dr Lou is also registered in the IEMA Specialist Register of Environmental Auditors.

<http://www.manchester.ac.uk/research/eric.lou/>

Dr Paul Blackwell

Lecturer in Risk Management and Project Cost Management



Dr Blackwell obtained an EngD in Integrated Manufacturing Systems from Cranfield University in 2003, having already obtained a Master of Research in Innovative Manufacturing (specialising in Management Information Systems) from the same institution in 1999. He then spent two years at Cranfield as a Research Fellow, helping to develop business with organisations such as Ford Motor Company, AMS Radar Systems, and the Ministry of Defence (MoD). Prior to his appointment at the University he spent seven years as a cost engineer with the MoD. Dr Blackwell's time with the MoD was spent in the BAE Systems shipyard at Barrow-in-Furness, Cumbria, where he worked on the Astute Class Nuclear Submarine Programme.

<http://www.manchester.ac.uk/research/paul.blackwell/>

Tim Jones

Senior Lecturer in Project Management



Dr Jones joined MACE in November 2013 having previously worked in the Manchester Enterprise Centre in the Manchester Business School. He has a background in new product development consultancy for small manufacturing companies. In MACE, his role is teaching-focused and mainly involves the delivery of core undergraduate management units and a postgraduate innovation management unit.

He works in a Deputy Postgraduate Director role for postgraduate taught programmes and for the Project Management Professional Development Programme MSc (PMPDP).

<http://www.mace.manchester.ac.uk/people/staff/academic-staff/profile/index.htm?staffid=703>

The Bigger Picture

WavePOD: Wave industry leaders and Bosch Rexroth join forces

A number of leading wave energy firms have joined forces with global drive and control manufacturer Bosch Rexroth in a bid to create a standardised, self-contained offshore electricity generator for the wave industry.

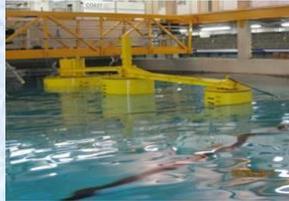
The project tackles one of the biggest challenges in wave energy – how to generate electricity reliably and cost effectively at sea – and has the potential to “transform the wave industry in the same way the internal combustion engine made the motorcar possible,” according to Aquamarine Power Chief Executive Officer Martin McAdam.

The new collaboration brings together project founders Aquamarine Power and Bosch Rexroth, along with wave technology developers Albatern, Carnegie Wave Energy UK and Professor Peter Stansby. It also includes Irish utility provider ESB which is developing the European-funded Westwave wave farm off the west coast of Ireland.

Professor Peter Stansby, developer of the new line absorber M4 Wave Power, said:

“Conversion of mechanical power into electricity is a generic component of any wave energy converter. As a new developer striving to improve wave energy capture, the WavePOD consortium approach to hydraulic PTO development is a great bonus since hydrodynamic expertise in wave-body interaction is quite different from that for hydraulic systems.”

<http://www.mace.manchester.ac.uk/our-research/research-themes/offshore-coastal/specialisms/wave-energy/>



Science on the Big Screen

Dr Ben Parslew was consulted by the producers of the film Noah to give advice on some of the film’s visual effects.

Thanks to his background in avian flight biomechanics, Ben was well placed to share his expertise on scenes depicting flying doves.

The film, directed by Darren Aronofsky, follows the story of Noah’s Ark and stars Russell Crowe, Jennifer Connelly and Anthony Hopkins.



M4DE

Multimillion pound funding has been awarded for the EPSRC Centre for Doctoral Training in **Materials for Demanding Environments**. Funding will start in Sept/Oct 2014 and run for 5 years. Professor Bob Ainsworth is the Co-director and Dr John Francis will be the Centre Associate Director. The first year cohort will be 12 PhD (home/EU) students and the following years will have 20 (home/EU) students each year.

<http://www.m4de.manchester.ac.uk/>

Athena SWAN Bronze Award

The School has been awarded the Athena SWAN Bronze Award.

Congratulations to all those involved in the Athena SWAN working group, which is led by Dr Margaret Emsley. The award recognises steps taken in the School to advance gender equality and change the working culture.

Michael Rex Horne Scholarship

James Paul from the Nuclear Engineering Research Theme was awarded the first Michael Rex Horne Scholarship prize following a School wide research showcase at the annual Postgraduate Conference. The Scholarship follows a generous donation by [Professor Yoo Sang Choo](#), which goes towards supporting scholarships to celebrate the life and research of [Professor Michael Rex Horne](#).



Michael Rex Horne OBE FRS FREng was a Professor at Manchester and research supervisor to Professor Choo. Professor Choo is an alumnus of Manchester and holds The Lloyd’s Register Educational Trust Chair and Professorship at the National University of Singapore.

Prof Choo visited the School on September 2nd and delivered a seminar on *Construction and Installation Engineering of Offshore Structural Systems*.

University of Johannesburg

Professor Paul Mativenga has been made an Honorary Distinguished Visiting Professor at the University of Johannesburg, South Africa. Paul will use his position as a springboard for relationship building and engagement with that region and to develop research on sustainable manufacturing and resource efficiency.



Popular CPD Course on Turbulence Modelling

For the third consecutive year Dr Sergey Utyuzhnikov led the CPD Course on Turbulence Modelling (Large Eddy Simulation) on 8-11 September. Each year it attracts about 20 delegates. Most of the delegates are from Russia. The course is delivered in collaboration with the Daresbury Laboratory.

For further information:

<http://www.mace.manchester.ac.uk/business/cpd/les/>

CIRP Fellowship

In August, [Prof Paulo Bartolo](#) was awarded Fellow of the International Academy for Production Engineering (CIRP, French acronym of *College International pour la Recherche en Productique*).



Founded in 1951, CIRP is the world leading organization in production engineering research and is at the forefront of design, optimization, control and management of processes, machines and systems. The Academy has academic and industrial members from 50 industrialized countries. Its restricted Membership is based on demonstrated excellence in research and the number of Fellows is restricted to 175.

Two Awards for Professor Lin Li

Congratulations to Professor Lin Li on the award of both the University of Manchester Distinguished Achievement Medal for Researcher of the Year, and also the prestigious Royal Society Wolfson Research Merit Award for research in laser nano-fabrication and nano-imaging. The Royal Society Wolfson Research Merit Award is given to individuals of proven outstanding ability to undertake independent research and is for a period of 5 years.



Recently published books

