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Landwards

AGRI-EPI CENTRE

A NEW ERA OF RESEARCH AND INNOVATION

In this issue

- *AGM at JCB*
- *Meet the President*
- *JCB Academy*
- *National Landbased College*
- *Young Engineers competition*
- *2016 IAgrE Awards*

IAgrE

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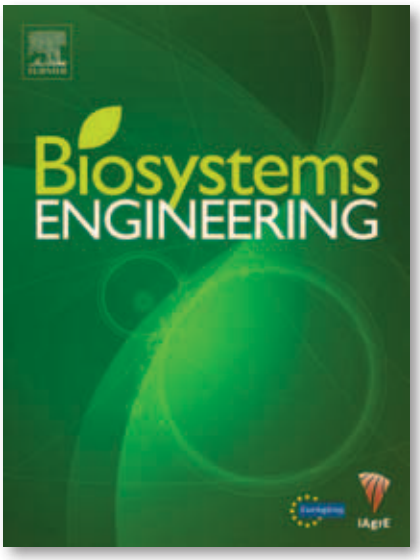

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The Managing Editor of Biosystems Engineering, Dr Steve Parkin, has kindly summarised some of the papers published in the last three issues which he thinks may be of interest to IAgrE members

Biosystems Engineering
Volume 144, April 2016, Pages 52–60
A review on the main challenges in automatic plant disease identification based on visible range images Jayme Garcia Arnal Barbedo Embrapa Agricultural Informatics, Campinas, SP, Brazil
The problem associated with automatic plant disease identification using visible range images has received considerable attention in the last two decades, however the techniques proposed so far are usually limited in their scope and dependent on ideal capture conditions in order to work properly. This apparent lack of significant advancements may be partially explained by some difficult challenges posed by the subject: presence of complex backgrounds that cannot be easily separated from the region of interest (usually leaf and stem), boundaries of the symptoms often are not well defined, uncontrolled capture conditions may present characteristics that make the image analysis more difficult, certain diseases produce symptoms with a wide range of characteristics, the symptoms produced by different diseases may be very similar, and they may be present simultaneously. This paper provides an analysis of each one of those challenges, emphasizing both the problems that they may cause and how they may have potentially affected the techniques proposed in the past. Some possible solutions capable of overcoming at least some of those challenges are proposed.

Biosystems Engineering
Volume 143, March 2016, Pages 20–27
Effect of acidification on solid–liquid separation of pig slurry
Giorgia Cocolo, Maibritt Hjorth, Agata Zarebska, Giorgio Provolo
Università degli Studi di Milano, Italy
Aarhus University, Denmark
University of Southern Denmark, Odense M, Denmark
Manure management causes massive nutrient losses to the environment. Acidification can reduce ammonia emissions and solid–liquid separation improves organic nutrient distribution on fields. Because acidification changes slurry composition, it impacts on the subsequent operation of solid–liquid separators and products. The aim was to determine the effects of slurry acidification on separation processes: screw pressing, centrifugal decanting, and flocculation with drainage. Separators were operated at full scale, and the electrochemical, physical and chemical properties of raw slurries, solid fractions and liquid fractions were analysed. The rapidity with which acidified slurry was separated increased the loss of slurry constituents to the liquid fraction, including particulate matter. In the solid fraction, acidification reduced the amount and concentration of particulate species, increased the amount and concentration of divalent species, and decreased the amount of monovalent species but it did not affect their concentration. Overall, acidification simplified the operation of separators and increased the flow rate of the operation.

Biosystems Engineering
Volume 142, February 2016, Pages 53–82
Image analysis operations applied to hyperspectral images for non-invasive sensing of food quality – A comprehensive review
Gamal M. ElMasry, Shigeki Nakauchia
Toyohashi University of Technology, Japan
Suez Canal University, Ismailia, Egypt
The theoretical and practical issues associated with the development, analysis, and application of essential image processing algorithms are explored in order to exploit hyperspectral imaging for application to food quality evaluations. The fundamental configurations and working principles of hyperspectral systems, as well as the basic concept and structure of hyperspectral data, were described and explained. Strategies and essential image processing routines necessary for making the appropriate decision during detection, classification, identification, quantification and/or prediction processes are presented. Examples and figures were selected to reinforce the main approach of each analysis algorithm applied in different agro-food products to answer the question "What does the user want to see in the target food samples?" Hyperspectral imaging systems have gained a rapid interest from researchers to display the chemical structure and related physical properties of numerous types of food stuffs and hyperspectral imaging systems are expected to gain more considerably more potential and application in food processing and engineering plants.

EDITORIAL: LESSONS FROM THE PAST

"IT is the practical application of the useful results of research work that matters most"

The above is a line taken from the editor's notes in the *Farm Implement and Machinery Review* magazine of November 1965. It was written at a time when the National Institute of Agricultural Engineering (NIAE) at Silsoe was in full swing. The magazine editor, Jim Priest, had also just completed his two year term as the 10th President of IAgrE. I first got to know Jim Priest in 1960 as I was embarking on a career in agricultural engineering. But, I always had a hankering to be a journalist, and Jim Priest helped sow the seed for me, and his guiding advice was invaluable when I started out on a journalistic career in 1988. The spirit of evolution was never more evident than during the past few weeks as we start on the post-NIAE era in the shape of the Agri-EPI Centre for research and innovation – the chrysalis of which is gradually being peeled back.

It will be a very different concept to its forerunner. A research model for today, with tentacles that stretch the length and breadth of the nation as we search for the solutions needed for sustainable agriculture in the future.

We have recently also expressed our warm thanks and gratitude to outgoing President, Mark Kibblewhite, who has been a splendid and effective ambassador for the Institution over the past two years. His successor, Rob Merrall brings a wealth of academic and business experience to the role. He also credits the advice and mentoring he received from a former IAgrE President, David Manby. As we connect yesterday's IAgrE stalwarts with today, it gives real resonance to Geoff Freedman's phrase, repeated at the recent IAGRE awards, "Your Institution is for life"

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IAgrE is a founder member of EurAgEng, a licensed body of the Engineering Council and a founder constituent of the Society for the Environment

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NATIONAL LANDBASED COLLEGE LAUNCHED

A new national college for those pursuing land based careers was launched at the House of Lords. The National Landbased College (NLBC) will be a 'virtual college' creating a hub for leading colleges, universities and industry experts to collaborate on dynamic new courses tailored for, and responsive to, this vital part of the UK economy.

"We are very ambitious for the agricultural sector's future and want to see it become a leading career destination for high-flying students, entrepreneurs and new entrants,' said George Eustice, Minister for Farming, Food and Marine Environment. 'I am delighted to see the National Land Based College come to fruition.

Courses will be delivered through the UK's specialist land based colleges, a new online platform and by industry experts in their workplaces.

The NLBC has appointed its first chief executive officer. Leigh Morris joins from the Royal Zoological Society of Scotland where he was Director of Community Conservation.

He said 'Farmers and those in land based industry maintain 75 percent of land in the UK. These custodians of our countryside face diverse and increasing pressures, from the drive towards environmental sustainability to concerns about food security and public health. The goal of NLBC is to equip this, and associated workforces, with the skills they need to flourish'.

The NLBC hub will actively promote land based careers and Its online platform will also function as a portal, linking to diverse land based organisations and a CPD register for graduates.

NLBC has a board of 21 directors, ten principals from UK land based colleges and universities, ten from industry leaders, and Lord Curry. It is a registered charity and a company limited by guarantee. Seed funding has been provided by Landex member colleges, Landex, and City and Guilds who contributed £250,000 from their National Proficiency Test Council fund. NLBC will receive a percentage payment for all City and Guilds land based qualifications endorsed by the college.

Leigh Morris

JOHN DEERE OPENS APPRENTICE CENTRE

John Deere, in association with training provider ProVQ has opened a purpose-built apprentice training facility at St James Business Park, Radcliffe-on-Trent in Nottinghamshire, believed to be the first dedicated solely to the agricultural and turfcare industry.

Designed specifically for John Deere dealer apprentices enrolled on the company's award winning Ag Tech, Parts Tech and Turf Tech training programmes, the new centre is close to John Deere Limited's headquarters at Langar.

The company's three-year Ag and Turf Tech apprenticeships lead to the IMI Level 2 and 3 Diplomas in Landbased Engineering. Each year group trains at the centre for eight weeks a year in four blocks of two weeks, with some days spent at Langar when working with larger machines such as combines and self-propelled forage harvesters.

The two-year Parts Tech apprenticeship, leading to a Level 3 Diploma in Vehicle Parts Competence, is mostly work-based at the sponsoring dealer, with four weeks of training taking place at Radcliffe.

John Deere appointed ProVQ Limited in summer 2015 as its new business partner to deliver the apprentice training programmes on behalf of its dealers in England, Scotland and Wales (separate training programmes are provided in Northern Ireland and Eire). ProVQ started its apprentice training programmes in 2005, and went on to develop a full range of national services including apprentice recruitment, training, vocational assessment and qualifications. Today the company trains over 600 apprentices and many hundreds of adult learners on technical, parts and customer service programmes.

"Our new business partnership with ProVQ is already going from strength to strength, and we are delighted to have established this new bespoke facility so close to our UK headquarters," says John Deere Limited training centre manager Richard Halsall. "The company's investment in the Apprentice Training Centre reinforces our continuing aim to provide industry leading training programmes for our agricultural and turf dealers."

John Deere Apprentices

KEENAN SYSTEMS SAVED

US company steps in to save Irish feeder manufacturer

US animal nutrition company Alltech has bought Keenan Systems, the Irish cattle feed machinery firm from the receivers, KPMG in a deal understood to be worth less than €10 million.

The purchase of Keenan which employs 222 people, including 176 in Ireland, marks Alltech's 14th acquisition globally since 2011.

The company run by executive chairman Gerard Keenan, fell into receivership earlier this month with debts in the region of €14 million. Some half of that amount was owed to Bank of Ireland, the company's main lender.

The receivers Kieran Wallace and Cormac O'Connor of KPMG had said that they were confident that all the company's jobs would be preserved. However, a spokeswoman for Alltech said yesterday that it will review over the next 100 days how it can grow the business and that "we don't want to speculate on jobs in the meantime."

The company, which makes diet feeders and mixer wagons, succumbed to financial pressure because of the downturn in commodity prices, which has put a squeeze on farmers' incomes.

"Between Alltech's primacy in science and Keenan's manufacturing strength and technological know-how, we have a winning combination for delivering greater farm efficiency and profitability direct to our farming customers," said Pearse Lyons, founder and president of Alltech, after the deal was agreed.

Alltech said it and Keenan have already identified possible growth opportunities together, which may include nutritional technologies and feeding programmes focused on feed efficiency and herd health as well as advanced ration formulation.

Keenan, which was a family-owned business established by Richard Keenan, a self-taught engineer, in 1978, will continue to be headquartered in Borris. Co Carlow. Together, Alltech and Keenan employ nearly 300 people in Ireland and close to 5,000 globally.

Keenan feeder

THANK YOU STEVE

AT its meeting in May, the IAgrE Membership Committee had the opportunity to thank outgoing chairman, Steve Parkin, who has stepped down after 18 years

NFU URGES ACTION OVER FAST BROADBAND

The National Farmers Union (NFU) have urged the Government to prioritise its upgrade of broadband in rural areas. With only four per cent of farmers having access to superfast broadband, the roll-out of complete mobile networks and affordable reliable superfast broadband to rural areas must take centre stage says the NFU.

Their report ***Farm Broadband & Mobile Networks*** launched to MP's recently picks up on the results from a comprehensive NFU survey of farmers and growers. It is concerned about the Government's broadband delivery programme, worth £1.7billion, which will leave an estimated 1.2 million premises without superfast broadband. This is the equivalent to 5% of all premises, the majority of which will be farm businesses and rural communities. NFU Vice President Guy Smith said: "If our industry is to meet any of the ambitions of the long awaited Government 25 Year Food & Farming Plan, it will be essential for barriers to growth to be removed. Poor access to broadband and mobile networks is one such significant barrier and the current situation is neither sustainable nor acceptable. The Government is asking farmers to run their businesses in conditions that put them at an immediate disadvantage.

HOUSE OF LORDS CONCERNS OVER SOCIAL MOBILITY

IAgrE has welcomed a recent report from the Select Committee of the House of Lords on social mobility. The report ***"Overlooked and left behind: improving the transition from school to work for the majority of young people"*** raises concerns about a wide range of factors and makes some clear recommendations as to what needs to be done to improve circumstances for young people making decisions about that important transition from compulsory schooling at the age of sixteen.

Commenting on the report, IAgrE CEO Alastair Taylor said. "I am especially pleased to read the recommendation stating the need to reduce unfairness between academic and vocational routes to work, particularly in funding. We and our partners representing the Agricultural Engineering industry, work hard to promote the fantastic careers available in our sector but too often we hear stories of how specialist land-based colleges are starved of the resources needed to secure good quality staff and the equipment to support good quality vocational learning.

It has always seemed unjust that universities and schools should have their funding ring-fenced while vocational learning at colleges has been subject to cuts year on year. All of this at a time of growing shortage of technicians"

The Select Committee Report makes a number of recommendations including; ensuring apprenticeships remain high-quality; improving careers guidance and advice for young people; increasing employment involvement with schools in the transition to work and inequality between academic and vocational routes to work.

SECURITY GUIDANCE FOR ENGINEERS

The Rt Hon John Hayes MP, Minister for Security, hosted the launch at the House of Commons of the Engineering Council's new ***Guidance on security for engineers and technicians*** on 19 May. The event was attended by over 100 people from across the engineering profession.

The guidance was developed in consultation with 35 professional engineering institutions. It sets out six key principles to guide engineers and technicians in identifying, assessing, managing and communicating issues about security. The guidance defines security as 'the state of relative freedom from threat or harm caused by deliberate, unwanted, hostile or malicious acts'. The principles emphasise the importance of taking a security-minded approach to both professional and personal life, being aware of and taking responsibility for all security related issues.

IN BRIEF *IN BRIEF*

Kubota Corporation has acquired Great Plains Manufacturing, Inc., based in Salina, Kansas. The purchase expands the long-time partnership with Land Pride and includes all five Great Plains divisions with multiple facilities in Kansas and in Lincolnshire, England. The acquisition adds to the Kubota portfolio which also included the Kverneland Group which has been part of Kubota since 2012.

Twose of Tiverton, established in 1830 has merged with its sister company McConnel. The move, which took place 1st May 2016, saw the creation of a specialist Grassland and Arable Machinery Division. All Grassland and Arable machinery will be produced at the parent company Alamo Manufacturing's production facility at Salford Priors, whilst the hedge and verge cutting machinery will continue to be manufactured at Ludlow.

UK tractor registrations fell by more than 20% in April 2016 compared with the same month the year before, according to latest figures from the Agricultural Engineers Association (AEA). Tractor sales fell from 1,292 in April 2015 to 1,025 in April 2016. Since the start of the year there has been a 13.2% drop in sales. This means 518 fewer tractors over 50hp were registered in the first four months of 2016 than the same period in 2015.

The recent launch of the new Sentinel satellites, part of the European Union's Copernicus Earth observation programme, has the potential to help farmers take precision agriculture to a new level. Along with a host of other land monitoring uses, Sentinel will create a major opportunity for service providers, and can be applied within agricultural technology to provide data sources that can be used for precision farming, disease prediction or drought warning.

Feedback

CHALLENGES OF PROFESSIONAL REGISTRATION

Dr Martin Goodchild, CPhys, FIET, Principal Scientist and Electronic Engineer for Delta-T argues that there are underlying reasons for the decline in CEng registrant figures

In the Spring 2016 issue of ***Landwards***, Alastair Taylor raises issues surrounding professional registration. These, together with the registrant figures in the IAgrE Annual Report, made me reflect on my own experiences.

I agree with Alastair's list of challenges - time, value expectations, market structure, competition and technology. All of these were considerations during my recent professional registration application, obtaining Chartered status last year. The reference in IAgrE's Annual Report to the startling decline in registered engineers and the registrant figures are very disappointing.

Perhaps I should provide some background. In 1987, having recently completed a CEng accredited BSc in Electronic Engineering, I joined the Institute of Electrical Engineers (now IET) as an AMIEE and have been a member ever since, obtaining Fellowship (FIET) in 2012. During this time I completed a PhD, had a couple of post-doc positions, spent 13 years at a large Cambridge technology consultancy and since 2009 enjoyed working at Delta-T Devices.

> Colleagues with CEng have found little value or recognition in their registration.

As a result, I have worked in Material Science, Physics & Electronic Engineering University departments, worked on (and lead) a wide variety of technology development consulting projects in: digital printing, FMCG, drug delivery systems and medical devices. More recently at Delta-T I can add aspects of environmental, soil and plant sciences. This broad range of disciplines has led me to become a Member of the Institute of Physics (IOP) and an Associate of the Institution of Agricultural Engineers.

This combination of the IET, IOP & IAgrE provides a great deal of support and many professional development opportunities, not only for me but also for my colleagues at Delta-T.

In respect of professional registration with the Engineering Council, I am aware that some industries such as civil engineering do place great emphasis on CEng. However, during my time in academia, manufacturing and consultancy I have not seen the need to become a CEng. It is a topic rarely been discussed in annual appraisals or figured in discussions on consulting projects. Former colleagues with CEng have found little value or recognition in their registration. The lengthy application forms I received have left me feeling that the value is just not there. The really disappointing aspect is that the Engineering Council has had so little engagement or impact on the career of someone who has experienced such a wide range of working environments and industries leading up to becoming an FIET.

On a positive note, I agree with the aims of professional registration - building on academic qualifications I therefore felt I should become professionally registered and endeavour to be proactive about promoting registration to others.

This brings me onto my own registration as a Chartered Physicist which I obtained last year. Initially my IET, IOP & IAgrE memberships provided options of CEng, CPhys & CEnv as pathways to professional registration.

- First, CEng was eliminated as I felt it would not add to my FIET. Also there were application and renewal costs and interview requirement. The Engineering Council demands that both supporters are registered CEng. Delta-T does not have a CEng so this presented an additional challenge.
- CPhys via the IOP has a £50 application fee, an interview is not usually required and the application process is web-based with the only additional requirement was to provide MPhys equivalence. My CPhys supporters could be CEng, CPhys or other senior professionals with a supporting justification.

I discovered that the professional competencies shared many similarities for CEng, CEnv & CPhys, so maybe this is something that could be built upon in future?

So what would I recommend in order to help increase the registrant numbers on page 5 of the Annual Report? Firstly, I should say that the IAgrE, IOP & IET try very hard to promote professional registration and it was good to see the article about the Membership Committee in Landwards.

As a result I feel the registration bodies could do more, for instance:

- Could the respective councils work together to raise the public profile of Chartered status?
- Given the level of commonality of competencies could a CEng apply for CEnv via a fast-track route?
- Whilst the Professional Institutions do a great job of promoting and administrating professional registrations, the Engineering Council and SocEnv are rather distant organisations and with little outreach in my experience. Could these bodies do more to proactively engage with corporate members?
- With regard to the Engineering Council, the supporter requirements are appropriate if you are in a university or large plc but they can place an additional challenge for those working in smaller organisations?
- Some professional bodies offer 'get chartered' workshops, could the IAgrE collaborate to offer this to its members?

I hope some of the above will be of interest to IAgrE members. I would also stress that these comments are based on my own experiences and opinions, and not from my employer, Delta-T.

Responses to **Landwards** Feedback to the Editor chris.biddle@btinternet.com

CEO
Reflections on a changing world

NINETY YEARS OF PROGRESS

Recognising dedication and expertise of our membership

Alastair Taylor
IEng CEnv MIAgrE

Happy Birthday Your Majesty

I am writing this a few days after Queen Elizabeth celebrated her ninetieth birthday. Ninety years is a wonderful achievement by any measure. What is even more remarkable is the change which our Queen has seen over those years.

So what was agricultural engineering like in 1926 – some ten years or so before our Institution was formed.

These were pioneering days. Harry Ferguson had started to develop the famous Ferguson System in 1916 but it was another thirty years before the famous TE20 started production. Our Queen was then 20 years old.

In 1926 wheat yields were around 2 tonnes a hectare

Henry Ford had started to develop the famous Standard Fordson around the time our queen was born but it was another ten years or so before production took off. It took Joseph Bamford – Mr JCB until 1945 before he broke away from the old family firm to start his now famous construction equipment business.

Of course the other side of the first twenty years of the Queen's life were characterised by the great depression of the thirties and the Second World War. So much of the post war development which the Queen witnessed in her twenties and thirties was necessitated by these dark times – as the saying goes "necessity is the mother of all invention", or "difficult situations inspire ingenious solutions" as someone else put it.

It would be fair to say that a big part of our Queen's life has seen a steady development in agricultural engineering and farm mechanisation – things got bigger and more powerful and when combined with improvements in plant genetics, fertilisers and pesticides, a revolution in crop yields took place.

In 1926 wheat yields were around 2 tonnes a hectare with, at best, a fivefold increase over the next 90 years. Impressive by any measure.

I would like to think, and genuinely believe that, the developments in Agricultural Engineering which the Queen will witness in the next ten years will make the progress made over the past ninety pale into insignificance. With autonomous vehicles, remote sensing, smart machines, and a whole world of innovation not dreamt of a generation ago, we are about to embark on a new journey which only HG Wells could think about – incidentally, more than twenty-five years before the Queen was born.

Need to make sure our awards are relevant

More celebrations

It was a real pleasure to host our annual Presentation of Awards alongside our AGM and Council meeting at JCB in Staffordshire in April. Over the past couple of years we have made this into a special event and it is great to receive nominations and to read citations for those who receive awards. I never fail to be impressed by the dedication, expertise, and breadth of interests of our members and others who we celebrate.

At the same time, we do need to make sure our awards are relevant and in keeping with the spirit of the Institution. I think they are but we are conducting a review of awards and competitions over the next few months to make sure we are seizing every opportunity to celebrate success and achievement. As ever, all ideas are gratefully received.

Watch this space

The summer period is (in theory) a relatively quiet period for the Institution. I think this summer may well be the exception. We are mid-way through a project to update our website and alongside this we are introducing a new membership data base. All of this take time and intense planning but the planned outcome is a much better interface for existing and potential members together with more future proofing and potential reliability. Please bear with use as we continue to develop your Institution. On behalf of the Secretariat, thanks as ever for your goodwill, ideas, humour and continued support.

IAgrE

MEET YOUR NEW PRESIDENT: Dr Robert Merrall

At the IAGRE AGM in April, Dr Robert Merrall MIAgrE, EngD was elected as the Institution's 38th President. CHRIS BIDDLE talks to him about his varied background, hopes and aspirations for the coming two years

FOR Rob Merrall, the 'trigger' for his wide and varied career in agricultural engineering was simple. "I came from a largely suburban upbringing, but from the age of 5 through to my teens, I spent most of my summer holidays staying with family friends on their dairy farm in Somerset. That's when I got the bug, and my love of the rural life and agriculture really started".

He also worked on a large farm estate in Dorset run by a former Grenadier Guards officer, which he describes as 'probably one of the last truly feudal farming set ups in Britain'!

After leaving school, and armed with the necessary 'A' levels, Rob was eager to learn more. Supported by a grant, he gained a place at Silsoe College in 1990 to study agricultural engineering. "What a time that was" he says "the small village of Silsoe in Bedfordshire was the UK's main centre for agricultural engineering, learning and research".

The National College for Agricultural Engineering (NCAE) had been established in 1962, initially operating from Boreham House, near Chelmsford before finding a more permanent location at Silsoe. The college was later to become part of the Cranfield Institute of Technology. Just across the road from the college was the National Institute of Agricultural Engineering (NIAE) located in the magnificent surroundings of Wrest House and Wrest Park, which was bought by the Ministry of Works in 1946.

"I was very fortunate to be amongst some of the last intakes at Silsoe. Not only was a full infrastructure for progressive agricultural engineering in place, but there were some extremely influential people on hand to give out advice and guidance".

HEADY DAYS

For a large part of the latter half of the 20th century, agricultural engineering was given a high profile as the rapid advance of mechanisation gathered pace post war. The annual Silsoe lecture in 1979 was attended by HRH The Duke of Edinburgh after he had visited the NCAE, whilst the previous year, the Institution of Agricultural Engineers (IAgrE) had marked its 40th Anniversary with the Silsoe lecture given at the Mansion House by the Lord Mayor of London, Sir Peter Vanneck (an IAgrE member). Its title was 'British Agricultural Engineering – a Service to the World'.

Heady days indeed for the industry. IAgrE President at the time (1976-1978) was T C D (David) Manby OBE, someone who was to have a great influence on the young Rob Merrall some years later. "During my time at Silsoe, I lived in one of David's properties, and he together with others like John Fox and Brian Finney brought the industry to life for me. They were in the vanguard of the drive for knowledge, research and collaboration". Indeed, David Manby's Presidential Address in 1976 emphasised the need for collaboration between researchers in agricultural engineering with other disciplines such as biology and chemistry.

Four years at Silsoe College saw Rob Merrall gain a BEng (Hons) degree in Agricultural Engineering during which time he not only studied higher maths, statistics and soil dynamics but also French and German. A useful skill as he was to discover later.

After graduation in 1994, he was offered the opportunity to take an Engineering Doctorate. The EngD scheme had only been introduced in 1992 by the engineering academic, Professor John Parnaby and Rob was able to complete a four year research programme to improve forage maize production in order to gain his Engineering Doctorate, guided by Richard Earl and Dick Godwin.

As part of the programme, he studied the MBA syllabus at Cranfield University. "Although I did not sit the formal degree, I was able to gain a first-hand appreciation of what effective business administration can do" he says "Looking back, it was invaluable and instructive. I do feel that too many under-graduates emerge with scant appreciation of business and commerce" he says.

Emerging from Silsoe after 8 years, Rob started to look around for job opportunities. One that caught his eye was a marketing opportunity with the French tractor maker, Renault. His

New President: Dr Robert Merrall

Victoria Cooper and Rob Merrall in conversation with Graham Teakle of the Warwick Crop Centre

job interview, in the Bath offices of the recruitment agency, was different. It consisted simply of sitting in front of a computer screen responding to and answering a series of questions – in French.

ON THE FRONT LINE

He got the job, and spent a very varied 5 years leading the UK Renault marketing team from its Warwickshire base which included organising dealer training, road shows, exhibitions and liaison visits to France for dealers and staff.

Renault Agriculture was acquired by CLAAS in 2004. "After working hard on the project to integrate a largely state owned French company with a private German manufacturer, it was apparent that, in the UK at least, there would be enough front line management based at CLAAS's UK Saxham headquarters, so I decided it was time to move on".

There followed spells at two leading New Holland dealerships. First as Marketing and Communications Director at Oakes Bros where he stayed for just over 3 years, during which time the dealer was expanding its territory through acquisition and relocation of branches. "In a smaller company, people are more resistant to change – and therefore my role was trying to 'glue systems together' and spend time on people management".

From Oakes, Rob moved in 2007 to an after-sales and marketing director role at Midlands-based Murley Agricultural Supplies. "That gave me an opportunity to gain experience in construction equipment which was fascinating and quite a challenge".

In early 2009, Rob was to take on one of his most challenging roles, that of Business Development Director for the Royal Agricultural Society of England (RASE) based at Stoneleigh. The Royal Show had been, alongside Royal Smithfield, the premier farming event in England. Staged first in 1839. The 'Royal' had been a permanent date in the farming calendar for 170 years.

The more recent history of the Royal Show is well-known, but the complex circumstances forced a difficult decision by the RASE Trustees to make the 2009 show the last, a decision that was taken very shortly after Rob accepted the role.

Rob continued work to help shape a much reduced team who would deliver more specialist events aimed at delivering the Society's moto "Science into Practice", whilst simultaneously balancing the need for realising revenue from and planning strategic re-investment in the facilities at Stoneleigh Park. "This was a challenging time for all involved", reflected Rob, "and after a few months it became clear that the Society needed to restructure in a much more radical way, and along with many others, my role came to an end."

Reflecting on the 12 months he spent at RASE, Rob says "It was an extraordinary and extreme, yet strangely compelling year of my life, from which I emerged with some enduring friendships and some valuable experience.

It was to prove a difficult and testing time of Rob's life. Leaving RASE in January 2010, he found himself without a job. "Having gained valuable commercial and to some extent political experience, it was time to take control of my own destiny" commented Rob.

CONSULTANCY

As so often happens, unforeseen events take on a life of their own. Rob had spotted an advert for a Lead Technologist in Sustainable Agriculture and Food at the Technology Strategy Board (TSB), now Innovate UK. He applied, but lost out to Calum Murray who was appointed to the role. "I have a great deal of respect for Calum" says Rob "whilst he and I shared a research background, he had headed up Bank of Scotland's Agricultural Division, and could bring far more in the way of banking acumen to the job than I could ever offer"

"I understood that he was more suited to the role, but we got on well and I said that I was passionate about getting better technology used in agriculture, and would relish working with TSB should the opportunity arise". Nothing happened for three months, when Calum phoned. "Rob, we are looking to appoint independent contractors to monitor our various projects and keep them on track" he said.

That was the catalyst that Rob needed. He established his present company, Merralls Consulting, to work principally with Innovate on dozens and dozens of research projects where funding needed to be monitored, but for which there is a tangible economic benefit".

He was joined in the company by Victoria Cooper in March 2012. As a qualified solicitor, and now a Director of Merralls Consulting her legal background has proved a real asset to the business.

Over the past six years, Merralls Consulting has gone from strength to strength, and Rob's recent election as President of IAgrE comes at a hugely significant time. The relationship and the influence that significant former Presidents such as David Manby and Dick Godwin had on Rob Merrall means that he is mindful of the Institution's heritage.

He says "Building on that heritage to allow our Institution to grow is what is important now. To ensure that Agricultural Engineering figures large in the aims and objectives of Beddington's Foresight Report (despite initial omissions), and help ensure that the new Government-funded Agri-EPI Innovation Centre will grow and nurture over the coming two years of my Presidency"."We have moved from a situation where agricultural engineering research was more or less centralised around a few key institutions, to a more collaborative, diverse model, as exemplified by the Agri-EPI Centre which pools the academic talents and resources of, among others, SRUC, Cranfield and Harper Adams as well as a number of significant commercial companies. It might take time to settle down and establish traction, but it is a superb combination of talent to support a vitally important economic activity – agricultural engineering!"

Robert and Victoria with former President Mark Kibblewhite

CONTINUING PROFESSIONAL DEVELOPMENT

REFLECTIVE PRACTICE

Following the feature on Ethical Engineering in the last issue of Landwards, IAgrE CEO Alastair Taylor invites members to engage in a spot of 'navel-gazing'

There are a myriad of proverbs and sayings around the process of learning: "Tell me and I forget. Teach me and I remember. Involve me and I learn". (Benjamin Franklin); "Learn as if you were to live forever". (Mahatma Gandhi); "You don't learn to walk by following rules. You learn by doing, and by falling over. (Richard Branson); or "Your most unhappy customers are your greatest source of learning". (Bill Gates)

All of these could be summed up under the general heading of Reflective Practice and let's be honest, very few of us would fail to recognise the importance of learning lessons from experience. We all make mistakes and the real skill is to learn and develop from these. I, for one, can think of many life experiences, which upon reflection, have made me consider adopting a different approach. As the other saying goes; "That which does not kill us, makes us stronger", a quote attributed to the German philosopher, Friedrich Nietzsche.

So what has this got to do with the IAgrE CPD Policy?

In the Spring edition of Landwards, Malcolm Carr-West produced an excellent article called "Ethical Engineer" which went on to pose the question: Could the VW scandal happen at a British Company, and what would be the consequences? All of this is a fair question and the article has generated some useful debate as well as reinforcing our duties as engineers and what we should do if we encountered a similar set of circumstances. My immediate reflection was around the complexity of the subject and whether, at some stage in my career I had been compromised by the need to follow the company line.

Following publication at a meeting where we were discussing the IAgrE approach to CPD, it was suggested that a few salient questions on Malcolm's article might be set in order that members could reflect on their learning in a more structured way. Malcolm suggested the following questions:

1. As a member of IAgrE which Code of Conduct are you obliged to follow? If you are registered with Engineering Council which code of Ethics are you signed up to?
2. What is the paramount principle governing the Code of Conduct
3. If you feel that you are being asked to go against the code of conduct what actions can you take, and what is the law that protects those taking such actions?
4. How can the existence of a Code of Conduct, which you are obliged to follow, be used to your advantage in your work?

These are interesting questions so on the basis that the IAgrE CEO has a duty to lead by example, I had a go at answering the questions. If I am honest it wasn't too difficult but it did make me stop and think.

In a further attempt to be "teacher's pet" I decided to use Engineering Council tool ***mycareerpath*** to record the answers. It is not compulsory that you use this, but for those of us who are registered (I am an Incorporated Engineer), or building up a portfolio of evidence in advance of becoming professionally registered, ***mycareerpath*** is a very useful tool for recording our reflective learning.

It is anticipated that some members will need to submit their work for feedback. I did the same. Malcolm said some very nice things (I think I passed!) but he did add a follow up point which I had not considered "by advertising that the individual in question is bound by such a code of practice and is subject to censure if they fail to obey, might be a powerful reason for employing them".

Why not have a go at answering the questions above?

A final thought is that we will look at setting a bank of questions following relevant Landwards articles so that those of you keen to demonstrate your expertise can do so. We will need to make sure our questions are sufficiently challenging as well as developing your reflective practice.

Past President Professor Mark Kibblewhite FIAgrE reflects on his two-year term of office

AG ENG AT CENTRE STAGE

Valedictory musings

Successful organisations like IAgrE are savvy about both their strategic and tactical progress. Here are just a few reflections on our progress and direction. But first, a comment on my experience of being President.

A key service tasked to the President is to chair Council and Executive, which is where we discern our longer and shorter term corporate direction, the actions needed and whether we are progressing properly. Without exception, all of the Council and Executive meetings in my two year term were lively and informed events reflecting a great excitement about the central role IAgrE has through its membership in driving and exploiting the prospects for agri-technology.

The healthy life of our corporate bodies is down to the excellence and hard work of our Chief Executive and the headquarters team and the many members who enthusiastically work voluntarily for the Institution. Thank you to all of them.

Our 2012 report "Agricultural Engineering: A key discipline enabling agriculture to deliver global food security" made a strategic difference and definitely helped to pull our discipline towards the centre stage of science and food security policies. One tangible result is substantial funding for the newly established agri-technology centres.

The report chimed with the growing and continued interest and investment in agricultural engineering from outside of our traditional orbit of companies and institutions, especially from global majors. For me this is a highly significant development – not least because it means that existing players in our sector will be challenged as well as offered new opportunities.

Agriculture is the pre-eminent global industry in which equipment and supplies as well as commodity products are traded across the planet. Innovation in design and production offers rapid international growth in sales for novel and cost- competitive products.

The question for existing manufacturers is whether they can invest adequately in effective innovation to keep pace. Arguably, UK firms are challenged because most are relatively small and may lack the funds to risk developing the most novel products. This is one reason why public investment to support UK innovation is critical for these companies and our members that work in them. On the other hand, substantial investment by companies such as Lockheed Martin, Toshiba and Google confirms the strategic opportunity and means there will be an expanding set of opportunities for agricultural engineers.

However, other engineering disciplines' interest in our sector is growing fast and this can be seen as a potential threat. It means that we will have to work harder to keep pace with new developments across the breadth of engineering and its supporting science. It is important that we promote strongly our knowledge of the context for engineering in agriculture as this is not easily accessed by other disciplines.

Climate change was a strategic challenge when I became President and I regret that progress in dealing with this has if anything slowed over the past two years. When reviewing the IPCC synthesis report I was seriously disturbed by its clear warning that human kind is happily approaching a cliff edge without appreciating the fatal height of the drop ahead.

It is easy and unhelpful to be cynical but the best summary of the current state of play I have read is in the recent issue of Private Eye: "*At the COP21 climate jamboree in December, 177 countries triumphantly came up with the 'Paris agreement' and awarded themselves a piss-up – aka a signing ceremony… in New York. So when they came together… last month…, how many actually ratified it? The answer is a deeply unconvincing 16.*" I have lost faith in Government and international governance to deal with climate change.

The sense I have is that innovative technologies and the engineers who underpin them are the only useful players left on the field. And Agricultural Engineering in all its forms is absolutely centre stage. Food and bioenergy crop production represents around a fifth of all emissions and this proportion is increasing as other sectors reduce their emissions. How can emissions from nitrogen use be reduced by a step change in precision agriculture? How can emissions from animals be captured and does this mean that permanent housing is unavoidable?

A revealing side comment I heard while attending a recent workshop organised by the Committee on Climate Change was that the best option to avoid catastrophic climate change would be to end meat consumption. This seems impossible to me, however desirable or not, but the comment underlines the cultural difficulty of finding solutions.

We desperately need new technology that supports higher yields and is an economic winner as well as reducing or eliminating emissions. Meanwhile, the warnings of artic ice losses, warming oceans, increasing storms and droughts are coming thick and fast. I think they understate the problem. We need to be working right now on radical alternatives to current agricultural systems to adapt to what is just over the horizon. So, what are these and how should they be engineered? This is the key challenge of our time.

Turning to matters close to home or more exactly close to the office, we are very lucky to have a highly motivated and effective Head Office team and their support for the President is excellent. Of the many developments they are pursuing I want to highlight the modernisation of our IT. The new web site will make sure we have the all-important strong web presence and this is a key investment. The new logo is an elegant evolution and specifically designed for digital media.

Our social media following is growing fast and provides much improved communication opportunities with members as well as those we need. These things and many others make me confident that we are on a good path.

The President's role has been fun and rewarding and I want to sign off by thanking the Institution for giving me the privilege to serve our community and wishing our new President, Dr Robert Merrall my best wishes in the certainty that he too will have a great time.

AT THE EPICENTRE

A new series of interviews with those at the 'sharp end' of agricultural engineering, research and education in the UK.

The recently announced Agri-EPI Centre aims to be a world-leading research hub for agricultural engineering and science. Chris Biddle talks to Interim CEO, **Dave Ross** BSc (Hons), PDip, AMIAgrE, AMIMechE, FRAgS

IT was fitting that on the very day that I caught up with Dave Ross (the Interim CEO) of the Agri-EPI Centre and his colleague, Richard Dewhurst (Agri-EPI Director), at their Scotland's Rural College (SRUC) base, the first sod was cut for the start of the building work on the new Agri-EPI funded high-tech dairy unit at Harper Adams University.

The Agricultural Engineering Precision and Innovation (AgriEPI) programme is still in its embryonic stages. Much has been said and done, hundreds of meetings, thousands (probably millions) of words, countless presentations, many late nights and gallons of coffee consumed in order to prepare for the emergence of a new era of research into agricultural engineering and precision farming.

To date, much of it coordinated by a group of industry figures, researchers and academics as an add-on to their normal day-to-day roles. "Both Richard and I have often finished our main day jobs at SRUC, before turning our attention to the detail and planning of the new global hub. I know that has also been the case with senior colleagues on the project such as chairman Willie Thompson at Harbro, Peter Mills and Liz Furey at Harper Adams and Leon Terry at Cranfield – and many others".

"At the moment, what we have is an evolving blueprint. There are no permanent staff, no buildings and only a couple of confirmed research projects, both worth £1 million overall incidentally. The dairy unit at Harper Adams is just the start of the Centre's physical presence".

"However, our aim is clear. We are embarking on a hugely important and significant collaborative research programme to support an industry estimated to grow to £2.3 billion in five years. Agri-EPI intends to drive that growth, supporting innovative ideas which will help farmers and business owners across the world become sustainable in these challenging times"

"We have to be looking long-term. Current market conditions such as the glut of cheap milk in the UK are driven by geo-political issues over which we have no real control. The objective is to drive increased production through a new revolution in information technologies and engineering science"

"We have to accept that agriculture is rarely seen as a key political issue. The phrase 'food security' is hardly ever mentioned. Our Scottish Rural Affairs Minister, Richard Lochead told the Oxford Farming Conference last year, that he hardly heard it mentioned in Brussels either".

A recent Defra report put the availability of agricultural land in the UK as 78% of the total land mass, of which around 30% is in production. Despite this, there had been a decline in self-sufficiency to just over 60% - compared with almost 80% in the mid-1980s.

Yet, according to Dave Ross, research at the Agri-EPI centres will not be parochial but will have global reach. "With the impact of climate change across the world, we will address the variability of production - and export our findings to markets around the world".

ORIGINS

First, we should perhaps remind

ourselves of the origins of Agri-EPI. The Institute of Agricultural Engineering began life in 1924, undertaking trials and research into areas such as subsoiling, hay and silage making, crop drying, tyre pressures and the generation of electricity by wind power. In 1932 the Institute was renamed the Institute for Research in Agricultural Engineering, but after war broke out it became a branch of the Ministry of Agriculture and moved to temporary headquarters at Askham Bryan in Yorkshire, where it was renamed the National Institute of Agricultural Engineering (NIAE).

In 1948, the Institute staff numbered 150, and a new home was found at Wrest Park in Bedfordshire. Tractor and machine testing was its major role initially but long term investigation and research was gradually being introduced. In 1986 the Institute became the Agriculture and Food Research Council, Institute of Engineering Research (AFRC IER) but in 1991 changed its name to the more manageable "Silsoe Research Institute".

In 1994 the Biotechnology and Biological Sciences Research Council (BBSRC) was established and SRI became one of its 8 grant supported institutes. Research during the 1980s and 90s expanded to cover physical, engineering and mathematical applications to agricultural and biological processes and systems. The Silsoe Research Institute closed in 2006 with many of its staff moving to universities, consultancies or set up their own businesses. Ongoing research thus became fragmented and largely uncoordinated.

The Scottish Institute of Agricultural Engineering" was based in Edinburgh (Bush Estate) and eventually became part of the Scottish Agricultural College in 1987 - becoming the Scottish Centre of Agricultural Engineering before closing in the 1990's.

The Agri-EPI Centre is also unique in that, unlike the other specialist centres, it will cover every sector of agri-tech research

AGRI-TECH STRATEGY

In 2011, the Government's chief scientific officer, Sir John Beddington published his long-awaited report, ***The Future of Food and Farming*** which addressed the challenges of how to feed a global population of 9 billion people by 2050 in the face of climate change, growing competition for resources and changing dietary habits. However, it made scant reference to the role that agricultural engineering could play in meeting these challenges.

This omission dismayed IAgrE, together with other stakeholders such as the Agricultural Engineers Association (AEA) and Harper Adams University who commissioned their own response in a report ***"Agricultural Engineering – a key discipline enabling agriculture to deliver global food security"*** which was presented just over 12 months later to Sir John Beddington. It said "Sustainable intensification of agriculture is needed and this report emphasises the important role agricultural engineering will play in delivering this goal – and highlights the opportunities that engineering, allied with other disciplines, is already offering as part of a vision for future global food security"

The report's recommendations included:

- A new approach to encourage strategic engagement of public and private sector stakeholders for agriculture and the food chain with the UK engineering sector, from education and research through to business and practical application
- the development of education and training in agricultural engineering
- the establishment of an active research programme in engineering for agriculture
- a partnership approach to translating research and innovation into practice

The report was accepted as an addendum to the original report by Sir John Beddington who said "I welcome this report, which highlights the role and importance of agricultural and biosystems engineering in contributing to new and existing technologies to make farming more sustainable"

In July 2013, the Government launched the Agri-Tech strategy along with a funding commitment of £160 million to help the UK become a world leader in agricultural technology, innovation and sustainability. This would be achieved by funding projects to help bring researchers' ideas to market and by the creation of Centres for Agricultural Innovation. Government funding would be matched by funding from industry, and industry would be encouraged to form partnerships with scientists and researchers.

The Government's Technology Strategy Board (TSB), renamed Innovate UK, invited bids from across the agri-tech sector and in December 2014, had received 28 formal bidders to run Centres, all of whom were invited to present their case at a meeting. "It was a fascinating exercise" says Dave Ross "the criteria was made plain to all. Bidders had to fully justify the commercial benefits accruing from their research projects – along with the export opportunities".

"Innovate UK and BIS facilitated the merging of bids down to 10 leaving the way clear to whittle down the final number to just four Centres

Work starts on dairy unit at Harper Adams

focussing on specific focus areas"

The process was underway, and confirmed in the Autumn Statement of November 2015 when Chancellor George Osborne formally announced the investment of £68 million in three new agri innovation centres to supplement a new Agrimetrics Centre which had been launched in October 2015 with funding of £11.8 million.

The three centres (see panel) are designed as stand-alone units but will collaborate on a range of projects and will link into the Agrimetrics Centre with the use of big data and analytical tools to understand the needs of farmers, food manufacturers, retailers, consumers and the environment.

PARTNERS

Each of the Centres will operate as limited companies limited by guarantee, and be backed by partners from across industry.

The partners represent expertise across a wide spectrum of engineering, science and technology. They include a number of leading agricultural machinery manufacturers, also food producers, leading supermarket chains and even input from the world of aviation and Formula One. These companies will complement the work of the core members of the Agri-EPI Centre, Cranfield University, Harper Adams University and Scotland's Rural College (SRUC) along with industry partners Harbro Ltd, AgSpace Agriculture Ltd and Kingshay Farming & Conservation Ltd.

Initial areas of interest will include cutting edge technologies such as automated vehicles, unmanned aerial vehicles (UAVs or "drones"), new instrumentation to monitor both operations and in-field performance of cropping systems, as well as sensing and imaging technologies to monitor livestock production in areas such as product quality and health.

Core to the operation of the Agri-EPI Centre will be a series of farms and technology facilities equipped with advanced bioengineering, robotics and artificial intelligence systems. "We have 33 satellite farm locations targeted so far" says Dave Ross "and plan to have 6 of these up and running by the end of this year"

"These 'future farms' will provide 'show and tell' locations to develop and demonstrate technologies to UK producers, and will in addition have meeting rooms and internet connected audio visual equipment to enable us to educate and inform on current projects across the Agri-EPI Centre network".

"The Agri-EPI Centre is also unique in that, unlike the other specialist centres, it will cover every sector of agri-tech research, arable, livestock, horticulture and include such areas such aquaculture, urban farming and vertical farming"

Commenting on behalf of Cranfield, Professor Leon Terry, Director of Environment and Agrifood and Interim Agri-EPI board member, says: "Agri-EPI is an exciting opportunity for Cranfield to lead the move to more technologically advanced agriculture. It will introduce new and unique facilities based at Cranfield including a sensor development laboratory and associated diagnostic capabilities. We will also be a hub for five instrumented satellite farms – developing effective technologies for the whole sector."

Running alongside the establishment of physical buildings and equipment at the three Hubs, recruiting staff and the setting up of the satellite farms, will be the essential harvesting of ideas and research programmes. "To this end" says Dave Ross "we will be starting to establish "Think Tanks' to develop project ideas, largely based on the data emerging from the satellite technology sites. But in the meantime we are eager to hear from anyone with their thoughts, ideas or suggestions on potential technologies that will offer solutions".

"In short, we be matching up the Problem Givers with the Problem Solvers"

Neither Dave Ross nor his colleagues are under any illusion that there will be tricky issues to address on their journey. "There will be partners who are competitors. We will have to be acutely aware of the sensitivities surrounding intellectual properties and the need to maintain confidentiality in specialist areas of research".

The initial government funding will have kick-started the agri-innovation network, and co-funding has enabled

Dave Ross (right) and Richard Dewhurst

the centres to get up and running. In the future however, the approach will be to use research as a means to provide commercially-viable solutions ". . by the emergence of CE-marked products or commercial services at the end of the research chain" says Dave Ross.

Agricultural engineering can no longer be regarded in isolation. The challenges faced by the agri-food industry are complex and wide-ranging – and can only be successfully addressed through collaborative approaches between engineers, scientists, biologists, analysts and others that extend far beyond its traditional fields.

These are indeed exciting times. The Agri-EPI Centre will not be fully operational until 2018, so any assessment now is based on plans, hopes and aspirations. But to come from a virtual standing start in 2014 to the vision and progress achieved by the Agri-EPI team barely 18 months later speaks volumes for both the urgency of the task - and dedication to the cause.

AGRI INNOVATION CENTRES

Agricultural Engineering Precision Innovation Centre (Agri-EPI) - £17.7 million government investment in the new, fast-moving market of precision agriculture to help the UK's agri-food sector develop advanced technologies that will increase productivity and sustainability in UK agriculture. The Centre will have hubs in Edinburgh, Harper Adams University and Cranfield University.

Centre for Crop Health and Protection (CHAP) - £21.3 million government investment to evolutionise how farmers manage crop threats including pests and disease, both in the UK and overseas. The Centre will have its headquarters in York at the National Agri-food Innovation Campus in Sand Hutton.

Centre for Innovation Excellence in Livestock (CIEL) - £29.1 million government investment to create new livestock technology and products to boost the profitability and productivity of livestock farming. The Centre will have its headquarters in York at the National Agri-food Innovation Campus in Sand Hutton.

Agrimetrics Centre - £11.8m government investment in the use and application of big data to give the agricultural sector an evidence-based edge. Agrimetrics will be based at the Lawes Open Innovation hub at Rothamsted. Reading University will host the data science infrastructure.

AGRIEPICENTRE
Engineering • Precision • Innovation

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THE EARTH BENEATH

Agricultural engineering . . . it's in the blood

Profile of Christopher Pett, general manager of Mastenbroek and 2016 IAGRE Award winner.
Report by Marion King

Christopher Pett, general manager of Mastenbroek, the Boston based engineering and manufacturing business, has grown up in the world of agricultural engineering. His father was a farmer and engineer, and he became immersed in the world of agricultural engineering from an early age. Born in Boston, Lincolnshire he attended the Queen Elizabeth's Grammar School, Horncastle and studied for an HND in Business Studies at what was Sheffield Polytechnic.

His early career was spent in the UK irrigation industry and in 2002 he felt it was time for a career move and he joined Mastenbroek as their sales manager.

Christopher Pett

C12 Trawler truck

The Mastenbroek story is one of pioneering innovation. It was founded in 1965 by John Mastenbroek who came over from Holland to South Holland, to import and eventually manufacture machines for water management. The company's first trencher was built in 1977 and it's still in use. "Mastenbroek's story is a history of innovation. To be based in South Holland is the ideal location for water and soil management and if you can make a machine work in UK conditions it can work anywhere in the world," said Christopher.

Today the company employs 35 people and the Boston headquarters houses sales and administration, design, manufacturing and fabrication. As well as manufacturing a range of trenchers the company also engineers solutions for a variety of other equipment for example; auxiliary kit for trenching, machine automation using in-cab Trimble precision laser technology which looks after depth and gradient, allowing the operator to concentrate on steering and supervising the whole operation, plus cutting technology for sub-sea trenching, ground stabilisation and ground water control using in-situ mixing of soil and binder to create below ground structures and water course maintenance and dredging.

"The company has been export focussed from the beginning. In the 1980's the government took away grant subsidies which forced the business to develop into new markets such as, off-shore sea bed trenching for oil and gas pipes and electric cables today for renewable wind turbines," said Christopher.

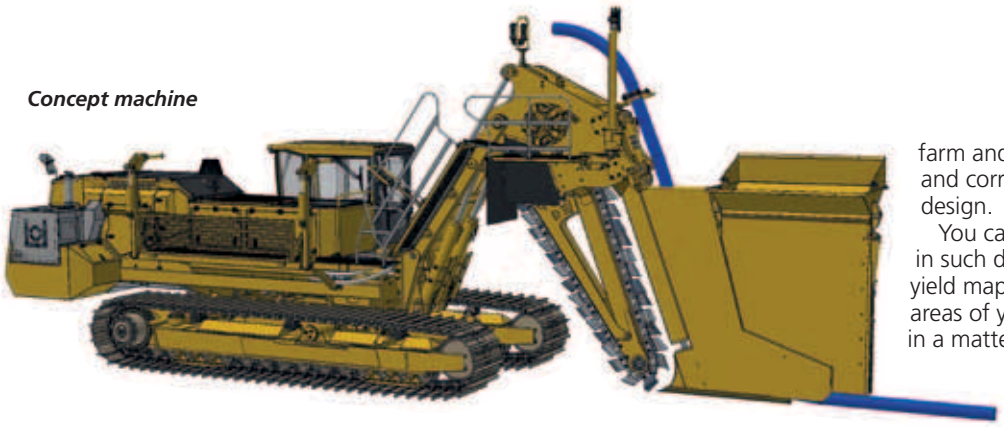
"We also reached out into world markets with oil, gas and water sanitation. With five decades of experience of designing machines for all types of soil and conditions Mastenbroek has made major steps forward in positional and grade-control accuracy of trenching applications and developed sophisticated GPS-controlled systems," added Christopher.

NEXT GENERATION

Christopher is passionate about British engineering, "We are extremely good at bespoke engineering in the UK and Mastenbroek is a company that illustrates this ability. We are good at engineering solutions, we do a lot of concept engineering which leads on to build and finally manufacture. We are able to build a 3D model and then create a machine that no one else has built in the world, which is really exciting" he added.

This passion for British engineering has also led the

Concept machine



company to build a close relationship with Boston College where Christopher is a governor. "We need to source the next generation of engineers from the local community and it is important for us to build very close links with the college. We plan to take one apprentice a year and one of our engineers is a STEM ambassador. We are also having on-going discussions with the College about the importance of maths and how we can demonstrate to students the significance of maths in the workplace.

I've always found the best engineers are the ones that have developed in-house," said Christopher.

When asked what skills are needed in his role Christopher laughs and says perseverance and a sense of humour. "It's a given that you need commercial and financial skills and have to be au-fait with employment, environmental and engineering issues but you need to be able to see what can't be seen, be open minded, looking for opportunities and solutions. Being part of a team is also important to me, collectively you are much stronger as a team. A great team with individual skills are the most significant benefit to an organisation.

It's also important to listen, be open minded and understand what the market needs. Looking and listening to what people want is what makes British manufacturing great. We are a technology driven company impassioned about bringing on new technology."

The most enjoyable part of his job is the unexpected which creates fresh challenges. "There can be a lot of frustration and I need to be aware of what might go wrong but I think I'm not bad at seeing the diversity and opportunities that are around us.

My role is also as an ambassador for the company and I think the UK too. I'm a great believer in UK manufacturing and at Mastenbroek we come up with opportunities and solutions that other countries can't."

One of the greatest challenges Christopher faces is bringing on the next generation of engineers and technicians and being able to differentiate between long and short term goals. "I think we can sometimes be a little 'short termist' in the UK with our business attitude. My focus is developing people and the technologies and sparking interest locally that engineering is a rewarding career. My ambition is to build up South Lincolnshire as leader of engineering excellence"

Model 2015 with total CPS machine automation

Another challenge is staying with your long term vision, managing your risks and avoiding distractions such as the new pension scheme, Brexit etc.

My advice to anyone wanting to enter agricultural engineering is – give it a go. It encompasses such a wide variety of skills but don't go into it with preconceived ideas and get involved where your skill set lies."

PRECISION AGRICULTURE

Looking towards the future Christopher sees precision agriculture as one of the most interesting technological developments. "The industry is very familiar with the technology now in the landbased sector, the development of machine control systems, using GPS to integrate your drainage as part of the entire farm operation, you can increase yields, micro analyse your farm and then take that information and correlate it with your drainage design.

You can survey your topography in such detail, correlate it with a yield map and see where the poor areas of your field are then design in a matter of hours what would have taken days. You are basically taking control of the operation of the machine and you are not having to rely so much on the individuals' operator skills because you are virtually automating the process so you can give the customer a much better guarantee of quality.

For British agriculture to compete against the world market we have to maximise our efficiency because your margins is not the first 3 or 3.5 tonnes, but comes from that extra 300 kilos to the acre. That's where I see the profit margin coming from and the whole GPS and the software that goes with precision farming has to be the biggest development yet."

Not that Christopher has a lot of time, but any of his spare time is given to skiing and hill walking. "I used to do a lot of coastal sailing but I just don't have the time at the moment. Fortunately I enjoy what I do, I enjoy travel, meeting people and communicating and I am very fortunate as my role is a good vehicle for just that," he concludes.

Christopher's engineering achievements have also been recognised recently by the Institution of Agricultural Engineers (IAgrE) and he has been awarded the Michael Dwyer memorial prize, which is presented to a mid-career engineer who has made outstanding progress in the agricultural engineering industry.

"Chris has a breadth of engineering talent," said Alastair Taylor, CEO of IAgrE. "He has responsibility for all aspects of Mastenbroek's business which includes a complex product portfolio, legislation changes both at home and overseas and introducing truly ground breaking products that have extended the company's reputation for reliability and performance. He truly deserves this award."

Mastenbroek Design team

ENGINEERS AND BUSINESS LEADERS OF THE FUTURE

The JCB Academy was the first University Technical College (UTC) to open its door. Six years on, it is oversubscribed and a flagship for specialist academies. CHRIS BIDDLE meets the Principal, Jim Wade

Engineering has always had its work cut out to attract young recruits in an age when the media, IT, fashion, travel, sports, retail and financial services were seemingly presented as more exciting career options.

But gradually the penny is dropping that engineering underpins all these sectors – and more. Interest has been building in recent years through increased coverage of major engineering projects such as Crossrail and new vehicle technology, and by engaging the interest of young through events such as the Big Bang Fairs.

But it was not always thus.

In 2000, Tony Blair's Labour Government announced the establishment of Academies with the aim of "improving pupil performance and breaking the cycle of low expectations."

Initially they were known as City Academies, a term that was changed to simply Academies in 2002. Included in the plans were Sponsored Academies which were intended to encourage the participation of private sponsors or industrial concerns who, it was hoped, would bring to them "private-sector best practice and innovative management".

From the Academy programme emerged University Technical Colleges (UTC), typically secondary schools taking pupils from 14-19 wishing to further their education in the STEM subjects (science, technology, engineering and manufacturing)

One of the industrialists approached in the early stages by the Blair Government was Sir Anthony Bamford (now Lord Bamford). He was asked whether he would be interested in setting up a UTC in a deprived area.

"Not really" was his answer "but I would be interested in setting up an Academy for a deprived sector, engineering!"

His company, JCB was interesting in unearthing many more young people of the right calibre and attitude who would be interested in careers with JCB and other successful engineering and manufacturing concerns. Here was an opportunity for 'home-grown' new talent, nurtured through an establishment which could reflect the JCB ethos.

True to his word, Bamford wasted no time in setting the wheels in motion, with the result that the JCB Academy became the first in a national network of some 30 UTCs that currently span the country. Some serve the interests of their local catchment areas, others serve specific industry sectors such motor-racing (Silverstone UTC), Heathrow Aviation Engineering UTC and the Health Futures UTC.

Each UTC has a University as a lead sponsor, in the case of the JCB Academy, it is Harper Adams University which gives a flavour of its specialisation. Yes, there is close association with the nearby JCB plant at Rocester, but also with the likes of Rolls-Royce, Toyota, Network Rail and Bosch Rexroth.

JCB Academy

OPENING THE DOORS

Populating the fledgling Academy with its first raft of students was an interesting challenge according to Principal Jim Wade. Jim was appointed to head up the Academy in 2009, a year before the formal opening, having previously been Principal at the highly-rated South Molton Community College in Devon

"There was a great deal of initial leg-work" he says "we ran a series of road-shows to drum up interest. The Academy draws from an 18-mile radius, but that is over 1000 square miles and does include major conurbations such as Derby, Stoke and Stafford"

The work on converting the historic Arkwright Mill on the outskirts of Rocester (parts of which date to 1781) to house the JCB Academy had begun in 2006 when new teaching units and over £1 million worth of modern engineering equipment had been installed.

In the event, 170 students enrolled for the first term, a number that would increase over subsequent years to the Academy's total capacity of 540. The £22 million facility gained Royal approval with an official opening by the Prince of Wales and the Duchess of Cornwall early in 2011.

For those pupils used to traditional school hours, the JCB Academy might have come as a bit of a culture shock.

"Our aim" says Jim Wade "is to prepare students for life in the real world from the time they join. In addition to the pursuit of technical and academic excellence, we help them develop life skills essential for success in work and in society".

School hours are more like business hours at the JCB Academy. The day is normally 8.30 to 5.00pm (4.00pm on two days of the week) and the school year lasts 41 weeks. Student dress is important, business-like for study, practical and protective for hands-on learning.

Because the working day is longer, homework for students is a rarity. "It all about time management" says Jim Wade "The curriculum is structured to encourage effective use of time, and out of school hours we encourage participation in a wide range of interests outside the classroom such as Air Cadets, Duke of Edinburgh Awards and sports"

Students joining the Academy initially spend two days at school, then a week at Harper Adams working on an engineering project such as helping design a remote controlled vehicle.

"It does throw them in at the deep-end, but we like to see the 'cut of their gib' right from the outset" says Jim Wade.

JCB Academy Principal Jim Wade

"Permeating through the Academy is a central ethos of developing employable young people with a positive attitude, emotional intelligence, intellectual horsepower, combined with academic achievement".

The emphasis is on ensuring that students not only have the requisite engineering qualifications but that they combine these with a clear and positive knowledge and appreciation of business and business practice. "It is no good having the highest engineering qualifications without the necessary interpersonal and communication skills to put them in practice" says Jim Wade.

Results from the Academy are consistently good. Of the 16-years old not going on the sixth form, a third found appropriate apprenticeships whilst two-thirds went into full-time employment. In the most recent Ofsted report, the first since the Academy opened, inspectors graded it as outstanding or good in all areas and said "All sixth form students leaving The JCB Academy went to university, found employment or entered into an apprenticeship".

A succession of business leaders and politicians visiting the JCB Academy have experienced for themselves the aspirational qualities embedded in the students. "The JCB Academy is outstandingly good, the students are highly motivated and their results are astonishingly good" commented the CEO of the Royal Academy of Engineering.

AN EYE ON ENGINEERING

And the students themselves are a very well aware of the opportunities they being given. Yunnus Bozkurt is head boy this year. Together with his twin brother Ozan, he moved to the JCB Academy when the Black Country UTC at Walsall closed due to lack of numbers.

Both are studying physics with an eye to a future career in the aerospace industry. They recently spent time with engineers from Bosch Rexroth, who designed the hydraulics system for the London Eye. "We were given a trip behind the scenes to see the hydraulic system in action at the Eye, and given access to Bosch Rexroth's headquarters in St Neots. It was a unique access to manufacturing facilities and iconic landmarks to help us think practically about hydraulics and complex engineering systems"

"We are often being challenged to come out of our comfort zone" added Yunnus, who recently had to make a formal presentation of his work to the JCB executives in the company's lecture theatre.

The creation of UTC's has not been a universal success. Some have struggled to recruit viable student numbers. Four have closed, Hackney, Black Country, Bedford and Lancashire. However, the JCB Academy goes from strength to strength – and according to education magazine, FE Week is the only UTC running at, or above full capacity

According to Jim Wade, the most recent intake of 198 students were selected from 275 applicants. That must tell you two things. The original planning and support of JCB was influential and crucial to its long-term prospects – and that engineering has become a much sought after career option for young people.

JCB Students

And perhaps more than that. Success breed success. And the former boys and girls (the alumni) of the JCB Academy are the best ambassadors for both the school itself and the engineering sector in general.

YOUNG ENGINEERS COMPETE AT KNIGHT MACHINERY

Win for the Green Monster

Luke Crowhurst and Toby Cutler of the John Deere team

This year the annual Young Engineers' Competition took place on Tuesday 8 March and was held at Knight Farm Machinery Ltd, South Luffenham, Rutland. The competition continues to be run on similar lines to those first envisaged by Richard Robinson (Autoguide Equipment). It is open to all UK landbased universities and colleges.

Teams of two students are given a set of wheels, a battery and maximum dimensions and their task is to produce a remote or radio controlled vehicle to power up a curved ramp with the one going the highest declared the winner.

In spite of much effort from the IAgrE secretariat, entries to the competition were at an all-time low, which was extremely disappointing. This low entry was exacerbated when some teams (for genuine legitimate reasons) had to withdraw at the very last minute, some on the day of the competition. This meant that only two teams competed on the day, one from Hartpury College and one from ProVQ (the John Deere apprentice training provider).

George Leighton, Stewart Truman and Harry Bridle of Hartpury College team

ON THE DAY

On arrival everyone signed in whilst enjoying light refreshments and Brian Knight extended a very warm welcome to all and wished the teams good luck.

Next came the scrutineering which unfortunately reduced further the competition element as it deemed that the "Green Monster" from the John Deere apprentice team passed whilst the Hartbury "GH&S" Machine being outside the set dimensions had failed. This meant that we had just one machine in each class.

Richard Robinson then explained the format of the competition and the necessary strategy to beat the opposition. The overall result was that the Green Monster machine just pipped the Hartbury GH&S Machine on each of the three runs but as there was only one team in each class, both teams were declared winners and were presented with power tools courtesy of our sponsors Bosch Rexroth and cash prizes from the Douglas Bomford Trust.

Following a delicious lunch we all listened to an excellent illustrated talk by the inspirational Brian Knight who then took us for a very informative (and mind-blowing) tour of the works. All this ensured that those who attended, as always, enjoyed a great day.

Special thanks go to Brian Knight, who made us so welcome; our sponsors Autoguide Equipment, Bosh Rexroth and their very supportive representative Sean Kilgallen; the Douglas Bomford Trust and IAgrE; Richard Robinson, the very enthusiastic prime mover; Peter Leech for keeping track of the scores; the IAgrE secretariat and in particular Sarah McLeod for all their hard work behind the scenes.

John Deere team with the Green Monster

SUMMARY

This year the lack of enthusiasm for the competition has been very disappointing. Following the competition a brief survey suggests that the timing of the event, i.e. just before Easter is right. However, if any university/college staff have any suggestions of how to improve the entry, please let the IAgrE secretariat know. We would welcome your suggestions/ideas. Provisional date for the 2017 competition is Tuesday April 4th.

DOUGLAS BOMFORD TRUST

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Telephone: +44 (0)1234 750876
www.dbt.org.uk enquiries@dbt.org.uk
Secretary: Paul Miller
Administrator: Elizabeth Stephens

GENERAL MANAGEMENT BOARD MEETING HELD IN APRIL

A meeting of the Board of Trustees was hosted by AGCO at Stoneleigh Park in early April and was attended by all but one of the Trustees. At this meeting the Trustees:

- Reviewed the administration and financial position relevant to The Trust.
- Reviewed the progress of research projects and other activities that are refunded by The Trust.
- Examined new proposals for funding and made recommendations as to which of the submitted proposals should be funded: The Trust agreed to support activities relating to:
- The monitoring of grazing livestock at Liverpool John Moore's University subject to a positive response from an invited referee.
- Approaches to educating learners in how software development can assist in fuel economy and emissions reduction at Hereford and Ludlow College, and
- A novel EM sensor for measuring fish at the University of Liverpool.

It was also agreed to extend The Trusts involvement with the Arkwright Engineering Scholarship Scheme that aims to promote engineering to those studying for A-levels at school and to seek cooperation with the Agricultural Engineers Association to broaden the possibilities for providing work experience for sponsored students.

Studentships

Undergraduate students from Harper Adams University who had successfully applied for Douglas Bomford studentships had their awards presented to them at a special scholarships presentation held at the University on 17th February 2016. Awards were made to William Ashton, John Nixon, James Charnley, Binbin Dong and Thomas Sutton and The Trust was represented at the presentation event by Dr David White in his role as a trustee.

Dr David White, trustee (centre) and recipients of Douglas Bomford studentships at Harper Adams University (left to right John Nixon, James Charnley, Tom Sutton and William Ashton)

Travel and Small Project Awards

The Trust contributed to an "Engineers without Borders - Sheffield" project concerned with the development of a pedal-powered water pump for irrigation use. The objectives of the project included:

- To develop pedal-powered water pump technology so that it can be used as a viable, small scale, off-grid method of irrigating low-acreage farmland in Northern Malawi during the dry season;
- To provide EWB-Sheffield members with invaluable experience working on engineering development projects abroad thereby developing their skills in designing engineering solutions and implementing complex agricultural projects.

Sam Stedman and Andrew Merson visited a collaborating organisation in Malawi during August to October 2015 and provided The Trust with a comprehensive report of their activities and findings on their return. Copies of this report are available from the secretary to The Trust on request. It was interesting to note that observations relating to their initial testing of a pump design included:

- That women were much less comfortable pedalling the bicycle than the men. The reasons were: they did not usually ride bicycles so the wobbling made them feel unsafe, they did not want to show their legs to the men when pedalling, and the seat was very firm which was uncomfortable.
- Initially men had to be encouraged to sit on the bike and pedal with their legs instead of using their arms to turn the cranks. (They did this with one person on each crank arm)
- Users were disappointed with the flow rate in proportion to the amount of work they had to put in.
- The pump had to be re-primed many times during pumping
- Users preferred using the mountain bike we supplied as opposed to their own local bike as the higher gear ratio allowed them to pedal more slowly
- Users could not put the pump into transportation mode on their local bicycle because the rear mudguard was too wide to fit inside the pump casing.

Trials with the pedal-powered pump in Malawi

LAST WORD:

Random thoughts by The Engineer

WHAT IS THE POINT OF AGRICULTURAL ENGINEERING?

The Institution is currently considering whether its Memorandum and Articles of Association need updating, and of course that document defines the purpose of the Institution of Agricultural Engineers. In a nutshell, it exists to promote and support agricultural engineering, which then begs the question 'What is the point of agricultural engineering?'

I think a visitor to the UK could be forgiven for thinking that all science, technology and engineering exists solely to put as much money as possible into the hands of the Chancellor of the Exchequer. Innovate UK, a major funder of applied R&D, makes no secret of that: all proposals for grants have to score highly in terms of economic benefits, be led by industry and have a route to commercialisation. Even research council support for science – which we would have traditionally seen as 'blue skies' and far removed from filthy industry – now has a very clear steer towards commercialisation and economic benefits.

For agricultural engineering, opportunities for public funding for anything other than industry collaborations are almost nil, and those that do exist are open to only a few select institutions. So what would an inventor do (and I am sure there are a number of you out there) with a good idea, say, to half the environmental impact of some aspect of agricultural production by changing practice? Unless there is some 'product' that can be sold to farmers, forget it, no one will fund this.

> Unless there is some 'product' that can be sold to farmers, forget it, no one will fund this.

I did a brief survey of scientists, including one agricultural engineer, about why they chose such a career path. Ok, actually I just asked my family. None of them said their motivation was to improve the UK economy, nor to make lots of money for themselves (although one would do almost anything for an iPhone 6). In some vague, fluffy way, we all want to do some good in the world. I feel very dispirited by the relentless, ugly focus on money-making.

The point of agricultural engineering is clear if you look at what it has achieved over the last century: arguably the most crucial component of a secure supply of quality food. But just as important are the immense improvements in the quality of life. Just think how crops were sown and harvested before mechanisation –back-breaking work, often done by women and children. These benefits are priceless. Agricultural engineering has changed peoples' lives in ways that are so fundamental we have forgotten about it.

And there is more to come, I am sure. But not with the current funding regime. Altruism is of no interest. Of the three pillars of sustainability, only one matters now, the others we pay lip service to. Yes, agricultural engineering employs many people and contributes to the UK GDP. But that isn't the most important thing. Yes, the treasury needs income, and we need entrepreneurs to ensure it gets it, but we don't *all* have to make piles of money. Some of us can just try to make the world a better place and at the end of the day feel quietly satisfied that we at least haven't made it worse.

> Agricultural engineering has changed peoples' lives.

NEW FEATURE

Contributions are invited for this new feature in Landwards. The aim is to present original, perhaps contentious or provocative opinion by IAgrE members on an industry related topic. Authorship will be credited if requested or appear under the nom-de-plume of ***The Engineer****. Copy for consideration should be around 750 words and be sent to the Editor (chris.biddle@btinternet.com)*

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IAgrE Annual General Meeting and **Awards** 28 APRIL 2016

JCB HOSTS IAGRE AGM AND AWARDS

Rob Merrall elected as President for 2016/17

Meeting of IAgrE CEOs

John Smith, JCB Agriculture General Manager welcomes delegates

The 2016 IAgrE Annual General Meeting combining the Council Meeting and presentation of Awards was held at the impressive headquarters of JCB Landpower at Rocester on 28 April.

Over 30 members and guests were welcomed officially in the JCB Theatre with an overview of the company before the official proceedings commenced.

In his final task, outgoing President Professor Mark Kibblewhite said that the Institution was in a strong condition especially in terms of energy, direction and financial stability and praised the officers employed by IAgrE and the leadership of CEO Alastair Taylor.

He said "It has been a privilege and delight to serve IAgrE as its President. My term has been convivial and enjoyable, and I really appreciate the support and friendship extended by the whole team at Cranfield and by Alastair Taylor in particular".

Presenting the Accounts, Alastair Taylor confirmed that the Institution was financially secure, but added that there would be greater expenditure in 2016 due to the redevelopment of the website and other initiatives aimed at investing in the future of IAgrE in the future.

The meeting then saw the election of Dr Robert Merrall as President for 2016-17 with Professor Jane Rickson as President-Elect.

Robert Merrall runs Merralls

IAgrE AGM

Consulting and is an independent consultant with Innovate UK, the Government's Innovation Agency. Well-known in the agricultural sector, Rob spent his early career in agricultural engineering research at Cranfield University before working in roles with the Renault Group, as a director of two major UK farm equipment distributors and as a director of the Royal Agricultural Society of England.

"I am honoured to be appointed to this important role and look forward to helping the Institution raise its profile, continue its work post the Government's 2011 Foresight Report 'Future of food and farming', build new 'Agri-Tech' networks and encourage profitable innovation amongst agricultural engineers," said Rob.

President Elect is Professor Jane Rickson, IAgrE Fellow and Chartered Environmentalist. Jane is a soil and water engineer, involved in research for Government and private sector clients at Cranfield University. She is also involved in training and teaching on Masters and continuing professional development courses in Land Reclamation and Restoration, Environmental Engineering and Soil Management.

Commenting on the appointments IAgrE's CEO Alastair Taylor said, "The IAgrE team are looking forward to working with Rob as the new President, together with all newly appointed council members, to develop the Institution over the next few years. Rob brings an amazing array of contacts and ideas which we hope to harness in further growing the reputation of, and respect for our profession. It is important that I express my thanks to the outgoing President for his wisdom and good humour during his term of office."

Following lunch, guests were taken on a conducted tour of the Story of JCB exhibition and of the Loadall production facility.

Mark Kibblewhite (left) hands over to Rob Merrall

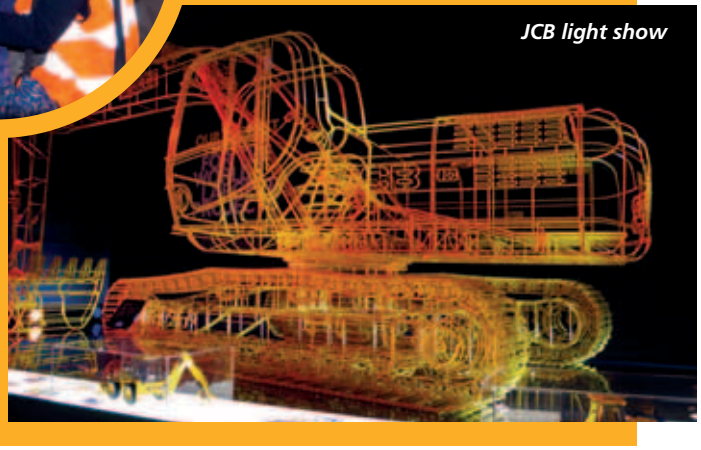
The story of JCB Tour


Introduction to Story of JCB

The beginnings


IAgrE's Elizabeth Stephens in the seat


Flying the flag


JCB light show

2016 AWARDS

The new format IAgrE Awards were presented along with supporting citations following the AGM and Council Meeting.

HONORARY FELLOWSHIP AWARD

One of the Institution's most important award of an Honorary Fellowship was presented to **Geoffrey Freedman**, IAgrE Past President and of the Forestry Engineering Group.

In his response, Geoff Freedman said "Over the last 20 years, I know I made the right choice in becoming part of the IAgrE 'family'.

I would like to thank the Institution sincerely for this award but not so much for the award as for what it means. Although I was and always will be member of Institution of Civil Engineers (ICE), my work in rural areas always felt on the fringe of pure Civils and when I joined IAgrE I immediately felt I had arrived somewhere.

When I became President I wrote a piece in Landwards which was my considered opinion about why we have Institutions and why people in the Industry should support them. During it, I coined the phrase 'your Institution is for life'. It is what I still honestly believe and was very pleased that Chris Whetnall saw fit to repeat it at his retirement dinner.

If you check my CV on my website, you will note my Presidency of this Institution is at the top. I may have 22 major awards - including a gold medal from ICE for Innovative Design - but my association with IAgrE tops everything. I am not fully retired yet and continue to work with FEG and am still designing bridges while also recruiting for IAgrE - the family I was welcomed into 25 years ago.

Congratulations to the management of the Institution (a group of people who seem to have been bred for the job). In particular, for making such an impact on the recruitment of the young, whilst maintaining respect for older members. As I look around, I am struck by the fact that there are so many faces I don't recognise – for it means that there are lots of new members and that the Institution is evolving. You are indeed demonstrating that 'YOUR INSTITUTION IS FOR LIFE'.

DOUGLAS BOMFORD PAPER AWARD:

Dr James D Browne AIAgrE and D J Peter Frost MIAgrE for their paper "The effects of storage time and temperature on biogas production from dairy cow slurry" published in Biosystems Engineering, January 2015. This award had been presented at the Northern Ireland Branch AGM in March by President, Mark Kibblewhite.

BRANCH MERITORIOUS SERVICE AWARDS:

Hugh McIlvenna MIAgrE: Northern Ireland Branch (presented earlier in Northern Ireland)
David Yates MIAgrE: East Midlands Branch

David Tinker FIAgrE: South East Midlands Branch

SPECIAL IAgrE AWARD FOR FORESTRY:

John Scott (Award to be presented at the FEG Symposium in September)

IAgrE AWARD FOR CONTRIBUTION TO THE LAND-BASED SECTOR:

Ronald Knight: for his work in restoring combine harvesters

Nick Tillett, MIagrE: Tillett and Hague Technology

MICHAEL DWYER MEMORIAL AWARDS:

Andrew Kneen: Director of Househam Sprayers

Christopher Pett: General Manager, Mastenbroek

AWARD OF MERIT

Ian Duff, MIAgrE, Northern Ireland Branch

OTHER AWARDS

The **IVEL AWARD** for a new product was won by **Poclain Hydraulics** and presented at LAMMA in January, as was the **STUDENT PROJECT AWARD** won by **Cennydd Hughes**, formerly of Coleg Sir Gar for his "Multi-Purpose Log Splitter". Two other Awards, the JOHNSON NEW HOLLAND TROPHY and the IVEL SAFETY AWARD were not won during the past 12 months.

WEST MIDLANDS

AGM
At the recent West Midlands Branch AGM retiring Branch Secretary Mike Sheldon was presented with a certificate 'In recognition of 35 years of service to the West Midlands Branch of the Institution' by Dr Mark Cooper, IAgrE Vice President.

In reality nobody is quite sure how long Mike has been a member of the Branch committee and it is more likely 35 years plus. During his time on the committee Mike has served in several roles including Chairman, Treasurer and latterly, for at least the fifteen years I've been a member of the Branch, as Honorary Secretary. On behalf of all the West Midlands members I would like to say thank you to Mike for his work as secretary and wish him all the best for his well-earned retirement. Ian Moore – Branch Chairman

TURFCARE ENGINE EVOLUTION
In February the West Midlands branch members were given a very interesting and informative presentation on the 'Evolution of the Turfcare Engine' by IAgrE member Alex Brawn, Engineering and Regulations Manager for Kawasaki Motors Europe. Alex started his presentation with an overview of Kawasaki Heavy Industries Ltd which was established in 1896 and now employs around 35,500 people worldwide. He explained how the general purpose engine business is part of the Motorcycle and Engine Company and accounts for around 25% of Kawasaki's 11.4 billion

Euro annual turnover. Alex then expanded more on the company's product range and the technology behind it, with a brief overview of some of the topics covered during the evening's presentation below. Kawasaki produce both two stroke and four stroke engines for use in a wide variety of applications, with the biggest being turfcare equipment. The smaller two stroke engines are traditionally used for brush cutters, leaf blowers and hedge cutters. The four stroke engines are either single cylinder or V twin, 603cc. If the engines are any larger than 1000cc or produce any more than 30kW they fall in to a different and more demanding EU emissions category when the new non-road mobile machinery' emissions regulations come into force in 2019 All the V twin engines are manufactured in the US which is the world's biggest market for professional gasoline turfcare equipment.
The turfcare market uses the V twin engines for larger ride on mowers, both professional and domestic, and the single cylinder engines for walk behind mowers and smaller ride on mowers. Big OEM customers for these engines include John Deere, Husqvarna, Countax (Ariens), Viking and Hustler. Other niche customers include for example Czech company, Dvorák who manufacture a range of radio remote control 'Spider' slope mowers for grass cutting in extreme and difficult environments. Alex's presentation was supported by a superb 'exploded' single cylinder engine, see photo, and lots of engine components for members to look at and handle.

OBITUARY:
PROFESSOR CHRISTOPHER WATHES OBE FIAgrE
19 May 1952 - 6 May 2016

Christopher Michael Wathes OBE died on the 6th May 2016 after 5 years hard and difficult battle against Parkinson's disease.
Christopher was born in Birmingham in 1952 and graduated from the University of Birmingham with a BSc degree in Physics in 1974. He graduated from the University of Nottingham in 1978 with a PhD in Environmental Physics. His involvement with the agricultural engineering community increased substantially when, in 1990, he moved from Bristol University to Silsoe Research Institute and became head of the Welfare Science Division – one of the eight divisions of the Institute at that time. In the mid-1990's the Institute was re-structured to give two main research divisions with Christopher becoming the head of the Bio-Engineering Division and in 2003 he was appointed Director of Science at the Institute. In 2005 he transferred, with his research team, to the Royal Veterinary College where he became Professor of Animal Welfare and director of the Centre for Animal Welfare. He joined the Institution of Agricultural Engineers in 1991 as a Fellow and contributed to many activities including being a member of Council between 2002 and 2005 and convened IAgrE's "Integrated management Systems for Livestock" Conference held at Selwyn College in September 2001.
Christopher was a research scientist who worked for all his career in agricultural and veterinary science. His research interests were broad, ranging from animal welfare to environmental physics while taking in agricultural engineering, environmental biology and veterinary ethics. Among many things that he will be remembered for was the EU Air Pollution Project relating to the pollution in and from farm animal houses – this project established base data on the emissions associated with animal production systems, and the environments in which animals lived. His strong scientific drive established a programme at the

interface between environmental physics and animal welfare, and the research students and teams he developed through his career have demonstrated the value of such research for both agriculture and animals
From 2005 to 2013, Christopher was Chairman of the Farm Animal Welfare Council, which advised the Department for Environment, Food and Rural Affairs (Defra) on the welfare of farmed animals. He was a member of Defra's Review of Avian Quarantine in 2005 and the co-founder of the European Forum of Animal Welfare Councils (EuroFawc).
Christopher Wathes was awarded the Research Medal of the Royal Agricultural Society of England for research on environmental management for livestock in 2002. In 2013 he was appointed an Officer of the Order of the British Empire in the Birthday Honours for services to animal welfare. Christopher received the 2016 Universities Federation for Animal Welfare (UFAW) medal that was to be presented at a ceremony in June but he died knowing that he had received this award.
Christopher was a strong character who made a tremendous contribution to agricultural engineering and issues relating to the science of animal welfare. He will be sadly missed by many of us.

OBITUARY:
PETER STEARNE MIAgrE
20 August 1960 - 23 April 2016

Peter Stearne grew up on a small farm in Cambridgeshire which housed a collection of 28 full size steam traction engines. Since graduation from the National College of Engineering in 1981, Peter had been working in horticulture and agriculture as a consultant, both for ADAS and latterly running his own international consultancy business with his wife, Kathy. Clients included Kew Gardens and RHS Wisley as well as commercial growers.
Peter was an avid model engineer building from scratch a working quarter- scale fairground with 3 live steam traction engines. He was also an expert on the history of fairgrounds and presented talks and lectures aboard cruise liners.

WREKIN

LATEST ENGINE DEVELOPMENTS
The concerns of the world for emission control on engine exhausts opened up the way for an intense meeting where the delivery of post diesel combustion acronyms and associated treatments outlined by Malcolm Yearsley of CNH Industrial hushed and focused the audience at the meeting on 9 March.
Initially contrasting North American with European standards he reminded the audience of litigation propensities across the Atlantic whilst he guided thoughts of development from Tier 3 through Tier 4 A and 4B (Euro 6) in various emission outputs, e.g. Carbon Monoxide, Nitrous Oxide, Hydrocarbons and particulate Matter. Massive improvements were noted between the stages, e.g. Particulates down by 90% to 4A and then a further 90% to 4B. Reduction in Nitrous Oxide similarly had followed 65 % and 95% reductions respectively. Hydrocarbon reduction of 98% was cited with Carbon Monoxide suggested as next for scrutiny.
Outlining the functions and efficiencies of the main systems of emission control, **S**elective **C**atalytic **R**eduction and **E**xhaust **G**as **R**ecirculation he linked these separately with CNH products to engine power levels currently but suggested combined use with certain products soon particularly with cooling on EGR.
The meeting was reminded of the immense pressures now in use (2200 bar) within diesel injection systems as combustion efficiencies are ever increased. Practical use and management of Ad Blue injection (**D**iesel **E**ngine **F**luid to be more correct) were covered in the style of a truly informed engineer with continuous references to operators in some parts of the world 'avoiding or restricting' use of DEF – basically as it costs money, and how engine management systems are set to counter such deliberate acts.
Faced with vehicles (HGV's particularly) being restricted to a creep mode can be challenging to operators who pay no regard to emission by not refilling DEF tanks, or filling them with fluids other than DEF of the right grade!
So as with many IAgrE meetings the audience was left fully appreciative of such complex developments, where issues may be raised to in the future, the ingenuity of both designer and users in practical operation alongside the need to demonstrate responsible operation.

WESTERN

MONITORING FLEET EFFICIENCY
We're all aware of the current impact of lower fuel costs on our travel costs and it would be easy to forget about efficiency, however at the Western branch meeting 9 March we were reminded of the role of monitoring and reporting plays in vehicle operation. David Lester, Head of Fleet Manager at MAN trucks presented to us "Vehicle and Plant telemetry systems".
MAN Truck and Bus of one of the leading suppliers of commercial vehicles and transport solutions. It is therefore committed to having the necessary management systems in place to support their products and drive down logistics costs.
The capital investment of a tractor lorry unit is approximately £70,000 with fuel accounting for 45% of operator annual costs. The MAN truck fleet telematics systems, developed through their technology partnership with the German engineered system Microlise, uses monitoring sensors located throughout the engine, transmission and braking system to record the trucks performance. Ultimately these KPIs are a direct result of the driver's action and response to traffic conditions.
Although this might be interpreted as the 'big brother' in the cab, businesses operating on a just in time principle rely on the professionalism of their drivers. The old adage "if you can't measure it, you can't manage it" applies.
Even idling can consume anything up to 2.4 litres of fuel and hour and MAN identifies anything over 2 minutes idling as inefficient.
Another performance indicator is braking. We all seen a tractor unit cab test the full range of suspension as it comes to a stop – MAN therefore includes this in their monitored parameters.
David explained how small consistent savings per vehicle could result in significant saving of up to £100,000 a month for vehicle fleets of over 900 units.
The Microlise system also uses an on-board camera to record what the driver sees from the cab to defend inaccurate incident claims from drivers. Overall an enlightening evening presentation of current engineering technology used for logistics management

EAST MIDLANDS

VISIT TO BAILEY TRAILERS

A trailer is just a trailer - or so you may think until you pay a visit to Bailey Trailers at Sleaford. Founded by Tom Bailey in 1982, the company has seen continuous growth. Today it's not just Tom but also his four children involved in the business. For the visit we were hosted by both Tom and his eldest son Michael Bailey and was attended by around 30 members.
The visit was something of an eye opener much driven by the passion and enthusiasm for the business shown by both Tom and Michael. Surprising to some was the equipment employed by Bailey Trailers like their new laser cutter that had just replaced the previous one after five years to increase capacity. Growth has been somewhat rapid in the last few years, so despite moving to new premises in 2010, in 2015 they extended again giving a total of 60,000 sq ft of production area. In addition they have already purchased additional land so further expansion is possible.

The question asked near the end of the meeting was "How have you been able to achieve continuous growth"? The replies from Tom and Michael included product support, their ability to tailor products for customers and a bit of luck. In addition to these it was quite obvious from the visit that they exhibited some other traits - they were innovative and were always trying to improve their products, they demonstrated they were prepared to invest in the business, had a keen eye for detail, they built products customers wanted and were passionate about what they produced. It was a privilege to visit such a success story from our industry and our thanks go to Tom and Michael as well as the ladies who supplied copious quantities of cakes, tea and coffee.

NORTHERN IRELAND

REMOTE SENSING IN AGRICULTURE
Dr Toby Waine, a Lecturer in Applied Remote Sensing at Cranfield University was the guest speaker at the meeting of the Northern Ireland branch on 10 March when he discussed Applied Remote Sensing in Agriculture. Which was also attended by IAgrE President Mark Kibblewhite.
Since the start of manned flights, pictures taken from a height have been used to view farm land. The images have proved useful in viewing crops, monitoring crop establishment and identifying problem areas. The development of digital cameras and the range of aerial vehicles to carry them (satellites, aircraft and now unmanned "drones") is now advanced and a new dimension in agricultural science now exists to exploit the available data. Remote sensing for vegetation monitoring is now a sophisticated tool and the subject of Dr. Waine's research and teaching at Cranfield.
The aim is to select the correct spatial resolution (pixel size) for the application. There is a trade-off between greater pixel size and coverage (the area on the ground). For some purposes, such as regional crop monitoring, images taken over field sized areas (250 metre pixels) from satellites are sufficient to monitor whole countries, provided that there is minimal interruption due to cloud or weather.
High definition work takes a lot of time due to the large number of image frames to be recorded and analysed. Individual frames can be stitched together automatically, using specialist (photogrammetric) software, to provide high definition field-size images. Automation software is also available to guide aircraft flying within a grid pattern. However there are current aviation restrictions in terms of altitude (currently 110 metres) and control range has to be within line-of-sight for UAVs which may limit the quality of the images obtained. The fast growth and development of certain crops, especially salad vegetables, require frequent observation and fast

IAgrE President Mark Kibblewhite (centre left) and Dr Toby Waine (centre right)

turnaround of data to guide management decisions. Such a system can detect when individual lettuce plants are ready for harvest.
Cranfield University, working with G's Growers, carried out a comparative test of agricultural data collected during 2014 from various commercial UAV services. Affordable user-friendly "drones" to carry cameras are a convenient way to provide local control of frequent fly-over coverage of, for example, trial plots or small fields. Ongoing technology developments will ensure that these limitations will be overcome in the near future. The quality of data available now helps growers to monitor crop growth and the effects of limiting factors like impeded soil drainage, soil type and fertility, compaction or pest damage.
The technology is now good enough to monitor harvest maturity of individual plants like lettuce and, as such, will be an increasingly used management tool for intensive crop enterprises of all sizes.

Dr John Mawhinney

RURAL ELECTRICITY NETWORK

A recent meeting of the Northern Ireland branch of IAgrE centred on a presentation by one of our own members, Mr John Mawhinney, on the subject of "Rural Electrification – The success and future challenges". Mr Mawhinney has spent his career in the electrical supply industry and is Head of Operations at Energia. Energia is part of the Viridian Group and supplies energy to businesses throughout the island of Ireland from both conventional and renewable sources.

The presentation began with reference to the innovative first steps in electrical technology such as that by Benjamin Franklin in the mid 1700s with his famous kite experiment, to capture electrical discharge from storm clouds.

The first generation systems in Northern Ireland were small and set up locally for specific purposes such as charging batteries or steel galvanising. In 1934 there were 16,000 connected customers and 2400 electric cookers. The next year there were 26,200 customers across 93 towns and villages. Expansion gradually resumed after the war years and 3 separate new power stations were in operation by 1951. There were 17,000 farms connected at this stage, 23,000 by 1960 and 36,000 by 1970.

High-capacity power stations are capital intensive and need to be kept busy to cover their fixed costs. Because the demand for power can vary so much the supply network has to be able to respond quickly to changing needs. Security of Supply and reduced costs are now centre stage again with plans for a new 400 kV Interconnector between Tyrone and Cavan. Recent years have brought a huge increase in supply from renewable sources, especially wind turbines. But this is weather dependent and often not available at the correct times to match peak demand. The ESB Turlough Hill pumped-storage generation station in Co Wicklow is a good example of how surplus electrical power can pump water up to a reservoir from which it can be released at short notice to the turbines for power generation. It was a major construction project and significant development in the early 1970s.

Energia has a significant windfarm portfolio throughout Ireland and the presentation included an impressive aerial overview of the newest 95MW wind farm in Co Donegal which is due to open in January 2017.

Underground bulk gas storage is proposed for sites in Co Antrim to provide buffer capacity and take advantage of times when fuel prices are attractive. Recently, a 10MW battery storage facility was opened at Kilroot with potential to grow to 100MW if the market conditions permit. Such new and emerging technologies will play an increasing role in the generation mix in years to come.

LOW ENERGY DWELLING IN CO DOWN

Northern Ireland Branch members recently went to see a new low energy dwelling on the farm of Mr Bob Armitage near Ballynahinch, Co. Down. Bob is a retired Chief Engineer, who worked in industry from 1949 to 1993, and is a regular Branch Associate attendee at our Branch meetings. He is a keen advocate of renewable energy sources and this major project has taken a lot of his time during the last 2 years. He first discussed his ideas with his grand-daughter who is an architect, based in Scotland. She drew up the plans and, after planning permission was obtained, tenders were sought for the basic structure. The building is designed with a high standard of insulation and to use a mechanical extract ventilation system with heat recovery. The contract was awarded to Tyrone based Leadon Timberframe who manufacture and erect timber frame building kits to ISO 9001 standard. The associated site preparation and building work was carried out by a local contractor. Because of the close proximity to 2 local quarries the reinforced concrete foundation and reinforced sub-floor are isolated from the rock base by a 75mm layer of consolidated stone dust.

The building is constructed with a high standard of insulation for heat retention and, at the time of our visit, was almost ready for occupation. A 9kW Dimplex Air Source heat pump is installed although the design indicated a total space and domestic requirement of 5.7kW . Dimplex SmartRads are used throughout the building for space heating.

The building is mains connected and there is a bank of South facing 6.5kW photo voltaic panels on an adjacent livestock shelter roof. Surplus power is fed back to the grid. During the day this generation capacity is often used to top up the batteries in Bob's plug-in hybrid vehicle.

Condensation Solutions supplied the main ventilation and heat recovery unit which extracts from the bathrooms and kitchen. It also brings in filtered fresh air that is preheated via an inbuilt heat exchanger with a claimed efficiency of more than 90%. Mr P. Gallagher from Condensation Solutions was present and demonstrated the operation of a wide range of their axial and centrifugal fans.

The evening meeting finished with a discussion around the technical aspects, the planning process and the practical issues in all the stages of the build. Bob also provided us with an interesting summary of his own career experience in electrical / general engineering.

Bob Armitage

Low energy dwelling

MEMBERSHIP CHANGES

ADMISSIONS

Fellow
Prof David W Hopkins (Western)

Member
Day J (East Midlands)
Williams MG (Wrekin)
Wyatt A (Southern)

Associate Member
Adams NV (SE Midlands)
McVittie G (Yorkshire)
Rickwood D (SE Midlands)

Associate
Manson R S (Scottish)

STUDENT

University of Aberdeen
Roberston CJ

Harper Adams University
Peters M

Hartpury College
Ashwin C
Bowen J
Bridle H
Greenfield E
Leighton G
Plant J
Price A
Sealey F
Truman S

Reaseheath College
Allard J
Armstrong D
Bailey A
Ball J D
Bennigsen JG
Bickford S
Bonser G
Brindley M
Brown P
Burton J W
Clewley C
Coombe A
Craddock J
Davies D J
Fox S
Galley J
Hamer T
Hartshorne B
Herward N
Hollingworth J
Horler M
Hughes G R
Hughes S
Jones E
Kelsall I
Knight A
Leyland J P
Maddox B
Mashall L
Mosford C
McLintock E
Mottershead W
O'Hagan C
Osman J
Raven M B T
Salter C
Scott R H
Thomas J
Timmis J
Tizzard J
Torr J
Williams J
Wilson J C

University of Portsmouth
Chapman T P

West Anglia Training Association
Graham C A

DEATHS

We have recently learned of the death of the following members and we send our condolences to their family and friends:

Mr T D Angier MIAgrE (West Midlands) a member since 1963

Mr W J Edwards AIAgrE (Wrekin) a member since 1984

Mr G L Taylor-Hunt MIAgrE (South Western) – a member since 1964

Mr W J McClement IEng MIAgrE (Scottish) – a member since 1958

Professor C Wathes, FIAgre – a fellow since 1991

TRANSFERS

Member
Dr Seamus D Murphy

Associate Member
Harrison LA (from PreProf)
O'Leary A – (from PreProf

Associate
Greenwood O (from PreProf)
Jones E W (from PreProf)

SOCIETY FOR THE ENVIRONMENT

REGISTRATIONS CEnv
Gumbe L O M

ENGINEERING COUNCIL

REGISTRATIONS CEng
Carter RJD

EngTech
Adams NV (SE Midlands)
Day J (E Midlands)
McVittie G (Yorkshire)
Rickwood D (SE Midlands)

LONG SERVICE CERTIFICATES (JANUARY – MARCH 2016)

Name	*Grade*	*Date of Anniversary*
50 Years		
Anthony Arthur Wiliam Chestney	MIAgrE CEng	13/01/2016
Edward Stuart Estcourt Southcombe	FIAgrE CEng	13/01/2016
Brian Terence Webb	MIAgrE IEng	13/01/2016
35 Years		
Michael Willian von Kaufman	MIAgrE IEng	07/01/2016
Richard Gladstone Brooke	FIAgrE CEng	08/01/2016
Paul Ashley Hill	MIAgrE	14/01/2016
Arthur George Bellerby	AIAgrE	19/01/2016
David Richard White	FIAgrE CEng CEnv	21/01/2016
Fergus Robertson Mitchell	AMIAgrE	12/02/2016
Timothy Philip Reynolds	MIAgrE CEng CEnv	12/02/2016
Rupert Colin Hennah	MIAgrE EngTech	19/02/2016
Jeremy Paul White	AMIAgrE	05/03/2016
John Colin Taylor	MIAgrE CEng	12/03/2016
Murray Anthony Eaglesome	AIAgrE	12/03/2016
Adrian Guy Snow	MIAgrE EngTech	14/03/2016
David Adam Scotchmer	AMIAgrE	19/03/2016
25 Years		
Christopher Michael Wathes	FIAgrE	10/01/2016
Jonathan Henry	AIAgrE	01/02/2016
John Richard Sivil	AMIAgrE	20/02/2016
Malcolm McGechan	FIAgrE CEng	25/03/2016

LONG SERVICE CERTIFICATES (APRIL – JUNE 2016)

Name	*Grade*	*Date of Anniversary*
60 Years		
Abdullah Arar	FIAgrE CEng	24/04/2016
Peter Alfred Cowell	FIAgrE CEng	24/04/2016
Neville John Hubert	HonFIAgrE CEng	24/04/2016
50 Years		
Andrew Barber	MIAgrE	05/04/2016
Michael John Hann	FIAgrE CEng CEnv	05/04/2016
Roy Streatfield	MIAgrE CEng	05/04/2016
35 Years		
Kenneth James Gordon	MIAgrE CEng	17/05/2016
Stephen John Temple	FIAgrE CEng	03/06/2016
Andrew Roycroft	AMIAgrE	04/06/2016
Jonathan Alan Charles Whiteley	MIAgrE IEng CEnv	11/06/2016
Christopher Gower Brown	MIAgrE CEng	21/06/2016
Mark John Cooper	FIAgrE CEng CEnv	29/06/2016
25 Years		
Walter John Golden	AIAgrE	30/04/2016
Brian Hagan	AMIAgrE	29/05/2016

ACADEMIC AND COMMERCIAL MEMBERS

ACADEMIC MEMBERS

Bishop Burton College
York Road
Bishop Burton
Beverley HU17 8QG

Brooksby Melton College
Asfordby Road
Melton Mowbray
Leics LE13 0HJ

Coleg sir Gar
Gelli Aur Campus
Llandeilo
Carmarthenshire SA32 8NJ

Cranfield University
Cranfield
Bedfordshire MK43 0AL

Duchy College
Stoke Climsland
Callington
Cornwall
PL17 8PB

Easton & Otley College
Easton
Norwich
Norfolk, NR9 5DX

Greenmount Campus
CAFRE
22 Greenmount Road
Antrim,
Northern Ireland BT41 4PU

Harper Adams University
Newport
Shropshire TF10 8NB

Institute of Technology
Tralee
Clash,
Tralee
Co Kerry, Ireland

Myerscough College,
Bilsbarrow
Preston
Lancashire PR3 0RY

Newcastle University
King's Gate
Newcastle Upon Tyne NE1 7RU

Pallaskenry Agricultural College
Co Limerick
Ireland

Plumpton College
Ditchling Road
Lewes
East Sussex, BN7 3AE

Reaseheath College
Reaseheath,
Nantwich
Cheshire, CW5 6DF

Royal Agricultural University
Cirencester
Gloucester, GL7 6JS

Sparsholt College
Sparsholt,
Winchester SO21 2NF

SRUC – Auchincruive
Auchincruive Estate
Ayr, KA6 5HW

Wiltshire College Lackham
Lacock
Chippenham
Wiltshire SN15 2NY

COMMERCIAL MEMBERS

Agricultural Engineers Association (AEA)
Samuelson House,
62 Forder Way,
Hampton,
Peterborough, PE7 8JB

AGCO Ltd
Stoneleigh,
Abbey Park,
Kenilworth,
Warwickshire, CV8 2TQ

Alvan Blanch Development Co,
Chelworth,
Malmesbury,
Wiltshire SN16 9SG

Autoguide Equipment Ltd
Stockley Road
Heddington
Calne,
Wiltshire, SN11 0PS

BAGMA
Middleton House,
2 Main Road,
Middleton Cheney,
Banbury,
Oxon, OX17 2TN

Bomford Turner Limited
Salford Priors
Evesham,
Worcestershire WR11 5SW

City & Guilds
1 Giltspur Street
London EC1A 9DD

City Farm Systems Ltd
Paragon Studios, East Burnham Park
Crwone Lane, Farnham Royal
SL2 3SF

David Ritchie (Implements) Ltd
Carseview Road, Suttieside,
Forfar, Angus, DD8 3EE

Douglas Bomford Trust
The Bullock Building
University Way, Cranfield
Bedford, MK43 0GH

FEC Services
Stoneleigh Park
Kenilworth
Warwickshire CV8 2LS

Fullwood
Grange Road
Ellesmere
Cheshire SY12 9DF

Huntaway Consulting
Ivy Cottage
Torlundy
Fort William
Inverness-shire PH33 6SW

John Deere Ltd
Harby Road
Langar
Nottinghamshire NG13 9HT

Mastenbroek Limited
83 Swineshead Road
Boston, Lincs, PE21 7JG

Shelbourne Reynolds
Shepherds Grove Ind. Est.
Stanton
Bury St Edmunds
Suffolk, IP31 2AR

SSAB Swedish Steel Ltd
Narrowboat Way
Hurst Business Park
Brierley Hill
West Midlands DY5 1UF

TeeJet London Ltd
Headley House,
Headley Road,
Hindhead,
Surrey, GU26 6UK

FORTHCOMING EVENTS

14-16 June 2016
Field Robot Event 2016
Venue: Gut Mariaburghausen in Haßfurt, Germany
The Field Robot Event 2016 will have a new and improved set of tasks. Some tasks will remain similar to previous years, but we have come up with some exciting new ones for you. For all details of the event/tasks/sponsorship opportunities please visit their website
Web: www.fieldrobot.com/event/

21 & 22 June 2016
N8 Universities
N8 AgriFood Launch 2016: One Network, Many Solutions
Speaker: Various
Venue: University of Manchester, University Place
A unique opportunity to explore new projects and solutions to the major food security, agritech and consumer health issues across the supply chain. Keynote presentations, collaborative workshops, drinks reception at the Manchester Museum and optional dinner in the neo gothic Whitworth Hall.
Free event (optional dinner which is not free). To book follow the link below or download more details.
Web: n8agrifood.ac.uk/events/n8-agrifood-launch-2016-one-network-many-solutions/

25-30 June 2016
EurAgEng
CIGR AgEng Conference 2016
Speaker: Various
Venue: Aarhus, Denmark
Full details and registration etc may be found on the website below
Please contact Dave Tinker, Secretary General EurAgEng for additional information
Email: tinkerd@iagre.biz
Web: http://conferences.au.dk/cigr-2016/

Thursday 30 June 2016
Groundswell Ag
The No-Till Show & Conference
Venue: Lannock Manor, Weston, Hitchin, Herts SG4 7EE
Speaker sessions and demonstrations will be throughout the day from 9.30am until 5.30pm.
Ticket numbers are limited and available on a first come, first serve basis
Web: www.groundswellag.com/tickets/thenotillshow

Wednesday 6 July, 5.30pm
Western Branch
Visit to Woodlands Farm Ltd
Venue: Woodlands Farm, GL54 4NT, Chedworth just off the A429 Fosse Way between Cirencester and Northleach
To view the yogurt making facilities at the Woodlands farm and hear how they add value to their milk in the marketplace. Meet at the Farm Shop at 5.30pm. Please let Mike Whiting, Branch Secretary know if you plan to attend
Tel: 07751 315580
Email: mike.whiting@newmac.org.uk
Web: www.woodlandsfarmltd.co.uk/

Tuesday 12 July - Friday 15 July
12th European IFSA Symposium
The theme of the Symposium will be: Social and technological transformation of farming systems: Diverging and converging pathways
Full details and how to book may be found via the website listed below
Web: www.harper-adams.ac.uk/events/ifsa-conference

Thursday 14 July 2016
Harper Adams University/IFSA
Robots in Farming: Good or Bad?
Speaker: Keynote: Professor Simon Blackmore
Venue: Harper Adams University
This IFSA workshop will consider social and environmental risks of RAS in major farming systems and the morning session will give delegates an opportunity to learn about some of the current and possible future developments in RAS for farming. In the afternoon session there will be a chance to hear about the relevant risk governance issues in other recent technology advances, and to contribute to discussion of the wider impacts and risks of RAS in different farming systems.
Part of the 12th European IFSA Symposium 2016
More info and Registration via the links below
Web: www.harper.ac.uk/ifsa4robots
Web2: www.harper-adams.ac.uk/events/ifsa-conference

24 - 28 July 2016
Association of Lecturers in Agricultural Machinery (ALAM)
ALAM Conference Study Week
Venue: Yorkshire
Based in Yorkshire there will be a full programme of visits to colleges, manufacturers and farms.
Members £230.00, Non Members £245.00. For more information and to reserve your place please contact John Gough details below.
Tel: 01630 685942
Email: gough.j@btinternet.com

Thursday 8 September 2016
IAgrE Forestry Engineering Group
FEG Symposium 2016
Venue: Newton Rigg College, Penrith CA11 0AH
Dates from Newton Rigg have been confirmed and we will be holding this year's FEG Symposium on Thursday 8th September starting at 0930hrs registration from 0900hrs.
Cost to be set at £100 plus VAT £120.
Student £25 plus VAT £30
Our main focus this year will be the hot topic of Flooding, and looking at how Forestry and Engineering can contribute to reducing impacts downstream. Summing up for us at the end of the day will be Alastair Taylor CEO IAgrE
Booking details to follow shortly.
Further info: 0131 464 0500
Email: bruce.hamilton@forestry.gsi.gov.uk

Tuesday 11 October 7pm
East Midlands
"Engineering Solutions for Trenching" visit to Mastenbroek Ltd
Venue: Mastenbroek Ltd, 83 Swineshead Rd, Wyberton Fen, Boston, Lincs PE21 7JG
The meeting consists of a talk entitled "Engineering Solutions for Trenching", followed by a tour of the works. This is one occasion where the start time is 7.00pm sharp, and numbers have been limited, so please let me know if you plan to attend. First come....first served
Book your place with Richard Trevarthen.
Tel: 01509 215109
Email: richard.trevarthen@gmail.com

24 & 25 October 2016
South Bank Consulting
CropWorld Global 2016
Venue: Amsterdam RAI, Netherlands
Includes Exhibition, Congress & 4 Briefings across 2 days
Web: http://www.cropworld.com/

Wednesday 16 November 2016
IAgrE Secretariat
IAgrE Conference 2016 - AgEng Innovation - Concept to Cash
Speaker: Various
Venue: Harper Adams University
This conference seeks to equip you with the information and knowledge you need to answer these questions. As well as hearing from experts in research and development, copyrighting, intellectual property, and patents; established and respected technologists who have dealt with these issues will tell you how they managed the challenge and give insight to the various questions you need to consider.
For full details see our Conference page web address below.
Tel: 01234 750876
Email: secretary@iagre.org
Web: iagre.org/resources/conference2016

UP TO DATE INFORMATION ON FORTHCOMING EVENTS CAN BE FOUND AT WWW.IAGRE.ORG/EVENTS

2016 FEG SYMPOSIUM
ENGINEERING TO STEM THE FLOW

Thursday 8th September 2016

Newton Rigg Campus, Penrith CA11 0AH

9.30am – 4.00pm

In response to the recent dramatic change in rain-fall intensity this year's FEG Symposium will focus on a subject that is urgent, not only for the Land-based industries, but for the community as a whole. To ensure that all aspects of the recent problems can be authoritatively covered, a range of expert speakers has been selected so that a base-line of knowledge on the flooding problem can be established.

Rory Stewart MP

SPEAKER PROGRAMME

Rory Stewart MP - Parliamentary Under Secretary of State for Environment and Rural Affairs has agreed to open the Symposium by giving an overview of the Ministerial Approach to address the problem.

Since two major and untypical storms have been experienced recently in Europe mitigation measures have already been tried and tested in France. To take advantage of this experience **Morgan Vuillermoz** from the **Forêt, Bois, Construction et Ameublement** will give an overview of the organisational and operational aspects of the procedures put in place.

Tom Nisbet from **Forest Research** will report on a project that implemented changes in land use and management interventions in the catchments area to reduce the flood risk. His presentation will give details of the scheme and, now that there has been time to evaluate how well it has been performing, he will also comment on its effectiveness.

Alan Eves the **Forestry Commission's** FDM in Yorkshire will explain how his approach to Flood mitigation that required the cooperation of a number of agencies. Alan's presentation will cover his experiences working in co-operation with the Public Forest Estate using timber debris dams, planting and natural land management strategies.

Since Flooding is not the only impact of intense rainfall, **Jock McKie** of **John Deere Forestry** will outline the adaptations that machine manufacturers are incorporating in their harvesting equipment to improve wet-ground working. A machine will be onsite so that the latest features can be examined

Andrew Black from **Dundee University** will outline how historical changes in land use and forestry practices have impacted on downstream flooding in Scotland.

Heather Forbes from **SEPA** will spotlight forestry's role within flood management and explain how Climate change, population growth, economics, and environmental issues all necessitate a move towards a more integrated, catchment based approach to the management of land and water as explained in the SEPA NFM Handbook released in 2015.

Hugh Chalmers, from the **Tweed Forum** will focus on the work of the Eddleston Water Project in the Scottish Borders. The project has been set up to measure the effectiveness of natural flood management methods to improve water body status. This involved working with private forestry companies on restructured coupes in upland forest blocks.

Conor Price from **Scottish Borders Council** will report on a case study of the delivery of the Selkirk Flood Protection Scheme. This is a multi-faceted approach to Flood Relief Management. It will focus on how the St. Mary's Loch and other Natural Flood Management schemes have helped in protecting the town of Selkirk from floods similar to the 2003 event.

The Cost including lunch and coffee etc. will be £120.00. Student and Retired Members Rate is £30 all rates shown are VAT inclusive. For bookings and further information contact - bruce.hamilton@forestry.gsi.gov.uk

The Institute of Chartered Foresters (ICF) and the UK Forest Products Association (UKFPA) are lending support to the symposium. They have endorsed the event and are promoting it to their members 6 CPD hours will be awarded.

IAgrE Landwards Conference 2016

Ag-Eng Innovation: Concepts to Cash

Wednesday 16 November 2016 **Harper Adams University**

Turning ideas into profit: The Engineers Survival Guide

Business start-ups, new partnerships, re-engineering of existing applications all provide new challenges including:

- **Intellectual Property:** Retaining and protecting your ideas
- **Collaboration:** Working with others whilst retaining intellectual property
- **Funding:** Business challenges and accessible funding

Experts in research and development, copyright, intellectual property, patents and established technologists will provide an insight into these and other issues

Dr Robert Merrall,
IAgrE President
& Conference Convenor

It has never been so exciting to be an Agricultural Engineer

"The government's Agri-tech strategy and new Agri-EPI Innovation Centre has put the spotlight on engineering and technological solutions. But developing novel approaches and fresh technologies creates new challenges. The conference will address many of these key issues"

BOOKING DETAILS

When: Wednesday 16 November 2016

Where: Harper Adams University College, Newport, Shropshire

Cost:

Standard delegate:	£120 + VAT
Early Bird delegate:	£100 + VAT
Retired delegate:	£75 + VAT
Student delegate:	£20 + VAT

Booking and information:
Tel: 01234 750876
www.iagre/resources/conference2016